

The symptoms continued to grow worse until seven o'clock (*vespere*), when she expired, having lived about twenty-seven hours after the operation.

Body examined twenty hours after death, by Mr Dunn and Mr Gaskell, in the presence of Dr Radford, Mr Gooldeen, Mr Piggott, and Mr H. Winterbottom.

General tumefaction of the abdomen; its parietes being extremely thin. The edges of the external wound were nearly altogether adherent; adhesion of the peritoneal surfaces of the intestines and that of the abdominal parietes. On breaking through these adhesions, about a pint of bloody serum was discharged. The convolutions of the bowels were firmly united, and effused lymph was seen on their surfaces. The colon adhered to the uterus. We were particularly struck by the very remarkable paleness of the tissue of the intestines when compared with their highly injected vascular state seen during the operation. The uterus stood obliquely; the wound in this organ was three and a half inches long; its edges were flabby and gaping; the os was very patulous, and its lips ragged and gangrenous. The lower portion of the cervix was very soft and dark coloured. The internal surface of the uterus was softer and darker in colour than usual. The gall bladder large and full; spleen healthy; the left kidney externally natural, its pelvis large, and it contained a creamy coloured fluid; right kidney smaller than usual and contained a similar fluid; the legs very oedematous. Pelvis removed, found an excessive quantity of fat about the pelvis and back.

Pelvis —Brim tripartite in shape.

From upper edge of the 5th lumbar vertebra to the inner surface of the symphysis pubis two six-eighth inches.

From side of the said vertebra to the ilium behind the acetabulum on the left side five-eighth of an inch.

From side of the said vertebra to the ilium behind the acetabulum on the right side one one-eighth inch.

From the inner surface of the pubes anteriorly, to the acetabulum on the right side three seven-eighth inches.

From the inner surface of the pubes anteriorly, to the acetabulum on the left side, three and a-half inches.

Cross measure of the widest portion of the anterior slit five-eighth of an inch.

Cross measure at the point of anterior slit two-eighth of an inch.

Outlet.—From the point of the coccyx to the lower edge of the symphysis pubes two five-eighth inches.

From the widest part of the anterior slit to the coccyx one and two-eighth of an inch.

Depth of the anterior slit two inches.

Between the anterior edges of the *tubera ischii* and six-eighth of an inch.

Between the posterior edges of the *tubera ischii* two and a-half inches.

From the right spine of ischium to the coccyx six-eighth of an inch.

From the left spine of ischium to the coccyx five-eighth of an inch.

Depth of the fore part of the pelvis three five-eighth inches,

„ lateral part of the pelvis three six-eighth „

„ posterior part of pelvis three „

Distance externally between the bottoms of the acetabula one seven-eighth of an inch.

Distance internal measurement one three-eighth of an inch.

Distance between the superior spinous process of the ilia seven and a-half inches.

Distance between the inferior spinous process of the ilia, four seven-eighth inches.

Distance between the centre of the crests of the ilia, ten inches.

Distance from the upper edge of the 4th lumbar vertebra to the inferior spinous process of right ilium, one six-eighth of an inch.

Distance from the upper edge of 4th lumbar vertebra to the inferior spinous process of right ilium, two six-eighths of an inch.

Remarks.—*Mollities ossium*, under which this woman suffered, usually commences during pregnancy, but in her case it most likely begun at the time she first complained of pains in the back and hips. The disease most probably made little progress until her second pregnancy, when no doubt it was much aggravated, but its ravages on the pelvic bones were chiefly made during her last gestation. Some of her relations had suffered from rheumatism, and it was said that she had laboured under the same complaint; but for anything I know to the contrary, they (her relations) might have had the disease now under consideration. The predisposition then (most likely hereditary,) remained comparatively undisturbed, until roused into activity by those changes which are produced on the vascular and absorbent system by impregnation. Her occupation as a weaver no doubt greatly contributed to increase the degree of pelvic distortion. The projection of the promontory of the sacrum and lumbar vertebræ mechanically impeded the passage of the fæces into the rectum, which in such cases is always an additional cause of constipation, and which almost invariably occurs, to a greater or less degree, in ordinary pregnancies.

The enema apparatus should have a long flexible tube, (like that which is passed into the stomach to throw fluids into it,) so that its point can be carried beyond the altered pelvic brim. An ordinary female catheter is too short to answer its purpose in cases of this sort; it should be equal in length to that of the male. By the deflected state of the uterus, the bladder is forced forwards and downwards, whereby its cervix is lengthened and compressed upon the pubes. This altered position of the bladder requires a different method to pass the instrument. The point being introduced into the meatus, (which lies in the upper part of the anterior pelvic slit, and a little behind the lower part of the *symphysis pubes*,) the hand part must then be depressed and carried backwards towards the extremity of the coccyx, and the instrument must afterwards be cautiously moved on into the bladder.

The stethoscope affords us information of two kinds,—positive and negative; in its application here we only derived the latter kind. The pulsations of the infant's heart could not be heard, and from the absence of its sound, coupled with the odour of the vaginal discharge, we concluded it was dead. The functions of the placenta had long ceased, and therefore no *soufflet placentaire* was audible, so as to point out to us the location of this organ. If it had been otherwise, I might, and indeed ought, as far as possible, to have made the incision into the uterus, so as to avoid cutting on and into the placenta. The importance of such a procedure I had stated, before the operation, to Mr Dunn, and requested that he would, as expeditiously as possible, extract the infant, and at the same time pass one hand to guard its neck from spasmodic seizure by the uterus, if perchance I should unfortunately cut upon the placenta. I have elsewhere (*Edin. Med. and Surg. Journ.*, Vol. 60, p. 67,) ventured to state this, (the incision and consequent partial separation of the placenta,) as the cause of this irregular contraction of the uterus. If the child had been alive, most likely such a grasp would have destroyed it before it could have been extricated.

It is to be lamented that the existence of labour had not been earlier known, as perhaps a different termination would have taken place. To wait for the changes which usually occur in the *os uteri*, during the first stage of normal labour, is a great mistake in those cases in which there

exists extreme pelvic distortion. This part of the uterus is not often to be felt, and when it is accessible, it is found a little open, its full dilatation having been prevented by the vicious conformation of the brim of the pelvis. The evil arising from this prostration ought to be a beacon to us in future, and guard us against vainly waiting for such a change. The highly inflamed state of the bowels which existed before the operation, and their pathological condition after death, together with that of the *os* and *cervix uteri*, &c., afford indisputable evidence of the mischief which had been inflicted during her protracted labour.

The term protraction should be relatively considered; a woman (as in this case) in a bad state of health cannot safely endure the same degree of pain, or for the same length of time as one who is well; nor will the *os* and *cervix uteri* bear pressure very long, without structural injury.

Surely there is here sufficient proof of the necessity of the *Cæsarean section*, for neither the presentation of the infant nor the *os uteri* could be touched. Independently of these circumstances I am bold to assert, the delivery could not have been performed by the perforator and crotchet, even if assisted by the marvellous power of the osteotomist, provided the implements were used by the most experienced and celebrated anti-*Cæsarean*ists. No practitioner, then, however warped his opinions are, will presume to attribute the death of this patient to the operation; but on the contrary, will place the case in the catalogue (already too great) of those in which death has happened in consequence of having too long deferred its performance.

2d Case of Cæsarean Section. By THOMAS RADFORD, M.D., F.R.C.P., Edinburgh, &c., &c., &c.—(*Successful.*)

This case has been twice more or less placed before the profession; once partially cited in the London Medical Gazette, vol. 36, page 1506; and afterwards in the first volume, with some inaccuracies in date, of the British Record. The following is understood to the authentic and correct report of the case as given by the author.

At half-past one o'clock A.M., Thursday, November 20th, 1845, I visited Mrs Sankey, Bedford Street, Salford, who was then in labour. I met Mr John Goodman, from whom I learnt that the case was one of extreme distortion of the pelvis, &c. She first felt slight pains about eleven o'clock on Wednesday morning. Sometimes they were stronger, and continued to vary in severity until about three hours before my arrival, during which time they were uniformly stronger. The membranes ruptured some time in the afternoon, and there was a slight dribbling discharge at intervals up to the time of my first visit. The tongue was clean and moist; her countenance was calm and composed; her bowels had been freely evacuated; and she had regularly passed her urine. She was free from sickness and vomiting. Pulse 84 at first, but temporarily rose to 100.

Placing my hand on the abdomen I found the uterus of a spheroidal shape, but less so than I had observed in former cases; it felt firm and free from pain when I pressed upon it. The relative position of this organ was now much altered; it hung over, and rested on the pubes, and the fundus projected so much forwards as actually to form its anterior surface. Connected with, and in reference to the axis of the vagina, it presented the retort form. By a vaginal examination, I found the outlet of the pelvis considerably diminished by the close approximation of the rami of the ischia and pubes, which, jutting forwards, had nearly destroyed the arch, leaving in its place only a narrow slit, which would barely admit the point of the finger. The tubera of the ischia were so near as scarcely allowed two fingers to lie in the transverse diameter; the antero-posterior diameter was also much shortened by the great incurvation of the coccyx and lower portion of the sacrum. The cavity was diminished by the several bones

which unite in each acetabulum being forced inwards, backwards, and upwards. It was difficult to measure the brim; its figure was tripartite. This alteration in shape was produced by the falling down of the pronon-tory of the sacrum and lumbar vertebræ, and by the ischia and pubes being pushed backwards and inwards, and the jutting forwards of the symphysis and rami of the pubes. The antero-posterior diameter was not more than one inch and a half at its widest part on the right side, and in some parts not an inch. The anterior lobe of the opening was not more than would admit the finger edgewise. The vagina was moist, and had only its natural temperature; it was free from swelling. Neither the *os uteri* nor the presentation of the infant could be felt.

On returning to Mr Goodman, I agreed with him that the Cæsarean section was the only means by which delivery could be performed. I suggested the propriety of having the stethoscope applied to notify whether the infant was alive as the mother affirmed, and also to ascertain the location of the placenta. At this stage I also requested that Mr Winterbottom, surgeon, should be invited; a messenger (Mr S.) was dispatched for Mr Winterbottom, who was desired to bring with him a stethoscope. I now remarked on the danger of cutting into and partially separating the placenta during the operation. Auscultation indicated that this organ was attached to the anterior and right lateral portion of the uterus, and corroborated statements made by the patient that the infant was alive. I now raised the *fundus uteri*; and Mr Goodman made an incision from seven to eight inches long, a little to the left of the umbilicus, and divided the integuments, which were extremely thin. A corresponding opening was then made through the uterine tissue, which was about a quarter or one-third of an inch in thickness, just bordering on the edge of the placenta. I now passed my hand and seized one leg of the infant and extracted it, and when it passed to the head, Mr Goodman assisted its escape through the wound, and afterwards expeditiously extracted the placenta entire. The infant, a girl, was alive. There was very little blood indeed lost, and the uterus contracted and lowered itself to its resting place. The intestines and omentum protruded during the operation, but were then restrained and afterwards replaced and retained in their natural position during the time the ligatures were introduced. I swept my finger round the boundary of the uterus and through the wound into its cavity, to ascertain if any portion of the viscera had got into it. The *interrupted suture* was used, and the thin integuments further brought together by straps of adhesive plaster, and over all a bandage just tight enough to give support was applied. There was a calmness and resignation of mind throughout the entire operation which indicated an enduring Christian spirit; no complaint was made, nor murmur heard, and she expressed herself as happily relieved.

The pulse now beat 92. She had a little gulping; the skin felt warm. To have Tinct. Opii, dr. iss. in about one to two hours; pulse 94; slight retching, and a very trifling oozing of blood was seen on the bandage; her lips were naturally red; respiration 26; fresh bandage and a compress applied.

Quarter-past nine o'clock A.M. Tongue clean; countenance natural; respiration 24; about two to three ounces of blood lost. A negative plan recommended. Mist. Acaciæ, oz. iss. ter in die.

Eight o'clock *vespere*.—Pulse reduced from 100 to 90; countenance good; had complained of tightness of the bandage; the belly a little tumefied, but not tender; there is no bleeding. To take Ext. Hyocym., gr. x.

November 21st.—Ten o'clock A.M.—Had vomited a sour fluid during the night. Pulse 86. Countenance natural; tongue clean and smoth; skin cool; lochial discharge natural; bowels not moved. Had passed her urine. Ordered an enema as follow:—Spt. Terebinth., oz. ij.; Ol. Ricini, oz. j.; Vitelli. Or. et Dec. Hord. q. s.

Half-past one o'clock P.M.—Tongue clean; she has vomited a dark coloured thick and sour fluid, which in appearance looks like *fæces*. Enema has not operated; ordered it to be repeated, and to take barley-water.

Nine o'clock, *vespere*.—Has had no stool; vomiting continues; belly tympanitic. The compress being removed, the site of the lower portion of the abdominal wound was tumid; and on raising the plaster, the wound itself was seen gaping, and a fold or convulsion of intestine had protruded through between (in the interstice of) the two ligatures. The bandage and plasters were now entirely removed. An attempt was made to reduce the bowel, and the edges of the wound well adapted, and fresh straps of plaster and a three-tailed bandage applied.

Ordered, at her request, *Ol. Ricini*, oz. ss.; to be repeated if necessary.

22d.—Nine o'clock A.M.—Had some sleep. Pulse 100. Had vomited the oil, and also some of the same fluid. Tongue clean; bowels less swelled, but slightly sore; there is a considerable bloody serous discharge from the wound; has passed urine; lochial discharge; has had no stool.

To take calomel, gr. v.; a quantity of gruel to be thrown up by the syringe, with the oesophagus tube passed high up towards the sigmoid flexure of the colon.

Seven o'clock, *vespere*.—Has slept several times; pulse 90 to 95; feels better; skin cool; vomiting ceased; belly less swelled and easy; and another enema had been administered, but it procured no stool.

She was ordered to take immediately five grains of calomel, with five grains of white sugar; and every third hour a table spoonfull of a mixture, consisting of six drachms of sulphate of magnesia, two drachms of calcined magnesia, and one drachm of compound tincture of cardamom in three ounces of cinnamon water.

23d.—Ten o'clock A.M.—She had slept; pulse 90; tongue clean; had vomited only once a light-coloured fluid; bowels opened four times; skin warm and perspiring; very slight abdominal uneasiness.

Five o'clock, *vespere*.—Had visited her before, and found her going on well; a considerable serous discharge from the wound; had not vomited; has had three stools; has passed urine; has had several sleeps.

To continue *Mist. Acac*.

24th.—Ten o'clock A.M.—Pulse 95; tongue clean, but redder in the centre; has very little abdominal pain on pressure; bowels purged two or three times; has passed urine; she says she feels weak.

Continue to take beef-tea.

Half-past seven o'clock, *vespere*.—Pulse 100; tongue clean, but sore; belly less tumefied, and bears pressure; a considerable bloody serous discharge from the wound; had been twice purged, and attended with gripping pain.

To continue the medicine, and to take half an ounce of the following mixture if the diarrhoea continues:—One drachm of chalk, one ounce and a-half of gum arabic mixture, one ounce of distilled water, one drachm of laudanum; and at the hour of rest to take one pill, consisting of half a grain of opium, and some aromatic confection.

25th.—Ten o'clock A.M.—Pulse 94; tongue clean; had slept; lochial discharge natural; had passed urine; bowels not again moved; gentle perspirations; belly easy. Cont. Ordered chicken broth.

Half-past four o'clock P.M.—Pulse 95; symptoms all favourable; has a cough. Taken freely of chicken broth and beef-tea.

To have at hour of rest ten grains of extract of hyoscyamus. To take for the cough when troublesome, one tea-spoonful of the following:—*Mucilage* two ounces, compound tincture of camphor three drachms, syrup of poppies half an ounce.

26th.—Ten o'clock A. M.—Pulse 94; tongue clean; skin a little hotter; bowels unmoved and tympanitic; had passed urine; her countenance a little more anxious. The bandage and plasters were removed. The ligatures were detached from their hold; the integuments expanded to such a degree as to present a large surface of the bowels, which were uniformly covered with lymph. The incised edges were firmly agglutinated to the contiguous parts. Attempts were made to bring the integumental edges nearer together, and the bowels were gently pushed back, and broad straps of adhesive plaster were tightly applied, and a six-tailed bandage, so as to afford firm and equal support.

Sulphate of magnesia, six drachms; calcined magnesia, two drachms in six ounces of water. One ounce every third hour. To have, if requisite, an enema with two ounces of oil of turpentine and two drachms of tincture of assafœtida in five ounces and a-half of water.

Six o'clock, *vespere*.—Pulse 120; skin hotter; has great depression; tongue dry; countenance anxious; bowels unmoved; complains of pain in the belly; has passed water. Ordered the enema to be immediately thrown up. She has just vomited. Cont. An anodyne to be prescribed.

27th. Took one-sixth of a grain of acetate of morphia. Four motions. Slept well. Pulse 60 to 66.

28th.—Pulse 69; has slept well; has had two motions; a considerable discharge from the wound; all the other symptoms better except the cough, which is rather more troublesome. Continue medicine and diet, and isinglass.

29th.—Pulse 84 to 90; slept well; bowels twice naturally moved; all the symptoms more favourable; a considerable discharge on the bandage. Upon removing the bandage and dressings, the wound presented a healthy granulating surface, and was covered with pure pus. There was a small slough at the lower edge. The integuments below, in the bend of the thigh, were irritated and excoriated by the discharge. Continue diet and medicine.

30th.—Pulse 86 to 100; tongue clean and smooth; bowels moved; complains of sore throat, which is red and slightly apthons. Cough very troublesome, and, from its force, produces a sensation of forcing some part through the wound, and, on examination, a portion of bowel was found protruded. The lower part of the bandage and dressing being now removed, it was seen to be not so well; the granulations were paler; the discharge from the left was blackish from the slough. Fresh pledget of lint and plaster applied. Continue the same medicine and diet, and also to have eggs and the following mixture.

Borax, three drachms; syrup of poppies, half an ounce; mucilage, two ounces and a-half. A little occasionally. To take at hour of rest one pill containing one-fourth of a grain of acetate of morphia, and repeat it if necessary.

December 1st.—Pulse 100; all other general symptoms better. A considerable discharge from the sore, which was dark coloured and offensive; a protrusion of the granulated portion of the sore through the dressings, which were now removed. The aspect of the sore pale, its left edge was sloughy in places. The dressings were changed for pledgets of lint with cerate, over which double folds of lint were placed, and a six tailed bandage to support as far as possible. Our object was to form a barrier to further protrusion, as from the intimate adhesions which now existed amongst the convolutions of the bowels themselves, and between them and the integument, it would be mischievous to attempt to do more than to defend and barely support these parts. On the right side, the old and

new surface presented one plane. To take a generous diet and porter, and also the anodyne pill.

December 2d.—All the general symptoms favourable; had first refused to take porter, but afterwards did so; wound looks better; granulation redder; pus laudable; cicatrization on the left side proceeding; sloughy appearance on the right side much better. Continue diet, porter, and night pill. At the evening visit she reported she had taken beefsteak and porter at dinner, and we found her eating the leg of a fowl, and again drinking porter. Cautions given not to get into excess.

3d.—Mr Goodman, at a later visit last night, found her pulse considerably more frequent. She complained of the wound. On examination he discovered that a large loop of intestine had protruded on the left side, which he unsuccessfully attempted to reduce. He placed a pledget of lint with cerate over it. This morning the pulse 120; bowels not moved; she had vomited some undigested animal food. The body linen was very wet by discharge, which had a pungent disagreeable smell. The dressings adhered so firmly that they were with difficulty removed. A loop of intestine, of a horseshoe shape, covered with lymph, was fixed by adhesion; it was very much distended. Cautious but unsuccessful attempts were made to reduce it. I suggested the propriety to pierce it with a needle; a sharp-pointed bistoury was however used, but nothing but a little blood escaped. Another unsuccessful attempt was made to reduce it. Broad slips of plaster and a bandage applied. An enema, with oil, &c., to be thrown up with the syringe and œsophagus tube. To discontinue the porter and animal food; to take chicken broth. Ordered some coriander or mustard seed to be taken, and the anodyne pills.

4th.—Bowels freely moved several times, but the seeds were not seen. All the symptoms better. Continue.

5th.—Bowels three times moved, and in the last motion the coriander seeds were seen: every other general symptom favourable. The wound healthy. The union on the right side complete, and the cicatrization proceeding. On the left side, the loop still lay prominent, and the edges of the sore were everted, and in an unfavourable position for this reparative process. Continue diet and anodyne pills.

6th.—Pulse 95; bowels unmoved, slept well; wound looking healthy, lessening in diameter, cicatrization rapidly proceeding; the surface over the protruded intestinal loop granulating; this portion of bowel immovably fixed down. Continue medicine; to have an enema and her anodyne pill.

7th.—Pulse 90; bowels twice very freely moved, and in one motion some coriander seeds were found; a profuse irritating discharge through the dressing. On exposing the parts, an opening was found at the lower end of the protruded bowel, through which fæces had passed, and were now escaping; the enema had not been given, but it was now directed to be administered. To continue to take the anodyne.

8th.—Pulse 90; slept well; bowels once opened by the enema; the size of the wound is considerably diminished, and its surface looks healthy; fæces in great abundance were discharged through the intestinal opening; to continue the same plan. Ordered an enema and anodyne pills.

9th.—Pulse 84; bowels opened by enema. The wound is diminished in size, and looks healthy; the fæces are largely discharged through the opening in the bowel. To try to eat some calves' foot. To continue to have an enema and the anodyne.

10th.—Pulse 80 to 84; the wound considerably lessened, and its entire surface looks well; the apparent size of the protruded bowel is greatly diminished, and it is covered with healthy granulations; its horseshoe character is nearly lost; great quantity of feculent matter comes through the

opening; portion of undigested calves' foot was observed in the discharge ordered a little wine. Continue diet. To have an enema and pill.

11th.—Pulse 74; wound lessened and looks well; bowels moved by enema; fæces in great abundance from the opening. To continue wine, &c.

12th.—Pulse 72; had two stools, which were too light in colour; this perhaps depends on the escape of the biliary fluid too soon, as the fæcal discharge by the opening has been all along very deeply tinged, and is still in great quantity; the sore is now considerably lessened, it does not measure more than four inches in length, and two to two and half in breadth; the protruded intestine so far retired as not to be seen, except when the integument is drawn aside; the integumental edges of the sore can now be approximated. To continue the wine, &c.; to have an enema, and to take the pill.

13th.—Pulse 74; right edge of the wound was more inverted, which had been produced by approximating the two sides; bowels slightly moved; considerable fæcal discharge from the wound, and in it some coriander seeds were seen which had been taken early in the day; the wound dressed in its longitudinal direction. Continue the wine, &c.; to have an enema; to take the pills.

14th.—Pulse 72; has had no motion; granulations paler; the discharge of fæcal matter great through the wound; a sponge compress was applied over the opening, which was to be removed at intervals; it was, however, permanently discontinued in the evening. Continue wine; to have jelly, blancmange, isinglass, and to be allowed a partridge.

15th.—Pulse 76; small hard fragment of stool brought away with the enema; countenance more dejected; complains this morning of a load at the stomach, which in the course of the day ended in vomiting of a quantity of undigested animal food; the fæcal discharge great from the wound. As the granulations were exuberant, the sore was dressed with dry lint. Wine increased; continue altera.

16th.—Pulse 74; wound less and looks better; bowels not moved. To only have some broth, with a little of the chicken pounded in it. Continue medicine. To have an enema.

20th.—No particular change in the aspect of the case up to this date. Pulse now 74. The fæces still largely discharged from the intestinal opening. The protruded portion of bowel very red from the everted mucous membrane. Mr G. passed his little finger, and carried this part in. A compress was applied and supported by plaster.

31st.—During this interval the pulse nearly uniformly 72. Bowels some days spontaneously moved once or twice; but nevertheless an énéma was daily administered. All the general symptoms continue to improve, and the excoriations produced by the discharge were attended to by washing, &c. The everted mucous membrane of the bowel which appeared through the opening had at first rather increased, but now was considerably less. Compresses or pads were applied, &c. The discharge of fæcal matter through the opening has gradually lessened.

January 10th, 1846.—As in the last report, the pulse had uniformly continued steady. The bowels were sometimes moved more than once a day; the enemas were regularly administered; the everted state of the mucous membrane of the bowel varied in degree and in colour. Her spirits were very low on the 4th, in consequence of the very great discharge which took place through the opening in the bowel. The treatment consisted of small pads placed immediately over the aperture, being supported by small slips of adhesive plaster, and then upon the integuments, and over the other a larger pad, &c., fixed by broad straps and bandage.

17th.—Since the last report, the pulse continued natural, and she slept well, and her appetite was good. The bowels were naturally opened once

or twice a-day, and therefore the enema had been discontinued until the 14th ult., when the bowels were only partially moved, and as the *belle* had become more tumid, they were again used; the discharge from the intestinal opening was at first less solid and more serous, but afterwards it became again more feculent; compresses of different kinds were applied, and one suggested by me, made of layers of caoutchouc, was used, but did not succeed; on this day the fecal discharge was much greater, which I accounted for by the opening, which was about the size of a fourpenny piece, having changed its relative position with the integuments. I recommended that a conical piece of sponge should be placed with its point inwards, and be supported by plaster and bandage. Mr Goodman feared that it would be injurious to use the sponge, as it might dilate the opening and induce ulceration; my reply was that I did not fear the first effect, and if the second happened, it would only be limited in degree, and advantageous. I thought at this time the edges of the wound were in a favourable position to be pared, and a ligature used to bring them into apposition.

22d.—Pulse kept natural, and the bowels were daily moved twice; the sponge had become a little swelled, and the edges of the opening bled a little; it was re-applied on the 20th; the bandage was very wet, and was attended by a disagreeable ammoniacal smell, which no doubt arose from the decomposition of the discharged fluid which had taken place in consequence of the parts not having been dressed the day before, and the surrounding integuments were considerably irritated and excoriated; at my desire, a simple dressing with lint and cerate was adopted, and a very loose bandage applied. The patient had sat up, but the horizontal position was advised. On this day (22d.) the eversion of the mucous membrane was greater, and the opening had slightly increased; a piece of sponge was recommended by me, but a compress of lint was applied at Mr Goodman's desire.

January 23d.—Pulse good; bowels twice moved; the integumental excoriation rather extended; the intestinal opening is a little larger. Mr Goodman proposed touching its edges with argent. nitr., but I considered that the surface would heal underneath before the eschar separated, and suggested the *potassa fusa*. Mr G. thought it would be difficult to limit its application, although my opinion was that its action might be controlled, I recommended instead of it the edges of the opening to be pared off, which Mr G. did by a lancet and bistoury. This operation was not so effectually done, in consequence of the tender and fragile state of the part. The edges were approximated and supported by slips of adhesive plaster. The integuments being drawn together formed a covering and compress to the aperture.

31st.—During this interval the pulse was natural, and the bowels some days moved spontaneously, and always responded to the use of an enema. The intestinal opening remained much the same, and the discharge from it, although not equal in amount every day, was yet sometimes very great. Various methods were tried to control it. Pitch plasters in different ways, and compresses, were used, at the suggestion of Mr Goodman, but they invariably failed to do good, on the contrary mischief was done by them. At my request pads made from caoutchouc, of different sizes, and placed differently, were employed, but equally unsuccessfully. I recommended broad straps of plaster from the Infirmary to be tried, which also failed, as considerable irritation and excoriation had been produced by the pitch plaster; indeed the pain and inconvenience sustained by the patient was such, that she not only requested a discontinuance, but strongly protested against its use. My opinion was unfavourable to their use, as I considered disadvantages from them arose, not only on account of the irritation, &c., arising from the pitch itself, but from the mechanical effects by infecting

the integuments upon each other, and also by impeding, by the great pressure produced, the peristaltic motion of the bowels. On the 30th I saw the patient alone, and thought it would be better to apply a simple dressing.

February 1st to 13th.—It appears that a great discharge issued from the opening after the last dressing, so that the nurse, at the desire of Mrs Sankey, had removed them, and brought the edges together by adhesive plaster. Long straps of plaster were again recommended by Mr Goodman, and very tightly applied, some of which were passed round from one side of the spine to the other. Great integumental irritation and excoriation ensued, and it was, therefore, thought desirable not to bind the parts so tightly. The edges of the opening were touched from time to time with the Argent. Nitrat.

2nd.—I suggested the propriety of having a bandage made of some elastic but firm material, so that the diaphragm and abdominal muscles could move in opposite direction, and without the least impediment, and at the same time feel uniform support.

11th.—Mrs Sankey stated that they had removed the quill, as nothing had passed through it. Mr Goodman had placed the barrel of a quill as a conductor for the faecal discharge, but this it appears did not answer, nor was it likely to do so, as it would be quite impossible to place such a body in a parallel direction with the course of the intestinal tube; and we cannot for a moment suppose that it could act by suction.

12th.—I found that pitch had been used again in dressing the part the day before; the evils were increased by this plan, the surrounding irritation and excoriation were seen to be much greater. Mr Goodman ordered a new bandage, with gussets for the hips, and buckles and straps were attached to it, so that it could be tightened and fixed. This contrivance proved of great advantage to her. She wore it for a considerable time, and Mr Goodman states he had the satisfaction to find a progressive diminution of the faecal discharge which passed through the intestinal aperture.

Remarks.—Mrs Sankey's occupation was merely domestic. She was a slender, delicate, and spare-looking woman. Her complexion was pale, her skin was swarthy, her eyes were gray, and she was of a leuco-phlegmatic constitution. She was naturally of a mild and placid disposition, and her mind was placable, and strongly imbued with sound moral and religious principles, which wonderfully supported her in her severe trial, the intensity of which it is scarcely possible for imagination to conceive. What can be more dreadful than the anxieties of a woman in the pangs of labour without hope of delivery? She bore the operation with great fortitude, and scarcely made a moan, and afterwards endured a tedious recovery with great patience and resignation. Her age was 41 years. This was her seventh pregnancy. Her first four labours were natural and easy. In the first she was delivered of a living girl, and in the other three of boys, all born alive. The fifth labour was natural, but it was rather more tedious than her former ones; the infant (a boy) was born alive. At the end of two years she was again in labour of her sixth child, which was protracted by pelvic distortion, and Mr Goodman, with Mr Slack's assistance, delivered her by means of the perforator and crotchet.

The disease (*mollities ossium*) under which she now suffered no doubt commenced after her fifth labour, which proved a little tedious. It is, however, very probable, that the mischief inflicted on the pelvis was only slight at this period, and during the interval between it and her next pregnancy most likely the disease remained stationary; whilst pregnant of her sixth child it rapidly advanced, and committed great ravages in the pelvis. Her general health suffered, and her strength failed. Her stature became obviously less. Mr Goodman kindly informed me that the thighs somewhat bowed, but afterwards recovered the usual shape. During her labour Mr Goodman found the pelvic diameters shortened, the antero-pos-

terior only measured about two inches. After a consultation with Mr Slack, he delivered her with the perforator and crotchet. It, however, rarely happens, that the disease is so rapid in its progress, and does so much injury to the pelvis as to require these murderous instruments before those which are compatible with the safety of the infant, have been used in a former labour. After her puerperal recovery Mr Goodman judiciously prescribed for her tonics and other appropriate remedies, and recommended her to the seaside for the benefit of bathing. Her health was greatly improved, and perhaps the progress of the *mollities osseum* was temporarily arrested. This disease again returned, and produced effects on the pelvis during her pregnancy which rendered necessary the Cæsarean section for her delivery. Many circumstances existed in this case which favoured its propitious termination. Her calm and tranquil state of mind, and the high degree of moral courage she had, were very advantageous.

An early rupture of the membranes in protracted labours, especially if the pains are strong is always to be deplored, but most fortunately this did not happen here very long before the performance of the operation. The water was not suddenly and completely discharged at once but dribbled away. The pains were also very feeble until a very short time before my visit. The conjoined effects of these were doubtless favourable, and prevented an injurious pressure on the soft parts. The bowels were freely evacuated during her labour.

By the aid of the stethoscope the incision was made in a direction to avoid cutting into the placenta, which is very important. When the placenta is cut upon or into, partial irregular contraction of the uterus happens, and through such an accident the infants may be lost as I have already stated, but besides this, the tissue of the uterus is likely to suffer from the force required to extricate it (the infant) from the spasmodic grasp of this organ. Besides, there may be a greater risk of hæmorrhage when the placenta is prematurely ruptured or separated. The operation was timely performed in this case. There happened several important contingent circumstances which I shall briefly advert to. The abdominal parietes were so much attenuated as only to allow a very slender hold to be taken by sutures, and were quite unequal to resist the pressure they were subjected to. By the force of the cough, &c., this weak structure was torn through, and the edges being thereby set at liberty, retracted on each side to a considerable extent, and exposed the bowels fully seven to eight inches in one direction, by three to five in the other. Notwithstanding this serious accident the constitutional disturbance was only trifling in degree and of short duration.

The changes which successively took place on the exposed surface of the bowels were truly astonishing. A thin transparent effusion of lymph was first seen laid over the peritoneal coat of the intestines, which entered a little into the depressions formed between their convolutions. This thin gelatinous material gradually became thicker and more opaque, evidently the second step towards cicatrization. During this wonderful process,—for its effects were truly wonderful,—innumerable vessels were seen, destined to carry on this great work of reparation. As this went on there was a progressive and perceptible diminution in the size of the surface; and when completed there was a cicatrix to be seen very little different from one which is formed at the healing of a wound whose edges have been kept in juxtaposition.

Symptoms of strangulation appeared, for the relief of which several expedients were adopted. The protruded portion of the bowel was ineffectually punctured. Nature, however, stepped in, and immediately the symptoms were relieved by the formation of an opening, through which a great quantity of feculent matter and flatus were discharged. This aperture, as is mentioned in the reports, continued throughout the case. Al-

though this disaster protracted the patient's recovery, there is no doubt it had at the time it happened a most salutary effect. During the whole period of the case the bowels were strictly attended to; and there is no doubt their ready obedience to our measures (chiefly enemata) considerably contributed to her recovery.

The reparative process which happened in this case, and the decidedly conservative constitutional power which this woman had, proved beyond dispute that the opinion expressed by Dr West, *London Medical Gazette*, No. 1210, February, 1851, page 245), is not infallibly true; and, therefore, ought not to influence us, and deter us from the performance of the Cæsarean section. The same restorative power was observed in the other successful case, which is already before the profession.

As it was important to preserve the infant, Dr Radford strenuously urged Mr Sankey to obtain a wet nurse; and no time was lost in obtaining one. The infant continued to thrive, and lived rather more than seven months. Her death was occasioned by an hydrocephaloid disease, the consequence of exhaustion from diarrhoea. In a late number of this journal I mentioned that Mrs Sankey again became pregnant, aborted, and afterwards died.

3. *Case of Cæsarian Section.* By H. M. JETER, M.D. [*The Southern Med. and Surg. Journ.*, March 1851, and *American Journal of Medical Sciences*, No. xlii, April 1851, p. 538.]

On the night of the 4th of December last, Mrs B., aged thirty years, was taken in labour with her sixth child. I was called at 3 o'clock in the morning to attend her accouchement. I found her with weak and irregular pains, and was informed that such had been their character from the commencement of labour at 9 o'clock. Soon after, however, her pains began to increase, and, upon examination *per vaginam*, I found the *os tincæ* well dilated, and the waters collected in large quantity. The back of the fœtus presented; I waited until the mouth of the uterus was more completely dilated, and ruptured the membranes, discharging an immense quantity of water. I proceeded immediately to turn, so far as to bring down the breech, making a breech presentation. The difficulty attending the operation of turning was so great, in consequence of the extraordinary size of the child, (it being very large,) that I regarded it hazardous to attempt to complete the operation, and left it in this situation to the natural efforts of the womb. After about two hours of very hard labour, the breech so far advanced as to enable me to bring down the feet. I essayed by every possible means to assist the efforts of the uterus, by making all the traction upon the inferior extremities of the fœtus that was warrantable, being convinced that the fœtus was dead.

Finding all efforts to make any further advance in its delivery entirely fruitless, I attempted to perforate the cranium, but found it impossible, in consequence of the size of the child, to pass the perforator up to its head. I then eviscerated the fœtus, with the view of passing the instrument up within the cavity of the foetal thorax to the base of its cranium. This also failed to make room for the operation, without proceeding at random and great consequent hazard to the mother, as I could not insert the hand to give any certain direction to the instrument, the head still being entirely above the superior strait. Embryotomy was therefore determined upon, and after dissecting away the fœtus up to its axillæ, which required about two hours, the mother all the while suffering the most severe labour, but which at this time had ceased to make any impression upon the child, and which induced me to conclude that the uterus had probably ruptured, I found her rapidly sinking, so much so, indeed, that we did not think that we did not think that she could survive fifteen minutes longer. I determined at once to operate on the Cæsarian section. I gave my patient a stimulant, and, assisted by Dr Reese, proceeded to make an incision along

the *linea alba*, six inches in length, cutting down carefully to the peritoneum, upon dividing which, the head of the fœtus presented, showing that my apprehensions were correct in the womb's having ruptured some time previous to the operation. The head of the child was so large, that the incision had to be extended to ten inches in length to admit its passage. The head measured twenty-nine inches and four lines in its longitudinal or occipito-frontal circumference, and twenty-eight inches two lines in its perpendicular circumference, being hydrocephalic. The head and remaining portion of the body being removed, the placenta was found also without the uterus within the cavity of the abdomen, and the uterus contracted to about the size of a small cocoa-nut. This being also removed, the cavity of the abdomen was left filled with coagulated blood from the hemorrhage which took place at the time of the rupture of the womb. Having carefully removed the blood as completely as possible, the wound was closed by the interrupted suture and adhesive straps, leaving a space of about two inches at its inferior extremity for the discharge of the fluids that might remain or collect in the cavity of the abdomen.

Stimulants were given, and other applications made, to revive the sinking energies of the patient, which had become almost extinct. Reaction soon took place, and she was cleansed and placed in as comfortable a position as the circumstances would admit. The vital energies having been sufficiently resuscitated, opiates were given freely. She was kept quiet, and rested comfortably during the night and the following day, until about 9 o'clock on the succeeding night, (the 6th), when she was taken with violent vomiting, which continued, with intermissions of not more than half an hour, until 10 o'clock the next day, at which time I arrived, having been called off the evening before, and could not return sooner.

We succeeded in soon checking the vomiting, and she rested easy, with occasional return of the vomiting during the day and following night.

Dec. 8th. Patient complains of some soreness about the womb, and over the abdomen generally, which is considerably swollen; pulse 132, and very restless. Administered a clyster, which produced two evacuations; gave her to drink small quantities of cream of tartar and lemonade.

9th. Patient complains of great soreness and tenderness of the abdomen, which is greatly swollen; tongue dry and red, and great thirst; pulse 140, quick and hard; lochial discharges ceased. Put her upon a treatment of calomel and opium; gave injections of warm milk and water *per vaginam*, and applied flannel, wet with spts. turpentine, to the abdomen.

10th. Soreness and tenderness not so great; discharges from the wound in the abdomen free; lochial discharges also free; pulse 136. Gave clyster, which produced one evacuation.

11th. Soreness and swelling still subsiding; pulse 130, more soft and full; lochial discharges, and those from the wound in the abdomen continue freely. Gave small quantities of Dover's powder.

12th. Had one copious alvine discharge during the night, of natural consistence—says she feels much relieved since. The discharges all continue free; pulse 130; wound healing kindly. From this time, nothing of importance occurred to require noting. She continued to improve, and by the 18th day after the operation the wound was entirely healed.

I visited her yesterday for the last time, which was the 29th day since the operation, and found her sitting up by the fire, directing the domestic affairs of her family. Mrs B. is a woman of apparently very feeble constitution, and had been confined to her bed, for two months previous to her labour, with general anasarca of the whole system.

Resolutions unanimously adopted by the Royal College of Physicians of Edinburgh, regarding Practitioners of Homœopathy.

At Edinburgh, and within the College Hall there, the 9th day of May

1851, an extraordinary meeting of the Royal College was held, pursuant to a resolution agreed to at the last quarterly meeting, and of which extraordinary meeting due notice was given.

The PRESIDENT in the chair.

The following resolutions were moved, seconded, and unanimously agreed to:—

I. That the Royal College of physicians of Edinburgh did, several years ago, publicly express its opinion of homœopathy and homœopathic practitioners, by peremptorily declining to admit into its body a candidate for its fellowship who belonged to that denomination; and, consequently, that no fellow of the college can possibly be ignorant of the light in which all those who practice homœopathy are regarded by the college.

II. The College regrets that, notwithstanding this decided expression of its opinion, more than one of its fellows, after being admitted in a different character, have endangered the reputation of the college by becoming homœopathic practitioners; and the College expresses an earnest hope that these fellows, seeing they have thus virtually separated themselves from the College, will spontaneously sever their further connection with an Institution which repudiates them, and from which they can derive, as merely nominal fellows, nothing else than a false position and a spurious credit.

III. The College feels the more bound thus to express its opinion, seeing that those fellows who have become homœopathists, and any other medical practitioners who follow homœopathy, must necessarily be aliens to the other fellows, and to the profession at large; inasmuch as no Fellow of this College, or any other physician can, by any possibility, without derogating from his own honour, and from the honour of the profession, meet practitioners of homœopathy in consultation, or co-operate with them in the other common duties of professional life.

IV. That although the College has not thought it expedient hitherto to take any active steps for disclaiming those Fellows who have become homœopathic practitioners subsequently to their admission to the College, nevertheless, since it has the power of dealing summarily with those who act in a manner so unbecoming the character of a physician, it reserves its right to exercise that power when it shall be so advised.

Signed in name, and by authority, of the College,
J. Y. SIMPSON, *President*.

WE regret that we have to announce the death of **HENRY MARSHALL, M. D.**, Deputy-Inspector-General of Army Hospitals, on the 5th of May 1851.

Dr Marshall was well known as an able Contributor to this Journal for a long series of years; as a man of most extensive and accurate information on all topics connected with Military Medicine; and as one who has been most instrumental in improving the condition of the Soldier.

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THE
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MEDICAL AND SURGICAL JOURNAL.

1ST OCTOBER 1851.

PART I.

ORIGINAL COMMUNICATIONS.

ART. I.—*Contributions to the Military Medical Statistics of the Bombay Presidency.* By JOHN KINNIS, M.D., Deputy Inspector General of Her Majesty's Hospitals.

PART IV.—*On the Health of the Queen's Troops serving in the Presidency of Bombay, from 1st April 1849 to 31st March 1850.*

Changes of Stations, average Strength, and comparative Health of different Corps.—Her Majesty's 10th Hussars have remained at Kirkee, the 8th (King's) regiment at Kurrachee and Hyderabad, in Scinde, and the 86th at Deesa, the whole year. The 64th and 83d arrived from Ireland betwixt the 4th May and 14th July to relieve the 22d and first battalion of the 60th Rifles, which were transferred to the Bengal Presidency on the 1st November. The right wing of the 22d moved from Poona, first to Colaba, then to Kurrachee, to join the left, before proceeding to Bengal. The 64th and 83d went to Poona on their first arrival, and the 83d remained there at the end of the military year; but on the 24th–27th November, the 64th was moved in divisions to

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Panwell to embark for Kurrachee, where they first arrived on the 6th December. The 78th Highlanders, relieved by a European regiment of the Company's service, marched from Belgaum for Vingorla on the 6th and 7th November, and embarked the head quarters or left wing for Aden, the right wing for Colaba.

Of the	10th Hussars, Kirkee.	8th Regt., Kurrachee & Hyderabad.	22d Regt., Colaba and Kurrachee.	60th Regt., Peshavar & Kurrachee.	64th Regt. at sea, Poona, and Kurrachee.	78th Regt., Belgaum, Colaba, and Aden.	83d Regt. at sea and Poona.	86th Regiment, Deesa.	Total.
The aver. annual strength was	675	1069	665	592	1060	1073	1169	1145	7448
Average daily sick, ...	66	82	66	97	63	49	53	69	545
... i. e. per 1000, ..	98	76	99	164	59	46	45	60	91
Sick, 1st April 1849, ...	76	97	106	58	20	84	45	63	549
Admissions, ...	1556	2024	1566	1996	2161	1538	1466	1848	14155
... i. e. per 1000, ...	2305	1890	2355	3523	2038	1433	1254	1614	1900
Deaths in hospital, ...	19	34	40	36	76	31	62	27	325
i. e. p. 1000 of { strength, ..	28	32	60	61	72	29	53	23	44
{ admissions, ..	12	16	25	18	35	20	42	14	23
Invalids, ...	18	48	38	13	4	33	3	19	176
... i. e. per 1000, ...	27	45	86	22	4	31	3	17	23
Sick, 31st March 1850, ...	57	63	...	1	37	71	49	59	336
Deaths out of hospital, ...	...	4	1	1	4	2	1	4	16

In different corps, then the

Daily sick, ...	} varied from {	45 to 164	} per 1000 of the strength.
Total admissions, ...		125 to 3523	
Total deaths, ...		23 to 72	
Number invalided, ...		3 to 57	

And in order

of Sickness,		of Mortality,
The 60th Regiment was 1st		The 64th R g.ment was 1st
... 22d ... 2d		... 60th ... 2d
... 64th ... 3d		... 22d ... 3d
... 10th Hussars, 4th		... 83d ... 4th
... 8th Regiment, 5th		... 8th ... 5th
... 86th ... 6th		... 10th Hussars, 6th
... 78th ... 7th		... 78th Regiment, 7th
... 83d ... 8th		... 86th ... 8th

* 80 remained under treatment in the 22d and 183 in the 60th, when these corps were transferred to the Bengal Presidency, 31st October 1849.

The preceding table shews the comparative health of whole regiments dispersed, as the component parts of some were over distant parts of the command. The following exhibits the comparative salubrity of different stations.

Divisions.	Stations.	Corps.	Period at Stations.	Average strength for the period.	Annual average strength.	Admissions	Deaths.	Rates per 1000 of	
								Admission to strength.	Deaths to Admiss.
Presidency, Colaba,		22d R. wing,	1st April to 31st Oct.	586	342	1108	30	3240	88 27
		78th do.	6th and 7th Nov. to 31st March.	547	228	485	10	2128	44 21
		Queen's Depot,	...	..	16	25	2	1560	125 80
		Total duty men,	...	...	586	1618	42	2761	72 26
		Invalids, ...	...	...	38	97	11	2553	289 113
		Total, ...	...	...	624	1715	53	2748	85 31
Poona,...	Poona,	64th Regt.,	18th May to 23d Nov...	1078	552	1444	45	2616	81 31
		83d do.	6th June to 31st March,	1170	960	1228	56	1279	58 46
	Poona station, ...		...	...	1512	2672	101	1767	67 38
	Kirkee, 10th Hussars, ...		...	...	671	1545	18	2303	27 12
	Poona division, ...		...	...	2183	4217	119	1932	55 28
Southern, Belgaum,	78th Regt.,		1st April to 5th Nov.	1073	631	809	16	1282	25 20
Northern, Deesa,.....	86th do.			...	1145	1817	26	1518	22 14
Scinde,	Kurra- chee,	8th rt. wing,		...	579	786	16	1318	28 20
		22d left wg.,	1st April to 31st Oct., ..	507	296	451	9	1524	30 20
		60th depôt,	1st to 31st, 24th - 27th	150	87	146	6	1655	69 41
		64th Regt.,	Nov. to 31st March, ...	1054	362	637	26	1740	72 41
		Total, ...	...	...	1324	2010	57	1520	43 28
	Hydra- bad,	8th left wing,		...	489	1214	16	2483	33 13
Total Scinde, ...			...	...	1813	3224	73	1794	40 23

Divisions.	Stations.	Corps.	Period at stations.	Average strength for the period.	Average annual strength.	Admissions.	Deaths	Rates per 1000 of		
								Admission to strength.	Deaths to strength.	Deaths to admis.
Passage from Cork.	Peshawar,	60th, 1st battalion.	1st April to 31st Oct.	849	495	1851	29	3739	58	16
	Aden,	78th left wing.	6th-7th Nov. to 31st Mar.	498	208	222	2	1067	10	9
	{	64th Regt.	1st April to 4th May & 2d June (as 47 d.)	1108	140	73	2	521	14	27
		83d do.	1st April to 8th May & 1st July (as 67 d.)	1147	209	227	5	1085	24	22
		Total, ...	...	349	300	7	839	20	23	
	Grand Total, .. .			...	7448	14155	325	1899	44	23

By these and similar calculations made in Bombay during my service there, it appears that of every thousand men of the Queen's troops serving in

	In 1847-48.		In 1848-49.		In 1849-50.	
	Were admitted.	Died.	Admtd.	Died.	Admtd.	Died.
The Command,.....	1747	22	1748	26	1899	44
Presidency Division of Colaba,	1780	31	1978	53	2748	85
8th Regiment, ...	1526	10	1535	35		
22d "			2179	68	3240	88
28th "	1442	16				
78th "					2128	44
86th "	1996	84				
Queen's Depot, duty men,*			2666		1560	125
Poona Division, ...	2112	19	2154	19	1932	55
Kirkee, 10th Hussars, ...	2342	25	2282	13	2303	27
Poona Station, ...	2041	172	2066	23	1762	67
8th Regiment,.....	2136	12	2733	21		
22d "	1999	243	1784	24		
64th "					2616	81
83d "					1279	58
86th "	1837	132				
Southern division,						
Belgaum, 78th Regiment,	1770	127	1508	16	1982	25
Northern division,						
Deesa, } 86th	1278	209	1510	26	1517	22
} 28th	1170	178				
Scinde, ...	1195	238	1613	26	1794	40
Kurrachee, ...	1195	238	1590	28	1520	43
8th Regiment, ...			1659	18	1358	28

* The invalids admitted at Colaba are left out of this comparison.

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	In 1847-48.		In 1848-49.		In 1849-50.	
	Were admitted.	Died.	Admtd.	Died.	Admtd.	Died.
22d Regiment			2530	60	1524	30
60th "	1195	238	1336	31	1678	61
64th "					1740	72
Hydrabad, 8th "			2364	15	2483	33
Peshawar, 60th "			1344	23	3739	58
Aden, 78th "					1067	10
At sea, } 64th "					521	14
} 83d "					1085	24

Retrospective Health of Corps, 10th Hussars.—The 10th Hussars arrived from England in August 1846, and has been always stationed at Kirkee. Its average proportion of admissions has exceeded that for the whole command by 695 per 1000 of the strength the first year, by 534 the second, and 402 the third, while its mortality in hospital has been smaller by two and a-half per cent. the first year, one and one-third the second, two and seven-tenths the third; that of the whole command being only two and one fifth the first, two and six-tenths the second, four and seven-tenths the last year.

8th and 22d Regiments.—The 8th regiment continues divided betwixt Kurrachee and Hydrabad. At Kurrachee last year the admissions in the right wing were 1659, and the deaths nineteen per 1000; this year the admissions were only 1358, but the deaths, twenty-eight per 1000, or two and three-fourths per cent.; while the left wing at Hydrabad since February 1849 admitted per 1000 this year 2483, and lost thirty-three. During the seven months ending 31st October, the right wing of the 22d at Colaba, admitted 1108, and lost thirty men, from a strength of 586, being equivalent to 3240 admissions, and eighty-eight deaths per 1000 annually. Last year at Colaba, the left wing, from 2d October to 23d January, and the right, in succession, from 24th January to 31st March, admitted together 608, and lost nineteen men; the strength of the left wing being 501, and of the right 669. The annual average strength of both wings was 279, and the annual ratio of admissions to strength 2179, and of deaths to strength sixty-eight per 1000. At Kurrachee, from 1st April to 31st October, the left wing admitted 4510, and lost nine from a strength of 507 men, being an annual rate per 1000 of 1524 admissions and thirty deaths.

60th Rifles.—The mortality of the 60th Rifles last year at Kurrachee, 1st April to 6th October, en route to, and on service in the Punjaub 7th October to 31st March, including a detachment of 88 men left behind at Kurrachee, was 32 in hospital, 10 in action, and 2 from accidents—44 in all. This year at Peshawar, 848 strong, from 1st April to 31st October, the head quarters admitted 1851, and lost 29 men; being at the annual rate of 3739 admissions and 58 deaths per 1000; while the depôt at Kurrachee, 150 strong, admitted 147, and lost 6—i. e. at the annual rate per thousand of 1678 admissions and 61 deaths.

64th.—The 64th regiment embarked at the Cove of Cork in five divisions, betwixt the 6th January and 9th February, in medical charge of the surgeon, his three assistants, and assistant surgeon Innis, of the 83d, who had also a party of his own corps in charge. The first division reached Bombay on the 4th May, the last on the 3d June; the strength of non-commissioned officers and men was 1109. Four men died during the voyage from *phthisis pulmonalis*, erysipelas, fever, and cholera morbus, and a fifth was drowned. Unfavourable winds and the detection of measles among the children embarked detained the different vessels in harbour from 5 to 18 days. This detention included, the longest passage was 141, the shortest 106, the average 121 days. The average number of days at sea, from 1st April was 47, and in the Presidency 318. Catarrh, fevers, and measles among the children gave some trouble; but the men were very healthy, though since their arrival they have had the misfortune to lose 5 from coup de soleil in marching to Poona; 45 men at Poona, where they remained till the 24th and 27th of November; 26 at Kurrachee; and 3 at the Queen's Dépôt Colaba, making 76 in all. During the year 31 of these fell victims to cholera morbus; one (as already mentioned) at sea, 15 at Poona, and 15 at Kurrachee.

78th Regt.—The 78th regiment marched from Belgaum on the 6th and 7th November, to embark at Vingorla, the left, or head quarter wing, for Aden; the right for Colaba. Since these dates

Ratio per 1000.

	Have been	The strength.	Annual average strength.	Admis- sions.	Deaths.	Admis- sions to strength.	Deaths to strength.	Deaths to ad- mission.
At Colaba	547	228	485	10	2228	44	21	
Aden	498	208	222	2	1067	10	9	

83d.—The 83d embarked, 1143 strong, at Cove in 7 vessels, betwixt the 10th February and 15th March. The first division arrived in Bombay on the 18th May, and the last on the 14th July. In addition to the four medical officers of the regiment, Assistant-Surgeon Haffernan of the 60th rifles and two ship surgeons came in charge of the divisions. During the voyage, 3 men died from phthisis, 2 from bronchitis, and 2 from accidental injuries; and, on the march from Panwell to Poona, 3 from coup de soleil. The longest passage was 119, the shortest 97, the average 105 days. The average number of days at sea from 1st April, commencing the military year, was 67, leaving 268 for the command. At sea from 1st April to the date of arrival, 227 men were admitted, and 5 died. There were 2 cases of phthisis, 12 of bronchitis, 36 of acute and 5 chronic catarrh, 20 continued fever, 16 ophthalmia, 12 bowel complaints, 18 cases of primary sores, gonorrhœa, and bubo, and 13 of consecutive syphilis. Of the

fatal cases, 2 of bronchitis and one of phthisis had been admitted before 1st April. At and on the march to Poona, the 83d have admitted only 1228, but lost 56 men: of this large proportion, 22 at Poona were from cholera.

86th.—The 86th at Deesa has lost only 26 out of 1145 men, or two one-fifth per cent. during the year. Its proportion of admissions too is nearly one-third below the average.

Salubrity of different Months and Quarters of the Year.—The salubrity of the different months and quarters is in this table compared.

Quarters.	Months.	Admitted.	Died.	Ratio per 1000 in the different months to the whole	
				Admissions.	Deaths.
1st	April	1105	20	78	61
	May,	1156	20	82	61
	June,	1721	36	122	111
	Total,	3982	76	282	233
2d.	July,	1423	38	100	101
	August,	1366	53	97	163
	September,	1431	58	101	175
	Total,	4223	144	298	439
3d.	October,	1726	28	120	86
	November,	1007	15	72	46
	December,	946	31	66	98
	Total,	3679	74	258	230
4th.	January,	846	15	60	46
	February,	697	5	48	15
	March,	728	11	52	36
	Total,	2271	31	160	98
Grand Total,		14155	325		
Monthly Average,		1179	27½		

	The Strength.	Admissions.	Deaths.	Ratio per 1000 of		
				Admis- sions to Strength.	Deaths to Strength.	Deaths to admis- sions.
Was last year	6295	11006	165	1748	25	15
This year	7452	14155	325	1899	44	19
Difference	1157	3149	160	151	19	4

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Here in Sickliness		In Mortality	
June stands	1st.	September	1st.
October	2d.	August	2d.
September	3d.	June	3d.
July	4th.	July	4th.
August	5th.	December	5th.
May	6th.	October	6th.
April	7th.	April	} 7th.
November	8th.	May	
December	9th.	November	} 8th.
January	10th.	January	
March	11th.	March	9th.
February	12th.	February	10th.

Prevalence and Mortality of different classes of Diseases.—Of 14155 admissions during the year were returned under,

		i. e. per 1000 of the whole ad- missions.	And died.	i. e. per 1000 of the whole deaths.
Fevers,	4688	330	47	141
Eruptive fevers,	11	78	2	15
Cholera morbus,	110	78	62	222
Diseases of {	Stomach & bowels,	2667	188	86
	Liver,	674	407	40
	Lungs,	550	89	4
	Brain,	172	12	33
Dropsies,	14	99	4	12
Rheumatism,	763	54	1	3
Venereal,	1796	126	4	12
Ulcers and abscesses,	836	59	3	82
Wounds and injuries,	520	37	...	...
Punitis,	12	85	...	...
Morbi oculorum,	572	40	...	...
„ cutis,	68	48	...	...
Other diseases,	712	50	9	...
Total,	14155		325	

Predominance of fevers at every station.—The extent to which fevers have prevailed during the year is shown in this table:—

	For Fevers			The ratio per ratio.		
	From an average strength.	Were admitted.	Died.	Admis- sions to strength.	Deaths to admis- sions.	Deaths to admis- sions.
At Colaba	586	561	8	957	512	53
Poona	1512	796	16	527	105	20

	From an average strength.	For Fevers		The ratio per 1000		
		Were admitted.	Died.	Admissions to strength.	Deaths to strength.	Dths. to admissions.
Kirkee	671	439	5	639	7·35	11
Belgaum	631	92	...	146	...	...
Deesa	1145	451	5	392	4·3	19
Kurrachee	1324	433	7	327	5·2	16
Hydrabad	489	468	2	957	4·1	4·2
Peshawar	495	1361	8	2477	16	6
Aden	208	40	...	192	...	...
At sea {	64	106	6	56	..	...
	83	209	20	95	...	...
Duty men	7410	4661	46	899	6	7
Invalids	38	16	1	...	...	...
Totals,	7448	4683	47	900	6·3	6·3

This gives an average of 900 cases of fever during the year for every thousand men in the Queen's troops. At Peshawar 1361 cases were admitted from a strength of 848 men in 7 months. This strength is equivalent to 496 for twelve months, and gives the enormous annual proportion in the table.

The proportion of admissions per 1000 of the strength exceeds that of the preceding year by

217 in the command, 361 at Kirkee

2018 at Peshawar, 223 at Hydrabad

377 at Colaba, 22 at Kurrachee

and falls short of it by

149 at Poona, 21 at Deesa

27 at Belgaum.

The proportion of fatal cases to the admissions exceeds that of last year at Poona 17·4, Deesa 10·5, Kurrachee 22·5 per 1000; and falls short of it in the whole command by 7·75—at Colaba 13·6, at Hydrabad 16·8, and at Peshawar 16.

Here are the admissions and deaths from different types of fever at every station in every corps—

Stations.	Regiments.	Intermitt.		Remittent.		Continued.		Totals.	
		Admitt.	Died.	Admitt.	Died.	Admitt.	Died.	Admitt.	Died.
Colaba.....	22d Regt.	21	...	1	1	453	2	475	3
"	78th "	12	...	66	...	8	...	86	...
"	Totals	33	...	67	1	461	2	561	3
Belgaum...	78th Regt.	56	...	2	...	34	...	92	...
Kirkee	10th Hussars	89	...	14	1	336	4	437	5
Poona	{64th Regt.	39	...	340	5	110	6	489	11
	{83d "	12	...	12	4	283	1	307	5
Total		51	...	352	9	393	7	796	16

Stations.	Regiments.	Intermittent.		Remittent.		Continued.		Totals.	
		Admitt.	Died.	Admitt.	Died.	Admitt.	Died.	Admitt.	Died.
Deesa	86th Regt.	144	...	206	5	101	...	451	5
Kurrachee	8th Regt.	19	...	4	...	82	...	105	...
	22d "	50	...	6	...	42	1	98	1
	60th "	17	...	...	...	17	1	34	1
	64th "	52	...	142	5	2	...	196	5
	Total	183	...	152	5	143	2	433	7
Hydrabad	8th Regt.	323	...	13	2	132	...	468	2
Peshawar	60th Regt.	575	1	4	2	782	6	1361	8
Aden	78th Regt.	6	...	...	...	34	...	40	...
At Sea...	{64th Regt.	1	...	3	..	2	...	6	...
	{83d "	...	...	...	...	20	...	20	...
Totals		1	...	3	...	22	...	26	...
Invalids.....		4	...	2	1	10	...	16	1
Grand total....		1420	1	815	25	2443	21	4683	47

Fevers at Kirkee.—At Kirkee fevers were very prevalent during the suspension of and after the monsoon rains, when a tainted atmosphere appeared to impart to other diseases, as well as fever, a virulent character. Of 18 fatal cases, 8 occurred betwixt the 9th August and 6th September: five from cholera, 2 from dysentery, and 1 fever; 3 more from betwixt 4th November and 15th December; a fourth in an invalid who had contracted fever from drinking spirits largely and exposure to the sun in marching to Panwell. During several weeks the average admissions for fever at Kirkee were 5 daily. Fevers were very prevalent, but less intense after the cessation than during the intermission of the rains. They were generally accompanied by determination to the head, and often to the spleen and other internal organs.

Kurrachee.—A proportion equal to one-third of the strength was admitted for fever.

Of 433 cases of fever at Kurrachee were in the

	Intermittent.		Remittent.		Continued.		Total.	
	Admitt.	Died.	Admitt.	Died.	Admitt.	Died.	Admitt.	Died.
8th R. Wing,	10	0	4	0	91	0	105	0
22d L. Wing,	50	0	6	0	42	1	98	1
60th Depot,	17	0	0	0	17	1	34	1
64th Regt.,	52	0	142	5	2	0	196	5
Total,	129	0	152	5	152	2	433	7

8th Regiment.—The 8th regiment did not lose one case of continued fever out of 132 at Hydrabad, 91 at Kurrachee, and 2 at Colaba. Two, in 13 cases of remittent, died at Hydrabad.

Of 26 cases of that type, comprising all that had been treated

in the 8th regiment since 1846, and of which one was a relapse, five have died. Of 1846 cases of continued fever, treated during the same period, one in 149 $\frac{5}{8}$ or 51 per cent. died.

60th at Peshawar.—The 60th Rifle Regiment admitted at Peshawar in seven months, and from a strength of 848 men, 1361 cases of fever, eight of them terminating fatally. This regiment, at the beginning of the military year, was encamped on the plain of Jamrood, opposite the Kyber Pass. On the 6th May the Bombay force broke up its camp and marched to the places selected for the different regiments in and near the town of Peshawar, to remain during the hot season. The 60th were obliged to encamp again, near the town, in a recently cropped field, until the quarter assigned them was ready for occupation. This was a house and several buildings about half a mile to the southward of the town, which had belonged to and been occupied by Sultan Mahomed, and his people, built in a place or garden called Wuzeerabagh, comprising about twenty acres, enclosed with high mud walls, surrounded by extensive and thickly-wooded orchards. The town itself is very large and irregular, with mud walls all round, and is said to contain now about 50,000 inhabitants, though forty years ago the number was double. The filth of every description accumulated outside the walls in the neighbourhood of each gateway is very great, and the effluvia most overpowering, particularly in the hot weather. The graveyards, too, are very numerous, and in every direction round. They are quite open receptacles for filth, and the haunt of jackals and pariah dogs. On the north side of the town the ground is very low and swampy, and most of it cultivated to the bank of the river Cabul, distant about ten miles. Eastward the ground is also very low, and about half a mile from the town there is a large waste marsh. Beyond this the ground rises again, and is extensively cultivated. On the south side the ground is higher, and here is the belt of orchards, from half a mile to a mile in breadth. The other side, which is a broad flat ridge, is cultivated for grain almost to the foot of the Cabul Hills, distant about sixteen miles. Westward of the town the ground gradually rises, until terminated by the Kyber range of mountains, distant about twenty miles.

The cultivation extends to about six or eight miles from the town. The whole of the cultivation is carried on by irrigation, the water for which is brought by numerous channels from two mountain streams. As the supply of water is unfailing, the ground is kept saturated as much as wished by the farmer, and he has two crops a year from it, the first of wheat, oats, barley, and rice, reaped in May, the second of cotton, maize, and some small grains reaped in October and November. In some places, as many as four crops of different kinds are annually obtained from the soil.

From the quantity of marshy ground, and the constant irrigation of the country, particularly of the orchards, intermittent fevers, as might be expected, are very prevalent, chiefly in the autumn, and the troops in exposed situations suffered accordingly. On the north side of the town, the reserve companies of the Bengal Artillery, upwards of 200 men, were quartered in the Fort, at the foot of which the swampy ground commences, and only one man out of the whole number escaped intermittent fever. In almost all the disease was most severe, one-half of the men having organic disease consequent on it.

Eastward of the town, the 31st native infantry were quartered, and the greater number of the seapoys were attacked with the disease in October. On the southward, surrounded by orchards, were the 60th Rifles, and by the end of October upwards of 480 men out of a strength of 800 had been attacked with intermittents. Westward of the town, where the ground was higher and more free from cultivation and moisture, the troops mostly escaped, though many individuals who had suffered from the disease before had here a return of it.

The natives of the place are very subject to this disease, and many of them have disease of the spleen. Ophthalmia also appears to be of frequent occurrence, and the number of people met with who have lost eyes is very remarkable. In the latter end of March and during April thunder storms with heavy showers of rain occurred every six or seven days, keeping down the temperature, which seldom rose above 80° in tents. In the dry clear days, which were general towards the end of April and beginning of May, with a powerful sun, electricity accumulated in objects to an extraordinary degree. On brushing the hand on a towel along the wall or roof of the tents in the evening, a broad streak of light was produced from the number of sparks elicited.

The hot season fairly commenced on the 7th May. Some hot days had occurred in the beginning of the month and end of April, but rain had fallen and again cooled the air. The rest of the month of May from the 7th was excessively hot with frequent, almost daily, hot, dry, parching winds from the north-west, commencing at any hour either of day or night, and blowing strong for hours. The thermometer in tents rose to 115 and upwards, frequently to 100 during the night. Similar weather continued up to the middle of June, after which the hot winds seldom occurred, the weather clear and nearly calm, the heat from the powerful sun very great, the ground, wall, &c., becoming heated like a furnace. July was very similar; but twice or three times at intervals thunder storms occurred with showers which cooled the atmosphere for a few days at each time. In the beginning of August, the air had become loaded with moisture, the heat continuing

great and very oppressive till the 14th of the month, when a thunder storm and rain for two days came on and put an end to it. The end of the month and part of September were hot again in the day-time, but not oppressive, and the nights were comparatively cool and continued increasingly so. Throughout October the sun was powerful in the day-time, the nights very cold, the alternations of temperature being 45° and even 50°.

The supply of water for all purposes is abundant and very good. The natives consider that from the streams more wholesome; but to obtain it clear and pure, it is necessary to send some distance. Wells are also numerous, and the water sweet and good. Two of them are famed for the coldness and goodness of the water. One of these was in the Wuzeerabagh, the quarters of the 60th rifles. It was sunk to the depth of 75 feet, and afforded an abundant supply for every purpose to the whole regiment of excellent water, and at the temperature of only 55° throughout the whole season. It was the greatest luxury to every one, and of most essential benefit in the hospital. For the whole of these details I am indebted to the reports, official and private, of my esteemed friend Dr Boyes, surgeon of H. M. 60th rifle regiment.

Poona.—64th and 83d Regiments.—Of 796 cases of fever at Poona in the

	Admit.	Died.	Admit.	Died.	Admit.	Died.	Admit.	Died.
	Intermittens.		Remittens.		Continued.		Total.	
64th,	39	0	340	5	110	6	489	11
83d,	12	0	12	4	283	1	307	5
	51	0	352	9	393	7	796	16

Kurrachee, 64th Regiment.—At Kurrachee the 64th admitted for intermittent 52, remittent 142, continued 2, and lost 5. At Poona, in this corps, fevers increased from August to November, when the undrained surface on which the Ghorpoorie barracks stand is loaded with stagnant water, and the atmosphere with emanations from it. In the young and vigorous the more severe forms of the disease and relapses were very common. Eleven cases in the 64th, 5 under remittent, 6 under continued fever, and 5 in the 83d terminated fatally.

78th Regiment, Colaba.—In the 78th at Colaba, intermittent appeared chiefly during the dry easterly winds of January. The most severe cases of remittent occurred after the march from Belgaum in November. They were of highly inflammatory character, and ascribed chiefly to solar influence. In the progress of the month they became less inflammatory, and required less active treatment. In January and March they were complicated with hepatitis, and in February, as the sun became more powerful, hepatic congestion.

Cholera Morbus in 64th Regiment.—One hundred and ten cases

of cholera morbus, 63 of them fatal, have occurred among the Queen's troops during the year. Two men of the 64th Regiment were attacked with the symptoms of this disease in the ship "Tulloch Castle," on the 21st and 23d April, in lat. 36° 54' S., long. 37° 30' E., about a fortnight to the east of the Cape of Good Hope, and one of them died. The two first among the Queen's troops in the Presidency occurred in July at Khandalla in two men of the 83d regiment, marching from Panwell to Poona, on their arrival in the command. They both recovered, but are reported to have been very severe. The next cases occurred at Kirkee in the 10th Hussars, two on the 9th, one on the 12th, one on the 14th August, and one on the 15th September, all fatal. On the 20th August a case occurred in Her Majesty's 88d Regiment, occupying the left flank barracks at Poona, twelve more betwixt 21st and 30th August, ten from 9th to 15th September, two on the 19th, and one on the 22d, in all in the 83d Regiment at Poona 26, of which 22 terminated fatally. There have been since two cases, which did well, making the total 30; 13 of the number, not including the first case, were attacked in hospital while under treatment for other complaints. On the 7th September a case appeared in the 64th Regiment, quartered in the right flank or Ghorpoorie barracks, Poona, three on the 8th, 29 from the 11th to the 21st, and one on the 26th, making 34 in all from 7th to 26th September, of whom 14 died. Three women of the 10th Hussars, one of the 83d; three women (out of five attacked), and three children of the 64th (out of four attacked) also died.

64th Regiment.—The 64th regiment left Poona en route to Kurrachee in four divisions, on the 24th, 25th, 26th, and 27th November, embarked at Panwell on the 1st and 2d, and reached its destination on the 5th, 6th, and 8th December. One case of cholera, severe but not fatal, occurred in the first division two days before it reached Panwell. The same day a middle aged paralytic woman, and on the 3d December, in the steamer, an aged female was attacked and died. Betwixt the 7th and 29th December, 35 men of the 64th were attacked and 22 died. One officer of the 8th and one of the 64th have been attacked and recovered; one man of the 8th and one of the 60th depot at Kurrachee have been attacked and died. The latest admission for cholera at Kurrachee was in the 60th depot on the 3d January, and none remained under treatment in the middle of that month. The cases that have occurred during the year are in the

				Admitted.	Died.
10th Hussars	.	Kirkee	.	5	5
8th Regiment	.	Kurrachee	.	3	1
22d do.	.	Colaba	.	2	2
„ do.	.	Kurrachee	.	1	0

			Admitted.	Died.
64th Regiment	.	At Sea	2	1
„ do.	.	Poona	36	15
„ do.	.	Kurrachee	26	15
78th do.	.	Belgaum	2	0
„ do.	.	Colaba	1	0
83d do.	.	Khandalla	2	0
„ do.	.	Poona	28	22
83d do.	.	Deesa	2	1
Total			116	62

Bowel Complaints.

	From an average strength.	Were admitted.	Died.	Being per 1000	
				Admissions to strength.	Deaths to admissions.
At Colaba	586	404	20	655	52
Poona	1512	605	24	397	40
Kirkee	671	279	7	416	25
Belgaum	681	119	7	188	59
Deesa	1145	370	4	323	11
Kurrachee	1324	502	15	379	31
Hydrabad	489	171	6	350	35
Peshawar	495	105	7	212	66
Aden	208	40	1	192	25
At Sea	349	40	1	121	25
Duty men	7410	2635	86	356	33
Invalids	38	15	1	132	66
Total	7448	2650	87	342	32

In Comparison with last year.—Bowel complaints have prevailed and proved fatal in nearly the same proportion as last year for the whole command, but with increase and diminution at particular stations.

The Increase of Admissions has been at		The Diminution at	
Colaba,	271	Kirkee,	35
Poona,	77	Belgaum,	43
Deesa,	42	Kurrachee,	9
Hydrabad,	159	Per 1000 of the strength.	

While of Mortality.

The Increase is at		And Diminution at	
Poona,	6	Colaba,	26
Belgaum,	18	Kirkee,	29
Hydrabad,	35	Deesa,	26
Per 1000 of the admissions.			

The next table gives the comparative prevalence and mortality of fevers and bowel complaints at different stations, for the last

two years, in which one indicates the maximum, and seven to ten the minimum proportion of admissions to strength, and of deaths to admissions per 1000.

	Fevers.				Bowel Complaints.			
	Prevalence this last year.		Mortality this last year.		Prevalence this last year.		Mortality this last year.	
Colaba,	2	3	6	2	...	1	3	3
Poona,	4	2	1	5	...	3	4	1
Kirkee,	3	6	4	3	...	2	1	7
Belgaum,	.	.	8	8	...	9	6	2
Deesa,	.	.	5	5	2	4	6	5
Kurrachee,	.	.	6	7	3	6	4	2
Hydrabad,	.	.	2	1	7	7	5	7
Field Service,	.	.	...	4	...	...	6	...
Peshawar,	.	.	1	...	3	...	...	...
Aden,	.	.	7	...	...	...	8	...
At Sea,	.	.	8	...	...	...	10	...

From this comparison it appears, 1st, That fevers were most prevalent last year in the field, this year at Peshawar; and 2d, in prevalence at Colaba; 3d, Kirkee; 4th, Poona and Hydrabad; 5th, Deesa; 6th, Kurrachee; 7th, Aden; and 8th, the smallest proportion as well as mildest form at Belgaum, where there was not one fatal; also that the most fatal prevailed at Poonah.

2d, That bowel complaints were most prevalent at Colaba, and least prevalent as well as least fatal at Aden, where they had not lost a case in five months; 2d, in prevalence at Kirkee; 3d, Poona; 4th, Kurrachee; 5th, Hydrabad, and 6th, Deesa. That they were most fatal at Peshawar, 2d, in fatality at Belgaum; 3d, Colaba; 4th, Poona; 5th, Hydrabad; 6th, Kurrachee; 7th, Kirkee, and 8th Deesa.

Specific Stomach and Bowel Complaints.—To the class of stomach and bowel complaints have been referred

	Admitted.	Died.
Peritonitis,	6	...
Gastritis	10	...
Enteritis,	4	2
Colonitis,	1	...
Hæmatemesis	9	...
Dysentery acuta,	717	54
... chronic,	129	21
Diarrhoea,	1007	9
Dyspepsia,	346	...
Colica,	280	...
Obstipatio,	151	...
Total	2660	86

Abdominal Inflammation.—Of twenty-one cases admitted under peritonitis, gastritis, enteritis, and colonitis, two of enteritis terminated fatally in the 83d regiment.

Dysentery.—Of 846 admitted for dysentery, acute and chronic, 75, or one in eleven one-third died. Of these cases were

At	Regiments.	Acute.		Chronic.		Total.	
		Admitted.	Died.	Admitted.	Died.	Admitted.	Died.
Colaba,	{ 22d,	92	11	17	4	109	15
	{ 78th,	47	2	18	2	65	4
Total,		139	13	35	6	174	19
Poona,	{ 64th,	101	2	11	2	114	6
	{ 83d,	87	12	2	2	89	14
Total.		188	16	13	4	201	20
Kirkee, 10th Hussars,		26	1	8	1	34	2
Belgaum, 78th Regt.		46	7	6	...	52	7
Deesa, 86th „		52	2	7	...	65	2
Kurrachee	{ 8th „	64	3	10	...	54	3
	{ 22d „	28	2	23	4	51	6
	{ 60th „	8	...	2	...	10	...
	{ 64th „	100	4	2	...	102	4
Total,		200	9	37	4	237	13
Hydrabad, 8th Regt.		31	2	12	4	43	6
Peshawar, 60th „		21	3	5	1	26	4
Aden, 78th „		7	...	2	1	9	1
Invalids,		...	...	5	1	5	1
Total,		716	53	130	22	846	57

10th Hussars.—In the 10th Hussars the disease was less prevalent and more tractable than last year. Of 26 acute cases, 11 occurred in July during the height of the rains, and 4 in August; and of 148 of diarrhoea 97 occurred in the monsoon. Tubercles of the spleen, as well as ulceration of the intestines, were found in one of the fatal cases.

8th Regiment.—Of 10 fatal cases in the 8th regiment, 6, out
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of 43 attacked, occurred at Hyderabad, 3 at Kurrachee out of 70 and 1 at Colaba in an invalid.

The 22d regiment has suffered more from dysentery than any other corps. The right wing at Colaba having lost 15 out of 100 admissions, and the left wing at Kurrachee 6 out of 51. The last monsoon was of unusual severity, and the fall of rain greater at Bombay than any year since 1828. At the Queen's Depôt, Colaba, 117½ inches of rain fell during the monsoon, yet in the hot months of April and May, hepatic and dysenteric complaints were much more prevalent than during it. The 78th lost 7 men from dysentery to November at Belgaum, 4 more to 31st March at Colaba. Affections of the bowels became very prevalent in that corps in December and January, and are ascribed by Dr M'Kinnon, the senior assistant surgeon, to the alternations betwixt the mid-day heat and the cold dry easterly night winds. The 83d, one of the newly-arrived regiments, lost 14 cases of dysentery, which began to appear in that corps soon after the rains set in at Poona. One case only occurred in June, 52 and 3 deaths in July, 20 and 6 deaths in August, 11 and 4 deaths in September. In October 3 cases only, and no deaths. A fatal case in November, but no admissions for dysentery in December or January, and one case in February, making 89 admissions and 14 deaths in all. Though a more sickly corps than the 83d, the 64th lost only 5 men at Poona and 6 at Kurrachee from dysentery. In that corps it presented two forms, the one attended by colonitis and very severe, the other mild. One of the fatal cases was complicated with the rupture of a blood-vessel and extravasation of blood to the bulk of a hen's egg on the right posterior lobe of the cerebrum, causing hemiplegia of the left side and epileptic fits. The large intestines were thickened, congested, and ulcerated. A young recruit, who had suffered from *cynanche parotidæa*, followed by a deep-seated abscess which burst into the internal ear in July last, remained in hospital with the hearing gone, the motion of the right side much impaired and feeble from an attack of cholera at the end of the military year.

Dysentery, 60th Regiment.—Bowel complaints have not in general been of a formidable nature in the 60th regiment. There were 138 admissions and 8 deaths. Of the fatal cases some were combined with abscess in the liver, others were the sequelæ of intermittent fever. The admissions returned under dysentery at Peshawar are 26, and deaths 4; at Kurrachee, admissions 10, deaths none.

86th.—Of 486 admissions for abdominal diseases at Deesa, 84 occurred from April to June, 176 from July to September, 105 October to December, and 121 January to March. There were 11 fatal, chiefly in September, October, and November.

Diarrhœa.—Nine fatal bowel complaints in 1007 admissions are returned under diarrhœa, 4 in the 60th regiment, and one respectively in the 64th, 78th, 83d, and 86th regiments.

Hepatic Diseases.—Diseases of the stomach and bowels stand first, cholera morbus second, fevers third, and hepatic diseases fourth, as the causes of death among the troops during the year, and the derangement and disorganization of this organ are very often the prelude and concomitant of fatal dysentery in this as in other climates. To this class are referred

In the	Acute Hepatitis.		Chronic Hepatitis		Icterus.		Totals.	
	Admitt.	Died.	Admitt.	Died.	Admitt.	Died.	Admitt.	Died.
10th Hussars	23	...	33	2	6	...	62	2
8th Regt.	56	1	66	4	14	...	136	5
22d "	47	5	84	5	9	...	140	10
60th "	17	3	9	2	20	...	46	5
64th "	29	3	15	...	20	...	64	3
78th "	58	2	55	6	7	...	120	8
83d "	4	1	2	1	5	...	11	2
86th "	28	...	60	5	7	...	95	5
	262	15	324	25	88	...	670	40

Hepatic Diseases.—From this table we may at once assume that the men of the 83d regiment have sounder abdominal viscera than those of any other corps in the Queen's service. Such was the case two years ago with the 8th regiment, before it had sent a wing to Colaba, or left Poona; but the proportion of its admissions for hepatic diseases, next in amount to that of the 22d, now tells a less flattering tale.

Hepatic diseases bear a proportion of above 4 per cent. to the whole admissions, and 12 per cent. to the whole deaths. Of the fatal cases, 10 occurred in the 22d, 8 in the 78th, 5 respectively in the 8th, 60th, and 86th regiments, 3 in the 64th, and 2 in the 10th hussars and 83d; the strength of the hussars being 675, and of the foot regiments 1170. Of 136 cases (including icterus) in the 8th regiment, 64 occurred and 4 died at Kurrachee, 57 occurred and one died at Hyderabad. By instructive tables of calculations given in Dr Tice's Report, it appears that during the last 3 years and 8 months, embracing August 1846 to March 1850, 633 cases of hepatitis have occurred in the 8th regiment. Of the cases

1 in $3\frac{2}{8}$ of the number were relapses which had occurred once in 50 men, twice in 25, three times in 18, four times in three, and 6 times in two.

2. The average number of days every case was under treatment, was $6\frac{1}{2}$.

3. Of 633 case 7, or 1 in $90\frac{2}{3}$, died.

In the majority of the fatal cases of dysentery in the 8th regiment hepatic abscess was associated with the intestinal disease.

60th.—In the 60th regiment many of the cases of hepatic disease occurred in April whilst encamped at Jamrood after the termination of the campaign.

64th Regiment.—Of acute hepatitis in the 64th, were 29 admissions, chiefly in Poona, two of them terminating fatally; one case also died at sea.

78th Regiment.—Assistant-surgeon M'Kinnon dissents from the opinion that Belgaum gives predisposition to hepatic diseases. The men of the 78th regiment who arrived from England while it was quartered there, became stout and ruddy with every appearance of good health; but since the wing came to Colaba in November these men look ill, thin, and sallow. This change, though often aided by intemperate habits, must be chiefly ascribed to the high temperature and relaxing climate of Bombay. In November there was no case of hepatitis, but nine of deranged function of the liver. From December to 31st March inflammatory and other diseases prevailed, and seemed to increase in proportion to the advance of the hot weather. Dr M'Kinnon gives a table embracing useful observations on this subject, and subjoins several well written dissection reports. At Belgaum and Aden together, 36 cases of acute and 43 of chronic hepatitis have been treated; two of them remained from last year, one was admitted four, two three times, eight twice. The acute cases occurred chiefly at Belgaum, in the rains, and several required the most active treatment. Abscesses were found in fatal cases. At Aden there have been several relapses, and the cases which occurred were chiefly subacute and chronic, in no case requiring general blood-letting. Men of drunken habits have been the chief sufferers from the disease.

83d Regiment.—Large abscesses were found in the livers of the two cases that terminated fatally in the 83d Regiment.

86th Regiment.—At Deesa 88 cases were admitted and six died of hepatitis. The cases were more severe in the hot than in the cold season. Hepatic abscess often forms here and in other parts of India without any preceding stage of acute inflammation.

Hæmatemesis at Deesa.—Of nine cases of hæmatemesis in the command seven occurred at Deesa, six of them in April and May, the two hottest months of the year. This disease appears to Dr Thom to be connected "with that vascularity and plexiform patches of congested vessels, observed on the mucous coat of the stomach, and dependent on high temperature and the use of drams of arrack. Acids always cured it in a very decided manner, and he found the same remedies, particularly nitric acid, equally useful in many cases of dyspepsia."

Pulmonic Diseases.—For diseases of the lungs were

	Admitted.	Died.
Bronchitis, .	90	5
Pneumonia, .	37	3
Pleuritis, .	10	1
Catarrhus acutus .	11	0
„ chronicus, .	282	1
Hæmoptysis .	73	4
Phthisis pulmonalis	29	20
Dyspnœa continua,	18	0
Total,	550	34

Bronchitis.—Of bronchitis, 33 cases occurred at Deesa, 21 in the 83d regiment, 13 in the 78th, 12 in the 64th, and 11 in the 8th. Five cases terminated fatally, one in the 8th at Kurra-chee, four in the 83d, two of them at sea, one in Poona, and one in the Queen's depot. One of the fatal cases was combined with, and probably arose from organic disease of the heart, which was surmised during life, and found on dissection.

The 13 cases of bronchitis in the 78th at Colaba occurred chiefly in January and February, and were easily treated.

The four fatal cases in the 83d had been contracted at sea, where two of them died, and were all along under treatment.

Pneumonia, Pleuritis, and Catarrh.—Three out of 37 admitted died under pneumonia, one out of 11 under pleuritis, one out of 282 returned as acute, and four out of 73 of chronic catarrh. Seventeen, or nearly one-half of the cases of pneumonia, occurred at Deesa. They were almost confined to the cold months; not a single case occurred in the first quarter, and only two in the second. One man who had been admitted with symptoms of pneumonia died from the bursting into the pleura of an aneurism the size of a duck's egg at the commencement of the descending aorta. Of 71 cases of catarrh in the 86th, only 15 occurred in the first six months, and 46 in the second. During which last the air was dry and subject at night and in the mornings to sudden vicissitudes of heat and cold. The usual form was gastro-catarrhal, the mucous membrane of the stomach and intestines, as well as the bronchi, being engaged, and diarrhœa, a common termination. In the treatment, Dr Thom found antimonials inadmissible when the mucous coat of the stomach was involved, but ipecacuanha in nauseating doses a safe and effectual remedy.

Of 282 cases of acute catarrh, one, and of 73 of chronic, four terminated fatally.

Phthisis Pulmonalis.—Twenty-nine admissions and twenty deaths are referred to *phthisis pulmonalis*. The fatal cases were, in the 83d, 6; 64th, 5; 8th, 3; 86th, 3; 22d, 2; 10th; Hussars and 78th, each, one.

Morbus Cordis.—Under *morbus cordis palpitatio corditis*, and pericarditis have been returned, 78 admissions and two deaths, 25 in the 10th Hussars, 11 in the 83d, 11 in the 64th, five in the 8th, two in the 22d. The fatal cases occurred in the 60th at Kurrachee and 78th at Belgaum. Twenty-five cases, but only 17 individuals were admitted in the 10th Hussars. One of them had disease of the brain, also disease of the lungs from previous pneumonia; one was ascribed to injuries received in falls from horseback; another to a severe beating from a comrade. The number requiring change of climate for cardiac symptoms was fewer than last year; from the smaller number of recruits, and from the horses of the regiment, being now thoroughly broken in, so that the amount of hard riding at Kirkee has been much diminished. One delicate lad was three times admitted for palpitation from the exertion of blowing a trombone in the band. He was removed to the ranks, and the symptoms have disappeared. Of 11 cases in the 64th regiment, five were relapses, none indicated organic disease, and they have all returned to duty. Of five cases in the 78th, two occurred at the top of the Ramghaut on the march to Vingorla from exposure to wet; one was cardialgia and relieved by opiates and leeches; one of pericarditis, in a subject tainted with syphilis, was cured by a mild mercurial course; the third was very like the second. In the fourth, irregular and tumultuous action of the heart, with intermitting pulse, were relieved by the periodical abstraction of blood, antimony, digitalis, and anti-spasmodics. Of six cases at Deesa, there was reason to suspect in one dilatation of the right ventricle, and he was invalided. In all the others, the cardiac symptoms, though obstinate and prolonged, appeared to be symptomatic of gastric or abdominal disturbances. A man, apparently in good health a few minutes before, met instant death out of hospital while in the privy, from the bursting into the pericardium of a small aneurism on the outside of the aortic valves. There was no other sign of recent disease of the heart, although its surface was covered with white spots from the effects of former pericarditis.

Brain and Nervous System.—To diseases of the brain and nervous system are referred

	Admissions,	Deaths,
Cephalalgia, . . .	26	—
Vertigo, . . .	1	—
Ictus solis, . . .	5	4

	Admissions.	Deaths.
Apoplexia, . . .	30	23
Paralysis, . . .	12	2
Epilepsia, . . .	24	—
Neuralgia, . . .	3	—
Amentia, . . .	32	—
Mania, . . .	6	—
Delirium tremens, . . .	33	4
Total,	172	33

Apoplexy and Ictus Solis.—Of 27 cases of apoplexy and ictus solis there occurred at

	Colaba.	En route to Poona.	Kirkee.	Bel- gaum.	Kurra- chee.	Hydra- bad.	Pesha- war.	Total.
April 6.	0	0	1	0	0	0	0	1
10.	0	1	0	0	0	0	0	1
22.	0	1	0	0	0	0	0	1
23.	0	1	0	0	0	0	0	1
25.	1	0	0	0	0	0	0	1
28.	0	1	0	0	0	0	0	1
30.	0	2	0	0	0	0	0	2
June 1.	0	1	0	0	0	0	0	1
9.	0	0	0	0	0	1	0	1
10.	0	0	0	0	1	1	0	2
11.	0	0	0	0	0	1	0	1
12.	0	0	0	0	0	1	0	1
15.	0	0	0	0	0	1	0	1
16.	0	0	0	0	0	1	0	1
July 27.	1	0	0	0	0	0	0	1
28.	0	0	0	0	0	0	1	1
29.	0	0	0	0	0	1	0	1
Aug. 4.	0	0	0	0	0	0	1	1
6.	0	0	0	0	0	0	1	1
11.	0	0	0	0	0	0	1	1
12.	0	0	0	0	0	0	1	1
13.	0	0	0	0	0	0	3	3
Oct. 26.	0	0	0	1	0	0	0	1
Total,	2	7	1	1	2	6	8	27

En route to Poona.—Of these fatal cases, seven occurred betwixt the 10th May and 1st June in the 64th and 83d regiments, on their march from Panwell to Poona, in oppressively hot weather, five betwixt the 9th and 16th June, and one on the 29th July at Hyderabad, eight betwixt the 28th July and 13th August at Peshawar, and no cause but inconsiderate exposure to the op-

pressive heat of the climate in these months can be assigned for them. At Hydrabad the month of June was extremely close and sultry, the thermometer being 98° in the hospital during the heat of the day. The patient was generally brought into the hospital in a state of complete insensibility, with a full intermitting pulse, hot skin, and stertorous breathing. There was in most instances a puffing out of the cheeks, and discharge of frothy mucus from the mouth, the countenance was turgid and livid, pupils contracted, muscular movements of the upper and lower limbs, and involuntary discharge of urine and fæces; shortly before death, breathing became slower and more laborious, pupils suddenly dilated, profuse perspiration broke out, and the pulse became very quick and small. The men attacked were generally of intemperate habits.

Kirkee.—The case at Kirkee occurred in a man of good character, who had committed no irregularity or imprudence. He was seen within a few minutes by two medical officers. By stimuli he was roused with difficulty, but hemiplegia of the left side with stertorous breathing, intervened, and he died in forty-seven hours. The membranes of the brain were found thickened, and blood extravasated on the hemispheres, to the size of the palm of the hand, with softening of the cerebral substance. The pericardium contained blood coagulated and fluid, the arch of the aorta was thickened, but became thin in approaching the heart, and had sustained a small rupture.

Paralysis.—In the 10th Hussars one man was admitted twice for paralysis, and another twice for delirium tremens. The paralytic seizure was in the right hand, more particularly the flexor muscles, and ascribed to a stroke of the land-wind. Another very serious case was brought on by an all but fatal drinking bout, which left the patient a helpless paralytic in every limb; but from this condition he has gradually rallied, and can walk slowly with a stick.

86th.—Of two cases returned under paralysis in the 86th regiment, one had recovered in the end of March from coup de soleil, and is referred to in Part III. The patient, 29 years old, had been eight years in the Presidency, and often undergone treatment for dysentery, hepatitis, secondary syphilis, and other complaints, including two attacks of cholera morbus and two of delirium tremens. His last admission was on the 20th July, with great nervous depression and convulsive twitchings of the left arm. On and after the evening of the 21st he had repeated general convulsions with stertorous breathing, followed by stupor and coma, at first temporary but latterly permanent, betwixt the paroxysms, up to the 27th, when he died. On inspection were found congestion of the cerebrum with thin layers of lymph

on its surface, and under its middle lobe, over the petrous portion of the left temporal bone, an oval shaped depression an inch long, half an inch broad, and three lines deep, which corresponded to an eminence on the upper surface of the bone. The pia mater covering the depression was vascular, with the surrounding cerebrum, very little softened, and slight serous effusion in the base of the skull and spinal canal. By application of the trephine the bone under the depression, near the tympanum, was found to be carious, its interstices filled with a soft fatty-looking, dark-coloured matter, with a small opening of communication with the external ear.

Amentia and Mania.—Thirty-eight cases are returned under amentia and mania,—15 in the 64th, 5 in the 8th, 6 in the 60th, 3 in the 78th, 3 in the 83d, and 2 in the 86th regiment; but many of these were re-admissions, and under observation only. Four individuals in the 64th furnished all the admissions. These were brought before the General Invaliding Committee, and sent back to their regiments for observation and treatment.

Small and Chicken-Pox.—Six admissions for small-pox, and five for chicken-pox appear in the returns;—two in the 86th, three in the 60th, and one in the 78th Regiment. Two cases were fatal; one in an invalid of the 60th at Colaba; one in the head quarters at Peshawar; the last in the month of June, when the patient, having to endure a temperature of 105°, the excessive heat affected his head, and he died rather suddenly. The disease, modified by vaccination, had been previously going on well.

Three cases of varicella in the 64th at Poona, two in the 86th at Deesa.

<i>Dropsy.</i> —For dropsical complaints were			
	Admitted.	Died.	
Anasarca,	10	.	1
Hydrothorax,	1	.	...
Ascites,	3	.	3

The cases of ascites were in the 10th Hussars, 78th, and 86th regiments, one of them an invalid.

Rheumatism.—To rheumatic complaints are referred in the

	Admissions.	Deaths.
10th Hussars,	109	...
8th regiment,	90	...
22d ...	90	...
60th ...	34	...
64th ...	61	1
78th ...	88	...
83d ...	97	...
86th ...	192	...
	763	1

Of these cases were acute, 304 ; chronic, 420 ; lumbago, 36 ; odontalgia, 3 : 190, *i. e.*, one-fourth of the whole occurred at Deesa.

One chronic case in the 64th terminated fatally at Poona.

Veneral Complaints in every Station in every Corps.—Veneral complaints comprise

		Primary Ulcers.	Syphilia Consecu- tiva.	Bubo.	Gonorrhoea.	Hernia Humoralis.	Stricture.	Cachex. Syphil.	Phymoses et Pa- raphymoses.	Total
Colaba,.....	22d,	9	2	12	9	14	...	...	2	48
	78th,	24	10	4	12	9	...	1	...	60
	Tot.	33	12	16	21	23	...	1	2	108
Poona, ...	64th,	48	10	23	32	9	...	...	...	122
	83d,	58	20	67	26	21	2	2	6	202
	Tot.	106	30	90	58	30	2	2	6	324
Kirkee,.....	10th,	54	4	69	61	20	5	...	...	213
Belgaum, ...	78th,	93	53	46	49	20	...	...	2	263
Deesa, ...	86th,	79	14	95	50	33	1	2	1	275
Kurrachee,	8th,	23	37	13	15	14	...	3	...	105
	22d,	14	6	3	11	7	...	...	...	41
	60th,	12	5	3	2	1	1	...	...	24
	64th,	14	4	17	13	2	...	...	...	50
	Tot.	63	52	36	41	24	1	3	...	220
Hydrabad, ...	8th,	58	11	57	61	16	2	...	2	207
Peshawar, ...	60th,	27	1	29	20	24	2	...	...	103
Aden, ...	78th,	15	1	6	3	7	2	...	1	35
At Sea,...	64th,	...	3	1	..	...	...	...	...	4
	83d,	9	13	2	7	4	...	...	...	35
	Total,	9	16	3	7	4	...	...	...	39

	Primary Ulecn.	Syphilis Consecu- tiva.	Bubo.	Gonorrhoea.	Hernia Hemoralia.	Stricture.	Cachex. Syphil.	Phymoses et Pa- raphymoses.	Total
Queen's Depot,.....	1	7	...	...	...	...	1	...	9
Total,.....	538	201	447	371	201	15	9	14	1796

Cases of Secondary Syphilis.—Of these, four terminated fatally,—three under secondary syphilis, one under cachexia syphiloidea,—two of them in the 8th, two in the 78th Regiment, one of the 8th, an invalid, in whom extreme debility appeared to be the cause of death. In the other, at Belgaum, a most offensive muco-purulent fluid was found in front of the *sella turcica*, and about the olfactory nerves, with an opening in the cribriform plate of the ethmoid bone, through which the matter had passed from the nose. The nasal and superior palatine bones, as well as the tonsils, were almost totally destroyed by ulceration. The liver and spleen were enlarged, and a *lumbricus teres* found in the jejunum, but the stomach and bowels were otherwise healthy.

The fatal case returned under *cachexia syphaloidea* occurred in the 8th Regiment at Kurrachee. On inspection of the body, the face was studded with scars from former ulcers, and the limbs with the conical eruption of *rupia*. The branches of the meningeal artery were distended with a milky-looking serum, the cortical substance of the brain softened, and the ventricles and upper part of the spinal canal distended with serum.

This patient had experienced an attack of hemiplegia at Poona, but so far recovered, first in the upper, then in the lower extremities, as to be able to march to Hyderabad, a distance of ninety miles. Not long after, he was attacked with *rupia prominens*, and alarming debility, which induced his medical attendant to recommend his removal to Kurrachee, where he lingered only a few days.

Ophthalmia.—Of ophthalmic diseases, were admitted in the 10th Hussars, 8th. 22d. 60th. 64th. 78th. 83d. 86th. Total.

24	48	18	106	140	49	136	51	572
Of cutaneous diseases.								
0	2	6	0	6	31	21	2	68

Ulcers and Abscesses.—Under ulcers and abscesses appear in

	10th Hussars,	8th Reg,	22d.	60th	64th	78th.	83d.	86th,	Total	Died
Phlegmonic Abscesses.	101	96	69	27	40	41	67	52	493	1
Paronychia,	...	1	1	1	4	1	3	2	13	...
Apostema Lumbare	1	...	...	...	...	...	...	...	1	1
Ulcus simplex,	54	14	27	8	61	71	46	41	322	1
Grave,	...	...	...	...	...	...	2	...	2	...
Oris,	...	...	...	...	...	...	1	...	1	...
Fistula in ano,	...	5	...	...	...	...	...	...	5	...
Total,	136	116	97	36	105	113	119	95	837	3
Total,	1	...	...	...	...	...	1	1	...	...

Lumbar abscess.—There were two cases of lumbar abscess, one in the 10th Hussars, one in the 83d regiment, both fatal. The last occurred in a young soldier, who was ill nearly all the voyage from Ireland, an immense tumour having formed on the lumbar region. He was left in the depot hospital, Colaba, on his arrival, and afterwards sent to Poona, where he died. There were various openings in different directions communicating with each other among the muscles; but unconnected with disease of the spinal bones.

Wounds and Injuries.—Of wounds and injuries the 60th Rifle regiment, so hotly engaged in the siege of Mooltan, and other field operations, last year, has a smaller proportion than any other corps, being twenty-one in seven months from 1000 men, while the 10th Hussars had 114 in twelve months, from a strength of 675; but this last is much above the average, as dragoons are much more liable to small wounds and injuries, incapacitating them for immediate duty than foot soldiers.

Under this head are comprised

	10th Hussars.	8th.	22d.	60th.	64th.	78th.	83d.	86th.	Total.
Luxatio	...	1	4	...	...	...	...	1	6
Subluxatio	18	25	10	8	19	25	5	8	118
Vulnus Sclop.	...	...	...	...	...	...	1	2	3
Vulnus Incisum	22	3	15	2	15	16	5	9	87
Fractura	1	2	...	2	...	3	2	1	11
Contusio	83	43	21	9	28	33	33	26	276
Ambustio	...	2	1	...	10	1	3	2	19
Total	124	76	51	21	72	78	49	49	520

None of these were fatal.

There were no corporal punishments during the year in the 10th Hussars, the 8th or the 33d regiment. There were four in the 22d, 3 in the 64th, 2 in the 78th, 2 in the 86th, and 1 in the 60th regiment; 12 in all, or one in 628 of the whole force.

Under other diseases are returned

	10th Huss.	8th. 22d.	60th.	64th.	78th.	83d.	86th.	Total.	Died.
Aneurisma . . .	...	1	...	...	...	...	...	1	...
Atrophia . . .	...	1	...	...	...	...	...	1	...
Contractura . . .	2	1	...	...	2	...	...	5	...
Cynanche Tonsilaris	4	15	4	14	8	13	24	12	94
" Trachealis	...	...	...	...	1	2	...	1	4
" Parotidæa	...	1	...	...	2	...	1	1	5
Cystitis . . .	...	1	...	...	...	1	...	...	2
Dracunculus . . .	12	12	5	...	...	...	...	13	42
Dyscæa . . .	1	2	...	...	2	...	...	...	5
Dysuria . . .	1	...	2	1	...	...	...	4	8
Eneuresis . . .	...	...	...	...	1	...	...	...	1
Epistaxis . . .	...	...	...	...	1	3	...	3	7
Erysipelas . . .	...	...	...	...	1	1	2	...	4
Erythema Mercur.	...	...	...	...	...	...	...	1	1
Fungus hæmatodes	...	1	...	...	...	...	...	...	1
Hæmorrhoids . . .	6	24	24	2	10	7	6	9	88
Hernia Inguinalis	2	2	...	...	...	2	...	3	9
" Strangul.	...	1	...	...	...	...	...	...	1
Hydrocele . . .	1	3	2	...	...	...	...	2	8
Morbus Coxarius	...	1	...	...	...	...	...	...	1
Morbus Cordis . . .	25	5	2	...	11	13	1	5	62
Necrosis . . .	1	1	...	...	1	1	...	...	4
Nephritis . . .	...	4	...	...	4	1	...	2	11
Otitis . . .	2	13	5	1	5	9	...	8	43
Observatio . . .	...	...	1	...	...	...	1	15	17
Palpitatio . . .	...	5	...	5	...	...	3	...	13
Pericarditis . . .	...	1	...	1	...	...	1	...	3
Periostitis . . .	...	...	...	...	...	...	2	...	2
Prolapsus Ani . . .	1	3	2	...	...	...	...	...	6
Sarcocele . . .	...	1	...	...	...	...	...	...	1
Scorbutus . . .	...	4	1	1	7	2	6	20	41
Scrofula . . .	2	23	2	4	13	5	8	14	71
Splenitis . . .	5	30	21	9	3	25	3	8	104
Tumours . . .	...	1	...	...	3	...	...	...	4
Tympanitis . . .	...	...	...	...	...	1	...	...	1
Varix . . .	1	...	2	...	...	...	...	1	4
Vermes . . .	5	7	6	...	3	...	...	2	23
Verrucae . . .	...	2	...	...	3	2	3	4	14
Total . . .	71	166	79	38	81	88	61	128	712
Total . . .	...	2	...	1	...	2	1	2	...

Popliteal Aneurism.—The first on this list is a case of popliteal aneurism sent from the left wing at Hydrabad to the 8th hospital, Kurrachee. Dr Tice tried to obliterate the sac by pressure; but œdema and threatened erysipelas of the limb compelled him to abandon a method he has seen successfully practised in Europe, and to tie the vessel a little below the origin of the *profunda femoris*. The patient underwent the operation while under the

influence of chloroform, without being conscious of more pain than the weight of an imaginary body resting on the inguinal region. The ligature came away in 15 days, when the wound was nearly healed, and the popliteal tumour had become less than a filbert in size.

Cynanche.—Of 103 cases of cynanche 94 affected the tonsils; 4 the trachea, and 5 the parotid glands. Of the whole, 25 occurred in the 83d, 16 in the 8th, 15 in the 78th, from 12 to 4 in the other corps.

Dracunculus.—Of 42 cases under dracunculus, 13 occurred at Deesa, 12 at Kirkee, 11 at Kurrachee, 3 at Hyderabad, and 3 at Colaba.

Epistaxis, fatal case in 78th.—Of 7 cases returned under epistaxis, one out of three had a very narrow escape, one terminated fatally, both at Belgaum.

The fatal case occurred in a private, thirty years old, of a sallow complexion, scrofulous diathesis, and dissipated habits, who the night before his admission, had been found drunk and bleeding profusely from the nose. When brought to hospital he was very pale and weak from loss of blood. Plugs of lint steeped in alum, were applied with temporary success, cold lotions to the head; a mild purgative was administered, and afterwards mineral acids internally, and generous diet was necessary from his weak state. His only bad symptom was want of sleep, for which he took anodynes. A constant oozing of blood but not alarming remained. He was in this state apparently improving until the morning of the 30th, when he became insensible, with heavy breathing, moaning, and scarcely perceptible pulse. Stimulants were administered without effect, and, as Mr Webster was about to perform transfusion for a last resource at 2 P. M., he expired.

On dissection was found effusion in the pericardium and pleura, the former being highly congested; the stomach contained about eight ounces of dark fluid, and its mucous membrane was softened, loose, and abraded. The intestines were of a dark leaden colour, and the spleen enlarged.

The second case was in a stout young sergeant, who had been struck by another man on the nose a week before admission; and though the injury had not troubled him much during that time, when he came to hospital on the night of the 9th October, he was in a state of syncope from loss of blood. Plugs of lint steeped in strong alum were introduced, his head was shaved and cold lotions applied without benefit; but dry cupping to the nape of the neck and shoulders had an almost instantaneous effect, and a permanently beneficial result. The bleeding stopped at 10 A. M., leaving him in a dreadfully weak state. He, however, made a satisfactory recovery, and was discharged on the 19th October.

Erysipelas.—Of 4 cases of erysipelas, one in the 83d regiment died. He was a fine young recruit. The disease attacked the head and face, numerous abscesses formed over the scalp, and he sunk from congestion of the brain after 12 days treatment. The head and face were much swollen, the tissues of the scalp broken by suppuration, the vessels of the brain and pia mater highly distended, and there was copious effusion of bloody serum in the ventricles and base of the brain.

Carditis.—A fatal case under carditis in a young soldier of the 78th regiment, two years and a half in India, who had suffered much from anasarca, and was admitted 9th September 1849, with symptoms of colonitis. Leeches were applied and oil administered. Next day the breathing was oppressed, pulse small, surface covered with perspiration; he moaned, and was unable to speak or swallow. Sinapisms to the chest and stimulants gave no relief, and he died on the 13th. The heart was found enlarged with fatty matter adherent to the pericardium, which contained four ounces and a half of serum.

Calculi passing from Kidney to Bladder.—The following interesting case of two urinary calculi, formed in the left kidney, finding their way through the ureter to the bladder, is abridged from Dr Thom's Report.

86th Regiment.—William Craig, aged twenty-two, an Irishman of temperate habits, and leucophlegmatic temperament of three years service, was admitted 19th August 1848, complaining of a feeling of weight in both lumbar regions, of twelve months duration, with dysuria and languor, but no vomiting or pyrexia. He had great difficulty in passing urine, and scalding pain along the urethra; he had no appetite; a pale anxious countenance; dry skin; sunk eyes; and a peculiar bluish tinge of the lower eyelids, with an ammoniacal odour from the body. Urine was stated to resemble at first thick pus, then to become clear. The bowels were open; the urine pale, alkaline, strongly ammoniacal. The urine being ascertained by chemical tests to be albuminous, he was placed on generous diet, vegetables and drinks, and the internal use of nitric acid and nitrate of potass, but with no very obvious advantage. On the 2d September, he passed two small thin, smooth, lamellated pieces of calculus, resembling phosphate of lime. Left kidney was the chief seat of uneasiness, countenance like that of a person with cholera, a strong ammoniacal odour. First warm baths and cupping of the loins, then nitrate of potash and conium, produced no good effect. Then, 5th October, guaiacum mixture was given with great benefit; and on the 8th, the urine was again tested, but no precipitates could, as before, be obtained from it. He appeared to be recovered, and was discharged 17th October. He was re-admitted on the 20th with œdema of the knees, without pain or urinary affection;

but on the 15th, the dysuria with the former languor and weight in the kidneys, especially the left, returned. Though the urine analyzed indicated this time the presence of little albumen, guaiacum was again prescribed, from the beneficial result formerly attending its use, and the morbid symptoms again rapidly disappeared. He was discharged 1st November. On the 1st December was again admitted with the same symptoms as at first, with frequent desire to void urine, which was passed only in drops. Analysis of the urine gave the same phenomena as before. He again recovered under the use of guaiacum. On the 10th April he was re-admitted with the same affection. The pain he now suffered was exquisite, and the urine could be voided only in drops. The catheter was passed on two successive days, but no calculus could be detected, and very little urine came away. There was exquisite pain in the left iliac and lumbar regions, and a circumscribed swelling in the former, which was very tender to the touch. The bowels became obstinately costive, requiring croton oil; peritoneal inflammation set in, and he died on the 19th April 1849 in great agony.

The heart was found soft, flabby, and somewhat enlarged, with coagulated lymph in the left ventricle. The descending colon adhered to the small intestines in front of the left kidney down to its termination in the rectum. From the diseased mass thus formed betwixt the spleen and pelvis, a small quantity of seropurulent effusion had escaped into the abdominal cavity, and the cellular substance surrounding the kidney was infiltrated with purulent matter, which had penetrated in every direction, irritating and compressing and inflaming the parts it touched. The left kidney was found in a highly morbid state; soft, flabby, nearly double its natural size, with several sinuses or small abscesses on its convex surface, penetrating through the cortical substance, by which urine and pus had found their way, not only down the sides of the colon but into the peritoneal sac. On laying open the kidney its pelvis was seen to form a large sac, divided above into two cells of very unequal size; the cortical substance furnishing a thin puckered wall round this morbidly enlarged pelvis, so attenuated as to resemble a diseased bladder more than a kidney. The corresponding ureter was enlarged almost to the diameter of the aorta before its division, and its walls were thickened and almost muscular. It was widest and funnel-shaped at its termination in the bladder, admitting the finger with ease.

In the bladder were found two calculi; one the size of a hen's egg, flattened, and weighing two ounces one drachm. The other, much smaller, lay near the neck of the bladder. Their surface was smooth and of a light brown, their section white, arrangement concentric layers, and composition phosphate of lime. The cal-

culi nearly corresponded in size and shape to the cells in the kidney, and from this resemblance, as well as the history of the case, and the extraordinary dilatation of the ureter, there can be no doubt, as Dr Thom infers, that they had been originally formed in the left kidney, and passed along the ureter into the bladder.

Scorbutus.—Forty-one cases of scorbutus have been admitted, —twenty in the 86th; seven, 64th; six, 83d; four, 8th; one, 22d; one, 60th. Two of the cases in the 86th died, the termination being in one hastened or caused by abscess of the liver. On inspection of the body, in the other, were observed marks of previous pericarditis, and an effusion of bloody serum within the chest.

Scrofula.—Of seventy-one cases of scrofula, twenty-three occurred in the 8th, fourteen in the 86th, thirteen in the 64th, from two to eight in each of the other corps. One terminated fatally in the 8th regiment.

Splenitis.—Of 104 cases of splenitis, thirty, and only one fatal, occurred in the 8th regiment, twenty-five in the 78th, twenty-one in the 22d, nine in the 60th, eight in the 86th, five to three in other corps. The fatal case was complicated with disease of the brain, and is detailed in Dr Tice's report.

Pericarditis.—In a fatal case returned under pericarditis in the 60th detachment at Kurrachee, tubercles were found in the lungs, and three ounces of straw-coloured fluid within the pericardium.

The following tables give the numbers and proportion of admissions and deaths, at different ages, and length of service in India.

I. Influence of Age on Sickness and Mortality—Ages of Non-Commissioned Officers and Privates.

	The strength.	Admissions.	Ratio per cent.			
			Deaths.	Admissions to strength.	Deaths to strength.	Deaths to Admissions.
Under 18 years	133	229	...	172	..	...
18 to 20	689	1425	39	207	5·6	3·9
21 to 22	1527	2675	53	175	3·5	1·9
23 to 25	1968	4033	64	205	3	1·18
26 to 30	1906	3726	98	195	5·14	2·6
31 to 35	706	1277	46	181	6·5	3·5
36 to 40	124	382	16	300	12·9	4·2
43 to 45	8	30	1	375	12	3·3
46 to 50	2½	10	...	400	20	...
Unknown,	15	62	...	493	1	...
	7073	13849	317	196	44	23

This general return is incomplete from the April Monthly Returns of the 64th and 83d, then at sea, wanting the table of ages. It does not include either the average strength, admissions or deaths of those two corps for that month.

From this table it appears that the

Healthiest ages have been in succession.

1 under 18 years

2 — 21 to 22

3 — 31 to 35

4 — 26 to 30

5 — 23 to 25

6 — 18 to 20

7 — 36 to 40

8 — 41 to 45

9 — 46 to 50

And the least fatal ages.

1 under 18

2 — 23 to 25

3 — 21 to 23

4 — 26 to 30

5 — 18 to 20

6 — 31 to 35

7 — 41 to 45

8 — 46 to 50

II. Length of service in India, embracing officers as well as non-commissioned officers and privates.

	Strength.	Admis- sions.	Deaths.	Ratio per cent.		
				Admis- sions to strength.	Deaths to strength.	Deaths to Admis- sions.
Under 1 year	2466	2132	147	87	5.9	6.9
1 to 2	490	875	23	176	4.7	2.6
3 to 4	1478	4689	30	317	2.03	.66
4 to 5	934	1952	13	210	1.39	.66
5 to 6	365	417	12	114	3.29	2.88
6 to 7	380	583	6	153	1.58	1.03
7 to 8	1035	1367	27	132	2.7	1.9
8 to 9	341	320	16	94	4.7	5
9 to 10	134	123	5	92	3.73	4.14
10 to 11	52	41	—	79	—	—
11 to 12	47	22	—	47	—	—
Above 12	27	11	—	41	—	—
Total,	9053	14451	331	1596	3.65	2.07

From this table the

Healthiest periods of residency in the Presidency have been

1 above 10 years

2 under 1 „

3 betwixt 8 and 10

4 — 5 and 6

5 — 7 and 8

6 — 6 and 7

7 — 1 and 2

8 — 4 and 5

9 — 3 and 4

The least fatal periods

1 above 10 years

2 betwixt 4 and 5

3 — 6 and 7

4 — 3 and 4

5 — 7 and 8

6 — 5 and 6

7 — 9 and 10

8 — 1 and 2

9 — 8 and 9

PART V.—On Venereal Diseases and the influence of Lock Hospitals in their prevention, in the Presidency of Bombay.

1. The records of the deputy inspector general's office in Bombay commence 21st December 1825, and embrace a period of 22 years, during the first 11 of which lock hospitals existed in Poona and Belgaum, though Queen's troops were not quartered at Belgaum before 1829.

2. The comparative prevalence of venereal diseases, in different years and periods and at different stations in the command, is shown in a "Return of Venereal Diseases, admitted annually into Her Majesty's European Military Hospitals, at different stations in the Bombay Presidency, from 21st March 1826 to 31st December 1849," which I have compiled from the Quarterly Sick Returns.

3. In 1826, women infected with venereal diseases were permitted to go at large in the neighbourhood of military cantonments, the purlieus of which and adjacent nullahs were their usual haunts, where they had every facility of communicating disease to the soldiers, while it was optional to themselves either to seek or decline medical treatment in lock hospitals, and few, if any, resorted thither for a cure, until incapacitated by the severity of their sufferings, or the unchecked progress of their disease from earning a livelihood in the way of their profession. In the city of Poona, more especially, were large numbers of abandoned females who lived chiefly by the military and their followers.

4. In the year ending 20th December 1826, venereal diseases formed one-third to one-fourth part of a heavy sick list in the European regiments.

The average strength being	}	2973	The Vene- real ad- missions.	}	1621	The ratio per cent.	}	54·52

5. The quarterly sick returns, but not the annual, specify the stations at which particular diseases occur, and the former commence in this presidency a quarter of a year later than the latter, that is, on the 21st March 1826. Of 289 cases which occurred in the first quarter of 1826, and are included in the 1621 admissions, the localities are unknown. Towards the remaining 1332 cases, distributed over the last three quarters,

		Strength of	Contri- buted.	Being per cent. for the period.	Per cent. per an- num.
The 4th Light Dragoons.	{ In 2 quarters at Kaira from a }	530	62	13·04	26·08

		Strength of	Contri- buted.	Being per cent. for the period. $\frac{1}{2}$	Per cent. per an- num.
The 4th Light Dragoons.	{ In one quar- ter at Kir- kee, }	400	5	·25	5·
2d Foot.	{ in three }	933	521	55·84	69·8
20th Foot.	{ quarters at }	982	569	57·74	72·17
	{ Poona, }				
The two last together,	.	1915	1088	56·81	71·
6th Foot.	{ in three }	641	177	26·37	33·48
	{ quarters at }				
	{ Colaba. }				

6. In December 1826, the commanding officer of Her Majesty's 20th regiment prohibited his men from frequenting the haunts of prostitutes in or near the city of Poona, and employed peons at the expense of the regiment, to take up for medical inspection all women of suspicious character found in the cantonment, and to place such as were diseased in the lock hospital for cure. These summary proceedings being followed by a marked decrease in the number of venereal cases in the 20th hospital, and practised soon after with similar success in the 2d Queen's, the commander in chief became satisfied of their utility, and government, approving of them, attached police peons to every corps with a moccadum over them, at the public expense, and allowed them a premium of one rupee in addition to their pay for every diseased woman they brought to hospital. Lhol bazaars, or establishments of females for the use of the men, with a strict superintendence of the health of the inmates, and their transfer for treatment when diseased to lock hospitals, appear also to have been introduced about this time; but are only incidentally noticed in the records of the deputy inspector general's office.

7. Here are given the results of these measures, actively prosecuted for three years, after that of their introduction.

		The strength was	Venereal admis- sions.	Ratio per cent. per annum.	
In the whole Command.	} In the year	{ 1826	2973	1621	54·52
		{ 1827	3361	996	29·6
		{ 1828	3239	607	13·74
		{ 1829	3644	688	18·88
		{ 1830	3831	661	17·1
	In 3 quarters of	1826	1537	1093	71·11
At Lock Hospital Stations.	} In the whole year	{ 1827	2086	868	41·61
		{ 1828	2476	536	21·61
		{ 1829	2469	584	21·78
		{ 1830	2971	621	20·19

			The strength was	Venereal admissions.	Ratio per cent. annum.
In the 20th Regiment, Poona.	{ In 3 quarters of	1826	982	567	72.17
		{ 1827	955	396	41.46
		{ 1828	942	167	17.83
At Colaba and Bombay.	{ In the year	1829	893	72	8.09
		{ 1830	808	38	4.7
	{ In 3 quarters of	1826	933	521	69.8
		{ 1827	756	416	55.03
In the 2d Queen's at Poona.	{ In the year	1828	947	246	21.97
		{ 1829	892	130	14.57
		{ 1830	843	70	8.3
In Her Majesty's 6th Regiment at Colaba.	{ In 3 quarters of	1826	647	177	36.48
		{ 1827	617	81	12.52
		{ 1828	741	71	9.58
Poona.	{ In the year	1829	634	241	38.01
		{ 1830	735	266	36.19

8. It hence appears that, by vigorous and well directed preventive measures, in aid of lock hospitals, venereal diseases were reduced in number and severity.

	From.	To.	From.	To.	
In the whole command.	1821 in 1826	661 in 1830	i. e. 54.5	17.1	Per cent. of the strength.
At Lock Hospital Stations.	1039 of 1826	621 in 1830	71.8	21.42	
In Her Majesty's 20th Regiment.	567 of 1826	98 in 1830	72.17	10.93	
In 2d do. do.	521 of 1826	70 in 1831	69.8	8.3	
In 6th do. do.	177 of 1826	71 in 1828	36.48	9.58	

9. In 1831, the number of police peons was reduced from six to two for each corps, their monthly pay from six to five rupees, the gratuity withdrawn, and the moocadums discharged. The few peons retained being now deprived of their accustomed reward, neglected their duty, loose women found their way back to the cantonments, and venereal diseases again increased.

	The strength was	Venereal admissions.	Rate per cent.	
In the whole command.	3778	992	26.25	i. e. 9 above 1830
At lock hospital stations.	2900	921	31.76	i. e. 10 ...

10. The 4th Light Dragoons at Kirkee in 1829 and 1830 employed a moocadum at eight, and six peons at six rupees each per month. In 1831 the former was discharged, and the latter reduced to two at five rupees each.

In	The strength was	Venereal Admissions.	Rate per cent.
1829 . . .	617	117	19
1830 . . .	661	106	16.05
1831 . . .	660	266	40.03

being twice and a half more in 1831 than in 1830.

11. Of the 40th regiment in

	The strength was	Venereal Admissions.	Rate per cent.
1830 at Belgaum, .	707	177	25.17
1831 at Poona, .	675	351	51.69

12. This increase appears to have stimulated to renewed efforts commanding officers of corps, who expended the regimental funds, most liberally and most beneficially, in the employment of additional peons. But these last being little known, distinguished by no badge, and exercising powers that might have been legally disputed, never attempted to follow suspected women beyond the regimental lines, at a short distance from which they met the men, setting all precautions at defiance. On the island of Colaba much of this intercourse could be prevented, and the Queen's 2d regiment of foot, stationed there in 1832, admitted only sixteen venereal cases from a strength of 503, being 3.18 per cent. At Belgaum, on the other hand, where it was more difficult to impede the approach of idle and dissolute women, the 20th regiment admitted 76 in 1831, 118 in 1832, the first being twice the number of admissions for 1830 in the same corps at Colaba. The venereal admissions into the 6th hospital at Colaba were reduced to 81 in 1827; and to 71 in 1828; yet, after the removal of that corps to Poona they amounted in 1829 to 241, and in 1830 to 266.

13. At lock hospital stations.

| In the whole command.

In	The strength was	Venereal Admissions.	Rate per cent.	The strength was	Venereal Admissions.	Rate per cent.
1831 . . .	2900	921	31.76	3778	992	26.25
1832 . . .	3868	780	27.2	3751	812	21.65
1833 . . .	2024	655	32.22	3573	757	20.07
1834 . . .	2088	436	20.88	3407	643	21.81
1835 . . .	2081	421	20.33	3402	663	19.29
1836 . . .	1700	413	24.29	3718	698	18.75

14. Lock hospitals and all other preventive measures in Bombay were abolished in December 1836. Venereal diseases have since progressively increased in number; and, in proportion to the strength, excepting only in the years 1840-42 and 43, during which the strength of the Queen's troops at Poona and Bel

gaum, the most fertile hot beds of venereal pestilence, was reduced to less than one half its previous average, by the large proportion on field service, where they were comparatively little exposed to that detestable infliction.

15. Previously to 1832 the sick returns of the Queen's troops commenced on the 21st of the month. From that year on the 1st, and the annual returns which were originally dated from 21st December of one year to the 20th December of the next, corresponded with the civil year, betwixt 1832 and 1836, but have since commenced on the 1st April. The annual return, therefore, commencing 1st January 1836 terminated 31st March 1837, and comprised five quarters.

16. During the last eleven years. At Poona, Kirkee, and Belgaum, formerly

		Lock Hospital Stations.			In the whole Command.		
		The average strength.	Venereal admissions.	Rate per cent. per annum.	Average strength.	Venereal admissions.	Rate per cent. per annum.
1st Quarter	1837	2038	165	32.35	3335	208	23.56
	1838	2051	646	31.01	3482	958	23.55
	1839	2085	727	34.91	4676	1096	23.44
	1840	1114	300	26.93	3899	597	15.35
	1841	2036	646	31.74	4391	940	21.41
Year ending 31st March.	1842	1549	399	25.76	6009	1063	17.69
	1843	1983	550	27.74	6844	1260	18.41
	1844	2874	1046	36.40	6045	2034	33.64
	1845	2515	1003	39.80	5955	1770	29.72
	1846	2808	873	31.16	6020	1536	25.51
	1847	3127	1469	36.98	6854	2191	31.95
3 last Quarters.	1847	3923	1453	46.24	6090	1890	38.79
Aggregate,		25784	9272	---	59120	15542	...
Average,		2344	843	31.7	5375	1413	26.29

From this table it appears that the annual proportion of venereal diseases has been greater from 1st April 1847 to December last than in any year since 1826.

17. During the last twelve months, i. e., from 1st April 1847 to 31st March 1848, of the Queen's troops serving

	The average strength has been	Average number sick.	Average number sick from Venereal disease.	Rate of Venereal sick to strength.	Rate of Venereal sick to the whole.
At Kirkee,	644	64	11	1.76	17.19
Poona,	1991	196	55	2.76	28.06
Belgaum,	1475	117	47	3.19	40.27
Colaba	970	40	10	1.03	25.
Deesa,	1464	57	17	1.16	29.82

* This aggregate strength for eleven years contains only one fourth of the strength in the first quarter of 1837, and three fourths of that in the three last quarters of 1847.

	The average number has been	Average number sick.	Average number sick from Venereal disease.	Rate of Venereal sick to strength.	Rate of Venereal to the whole sick
At Kurrachee, . . .	1705	46	8	·47	17·39
Detachment, en route 15 weeks, . . .	433	30	4	·92	12·5
Total average, . . .	6112	521	143	2·25	27·43

18. In a letter dated "Military Department, No 3492, Bombay Castle, 3d August 1846," the secretary to government informs the adjutant general of the army, that the reason assigned for the abolition of lock hospitals was "simply their uselessness;" and that the late Dr Burke, Inspector General of Her Majesty's Hospitals, in a report addressed to the military secretary, Government of India, on the 21st March 1834 shows,

(1.) "That since the abolition of lock hospitals in Bengal the proportion of disease has continually decreased."

By an abstract of venereal disease in Her Majesty's regiments in Bengal, given in Dr Burke's letter, it appears that

"During the existence of the lock hospital system, viz in the years 1827, 28, and 29, the proportion of venereals to strength was 30·1 per cent."

And that "since the abolition of the lock hospital system in the years 1830, 31, 32, and 33, the proportion of venereals to strength was 20·2 per cent."

19. By the accompanying return of venereal diseases in H. M's. regiments in Bombay for the last 22 years, and by the annual sick return for 1826, it appears that

During the existence of lock hospitals in Bombay from 1826 to 1836, the proportion of venereals to strength was 23·28 per cent.

And since their abolition from 1837 to 1847, the proportion was 26·29 per cent.

(2.) "That in the Bombay Presidency venereal complaints were less by at least two-thirds at stations without lock hospitals than at those where lock hospitals existed."

And the Bombay Medical Board have hence, according to Dr Burke, given and repeated an opinion, that "the lock hospitals under that presidency may safely be abolished."

20. But, with all deference to these high authorities, it appears to me that the preponderance of venereal diseases, at particular military stations, must have existed before the stations were selected from others for the foundation of lock hospitals, as it now exists eleven years after their abolition, and is therefore to be regarded as the cause, but in no sense as the effect or offspring of these institutions. During the existence, indeed, of lock hos-

pitals in Bombay venereal diseases were 17·95, and since their abolition, 20·49 per cent. more prevalent at lock hospital than at other stations.

From 1826 to 1836.

	The average strength was	The annual venereal admissions.	The rate per cent.
At lock hospital stations,	2292	666	29·06
At other stations,	1152	138	11·11

Difference, ... 17·95

From 1837 to 1847.

At stations where lock hos- pitals had been,	2344	843	35·93
At other stations,	3031	570	15·47

Difference, ... 20·49

(3.) "That, as the proportion of venereal affections in her Majesty's troops in the Bombay Presidency, with its lock hospital system, was greater by one-third than in Bengal, where no lock hospitals have existed for upwards of three years, the arguing advantages from the continuance of the lock hospital system in Bombay seems to be derived from impressions and sources not affording conviction from the force of facts."

21. The difference in the degree of prevalence of venereal diseases has been equally great at different stations in Bombay, both during the existence and since the abolition of lock hospitals. If venereal diseases were one-third more prevalent with lock hospitals in Bombay than without them in Bengal in 1833, they were more prevalent in Bombay in 1847, eleven years after the abolition of lock hospitals, than during any year of their existence since 1826, that year which preceded the introduction of preventive aids, indispensable to their success.

(4.) "In Bengal, on the 31st August 1833, the average strength of her Majesty's troops was . . . 1514
The number of venereal cases in hospital, . . . 60
The rate per cent. '8"

22. In Bombay, on the 31st August 1833, | On the 29th April 1848.

The average strength of her Majesty's troops was	3539	6415
The number of venereal cases in hospital,	42	135
The rate per cent.	1·2	2·1

or '9 per cent. higher 11 years after the abolition of lock hospitals, than at the date selected by Dr Burke while they ex-

isted. The causes which multiply venereal diseases, and the facilities for preventing or curing them, may be very various in the three presidencies, as well as at the different stations of each. There are in Bombay neither remedies of presumed efficacy in the cure of venereal diseases known to the natives, as in Bengal, nor old bawds to the uninterrupted exercise of whose superintending care of the females entrusted to them, Dr Burke seems to attach so much importance, as a protection to the health of the troops there.

(5.) According to Dr Burke, the proportion of venereal diseases was greater in Bombay, after the appointment of police peons in 1831, than previously in 1826; but he arrives at this conclusion by comparing the proportion that occurred in 6 months of 1826, with the proportion that occurred in the whole year of 1831, the first being 36·9, the second 38·5.

23. Now if we double 36·9, we find the *annual* proportion in 1826 to be 73·8—i. e. 35·3 per cent. higher, instead of 1·8 lower than in 1831. Nor is this all. To illustrate the inefficiency of police peons, Dr Burke has selected the very year in which their powers were paralyzed by a reduction of two-thirds in their number, and one-sixth of their pay. If he had taken, as an example, one of the three years they were in full force and activity, his own table would have given 21·4 per cent. as the proportion of admissions to strength in 1830, being 52·4 per cent. less than in 1826.

24. The following recapitulation gives an abridged view of the extent to which venereal diseases have prevailed in the Queen's forces serving in this presidency during the last 22 years:—

	At Lock Hospital Stations.			In the whole command.		
	The average strength was	Average annual admissions.	Ratio per cent.	The average strength.	Average annual admissions.	Ratio per cent.
	During the existence of the Lock Hospitals					
In 1826	1537	1093	71·11	2973	1621	54·52
1827	2086	868	41·61	3361	996	29·6
1830	2971	621	20·9	3818	661	17·1
1828 to 30, 3 years	2639	580	21·98	3567	652	18·25
1831 to 36, 6 years	2778	604	26·11	3605	761	21·11
1827 to 36, 10 years	2367	623	26·32	3569	752	21·07
1826 to 36, 11 years	2292	666	29·15	3453	804	23·28

	At Lock Hospital Stations.			In the whole command.		
	The average strength was	Average annual admissions.	Ratio per cent. Since the abolition of Lock Hospitals.	The average strength.	Average annual admissions.	Ratio per cent.
In 1837 to 47 } 11 years	2344	An. aver. 843	31.7	5375	1418	26.39
During the whole period embraced by the returns—						
1826 to 47, } 22 years	2318	An. aver. 755	32.51	4404	1109	25.15

25. It has been already remarked that the annual proportion of venereal diseases was greater from 1st April to 31st December last, than in any year since 1826. Their average proportion was above one-fourth of the whole number sick in hospital during the year ending 31st March last. They have deprived government for days and weeks annually since 1826 of the services of 1109 European soldiers, and permanently during last year of the services of 143. But these large numbers do not exhibit the whole mischief inflicted by them; for the ruined health and inefficiency of a considerable proportion of invalids, and of men admitted under other heads, may be traced to attacks of venereal disease, and to the hospital confinement, discipline, and treatment required for their cure.

26. That lock hospitals did not accomplish the objects for which they were established, during the whole of their existence in Bombay, is no proof that they are incapable of doing so, with the conditions dispensable to their success. These conditions are the employment of agents, in sufficient number for the detection of venereal diseases in prostitutes, and the compulsory seclusion and medical treatment, until restored to health, of every detected case. The very remarkable success which attended such preventive measures betwixt 1827 and 1830—four years only out of the eleven during which lock hospitals existed—in the whole command, at lock hospital stations, and in particular corps, has been already pointed out.

27. After a careful and patient examination of the question in all its bearings, my deliberate opinion is, that lock hospitals, though of very great use, during a few years of their existence in Bombay, might have been made, with proper aids, permanently and greatly more useful, and that their re-establishment for the compulsory seclusion and cure of prostitutes, labouring under venereal diseases, together with the organization of a police force and health officers for the apprehension and examination of suspected cases, are now urgently required, and are the measures most likely to succeed in preserving the health and efficiency of the Queen's troops, heretofore and now so very seriously impaired by the extraordinary prevalence of that class of diseases, at every important military station in the command.

ART II.—*Cases of Ichthyosis L., and Hirsuties.* By WILLIAM PICKELLS, A.B., M.D., one of the Physicians to the Fever Hospital, Cork.

It is now a lapse of years since the cases above alluded to came under my observation. The many epidemics, some of them unparalleled in the history of the country, which unfortunately visited this city during the eventful intervening period, allowed me more particularly, from my connection with the fever hospital, little leisure or inclination for writing. Lately, on looking over my notes, it occurred to me that by putting them together the cases might be worth communicating.

1. The first which I shall notice is one of *Ichthyosis*, which occurred in the person of a young female, aged sixteen, of decent and rather comfortable connections, whom I shall designate by the feigned initials of M. S. She was received into the fever hospital as affected with fever on the 21st of May 1829, having remained under medical treatment thirteen days previously sick at home.

On the 22d May, the day after admission, she is noted in the case-book as "covered with horny scales on knees, thighs, and part of the abdomen." Upon more particular examination and inquiry as the case proceeded, it appeared that the greater portions of the lower region of the abdomen and the extremities were enveloped in horny excrescences of a dark brown or black colour; in some places flat, scaly, and imbricated; in others wart-like but four-sided, or rhomb-shaped, standing at right angles to the skin, and so close set as to form a continuous, as it were tessellated structure or texture, not rising, however, more than about one-eighth of an inch above the skin. They were most prominent and regular in their arrangement on and from the knees upwards towards the hips; from the hips extending backwards to and traversing the nates. Over the knees, on the patellæ, the structure was very striking and peculiar, forming, as it were, a defence for the joints. From the knees downwards they gradually declined towards the feet, with the exception of the insteps, on which they were again prominent and close set. On the soles of the feet there were none. Above, they gradually declined towards the mammæ, becoming flatter until lost in the natural integument. The mammæ were free. The neck and face were also free. The palms of the hands, though as well as the soles of the feet exempt, were rougher than they ought to be for one that was not accustomed to hard labour. There was a roughness also on the arms and on the back, as well as on the outer part of the thighs. The scaly covering or formation bore on the whole (such was the impression on all that saw it) considerable resemblance to the skin on the back of the sole fish, particularly when boiled.

Clothed in her ordinary dress, and mixing in every day life, her face which was very handsome, and neck only appearing to view, she might have passed as the last person to be suspected of labouring under so unsightly a malady. Contrasting in the mind the beauty (so far as met the eye) of her appearance above, with the deformity of the lower extremities, one could not help applying the line of Horace, descriptive of the mermaid, or siren :

—————Turpiter atrum
Desinit in piscem, mulier formosa superne!

Her fever while in the hospital partook more of the character of synochus than of typhus. There was no petechial efflorescence. Headach and eyes suffused indicated determination to the head, but the mental faculties were quite clear. For some days there was excessive thirst; much tremor is also noted. There was pain of the right hypochondrium, on pressure, with bilious dejections (green). The symptom the most remarkable was an obstinate tympanitic enormous swelling of the abdomen, which, however, was at length brought down by a course of purgatives. In about a week after admission gangrenous symptoms supervened, first of the right ear, and afterwards of the hips and *os sacrum*. For these, after leaving the hospital free from fever, she continued to be treated during some time at her own house by one of the surgeons of the dispensary.

While in the hospital I learned from her the following particulars of her history. The cutaneous affection came on when she was about two months old. She is one of six children, two brothers and four sisters, of which number a brother and sister, who are at present in America, have it in a worse degree than she; it (with the exception of the face and hands) covering the whole body. Her two other sisters, who are at present in Cork, have very fair skins. What she thinks very extraordinary is, that her father has been always free from the disease, though her grandfather (by the father's side, who died shortly after at the age of ninety-four) has it (face and hands excepted) on the whole body, it extending even to the inside of the wrists. He was born so, and it never left him. He never perspired. Had a fever at one time, but did not perspire in it. Had a remarkable redness of the face.* His hair was, as is hers, brown. She experiences no material inconvenience from the horny rigidity in the motion of the muscles and joints. Can turn in the bed. No rustling of the knees while walking. The eruption does not itch. In those parts where thickest it was wont to bleed, if torn off, and cause pain. On the legs it may be

* In the second account of Edward Lambert, published in the Philosophical Transactions, he is described as, "a good-looking well-shaped man, of a florid countenance, and when his body and hands are covered, seems nothing different from other people."

scraped off with a knife without causing pain, coming off there in scales. She tried, in three successive years, to bathe in the salt water, but was obliged to desist, the pain was so great. She never perspired. The hottest day in the year if she walked out she used to have a sense of pins and needles, but did not perspire. There was no diaphoresis while in fever in the hospital. Other functions are regular, catamenia and urinary secretion. She had been inoculated repeatedly in her childhood by a regular practitioner for small-pox, but never took the infection. Seven years since, while in America, where some of her family are settled, she had scarlet fever, and afterwards jaundice and yellow fever, having been sick of these different diseases during eight weeks. Previous to going to America she had had the fever of this country, with spots (petechiæ) on the skin. Was insensible in it for three weeks.

September 4. She called at my house to return thanks. The excrescences, she said, with the exception of a very few on the knees, had totally disappeared, having scaled off. She was still under treatment for the gangrenous sores by the dispensary surgeon.

I saw her again in July of following year (1830). She has had some return since of ichthyosis, which also affected her face; from this, however, the eruption was going off, as I saw like dandruff, attended, she said, with a smarting or stinging sensation. The eruption did not materially affect her good looks, as she appeared healthy and blooming. Had been seven or eight months without return of ichthyosis. It returned in May. Continually perspires at the present time.

I heard of her last in the following November, from one of the hospital nurses, who used to visit her once weekly. She informed me, that, in about a fortnight after I saw her in July, the eruption went off, and that her skin has been quite clear ever since.

The purgatives above alluded to, as given in the treatment of her case while in the hospital, consisted of powders of calomel and compound powder of rhubarb combined; of the former ten grains, of the latter twenty, followed at intervals with doses of *Olei Ricini*, *Ol. Terebinth.* āā ʒi, *e aqua pura*, ʒiss. The long-continued discharge from the gangrenous sores contributed probably much towards the removal of ichthyosis. A portion of the lobe of the right ear sloughed off.

2. Previously to the occurrence of the case now detailed, I had seen that of a boy of thirteen or fourteen, named Gainer, which was particularly remarkable, inasmuch as the palms of the hands and soles of the feet were affected. Upon taking his hand to feel his pulse, I was struck, startled indeed, by the appearance of the palm, covered with brown, rugged horny excrescences, conveying rather the idea of the hoof of a quadruped than of the human hand.

The palm of the other hand, I found on examination, was similarly affected, as were also the soles of the feet. Over the knee-joints, on the patellæ, the coating was so thick and hard as to represent a sort of knee armour. The intensity of the eruption on particular parts contrasted strongly with the immunity of the rest of the body, which was almost free. He was a healthy looking boy. His fever was slight. Said that other children of the family were affected in the same way, and that they were born so (connate).

3. In another instance, also, which occurred subsequently, that of a man whom I did not see, not having been under my charge, the palms of the hands, I learned, were similarly encrusted. The soles of the feet were not examined. The case has been reported to me by an intelligent servant of the hospital, then a grown boy. Passing through one of the wards, the man's shoulder being uncovered, he was struck by the appearance of the skin, particularly on the acromion, looking, he thought, like the skin of a hake. Remarking on the appearance with surprise to the nurse, she said "he was a scaly man." Observing next the palms of his hands blue (he was a weaver by trade, and his hands had become blue in the exercise of his art), he asked him why he did not clean his hands. He said he could not; that all he could do would not make them look clean; but that at a particular season of the year, the scales (though afterwards replaced), then coming off (shedding or moulting), they were less discoloured and smoother than at other times. The eruption was on his wrists, too, all around. Further my informant did not examine. This case, as well as that of Gainer's, is particularly remarkable, as the cases of a mother and child by Mr Cline in vol. ninth of *Medico-Chirurgical Transactions*, and another cited by Willan, that of a boy who was exhibited at the Hague in 1689, "whose hands and feet were all scaly, the rest of the body, except the head, being covered with a substance like the skin of the seal," are the only recorded instances I have met with, in which the palms of the hands and soles of the feet, though in some cases rougher than they ought to be, are stated to have been affected.

4. In 1834, a poor woman, an idiot, died of cholera after a short illness in the cholera ward, whose abdomen and thighs were, as reported to me by the nurses, affected with ichthyosis.

5. The last case which I saw was in July 1841, that of a lad of 18 years of age, named Kidney. His whole body, more particularly over the knee-joints, was covered with ichthyosis of a dusky brown hue. He never perspired. Said his mother's brother was subject to the disease, implying that his father and mother were not. This case, then, is remarkable, inasmuch as the taint did not manifest

itself in the direct ancestor, but in a collateral. In Mr Cline's cases, the taint was inherited directly from the mother by the child, a girl.

The rarity of the occurrence of cases of ichthyosis may be inferred from the fact, that of the thousands of patients who have been from time to time stripped and examined on admission into the hospital, these were the only cases that presented themselves.

6. Not long after the termination of the case of M. S., a person was exhibited in this city for money, under the denomination of "The Porcupine Man covered," it was said in the handbills, "with scales, representing the skin of the rhinoceros." The skin of the rhinoceros, according to some naturalists, is so hard as to be proof against a musquet ball. Upon visiting him, I saw that his face, the palms of his hands, and the soles of his feet, were smooth like those of other men, but that the entire surface of the rest of his body appeared to be covered with, or encased, as it were, in a mass of excrescences of horny or semi-horny matter, of a dusky brown colour; in some places flat and scaly, in others, prominent and wart like; cylindrical in figure; rising about half of an inch in height above the skin, standing at right angles to it, and so stiff and elastic that when ruffled by the finger, the noise might have been heard at a considerable distance;—suggesting, it seems, to the minds of some persons, the comparison of the rustling of the bristles or quills of the hedgehog.

He cast, he said, the horny matter twice every year, particularly in winter, and that the horny warts, tubercles he called them, were then an inch in length. It was now summer.* He cut off one of the tubercles quite close to the skin, to show to me that differently from warts no blood was drawn in consequence. Could bear the application of a lighted candle to the surface, particularly to the olecranon, a considerable time without feeling pain. He burned off a portion of the surface in my presence without feeling, he said, pain. He seemed rather an intelligent sort of person, and to have acquired some just notions on the subject of the pathology of his disease, remarking on the affinity of horn to nail, as well as to epidermis and hair. He said there were hairs where the horny matter was, but that they could not be seen. Upon my telling him that I had lately seen in one of the hospitals of the city a case in which the palms of both hands were incrustated with horny excrescences similar to those on him, he seemed to doubt it much, asking, were they at right angles to the skin?

He had visited, he said, several of the principal cities of Europe, and he had been examined, among others, by Cuvier.

* This casting the horny matter annually, as the lobster casts its crust or shell, occurred, too, it will have been perceived, in the instance of the weaver above mentioned.

The eruption first showed itself at about two months from birth. His father, grandfather, and great-grandfather, had been similarly affected. He was a native, he said, of Davies' Straits, (meaning of course that the first of his ancestors came from that quarter), where there was a whole tribe similarly affected. He said he was thirty-five years of age.

This man was evidently the descendant of Edward Lambert who was presented to the Royal Society in 1736, and whose case, as published in the Philosophical Transactions, has been above alluded to. He was probably the person who, much about the same time (see *Lancet*, April 27th 1833), presented himself to the members of the Westminster Society, having a similar condition of skin, and claiming the same hyperborean origin. Comparing dates, he must have been son to one of two brothers, grandsons to Edward Lambert, who were shown in Germany many years before, and of the accounts of whom, by Dr W. G. Tilesius, and by Blumenbach, an abstract has been published by Mr Lawrence.

The story of the first of the Lambert family having been found by the captain of a whaler in a savage state in the wilds of Davies' Straits, where was a whole tribe similarly covered, and (christened in the captain's name, Edward Lambert), having been ultimately brought to England, has been latterly treated as fabulous,—got up to excite the greater curiosity and wonder, by throwing an air of marvellous over the circumstances of his birth, in deducing it from that strange and inaccessible region.

Some years since I recollect a man was shown in this city for money, who was stated to be a native of Timbuctoo, in the interior of Africa, and who could gainsay it? The possibility of the existence of a tribe such as that mentioned cannot, however, be denied. Mr Lawrence was of opinion that a pair, in which both parties were so distinguished, might be the progenitors of a new variety of the race, which would be thus marked in all future time.

In every instance I have met with, a few excepted, in which it was yellow or yellowish, the colour of the integument in ichthyosis has been either a shade of brown or black. In the instance of another individual of the Lambert family, who presented himself at the Westminster Hospital in 1834, it was *green*. I take the account from a newspaper (*Cork S. Repr.*, February 6, 1834) extract from the *London Medical and Surgical Journal* of that date.

“He is completely covered with a green horny substance, in the form of quills, not dissimilar to those which are produced in the porcupine. The parts which have escaped the deformity are his face, the palms of his hands, and soles of his feet; every other

part of his person is abundant, out in a collateral. In Mr Cline's substance. He sheds his horns from the mother by the child, crop succeeds. He has been thus in fancy; and all the male members of his family ichthyosis may be in great grandfather, have been similarly well furnished who have been aged man, of very athletic and robust form of body; and into the health excellent, and his secretions very regular." The statement of the line of descent agrees with Dr Elliotson's account of the statement, in this respect, of an individual of the Lambert family who had been exhibited in Bond Street. "The disease," he stated, "was transmitted to every male, without exception, in the male line, but had never appeared in the females or their male offspring."

The instance, however, of the family of M. S. proves that ichthyosis does not always, in its hereditary transmission, privilege or spare the female sex; as also, that, like other hereditary diseases, it may cease in one generation to be transmitted to the next,—her father having been free himself, while of six children, three (two of them females), were affected.

The appearance of the skin in ichthyosis, though in general bearing considerable resemblance to that of a fish, whence the term ichthyosis, has, as seen and described by different observers, given scope to a variety of similes taken from other parts of the creation, one comparing it to the bark of a tree, particularly to that of the elm; another to the skin or hide of the rhinoceros, particularly about the legs (the skin of the rhinoceros is of a dusky brown); another, (Blumenbach), to the skin of the elephant, especially about the vertex and forehead; another to the armour of the armadillo. Among amphibia, it has been compared to the skin of the seal; and in the instance of the individual who presented himself at the Westminster Hospital, some observer of lively imagination might have compared it to the skin of the crocodile "coated in green scales." To the Lambert family seems to belong exclusively, in published works, the designation of the Porcupine Men and the Porcupine Family.

Prichard, in his *Researches into the Natural History of Man*, in concluding that there is no original difference between the skin of the European and that of other races of men, which gives reason to imagine a diversity of species in mankind, refers to the history of the porcupine family, as affording a curious illustration of the anomalies, which display themselves external to the true skin, and of the wide range of variation to which these external coatings of the human body, as well as the corresponding parts in the inferior animals are subject. In advocating, in the course of his work, the doctrine of the unity of the human species, he has produced, from particular tribes of the human family, instances of variation of colour, from white to black, and from black to

The eruption first showed in both complexions subsisting in the undoubted progeny of his father, grandfather, and grandmother stock.

He was a native, but facts adduced in support of this view of the question course that the first of his added the following, which I casually met with, stated to there was a whole been taken from an old writer, Mizaldus, who flourished five years about three centuries since. "Children are not always like unto

their parents, as may appear in Holidas, which did beget a daughter of an Ethiopian, which daughter was not of the colour of her mother; but afterwards the said daughter had a son which was black, and like to his grandmother. So Niseus the poet did degenerate in his colour from his father and his mother, and was like his grandfather, being an Ethiopian; which thing ought well to be considered of such as suspect their wives when they bring forth children unlike to either of them."

The species of ichthyosis which has been now considered is that of *Simplex*, as contradistinguished by nosologists from *cornea*, in which horn-like projections, in some instances of considerable length, issue from different parts of the body, mostly from the head; but, in other instances, from some singularly odd part, as from the thigh, immediately over the great trochanter, the posterior part of the leg, the buttocks, &c.; the abnormal deviation or deformity being such, as that those who have had the misfortune to be afflicted with it have been regarded as monsters. Sir Everard Home, in his paper in the Philosophical Transactions (vol. lxxxi.) is of opinion that these horns, which, in instances on record, have attained to the length of a foot, or nearly a foot, "are very closely allied to nails, both in their growth, structure, and external appearance; and when of some length, they are so brittle as to break in two upon being roughly handled, which could not happen to hoof or horn."

In their forms they present the most grotesque variety; in some instances inflected and contorted like a ram's horn, in others crooked like a sabre. On a minor scale, they have shot out at the extremities of the fingers or toes to the length of two or three inches, not straight, but incurvated like turkeys' claws, or the talons of birds of prey. They are sometimes shed and reproduced periodically.

Clarke, the ossified man, who was a native of this county, and whose skeleton, regarded as the finest specimen of exuberant ossification extant, is preserved in the anatomical theatre of Dublin College, had always, it is stated, a bony excrescence issuing out of his left heel, which sometimes grew to the length of about two inches; and when it shed, as a deer does its horns, it still continued to sprout as before. A knife and fork, or knives and forks, the handles of which were made from this bony spur-like deci-

duous excrescence, were long preserved as curiosities in the late Mayoralty House of this city. He was one entire bone from the top of his head to his knees. The ligaments, and, with the exception of four of his breast, which served to move the breast in respiration, the cartilages were all converted into bone. In this state of almost universal ankylosis, he dragged out a wretched existence for a number of years.

The disease is more frequent among females than among males. In instances which I have met with, two horns shown were stated to have been taken from an individual whose grandfather had been affected with the disease, indicating that it is sometimes hereditary. Amputation has been in some instances successful in permanently removing the deformity. In others it has failed, the excrescences afterwards sprouting forth anew. Chemically analysed, they have been found to consist of modified albumen.

II. *Hirsuties*.—1. In July 1832, a man was received into my ward as affected with fever, whose whole body, with the exception of the face and hands, was, I saw, covered with a preternaturally copious or exuberant growth of elongated hairs, certainly several inches in length. The resident apothecary, who examined him more particularly, said he thought that in some places they could not have been less than six inches long. This man said his father had been similarly affected, as were also both his brothers and their offspring. The hair grew on them all as they grew up; that is, it increased with their growth. With the exception of the chest, on which he had been blistered some time before, where it was white, it was every where *black*. He was rather a stout person, about fifty years of age. His fever was slight. Was dismissed as quite convalescent after a few days.

2. A case of *hirsuties*, still more intense, which occurred some years since in the East Indies, and the particulars of which, as taken from Crawford's Mission to Ava, are given in the London Medical Repository, vol. vi., N. S., appears to have excited much sensation in that quarter, as presenting an aspect somewhat ferine. "As connected with this department may be mentioned," says Mr Crawford, "the existence of a man at Ava, covered from head to foot with hair, whose history is not less remarkable than that of the celebrated porcupine man, who excited so much curiosity in England and other parts of Europe about a century ago. The hair of the face on this singular being (ears included) is shaggy, and about eight inches long; on the breast and shoulders it is from four to five. He is a native of the Shan country or Laco. He was presented to the King of Ava as a curiosity by the prince of that country. At Ava he married a Burmese woman, by whom he has two daughters; the elder resembles the mother, the younger

is covered with hair like the father, only that it is white or fair, as, his is now brown or black, however, being fair when a child like that of the infant. It is singular that in the father the teeth are defective in number, the molares or grinders being entirely wanting."

3. Instances are to be found, according to Prichard, of races bearing an exuberant growth of hair. "Among the Ainos, or in the Kurilian race, there are individuals who have hair growing down the back and covering the whole body;" though, he observes, it is probable that none of these national diversities exceed that measure of variety which occurs in the same nation in different families.

It is an opinion which has been long received that much hair or hairiness is indicative of strength. Swayed, it would seem, by this opinion, some physiologists have deprecated the customs of shaving the beard, and of cutting the hair of the head, as tending to weaken the powers of the body and mind. Bichat attributes the superior strength of the ancients to the custom of wearing their beards. The opinion is, however, combated by Bell in his *Anatomy*, from the observation of famous boxers being smooth, while dark and sallow people are hairy. In this point of view, the recent discovery of a wild man in the woods of Arcansas in North America, in which, it would appear, he has been living a considerable number of years, cannot fail to arrest the attention of the physiologist and metaphysician. He is described as "being of gigantic stature, the body covered with hair, and the head with long locks that fairly envelope his neck and shoulders." It is supposed that, having survived the earthquake disaster which occurred in 1811, and having been thrown up in it helpless on the wilderness, the wretched derelict grew up in his savage state, until, as last seen, he now bears only the outward semblance of humanity.

The preceding paper having related to hereditary or transmissible diseases, it may not be out of place to add a few words on those peculiarities of certain families, and even of whole tribes, and of whole nations, marked by inability to pronounce particular letters of the alphabet. Whole families cannot pronounce the letter R. I knew an instance of the existence of the peculiarity in a member of a family to whom it had been communicated by intermarriage with another family who had been remarkable for it. The author of the article "Lurette" in the *Dictionnaire des Sciences Medicales*, says that those who are deprived of the uvula cannot pronounce R. An eminent surgeon of this city told me, however, that he asked the question of a former patient of his who had lost it by syphilis, and that he said, he did not experience the inability. Mitford, in his *History of Greece*, speaking of Methone, says in a note (vol I., p. 214) "Pausanias writes this

this name Mothone, and among the Greeks it so remains to this day; but the Italians, unable to pronounce the Greek Σ , speak and write it Modon; the French, for the same reason, call it Modon. Humboldt in his Personal Narrative, vol. vii., has a note, in which he cites Navarette as saying "the etymology of the word Cannibal seems to me entirely cleared up by the discovery of the journal kept by Colon during his first voyage of discovery, and of which Bartholomew De La Casas has left us an abridged copy, "Dice mas el Almirante, que en las islas passadas estaban con gran temor de carib, y en algunas, los llamaban caniba, pero en la Espanola, carib, y son gente arriscata, pues andan per todas estas islas, y comen la gente que pueden haber." Humboldt in commenting on this passage observes, "In this primitive form of words, it is easy to perceive that the permutation of the letters R and N, an effect of the imperfection of the organs in some nations, might change carib into canib, or caniba." The word Shibboleth, now naturalized in the English language, was originally used among the Hebrews, as making a criterion by which the Ephraimites were distinguished from the Gileadites; the Ephraimites being unable to pronounce the ψ , pronounced the word Sibboleth.*

ART. III.—*Remarks on a pretended distinction of AMAUROSIS into functional and organic.* By WILLIAM MACKENZIE, M.D., Surgeon Oculist in Scotland in Ordinary to the Queen.

§ 1. *Origin and object of the following remarks.*

IN the course of a long experience in the treatment of eye-diseases, I have often been asked the question by patients affected with AMAUROSIS, or by their medical attendants with whom I was called to consult, whether, in the particular case before me at the time, I considered the disease to be *functional* or *organic*. As far as I recollect, I have never returned any answer to this question, because I did not understand the meaning of the terms, and, in particular, could assign no proper signification to the word *functional* so applied. I have often reflected, however, on the meaning which must be attached to the terms *functional* and *organic*, by those who use them under such circumstances; and shall now proceed to give the result of my thoughts on the subject.

§ 2. *Explanation of terms.*

As it is possible that the confusion which seems to attach itself to the notions of those who speak of amaurosis as being sometimes a *functional*, sometimes an *organic disease*, may be owing in a great measure to the ambiguity of words, which has long been ad-

* Judges, Chapter xii., verse 6.

mitted to be one of the greatest impediments to the advancement of knowledge, I shall set out by defining these terms.

1. *Function—functional.* *Function* (Lat. *functio*, from *fungor*, to perform an office or duty), signifies the executing, or discharging of an office. Digestion, in this sense, is the function of the stomach; circulation the function of the heart and blood-vessels; vision the function of the eye. Function, then, is nearly synonymous with *power*—*δύναμις*.

Functional signifies of or belonging to a function and is synonymous with *dynamic*.

2. *Organ—organic.* *Organ* (Gr. *ὄργανον*) signifies an instrument, machine, or engine—something which performs a certain work or office. The stomach is the organ of digestion; the heart and blood-vessels the organs of the circulation; the eye the organ of vision. Organ, then, is nearly synonymous with *structure*.

Organic signifies of or belonging to the organs, or *structural*.

What can be more plain than this, that the functions of the body are the offices or duties to be performed or executed by the organs of the body; that the organs of the body are the instruments which perform or execute the functions; that no function can be performed without an organ; that no organ can be without a function?

The functions of the body are not executed by solid parts alone, but also by fluids. Only a small portion of the body is solid; by far the greater portion is fluid. Whether combined with the solid parts, as in the nervous substance; or flowing through the body, as in the blood; the fluids form organs or parts of organs, and suffer changes,—organic changes,—from morbid causes as well as the solids. The blood has a structure as regular as the most solid texture in the body, and as surely susceptible of organic change from disease.

3. *Disease.* (Gr. *πάθημα*, *πάθος*, *νόσος*—Lat. *Morbus*, *Vitium*, *Ægrotatio*.) Little information is to be gained by referring to the etymology of the words employed in different languages to signify disease. *Πάθημα* and *πάθος*, from *πάσχω*, signified *whatever one suffered, or was affected with*, bodily or mentally. *Νόσος* and *morbus* are original words which we cannot trace. *Morbus* differed in signification from *vitium*, which we generally translate *deformity*, in as much as the latter is permanent, the former temporary. *Æger*, an original word signifying *weak, sick, ill*, gave rise to *ægrotatio*, *bodily sickness*, and *ægritudo*, *discomfort of mind*. (Sed propriè ut *ægrotatio* in corpore, sic *ægritudo* in animo nomen habet. Cic.) *Morbus* appears to have had such a meaning as *disease* generally has; *ægrotatio* to have signified a less serious complaint. (*Morbus* appellat totius corporis corruptionem; *ægrotationem*, *morbum cum imbecillitate*.—Cic.) *Disease* literally

signifies no more than the absence of ease, being compounded of ease. (Fr. *aise*), and the inseparable particle *dis*, (Lat. *di* or *dis*-Gr. *διὰ*) which has a privative or negative signification.

I presume we need not seek for any other definition of disease than that of Galen. It seems perfectly clear and correct:—"Disease is an unnatural state of the body, causing a disturbance of the functions."* According to this definition all diseases are organic. One or several of the organs are in an unnatural state, and the functions performed by these organs are disturbed or have ceased. This view of the matter is conformable to a first principle which I conceive it is impossible to overturn, namely, that the functions of life in all instances, whether of health or of disease, bear an exact ratio to the condition of the organs.

§ 3. *Inadmissibility of the distinction, functional and organic.*

That some diseases are functional, and that other diseases are organic, is a proposition which cannot be admitted; for, however much the effects may be manifested in the functions, the seat of the disease must be in the organs.

No cause, capable of exciting disease, can act upon a function, but only upon an organ or organs; nor can any change constituting a disease exist in a function but only in an organ.

Those who speak of functional diseases may have some association of ideas in their minds by which their language, which seems jargon to others, becomes to them intelligible. He who uses the phrase "functional disease," may figure to himself an increased or diminished, a perverted or abolished action or function; but surely it is impossible he can for a moment suppose such a state to be independent of some change in the parts whose duty it is to fulfil the function—a transient or removable change, a permanent or irremovable one—but still, in fact, an organic change.

To speak of a functional disease seems to be as absurd as if one were to assert that the orbit of the earth could be affected by the attractive force of the heavenly bodies. These undoubtedly act on the earth, and affect its course; and so may morbid causes affect the body, and derange its functions. But a functional derangement, independent of some organic change, can no more take place than a deviation in the earth's orbit, independently of causes acting on the earth itself. The functions of the human frame may be deranged; but nothing can produce this effect, except through the medium of the organs which perform the functions. A physician setting to work to speculate on the causes which might directly disturb the functions of the body would plunge into a set of errors as gross as those which the as-

* Ergo dictum est, morbum esse corporis statum quendam præter naturam, a quo actio læditur primum. De Symptomatum Differentiis, cap. i.

tronomer would encounter, who should begin to speculate on causes capable directly of affecting the figure of the earth's orbit.

I conceive, therefore, that those who have introduced the phrase "functional disease" have invented merely an unphilosophical and absurd way of speaking.

§ 4. *Necessary to refer to the writings of the Functionalists.*

As to those unacquainted with the subject, it may perhaps seem impossible, that any authors can have adopted such a division of diseases as that of functional and organic, it will be necessary to bring forward examples of the fact; and to draw from the writings of the functionalists, some illustrations of the strange results arising from the admission of the class of functional diseases. In doing this, we may have occasion to touch upon a variety of topics, having no other connection with amaurosis than this, that, as opportunity is but seldom afforded for an examination after death of the causes of this disease, we are obliged to ground our reasonings regarding it very much on the analogy of the organic changes which we observe in other parts of the body than those affected in amaurosis, and especially in other parts of the nervous system, and to endeavour to discover whether it is not ascribable to similar causes.

§ 5. *Dr Charles J. B. Williams, a functionalist.*

In the introductory lecture prefixed to his *Principles of Medicine*, London 1843, p. xxiv., Dr Williams speaks of disease as a "condition consisting of altered function and structure." If altered function is to be mentioned in the definition of disease, it ought to be placed after altered structure. A condition consisting of altered structure being admitted to exist, altered function must follow; although there may be cases in which it is difficult to point out the connection between the two; and although we may in certain instances recognise only the alteration of function without being able to point to the alteration of structure, and *vice versa*.

At page 2, Dr Williams states, that "health consists in a natural and proper condition and proportion in the functions and structures of the several parts of which the body is composed. From physiology we learn," says he, "that these functions and structures have to each other and to external agents certain relations, which are most conducive to their well-being and permanency; these constitute the condition of health. But the same knowledge also implies that function and structure may be in states not conducive to their permanency and well-being; states which disturb the due balance between the several properties or parts of the animal frame; and these states are those of *disease*. For

example, physiology, as well as experience, teaches us, that in health the digestion of the food is easy and without annoyance. But when after food is taken, there is pain, sickness, eructation, flatulence, or the like, we know that the *function* of digestion is changed from the healthy standard—is *diseased*; and if this diseased function continues long in spite of remedies which usually correct it—and if on examining the abdomen we find at or near the epigastrium a hard tumour, which anatomy teaches us is not there in health, we know that there is also *diseased structure*.”

In this general enunciation of the doctrine of functional and structural or organic disease, it is evident, in the first place, that the supposition, that pain, sickness, eructation, and flatulence are unconnected with any structural or organic affection of the stomach, is unsupported by the smallest particle of proof; and secondly, that another gratuitous supposition is admitted, still less likely to be true, if not altogether absurd, namely, that stomachic remedies correct a diseased function, just as if a function, whether healthy or disordered, were a substantive entity, acting independently and for itself, and not the mere duty performed by certain parts of the body.

It is curious to observe, that though the minds of the functionalists are warped in the most extraordinary manner by the doctrine which they have embraced, and of which the above extract from Dr Williams affords a pretty fair example, they are unable to shut their eyes altogether to certain glimmerings of the truth, which occasionally break forth amid their pathological dogmata, and which evidently lead them to doubt the authority, and sometimes to qualify the expression, of their first principles.

Thus, Dr Williams goes on to say, “We find, then, that there is *disease of function*, known by its deviation from a standard furnished by *physiology*; and *disease of structure* which we recognise by a standard supplied by *anatomy*. These varieties of disease,” adds he, “may be, and very commonly are, combined. There is seldom structural disease without some disorder of function; and in many instances functional disease is, or will be, accompanied by change of structure.” This admission, similar to others which we meet with in other authors, approaches to an abandonment of the distinction of functional and structural diseases, and verges to the truth, that all diseases must be both structural and functional, the structural change being the primary one, and the functional secondary.

Dr Williams, in the extract quoted from page 2, mentions the usual symptoms of dyspepsia, as those belonging to a functional disease. Several authors, as Abercrombie, Parker, and Dick, relate cases of severe dyspepsia, in which no morbid changes were observed in the stomach after death. Even were the anatomical

investigations in such cases commenced at a sufficiently early period after death, conducted with very great care, and aided by the microscope, it would be a hasty conclusion, to infer that there were no structural changes present, because no very evident ones were detected. The aspect of the mucous membrane of the stomach, and even the forms of the gastric glands, and of their vesicular contents, may seem normal, and yet their intimate structure be changed, and their functions consequently impaired. We know from Dr Beaumont's inspections of the living stomach, (in Alexis St Martin, a young man who had recovered from a gun-shot wound, which carried away part of the integuments and muscles of the left side and perforated the stomach), that the interior of this organ exhibits the most unequivocal signs of disease during attacks of dyspepsia,—signs, however, which it is conceivable might be scarcely, if at all, recognizable after death.

Dr Beaumont states that when it is empty, the rugæ of the stomach appear irregularly folded upon each other, almost in a quiescent state, of a pale pink colour, and with the surface merely lubricated with mucus; that on the introduction of aliment the action of the vessels is increased, the colour brightened, and vermicular motions excited; that the small gastric papillæ begin to discharge the gastric juice, a clear transparent fluid, and that this continues abundantly to accumulate as food is received for digestion. He found that if the mucous covering of the villous coat be wiped off with a sponge or handkerchief, during the period of chymification, the membrane appears roughish, of a deep pink colour at first; but in a few seconds the follicles and fine papillæ begin to pour out their respective fluids, which being diffused over the parts abraded of mucus, restore to them their peculiar soft and velvet-like coat, and pale pink colour, corresponding with the undisturbed portions of the membrane; and the gastric juice goes on accumulating and trickles down the sides of the stomach.

If the mucous covering be wiped off when the stomach is empty, or during the period of fasting, a similar roughness and deepened colour appear, though in a less degree; and the mucous exudation is more slowly restored. The follicles appear to swell more gradually. The fluids do not accumulate in quantity sufficient to trickle down as during the time of chymification. The mucous covering only appears to be restored.

So much for the appearances of the internal surface of the stomach in health.

In disease, Dr Beaumont observed this surface to present a variety of essentially different appearances.

In febrile states arising from whatever cause, (such as obstructed perspiration, undue excitement by stimulating liquors, or overloading the stomach with food,) and in those states where the

nervous system is said to be depressed or disturbed, (as under the influence of fear or anger,) the villous coat became sometimes red and dry, or at other times pale and moist, and lost its smooth and healthy appearance; the secretions became vitiated, sometimes mixed with bile, greatly diminished, or entirely suppressed; the mucous covering scarcely perceptible; the follicles flat and flaccid, with secretions insufficient to protect the vascular and nervous papillæ from irritation.

Under the circumstances in question, Dr Beaumont sometimes found eruptions, or deep-red pimples on the internal coat of the stomach; not numerous, but distributed here and there upon the villous membrane, and rising above the level of the mucous covering. The pimples were at first sharp-pointed and red; but frequently became filled with white purulent matter. At other times irregular, circumscribed, erythematous, red or purplish patches, varying in extent from half an inch to an inch and a-half in circumference, and occasionally exuding small drops of grumous blood, were seen on the internal coat. These appeared to Dr Beaumont to be the effect of congestion in the minute blood-vessels of the stomach. There were also seen at times, small red and tender aphthous crusts, in connection with the red patches. Abrasions of the lining membrane, like the rolling up of the mucous covering into small shreds or strings, leaving the papillæ bare, for an indefinite space, were not uncommon.

When these diseased appearances were considerable, and particularly when there were corresponding symptoms of disease, as drying of the throat, thirst, dry skin, accelerated pulse, &c., very little or no gastric juice was secreted, and none could be extracted from the stomach, not even on the application of food. In this condition of the stomach, drinks were immediately absorbed, none remaining two minutes after being swallowed; while food remained undigested for twenty-four or forty-eight hours or more, increasing the derangement of the whole alimentary canal, and aggravating the general symptoms of disease.

After excessive eating or drinking, Dr Beaumont observed, that chymification was retarded, the fluids became acrid, sharp, and purulent, so as to excoriate the edges of the aperture left open by the wound, and almost invariably to produce aphthous patches. Whenever this morbid condition of the stomach occurred, there was generally a corresponding appearance of the tongue, which became furred and dry, and covered with a whitish, yellowish, or yellowish-brown coat. At these times, the patient complained also of headach, vertigo, heaviness and pain in the eyes, dimness of sight, pain and distress about the *scrobiculus cordis*, lassitude, and loss of appetite. His countenance became sallow, and his bowels slow.

Dr Beaumont remarks, that the morbid changes of the mucous surface of the stomach were seldom indicated by any ordinary symptoms or particular sensations, unless when in considerable excess, or when there were corresponding symptoms of a general affection of the system. They could not, in fact, he says, in most instances, have been anticipated from any external symptoms; and their existence was ascertained only by ocular observation. "It is interesting," adds he, "to observe to what extent the most important organ of the animal system may become diseased, without manifesting any external symptoms of such disease, or any evident signs of functional aberration."* *A fortiori*, in those cases of ailment of the stomach, which are attended with severe and long continued pain, acidity, want of appetite, vomiting, &c., how much more serious must the organic changes be! These changes, however, may not be evident to inspection after death; as they affect structures, which more than perhaps any other in the body, tend rapidly to alter their appearance as soon as life is extinct.

Catarrh, as well as dyspepsia, is an organic disease. After catarrh, the epithelium of the affected membrane is always produced afresh, and not unfrequently portions of the membrane itself have suffered so much as to require reproduction. Gerber states, that "should the mucous glands and the mucous follicles be altered in a less degree than the epithelium," then the discharge, besides the usual mucous-corpuscles and granules, contains a large addition of newly-formed small lenticular cells, instead of the usual older elements of the epithelium, who are large squamous granulated cells or cylinders. In these newly-formed small lenticular cells the nuclei are often recognised with difficulty, and this makes them look extremely like large exudation-corpuscles; from which, however, as they differ essentially, they are soon distinguished. Among these young epithelial cells we occasionally observe," says he, "true pus-corpuscles."†

That similar organic changes affect the other portions of the mucous system in their various diseases can admit of no doubt.

That many diseases, hitherto accounted functional, from no organic change of parts having been detected attending them, depend on abnormal states of the cells, which constitute so large a portion of our organs, and the contents of which are as various as the functions which the cells discharge, is extremely probable. The development, the multiplication, the transformation, and the degradation of cells, are all of them interfered with by the causes of disease. Cells, like the elements of the blood, are in a state of perpetual change, and are therefore much more likely to

* Experiments and Observations on the Gastric Juice, and the Physiology of Digestion, pp. 103, 107, 109, 138, 158, 172, 182, 238, 240. Plattsburgh, 1833.

† Elements of General Anatomy, translated by Guilliver, p. 102. London, 1842.

be the seat of disease than parts of a permanent character. The diseases of cells, though affecting parts extremely minute, and therefore requiring peculiar methods of investigation, evidently come under the head of organic affections. Nor must it be forgot that the formation of many pathological structures is but an imitation, or even a repetition, of the process, by which healthy tissues are formed by cells.

§ 6. Dr Prout's division of Diseases.

Dr Prout, in his work on the Nature and Treatment of Stomach and Urinary Diseases, tells us, that "Pathology, or the doctrine of diseases in general, is naturally comprised under three great heads or divisions, viz. *Functional diseases*, or those derangements arising from abnormal actions of one or more organs of which animal bodies consist: *Organic diseases*, or those diseases arising from actual lesions of one or more of the organs themselves: and *Mechanical diseases*, or those diseases arising from mechanical causes; such as from the imperviousness or destruction of organs by disease; or from the presence of foreign bodies, as for instance, of calculi, &c. in the kidney or bladder. As, however," he goes on to say, "we rarely find diseases exclusively belonging to either of these three great divisions; and as the two last divisions in particular are almost always associated in those diseases of assimilation and of secretion which form the chief objects of this volume, we shall consider the subject under two general heads only, viz.

"*Functional diseases*; or those diseases arising from the deranged operations and less obvious lesions of the assimilating and secreting organs; and

"*Mechanical diseases*; or those diseases arising from obvious lesions of organs; and from the presence of foreign bodies, as of calculi in the bladder, &c."*

The reflecting reader cannot help being staggered at the twofold and contradictory explanation of the word *functional* in these two classifications, exactly as "if a man should pretend to make use of a rule and bend it crooked,"† to answer his own purpose. In the first classification, the term *functional* is applied to "diseases arising from abnormal action of one or more organs;" in the second, its meaning is entirely changed, for it is applied not merely to "diseases arising from the deranged operations," but to those depending on "less obvious lesions of the assimilating and secreting organs."

* Prout on the Nature and Treatment of Stomach and Urinary Diseases, p. 1. London, 1840.

† "Ομοίον γὰρ, καὶ ἡ τις, ὅ μίλλαι χρῆσθαι καίονι, τοῦτον ποίησαι στρεβλόν. Aristoteles de Rhetorica, Lib. ii.

Here, I must observe, that it is a well known law in science, that magnitude forms no basis for classification. A lesion's being more or less obvious, affords no ground for the distinction of functional and mechanical diseases, adopted by Dr Prout. The being more or less obvious depends entirely on the greater or less degree of pains bestowed by the pathologist in his examination of diseased organs, and on the greater or less capability of the human senses, with their appliances, to detect morbid changes in minute organizations.

We are not satisfied with the mere naked eye in our attempts to discover diseased structure, but employ the microscope, which often displays changes in the form of minute parts, which the naked eye could never detect. But even when no morphological lesion is detected, we cannot conclude the structure to be free from organic disease. That there may be organic lesions of many parts of the body, which, from the minuteness both of the parts affected and of the alterations produced in disease, have hitherto eluded discovery, is generally admitted. Even Dr Prout speaks* of "obstinate functional affections, depending on lesions of the nervous system imperceptible by our senses,"—an expression tantamount to functional-organic disease.

§ 7. *Lobstein distinguishes diseases as dynamic and organic, attributing the former to injury of vital properties—Hartmann's remark on the term dynamic.*

Lobstein admits "two sorts of diseases; in the one, the vital properties only are injured; the others consist in a perceptible change in the structure of the organs." He calls the former *dynamic*, and the latter *organic*.†

At page 25, he speaks of the vital principle acting in diseases; exalting the properties of the different systems in fever, inflammations, and all acute affections; directing the morbid work, and leading on to crises.

The terms "vital principle," and "vital properties," to an injury of which principle or properties Lobstein refers functional or dynamic diseases, have been used to express the cause of all those actions in the living body which cannot be referred to any other general principle. Various phenomena, observed in the living body, which are referrible to the laws neither of mechanics nor of chemistry, are ascribed to the vital principle or vital properties. But these phrases have no meaning other than this, that the cause of the phenomena in question is neither mechanical nor chemical, but of an unknown nature. "These phenomena," remarks Dr

* Prout on the Nature and Treatment of Urinary Diseases, p. 176. London, 1840.

† *Traité d'Anatomie Pathologique*, Tome i. p. 35. Paris, 1829.

Bostock, "differ essentially among themselves, so that if we make this want of resemblance the bond of union, we proceed upon the fundamentally erroneous plan of generalizing specific differences, or of associating phenomena, not because they resemble each other, but because they cannot be reduced under any other class." *

No distinct account is given of the nature of the vital principle, nor can be, seeing it must vary greatly in different organs of the body. For instance, digestion, not being explicable upon mechanical or chemical principles, is attributed to the agency of the vital principle; it is said to be the vital principle which enables the blood, while circulating through the body, to resist decomposition; neither fermentation, nor filtration, nor any other mechanical or chemical hypothesis throwing any light upon secretion, it is referred to the vital principle—an entity of whose existence we have no independent evidence, no conception of its mode of operation, no knowledge of any general laws by which it is directed. How, then, can we pretend to refer the cause of disease to a lesion of the vital principle?

Lobstein goes on to say (p. 35) that in dynamic diseases, as he styles them, "the physiological properties (irritability, sensibility, contractility, &c.) are either exalted, or weakened, or deranged, without our being able to perceive in any organ the smallest alteration of form, aspect, structure, &c." Now, as I have already remarked, our being or not being able to distinguish organic changes, may depend on the state of our organs of observation, and the degree of pains we take in applying them. But that irritability, sensibility, or contractility can be exalted, or enfeebled, or deranged, independently of changes in the organs possessing these properties, is a proposition contrary to reason.

In the next page, he asserts, that "the primitive affection of the vital properties constantly precedes the change of structure, however slight it may be, and that every disease is essentially dynamic before becoming organic." I have already explained that I hold the reverse of this to be true. Every morbid cause must operate on organs, not on functions—on the living structures, not on the powers which these structures possess, nor on the actions which they perform. At the same time, it is proper to observe, that organic changes may be either primary or secondary. The primary changes are those which immediately ensue on the application of any morbid cause, and which give rise to the first functional derangements observable in any disease; the secondary are those which ensue from continued disease, ending in many instances in complete disorganization of the structures affected, and of course interrupting more and more their functions. For example, the external causes

* Elementary System of Physiology, vol. ii., p. 191. London, 1828.

which excite inflammation, (such as inflammation of the conjunctiva), have been supposed to act, in the first instance, on the nervous system, so as to suspend the supply of nervous influence to the small vessels, and to lead to the dilatation of these vessels, to a retardation in the flow of blood through them, and to its stagnation. These primary organic changes in the sanguiferous system, (whether arising from a previous organic change in the nervous system of the part or not, we shall not now stop to inquire), are speedily attended by redness and swelling, followed by the functional derangements of heat and pain. After a time, secondary organic changes not unfrequently ensue, such as secretion of pus, ulceration, &c., which are attended in their turn by another train of functional phenomena. Lobstein would attribute the first step in inflammation to an injury of the vital properties of the part affected. It seems a more correct and satisfactory view of the matter, that the dilated state of the small vessels, and the retardation and stagnation of the blood, which are the earliest organic changes discoverable by the microscope in a part artificially excited to inflammation, are owing to a diminution of nervous influence, and this to an organic change in the nerves which supply the vessels, produced by the exciting cause of the disease.

To attribute any disease to an injury of the vital principle is a mere waste of words, without any meaning whatever. Life, the vital principle, or the vital properties, are always associated with, and dependent on organization; and it is this which suffers primarily in every disease. True it is, that in the ovum, life precedes the development of most, nay, of all the organs of the body as they exist in the foetus at birth; but still life is from the first moment of conception associated with structure, and dependent on the organization of the germinal vesicle and germinal spot; and it is a degeneration of these or of some of the other structures of the ovum, not any lesion of the living principle, which gives rise to the abnormal conditions so frequently met with in the foetus, when it is expelled, and especially when it is expelled prematurely, from the uterus.

With respect to the term *dynamic* as applied to diseases, Hartmann makes the following judicious remark:—"Ut omnis evitetur confusio, monendum hic erit, non strictissimam hic esse vocabuli *dynamici*—significationem; neque sub morbis dynamicis meram solius efficientiae vitalis adfectionem, ab omni mutatione materiali liberam, intelligi; inter vires enim et materies corporis vivi arc-tissimus intercedit et necessarius nexus, ita quidam ut singulas scorsim mutari penitus repugnat."* How much better to dismiss such terms as *functional* and *dynamic* altogether from medical

* *Theoria Morbi*, p. 63. Vindobonæ, 1828.

language, than retaining them, to be obliged to qualify so much their signification.

§ 8. *Dr Billing, a functionalist—his extraordinary views of disease—Opposite and correct views of Andral.*

Dr Billing's First Principles of Medicine is a work replete with valuable and pithy practical remarks, but is not free from objections on the score of functionalism.

For instance, in the first page of his work, Dr Billing, after stating that "the very first step towards treating disease successfully is to ascertain, as far as possible, the nature of the *alteration* which has taken place in the *seat* of the *disease*, or what has been called, technically, the *proximate cause*;" and that "in default of this knowledge, which is sometimes unattainable, we can only depend upon analogies drawn from what we know to be the fact in other cases, and from *physiology*, which is a careful *observation* of the *phenomena* resulting from the *functions* of the different *parts in health*;" goes on to say, that "an accurate knowledge of the *functions* in their healthy state is the more necessary, because considerable deviations from the ordinary routine occur without disease; and as they are frequently much disturbed without any discoverable alteration in the structure of the organs having taken place, morbid anatomy alone will not be sufficient to elucidate all causes of disease; whilst, on the other hand, it is necessary to be aware that a considerably diseased change of structure may exist with little or no interruption of function."

Here we have three separate propositions.

To the third, namely, that "a considerably diseased change of structure may exist with little or no interruption of function," we cannot assent. It is true, some organs will bear, with apparent impunity, very great organic changes—even the brain sometimes seems to do so, but that interruption of function must follow change of structure is a self-evident proposition. The interruption of function may, indeed, not be indicated by any very evident symptoms, but still it must exist. No part of the frame is made without its use. No organ can be altered in its structure by disease, and retain its function in all its integrity.

The second proposition, that the functions are "frequently much disturbed without any discoverable alteration in the structure of the organs," may be admitted to be true, with this qualification, that the alteration not being discovered is no absolute proof that it does not exist, but only, that the method or the means used in the investigation have not been sufficient to detect it.

The first proposition, that "considerable deviations from the ordinary routine [of the functions] occur without disease," is just as much as if we were to say, that considerable disease occurs

without disease; for the very definition of disease is, that it is deviation from the ordinary routine of the functions. No one but a functionalist could admit so extravagant a proposition as this.

In place of the paragraphs quoted above from Dr Billing, let me substitute the following propositions;—

1. The alteration which takes place in the seat of any disease is its proximate cause.

2. To ascertain this alteration is not in all cases attainable by our present methods, and with our present means, of investigation.

3. To call a disease *functional* or *dynamic*, because the nature and seat of the alteration upon which it must depend, is unknown, would be equivalent to saying that it had no proximate cause.

4. When the alteration is not detected, we may sometimes venture to conclude from analogy, what is likely to be the proximate cause.

5. We may draw conclusions also from the deranged state of the functions, as to the organ affected, and the probable nature of the alteration, or proximate cause.

6. No derangement of function can happen, without an alteration, transient or permanent, in the organ which performs the function. But the alteration may not be discoverable during life, nor after death.

7. No diseased change of structure can exist without a corresponding interruption of function. But the interruption may be observed, neither by the patient nor by the practitioner. It may produce no pain nor lameness, but it must more or less impede the function which the affected organ is destined to perform.

These views, which I would substitute for the strange and extravagant assertions of Dr Billing, are identical with those of Andral, who, speaking of nervous asthma, remarks that "science possesses a considerable number of observations which prove that an alteration of the nervous system of the respiratory apparatus produces the functional disorders which characterize nervous asthma. But," asks he, "can these functional disorders exist independently of all alteration?" To this he replies, "To my mind it is clear that every disorder of a function must have for cause an alteration in the organ; but we think also, that these organic alterations are not always appreciable."*

The same author remarks, that when "anatomical disorders are not perceptible, we must not hasten to the conclusion that they do not exist, for upon this subject, science must be regarded as only provisional. "What do we know, in fact," he asks, "in pathological anatomy? Lesions of texture, of form, of colour, but nothing farther. And regarding the alterations of the fluids,

* Cours de Pathologie Interne, Tome i, p. 53. Paris, 1836.

what do we know? Some states which are not normal, that is all." *

To return to Dr Billing, at page 148, we find him opposing "functional debility" to "real debility of the frame." Yet, wherein lies the difference? In the weakness of fever, is it not the frame which is debilitated, just as much as in weakness brought on by starvation, or by hæmorrhage?

At page 182, he speaks of nervous diseases, such as morbid sensibility, or what others term irritation, depending "upon an alteration of the dynamic state of the nervous tissue." We can conceive the state of the nervous tissue to be altered, and consequently its power to be affected; but a change in the power without a physical alteration of the tissue, though quite conformable to the views of the functionalists, is impossible.

§ 9. *Abernethy distinguishes disorder from disease—Dr Venables' views of organic disease.*

Mr Abernethy has made some remarks on the meaning of the words disorder and disease.

"Disorder," says he, "I shall define to be an unhealthy state of the feelings or functions of parts, without any apparent alteration of structure; and disease, a visible alteration in the appearance or structure of the affected part: disorder is nervous; disease is the effect of vascular actions, excited by nervous disorder; an organ may become diseased to a certain degree, and yet disorder ceasing, its feelings and functions may be natural and healthy, yet disease may have a tendency to establish disorder.†

Disorder, in Mr Abernethy's language, is synonymous with functional disease of some other authors. His statement is, that disorder is attended with "no apparent alteration of structure," while in disease, there is "a visible alteration in the appearance or structure of the affected part." The circumstance of the alteration being apparent or not, is quite an insufficient basis for the distinction he attempts to draw between disorder and disease. In fact, his introduction of the word "apparent" into his definition, would lead us to suspect that he acknowledged an imperceptible organic change as a necessary antecedent to what he calls disorder, and what others would term functional disease.

The assertion, that "an organ may become diseased to a certain degree, and yet disorder ceasing, its feelings and functions may be natural and healthy," is a contradiction in terms; it amounts to an admission that a part may be both diseased and healthy at the same time. If a part be diseased, its functions must suffer, perceptibly or imperceptibly.

* Cours de Pathologie Interne, Tome i., p. 13. Paris, 1836.

† On the Constitutional Origin and Treatment of Local Diseases, p. 247. London, 1829.

Such are the strange notions to which functionalism sometimes conducts its followers!

What Mr Abernethy calls disorder is the same state, I presume with that which Sir Astley Cooper styles "irritation"—the *first* degree of disease, but still the result unquestionably of organic change. The *second* degree is inflammation and its sequelæ. The *third* degree includes permanent alterations of structure—"those alterations," to use the words of Dr Venables, "which render the structure more than useless, for it becomes a perpetual source of irritation, and generally speaking ultimately proves fatal."

The author last mentioned has subjoined to his Clinical Report on Dropsies, an appendix, On the Theory and Treatment of Organic Disease in General, containing many judicious remarks,

Setting out with the principle that "to suppose that an organ can be functionally deranged without a corresponding change in its structure, would be to imagine an effect without a cause," (p. 143.), he admits the three degrees of change to which I have just alluded.

The *first* change, which is usually considered nervous, he thinks may in some cases be referred to minute alterations in the blood. The *second*, or inflammatory, he traces in many instances to errors in digestion, following on this point the views of Dr Philip. The *third* degree embraces those incurable alterations of structure, which arise from the former degrees, and wholly unfit the organs affected from fulfilling their functions.

§ 10. *Confused classification of eye-diseases by Chelius.*

As a specimen of the confusion, to which the adoption of the division of diseases into functional and organic, must necessarily lead, I may refer to Chelius' classification of eye diseases.

In his "*Handbuch der Augenheilkunde*," he divides the diseases of the eye into two classes, viz. dynamic and organic.

Under the former, he includes inflammations and nervous diseases; under the latter, all those diseases which consist in a change of the normal form, position, composition, and structure of the parts belonging to the eye, or in the presence of foreign bodies.

The ophthalmiæ, then, in which take place such evident changes of structure, are classed among the dynamic diseases. Even collections of pus in the eye are brought under this head; while other sequelæ of the ophthalmiæ, such as synchia, prolapsus of the iris, opacities of the cornea, &c., are separated altogether from the diseases in which they originate, and are classed as organic affections.

Between the ophthalmiæ and the organic diseases of the eye,

we have the neuroses, which comprehend, among other disorders, myopia, presbyopia, myodesopia, and amaurosis, all of which are dependent on organic affections.

Such is a specimen of the confusion, to which the adoption of a system not founded on true first principles, must infallibly lead.

§ 11. *Mr Travers' definition of Amaurosis—his classification of the Amauroses—his enumeration of the causes and symptoms of Organic and Functional Amaurosis.*

As one of the earliest as well as one of the most elaborate expositors of that view of amaurosis, which regards it as in some cases functional, in others organic, Mr Travers claims a more than ordinary attention.

"The term amaurosis," says he, "comprehends all those imperfections of vision which depend upon a morbid condition, whether affecting structure or function, of the sentient apparatus proper to this organ."*

Had I not already commented upon similar statements, I should be disposed to say, that the enigma of the sphinx was nothing, compared to this definition; for although the one set of imperfections of vision, namely, those depending upon a morbid condition of the *structure* of the sentient apparatus of the eye are readily comprehended, the other set, which are said to depend upon a morbid condition of the *function* of the same apparatus, are, without some explanation, and some modification of the terms here used, altogether beyond my conception.

Mr Travers tells us, that amaurotic affections differ in kind, and that this affords a scientific basis of classification. He divides them into two classes, the organic and the functional. "The first comprehends," he says, "alterations, however induced, in the texture or position of the retina, optic nerve, or thalamus. The second includes suspension or loss of function of the retina and optic organ, depending upon a change either in the action of the vessels, or in the tone of the sentient apparatus."†

To vindicate such appellations as *organic* and *functional*, the former class should comprehend amauroses depending on changes of texture, and the latter amauroses independent of such changes. Mr Travers' second class depend on a change in the action of the vessels, which nourish the nervous optic apparatus, or a change in the tone of the nerves. We may admit congestion and inflammation as results of changes in the vessels, although not in their action alone; but the tone of a nerve is rather mysterious, nerves being parts whose functions appear in no degree dependent on elasticity, or any power of contraction or extension. By the tone

* Synopsis of the Diseases of the Eye, p. 293. London, 1820.

† Ib. p. 139.

of a nerve is meant, in fact, its health. When it is said that the tone of a nerve is changed, it is meant that it is in a state of disease, which is equivalent to saying that its action, composition, and structure are changed.

As causes of organic amaurosis, Mr Travers enumerates—

1. Lesion, by which he means wounds, extravasation of blood, inflammatory deposition upon either of the surfaces of the retina, (he might have added “or into the substance” of that membrane), and loss of transparency of the retina. Loss of transparency must here be taken as a sign of some other organic change, probably the result of inflammation, for mere loss of transparency can scarcely be deemed in itself a sufficient organic cause of amaurosis.

2. Morbid growths within the eyeball, dropsy, atrophy, and all such disorganizations as directly oppress or derange the texture of the retina. I cannot say, that Mr Travers shows much address, in thus enumerating as a particular cause, a whole host of organic causes of amaurosis; for how many of them fall under the head of disorganizations oppressing or deranging the texture of the retina! Neither can it be admitted, that dropsy of the eye, or morbid growths within the eyeball, come legitimately among the causes of amaurosis; for on such diseases presenting themselves to our observation, although we found vision impaired or destroyed, we should never call them cases of amaurosis, but say this is a growth within the eye, this is a dropsy of the eye. It would clear the subject, then, to dismiss this second division of the causes of organic amaurosis, so far as it comprehends diseases of other textures than the retina. Atrophy of the retina, and neuromata and other depositions in that membrane, constitute, of course, an important division of the organic causes of amaurosis.

3. The state of apoplexy, hydrocephalus, tumours or abscesses in the brain, in or upon the optic nerve, or its sheath, and thickening, extenuation (by which is meant, I presume, attenuation), absorption, or ossification of the latter, *i. e.*, of the optic nerve or its sheath.

Such are the causes of organic amaurosis, as classified by Mr Travers.

The causes of functional amaurosis he enumerates in two divisions. His *first* division comprehends—

“Temporary determination; vascular congestion or vacuity, as from visceral and cerebral irritation; suppressed, or deranged, or excessive secretions, as of the liver, kidneys, uterus, mammæ, and testes; various forms of injury and disease; and sudden translations of remote morbid actions.”

This first division of the causes of functional amaurosis includes fulness of vessels and emptiness of vessels,—hyperæmia and

anæmia of the optic nervous apparatus. It includes these affections, whether they be idiopathic, sympathetic, or symptomatic; that is to say, whether they depend directly on the state of the optic nervous apparatus, or arise indirectly from disorder in some remote organ; and whether they constitute an original and independent disease, or are merely a part or consequence of a similar disorder of the brain. A local excess of blood, or hyperæmia, and a local want of blood, or anæmia, are generally admitted by pathologists as causes of disease. It appears certain, that suppressed vascular or secretory action, in any one organ, is apt to be followed by determination to other organs, and especially to the brain. May it not often be the case, however, that the determination of blood to the brain is the precursor, and the remote cause, of the suppressed secretion or circulation in other organs?

Admitting the reality of cases of amaurosis arising from the causes here indicated by Mr Travers, how much more simple and true would it be to call the disease *vascular amaurosis* than *functional*—the one variety being hyperæmic and the other anæmic!

The question remains, how far such varieties of amaurosis are to be regarded as organic diseases. I do not know, that dissection or microscopical examination has thrown any particular light on the state of the capillaries in hyperæmia or anæmia. It appears to be the common opinion, that the state of the vessels in congestion and determination of blood is essentially the same (only different in degree) as that in inflammation. An "enlargement through growth," which Mr Mayo considers* likely to be an effect of continued local determination, or even a "relaxation of the coats" of the vessels, which he regards as the primary cause of such an affection, would come properly under the head of organic changes. But independently altogether of the state of the vessels, the blood itself is an organ, and its plenitude or scantiness an organic disease of the very highest importance.

Upon this subject, the following remarks of Mr Lawrence are worthy of attention. Speaking of the division of amaurosis into organic and functional, he says, "If we could see the parts, it might not be so easy as the familiar employment of these terms implies, to establish the distinction in question; for medical inquirers have not yet determined the exact limits of the change which they call organic. We apply the epithet functional to those diseases which produce no changes in a part recognizable after death. But we cannot infer in these cases that no alteration had existed during life. The state of an organ necessary to the correct execution of its function is a living not a dead condition; it requires not merely a certain organization as we find it after death, but a supply of healthy blood in a certain quantity, a natural state

* Outlines of Human Physiology, p. 53. London, 1837.

of nervous influence and sympathy, and perhaps other circumstances not clearly understood. If all these conditions are combined, can we consider it possible that the function should be disordered or interrupted? If one or more should be altered or wanting, can the disease be properly regarded as simply functional? Vascular congestion is an obvious deviation from the normal state of a part. If the retina, or any other organ, be said to be functionally disordered, when its vessels appear twice as numerous and large as in the normal condition, the expression must be employed too loosely to convey any clear information. Some restrict the term organic to alterations in the essential structure of an organ, thus excluding changes in the state of circulation, even although they should be visible after death. Since, then, the epithets organic and functional are indefinite, being employed in different senses by different persons, since they do not denote, generally, well ascertained and clearly understood conditions of parts; and since the situation of the nervous apparatus of sight renders it impossible for us to know its exact state in most instances, I consider this distinction of amaurosis to be of little practical utility, but from its vagueness rather calculated to mislead.”*

Mr Travers' *second* division of functional amauroses comprehends—

“Paralysis idiopathica, suspension or exhaustion of sensorial power from various constitutional and local causes; from undue excitement or exertion of the visual faculty; and from the deleterious actions of poisons on the nervous system, as lead, mercury, &c.”

The ancients applied the term *paralysis* to a loss of motion, of sensation, or of both. There is no inconsistency, therefore, in using it to signify a diminution or destruction of sensorial power. By the epithet *idiopathica* is probably meant independent of pressure on the optic nerve. Mr Travers, in fact, goes on to show that this is his meaning, for he uses the name *idiopathic paralysis* as synonymous with suspension or exhaustion of sensorial power, and attributes this suspension to two causes, in particular; viz., undue excitement or exertion of the optic nerve, and the action of poisons, both of which are generally admitted as causes capable of producing amaurosis. How these two causes act, and whether they produce amaurosis in one and the same way, are important questions. Such expressions as suspension of sensorial power, exhaustion, and fading, throw no light on the subject.

Excitement or over-exertion of the retina is likely to produce determination of blood to that membrane, congestion, inflammation—

* Treatise on the Diseases of the Eye, p. 508. London, 1841.

tion, and ultimate atrophy, all of which I consider as organic affections.

Lead and mercury do not probably act in one and the same way, in producing amaurosis. Amaurosis from lead is attended by colic, vertigo, headach, epilepsy, deafness, and various other symptoms, few or none of which attend amaurosis from mercury. The organic changes, therefore, produced by these two poisons are likely to be different. Other poisons, and especially narcotic vegetable ones, such as opium and belladonna, undoubtedly act partly by producing congestion; but besides this, each of them has its own specific effects on the optic nervous apparatus,—effects not less certainly organic, that in general they are but of temporary duration.

Before proceeding to enumerate the symptoms by which organic and functional amauroses are to be discriminated, Mr Travers makes an incidental remark or two, which deserve notice. He states:—

1. That organic amaurosis is incurable.
2. That many forms of functional amaurosis are incurable.
3. That functional, by continuance, lapses into organic amaurosis.*

Now, amongst the causes of organic amaurosis, Mr Travers enumerates extravasation of blood upon the retina, and apoplexy, neither of which conditions are absolutely incurable. The incurability of any of the amauroses enumerated as functional by Mr Travers, must be owing entirely to the cause being truly organic. The admission, that functional lapses into organic amaurosis, taken in connection with what he afterwards states, namely, that a great source of difficulty “is the circumstance of many symptoms being common to both classes,” is a partial acknowledgement of the defective grounds of his classification.

Mr Travers also enumerates the following as certain sources of irritation which he has known to produce functional amaurosis—that is, loss of vision, although the eye is “sound, and the orbit untouched;” viz.

1. Wound of the scalp, involving branches of the fifth nerve.
2. Caries of the skull.
3. Abscess and caries of the *antrum maxillare*, with excessive œdema of the integuments of the lids and cheek.
4. A large abscess under the masseter and muscles of the cheek.
5. An abscess at the extremity of a molar tooth, while the crown of the tooth was sound.

To these he adds the following seven other causes of functional amaurosis, which he says “are sufficiently obvious.

6. Excessive use or abuse of the visual faculty.
7. Disordered stomach, liver, uterus, &c.
8. Sudden and alarming depletion.

* Op. cit., p. 508. London, 1841.

9. Excessive or obstinately suppressed secretions. 10. Difficult dentition. 11. Worms in the intestines. 12. Deleterious effects of noxious agents on the eye or the system.

From the indefiniteness with which it is expressed, it is not easy to judge of the twelfth of these causes. The sixth acts directly on the optic nervous apparatus. So also may the eighth. The remaining nine must act sympathetically, or by a reflex operation, on the organ of vision. In investigating cases of amaurosis arising, or supposed to arise, from such causes as an abscess connected with the fang of a tooth, care must be taken to ascertain whether the reflex affection is not one rather of inability to use the eye; from a morbidly exalted degree of common sensibility, or an impeded mobility, than one of diminished power of vision; a reflex disease, in fact, of the ophthalmic division of the fifth nerve, or of the third, rather than one of the second.

Just as positively as Mr Travers believes, that the twelve causes above enumerated are capable of extinguishing vision, while the eye and optic nerve remain sound, I believe this to be impossible; but that in every one of the instances mentioned, there must be some change in the condition of the optic nervous apparatus, sufficient to produce at least temporary blindness. It is inconceivable that such a cause as an abscess at the fang of a tooth could produce blindness, while the optic nerve remained sound; but it is not difficult to comprehend that the painful affection of the branch of the fifth nerve, connected with the tooth, might by a reflex action, so exalt the sensibility of the ophthalmic branches of the same nerve, that any attempt to use the eye was attended with excruciating pain, or so affect the branches of the third or sixth nerve, that they were rendered unable to communicate the necessary stimulus for moving the muscular parts, either external to the eyeball, or placed within it, and which are essential to a due performance of its office. We can even suppose a reflex effect propagated from the affected nerve to the optic nerve, or to its vessels, sufficient to render the eye inadequate for the function of vision. According to this supposition, an actual organic amaurosis would be produced sympathetically. According to the two former suppositions, a disease might be sympathetically produced, either in a sensitive or in a motive nerve, which might simulate amaurosis—an event by no means unfrequent in its occurrence. *

The symptoms of organic amaurosis described by Mr Travers, he brings under five heads, embracing the state of the pupil, that of the superficial vessels of the eyeball, the colour and form of the sclerotic, the appearance of the vitreous humour, and that of the *fundus oculi*.

* *Morbi dentium in morbos oculorum mutantur, et contra.*—Baglivi.

1. The pupil is stated to be either fully dilated and contracting feebly on the sudden admission of light, or preternaturally dilated and absolutely motionless. It is added, that dilated pupil, though not invariable in either, is common both to organic and to functional amaurosis. If so, it ought not to have been placed here at all, but under the head of symptoms common to both. This admission shows still further, the imperfect foundation upon which stands the distinction of organic and functional amaurosis.

2. Mr Travers next mentions "congestion of the superficial vessels, especially of the long fasciculi of conjunctival veins." Congestion of the conjunctival vessels is as likely to be a symptom of amaurosis from determination of blood, which Mr Travers reckons as one of the functional varieties of the disease, as of any of those which he regards as organic. Not the smallest confidence, in fact, can be placed in this symptom, as indicative of organic amaurosis, in Mr Travers' sense of the term. The enlargement of the rectal arteries and veins, which vessels I presume are what Mr Travers means by "long fasciculi of conjunctival veins," is more significant than any mere congestion of the superficial vessels of the conjunctiva. A varicose state of the rectal vessels, as is generally to be observed in advanced cases of glaucoma, at once leads to the suspicion of serious organic changes having already occurred in the retina and optic nerve.

3. As a third sign of organic amaurosis, Mr Travers notices "a peculiar bluish grey tint of the sclerotic coat; sometimes a degree of bulging or protrusion on one or both sides of the globe; or simply a loss of sphericity, its sides appearing flattened." The bluish grey tint, and the bulging or protrusion here mentioned, are generally the effect of inflammation and thinning of the sclerotica, with preternatural adhesion between the sclerotica and choroid. The deterioration of vision which attends this state does not come, therefore, so much under the head of amaurosis, as of sclerotico-choroiditis. Loss of sphericity, and flattening of the sides of the eyeball by the action of the recti, is generally attended by softening of the eyeball, from a defective secretion of the vitreous humour, and is a common sequela of retinitis. A squarish form of the eyeball is not always a sign of disease, for eyes are often somewhat flattened under the tendons of the recti, which are normally firm and perfectly sound.

4. Mr Travers next describes glaucoma, in its first and second stages, as one of the signs of organic amaurosis. In these two stages, glaucoma is characterized chiefly by a greenish reflection from the crystalline, and is in general an affection of the crystalline only. In its more advanced stages, glaucoma involves a morbid condition of the vitreous humour, the retina, the choroid, the iris, and indeed of all the tissues of the eyeball, and is accompanied by absorption of the medullary substance of the optic

nerve. Glaucoma, in its early stages, is often unattended by any amaurotic affection; in its later stages, it destroys vision and disorganizes the eye by a process *sui generis*. That it is often coincident with amaurosis cannot be denied, but, on the other hand, it is as frequently an altogether independent affection.

5. Under the fifth sign of organic amaurosis, Mr Travers appears to describe glaucoma a second time, and along with it one of the varieties of what is styled cat's eye. The appearance which he describes "of a white or greenish-yellow spot, apparently in the fundus of the eye, a little to one side of the visual axis," and which "is seen only in a strong light, and in particular directions of it," is merely the first stage of glaucoma. That this cannot be considered as a sign of amaurosis follows from the admission, that it is occasionally seen in persons who make "little, if any complaint of their sight."

Mr Travers mixes up with this description of glaucoma, that of senile cat's eye, in which there is a silvery or resplendent reflection from the bottom of the eye,—an appearance very different from that of glaucoma. The cause of the appearance in senile cat's eye is unknown.* It is met with both in amaurotic eyes and in eyes which retain vision, as Mr Travers states. It cannot, therefore, be regarded as pathognomonic of amaurosis.

Mr Travers goes on to enumerate the changes which the eye presents when it is disorganized by deep-seated inflammation; and after this, the appearances, which are observed in those cases where the retina becomes collapsed or coercted, from absorption of the vitreous humour, and an effusion beneath the choroid. Such conditions of the eye are highly important to be known, but do not belong to the category of amaurosis.

Mr Travers here narrates the case of a young man, amaurotic of an eye from a tumour pressing on the thalamus and optic nerve of the same side. The eye had no unhealthy appearance; the pupil was regular and pretty active. The symptoms, in addition to the loss of sight, were those of disease in the brain, deep-seated pain in the fore part of the head, on the same side as the amaurosis, disposition to sleep, inability to employ the mind, disordered digestion, ptosis, slight strabismus, with occasional double vision, followed by emaciation, debility, and death. This case is highly interesting, as affording an illustration of some of the most remarkable symptoms of cerebral amaurosis.

Mr Travers next refers to various cases of amaurosis from injury, such as a blow on the temple, or the eye. "Of these," he says, "some were attended with signs of disorganization, some

* The appearance of senile cat's eye is well represented by Ammon, *Klinische Darstellungen der Krankheiten des Menschlichen Auges*, tab. xv. fig. 10, 11. Berlin, 1838.

were superficially inflamed, and others presented no external appearance of injury."

Lastly, under this head, Mr Travers directs attention to congenital organic amaurosis, of which he distinguishes four forms. In the *first*, the eye is small and soft, the iris tremulous, and the globe affected with perpetual oscillation. The *second* is albinism, which ought not to be classed among the forms of amaurosis, as vision is only dazzled and confused in that state, from the absence of the choroid pigment. The *third* is microphthalmos, characterized chiefly by extreme smallness of the cornea. In the *fourth*, there is no appearance of organic derangement, the defect being probably in the brain.

Mr Travers distinguishes three varieties of functional amaurosis, viz.

1. The *symptomatic*, the disease being a symptom merely of some general disorder of the system; as, general plethora, general debility, &c.

2. The *metastatic*, produced by the sudden transference of morbid action from another organ; as, the skin, testicle, &c.

3. The *proper*, depending immediately on a peculiar condition of the retina. As examples of such conditions he gives *visus nebulosus* and *muscæ volitantes*, both of which are names of symptoms, not conditions of the retina.

He then proceeds to treat of these three kinds of functional amaurosis each in its order.

1. As causes of *symptomatic functional amaurosis*, falling under the general heads of constitutional disease and general debility, Mr Travers enumerates, 1. Typhus. 2. Scarlet fever. 3. Various forms of acute constitutional disease. 4. Infantile fevers. 5. Chronic wasting diseases, in which organic changes interrupt the nutrition of the system. 6. A rapid and severe salivation. 7. Mental emotions, and especially grief and anger. 8. Prolonged suckling. 9. Impaired energy of the whole nervous system, occasioned by various states of physical disorder.

Some of these causes are so vaguely expressed that it is impossible to determine what is meant. What can we make, for instance, of "various forms of acute constitutional disease," and "various states of physical disorder?" It is not to be doubted, I believe, that typhus fever, scarlet fever, relapsing, and infantile remittent fever produce amaurosis, sometimes directly, by congestion in the brain, inflammation of the arachnoid, and effusion; at other times, by giving rise to secondary retinitis. The amaurosis which sometimes attends a burst of anger appears to be apoplectic. When grief produces amaurosis, there are evident signs of congestion or inflammation within the head; and the same thing may be observed, when prolonged suckling, and certain chro-

nic wasting diseases, such as scorbutus and albuminuria, affect the sight. The occasional co-existence of general debility, with local determinations of blood, and other organic derangements, is a fact universally admitted; and, in such cases, the optic nervous apparatus is often affected.

Mr Travers mentions the following as symptoms of amaurosis depending on vascular congestion:—1. Dilated and sluggish or immovable pupil. 2. Ptosis or strabismus. 3. Oblique or double vision. 4. Preternatural action of the carotids and flushed face. 5. Sense of weight, pain, or stricture of the scalp. 6. Lethargy. 7. *Tinnitus aurium*. 8. Greatly disordered and irritable stomach. 9. On straining, stooping, and on first lying down, the seeing of luminous sparks or flashes. 10. A reflection of one or more of the choroidal vessels, the visible pulsation of which is a cause of distress to the patient.

With respect to these symptoms of amaurosis from plethoric congestion, (which is plainly an organic affection), it must, on the whole, be admitted that there is very little diagnostic in them. Dilated and sluggish or immovable pupil is a symptom of amaurosis depending on pressure on the brain by tumours or by water, as well as by congested vessels; and the same holds true respecting ptosis, strabismus, and oblique or double vision. Mr Travers says, "double vision of the affected eye," but, although one eye may in some cases see two or more images of an object, as when a myopic eye views a candle beyond its point of distinct vision, the diplopia which attends amaurosis generally occurs when both eyes are open, and is owing to a slight inequality in the action of the muscles of the two eyes, so that their axes no longer maintain their proper relations to each other. Even throbbing of the carotids, flushed face, sense of weight, pain, or tightness in the scalp, and *Tinnitus aurium*, are attendant on what Mr Travers would admit to be organic affections of the head. As for lethargy and irritable stomach, tumours in the brain are well known to produce these symptoms. Whether the pulsation, which patients labouring under congestive amaurosis sometimes experience, depends on the choroidal or on the retinal vessels, is a point scarce worth discussing; but surely Mr Travers draws too much on our credulity, when he wishes us to believe, that one of his patients saw accurately the *zona minor iridis*! Neither does the epithet "visible," applied to such pulsations by Mr Travers, appear to be correct; for they are felt, rather than seen, by the patient.

Mr Travers states, that a loss of balance in the sanguiferous system, occasioning an undue determination of blood to the head, often exists, distinct from general plethora. He says it is aggravated by loss of blood.

He next turns to amaurosis from inanition, and mentions that

owing to the coincidence of a dilated and immovable pupil, muscae, and a deep-seated pain in the head, with occasional vertigo, and its occurrence often in a corpulent habit, it is sometimes mistaken for its opposite, namely, that from plethoric congestion. It follows uterine haemorrhage, and large and sudden depletion for acute diseases. The pain, Mr Travers states, is not confined to the region of the orbit, although it affects chiefly the same side of the head. It is perhaps connected with an imperfect injection of the medullary substance. It is relieved by a cautious use of tonics, but aggravated by whatever diet or medicine lowers or stimulates.

That the effects of inanition are in many instances similar to those of plethora is a very old observation. "Convulsions," says Hippocrates, "arise either from repletion or from inanition."* A certain amount of vascular pressure on the brain is necessary for carrying on the functions of that organ—greater or less than this amount disturbs these functions; and the same thing holds with regard to the organs of sense. "Pressure of blood," says Müller, speaking of the brain, "still within its vessels, also produces insensibility. And the effects of inanition are, in this respect, exactly the same as those of pressure."† Hyperæmia and anæmia have effects on the nervous system exactly similar to those produced by changes universally acknowledged to be organic, such as tubercles, pus, extravasated blood and water. In hyperæmia and anæmia, the blood and the vessels are the organs affected. These diseases may be transient, or they may persist, and lead to hypertrophy or to atrophy; but, whether transient or persistent, it would be a false view to regard them otherwise than as organic affections.

2. As examples of disease productive of *amaurosis by metastasis*, Mr Travers mentions; 1. Pulmonary congestion threatening effusion into the chest. 2. Gout in the foot and in the stomach. 3. Swelled testicles suddenly reduced by leeches and cold applications. 4. Sudden suspension of the catamenia. 5. Suppressed bleeding from piles. 6. Rapid healing of large ulcers of long standing. 7. Sudden retrocession of cutaneous eruptions.

The symptoms of metastatic amaurosis noticed by Mr Travers are. 1. Palsy of the upper eyelid. 2. Loss of sight. 3. Pupil dilated and motionless. 4. Pain in the head. 5. A feeling in the head, compared by the patient to that of opening and shutting. 6. The sensation of a dark screen rising gradually from below upward. 7. In gouty cases, vomiting, and pain in the stomach. 8. The sudden cessation of disease in the organ first affected.

* Aphor. Sect vi. § 39.

† Elements of Physiology. Translated by Baly, vol. ii, p. 1391. London, 1842.

That amaurosis occurs as a disease of conversion does not admit of doubt; and it seems equally clear that the affection of vision in such cases is generally produced by congestion, inflammation, or effusion within the head. It may be doubted, however, whether the conclusion is valid, that the affection of sight is always an effect of the sudden cessation of the disease previously existing in some remote organ. It seems fully as probable that, in some cases at least, the supervention of the new disease precedes the retrocession of the old, and may even be a cause of the yielding of the latter, the one disease relieving or proving curative of, the other. It seems a much more likely supposition, when a severe disease exists in one part of the economy, such as some of those enumerated by Mr Travers, that, through the participation of the constitution in the disorder, one or other remote organ, such as the brain, should become also seriously implicated, and that this should produce a diversion in favour of the part first affected, than that the disease which first existed, quitting its original seat, should wander, as it were, through the system, like an unburied ghost, till alighting on some remote organ, previously healthy, it should there manifest the symptoms of what is called a metastatic disease. The supposition savours too much of the exploded part of humoralism, to be readily admitted at the present day.

All that Mr Travers says regarding metastatic amaurosis shows it to be of the nature of an organic affection, such as congestion, inflammation, or effusion. The treatment in such cases should be directed undoubtedly against the head-symptoms, and towards the recall of the original affection, if it was an external one. The success attendant on a recall of the original affection is often remarkable, although, as happened in some of the cases narrated by Mr Travers, the amaurosis remained complete, notwithstanding that the original disorder was recalled, and the head thereby relieved.

3. As instances of what he terms *proper functional amaurosis*, that is, amaurosis depending on a peculiar condition of the retina, which Mr Travers calls palsy of that membrane, he mentions,—
1. Amaurosis from over-excitement of the visual organs, 2. That from insolation.

The symptoms of proper functional amaurosis are,—1. Growing imperfection of sight, 2. Dilated immovable pupil.

It can scarcely admit of doubt, that over-excitement of the retina, such as in intense study, with reading and writing to a very late hour, in miniature painting, in the use of the microscope, in observations with astronomical instruments, and the like, when it gives rise to amaurosis, does so by congestion, inflammation, and ultimate atrophy of the optic nervous apparatus, not by any pure paralysis, or functional exhaustion; while insolation, the

other cause mentioned by Mr Travers, operates upon the vessels of the brain, so as to cause, by compression of that organ, apoplectic or paralytic symptoms, and amongst these insensibility to light.

It would appear, then, that in by far the greater number of cases brought together by Mr Travers under the heads of symptomatic, metastatic, and proper functional amaurosis, the efficient cause resides in the vascular system of the optic nervous apparatus, and consists either in undue pressure, or in the want of proper support by the blood-vessels.

Mr Travers now proceeds to consider once more the symptoms of amaurosis, and sets out with the acknowledgement, that a great source of difficulty is the circumstance of many symptoms being common to the organic and functional classes. This is not to be wondered at, if amaurosis depends in every case on some organic change. The insensibility of a nerve, arising from transient congestion, may not easily, or may not at all, be distinguishable, while it lasts, from the insensibility resulting from the persisting pressure of a tumour.

1. *Headach*.—Mr Travers states pain affecting the forehead and temples to be a precursory symptom, diminishing in proportion as the dimness increases, and ceasing altogether when the amaurosis is perfect, if the disease has its seat in the eyeball. Whether the pain be characteristic of organic amaurosis must be judged of, he says, by its situation and extent, but especially by its association with other symptoms.

Pain, affecting the forehead and temples, occasionally considerable, and declining as the dimness increases, is common, Mr Travers states, in some forms of functional amaurosis. But if it be severe, remitting imperfectly, immediately increased by exercise, whether diffused over the entire side of the head, or circumscribed to a small space corresponding to the anterior cerebral lobes, it is usually connected with organic change within the head. In this case, derangement and torpor of the *primæ viæ*, loss of strength and flesh, disposition to stupor, occasional confusion of intellect, inaptitude to exertion, and paralysis of one or more muscles, will be concomitant symptoms.

2. *Tenderness of Scalp*.—Mr Travers has met with cases “clearly depending,” he says, “on cerebral disease or irritation, in which the scalp was universally tender even to soreness.” The expression “cerebral disease or irritation” includes, it may be presumed, both functional and organic affections, according to Mr Travers’ classification, so that this symptom is diagnostic of neither.

3. *Neuralgia*.—Mr Travers notices an intermittent pain accompanying some cases, shooting through the orbit into the head,

of acute and distressing severity. It makes its attack, he says, at or about the same hour every night, or every second night, continues for several hours, and is accompanied with convulsive quivering of the muscles of the eye and eyelids, and profuse lachrymation. This is neuralgia affecting certain branches of the fifth nerve.

Neuralgia is not, properly speaking, a symptom of amaurosis. It is merely an occasional concomitant. It occurs much more frequently as an independent disease than as an accompaniment of any imperfection of sight. When neuralgia and amaurosis have co-existed, I have repeatedly found that as the former yielded to appropriate means, the latter was removed at the same time. In such cases the amaurosis was probably a vascular and reflex affection, excited by the state of the fifth nerve. Where the disease of the fifth nerve and second nerve resists the usual means of curing neuralgia, some exostosis of the inner table of the skull, deposition on the *dura mater*, or tumour in the brain, may be suspected.

4. *Paralysis of the Levator of the Upper Eyelid.*—Mr Travers tells us that palsy of the levator is a sign of cerebral pressure, always accompanied by some degree of imperfect vision, and with so much vertigo that the patient is in danger of falling if the affected eye be uncovered. He ascribes the vertigo not to the double vision of the patient, which is a symptom he does not notice in this place, but to near objects appearing remote and much diminished in size, as if seen through an inverted opera-glass, an illusion which, he says, is usually removed by depletion. I cannot say that I have heard any patient mention this illusion. Mr Travers states that the pupil is over-dilated, and does not recover its activity proportionally with the recovery of vision. He had seen both levators affected with palsy in succession, each for a day or thereabouts, and in this case the blindness supervened upon the removal of the ptosis.

It is remarkable, that Mr Travers says nothing of the third nerve, as being the one affected in ptosis, nor of the paralytic state of the other muscles of the eye, animated by the third nerve, nor does he refer the dilated state of the pupil to a paralytic state of the iris, produced by the implication of the ciliary nerves, derived from the third nerve. Neither does he trace the ptosis and mydriasis, (for it is much more mydriasis than amaurosis, which is present in such cases, as is shown, in an instant, by making the patient look through a pinhole), to the most frequent exciting cause, viz. exposure to a draught of cold air while overheated; but he tells us, what may be very true in certain cases, that ptosis follows injuries of the head and top of the spine. To the train of symptoms here described by Mr Travers, Beer gave

the name of rheumatic amaurosis, and ascribed it chiefly to the sudden and continued exposure of the head to cold while it was in a state of perspiration.*

Just as with neuralgia and amaurosis, so with the coincidence of amaurosis and palsy of the third nerve; if the paralytic symptoms yield, so does in general the affection of vision.

5. *Paralysis of the orbicularis palpebrarum* is a less frequent attendant, Mr Travers says, on amaurosis; but of the many cases which I have seen of palsy of the muscles animated by the facial nerve, to which class the orbicularis belongs, I do not recollect one in which the disease was accompanied by amaurosis.

Mr Travers says vertigo attends palsy of the orbicularis; but this also I have never witnessed.

6. *Want of direction of the eyes.*—Mr Travers tells us, that in proportion as vision fails, the eye affected with amaurosis loses its fellowship with the sound eye, and that, owing to this loss of correspondence, persons affected with imperfect amaurosis of one eye often mistake the relative position and distance of objects, and frequently see them reflected. What is meant by seeing objects “reflected” I do not know. As to the want of correspondence of the eyes, and the mistakes in the position and distance of objects made by amaurotic patients, there can be no doubt. Porterfield has pointed out the advantage to be gained in respect to the prognosis, from ascertaining from the patient at what period he first became liable to mistakes as to distances; as, in snuffing a candle, pouring liquor into a glass, threading a needle, and the like. If he has begun to make such mistakes only recently, the disease is not of long standing, and the hope of a cure greater.

Mr Travers observes, that in perfect amaurosis the inexpresiveness or vacancy of countenance depending on the non-convergence of the optic axes, is too remarkable to escape an ordinary observer, especially if both eyes are affected. “The patient,” says he, “has either a fixed unmeaning stare, or a constant rolling motion of his eyes. The loss of association in strabismus results from a relative debility of one of the straight muscles; and if both eyes are employed, is generally accompanied with double vision; but that which I have just described is in no degree depending upon loss of muscular energy, partial or general, direct or indirect, but on the total failure of sensation, by which the actions of all the muscles subject to the will are directed.”

With respect to these statements of Mr Travers, it may be remarked that constant oscillation of the eyes is rarely attendant, except on congenital amaurosis. As to strabismus, when we see the squinting eye instantly resume its natural place and power of motion merely on the patient's closing the good eye, we cannot assent to the opinion of Mr Travers and others, that the cause of

* Lehre von den Augenkrankheiten, Vol. ii. p. 527. Wien, 1817.

the distortion is "a relative debility of one of the straight muscles." The cause lies deeper. One thing must not be overlooked, that a squinting eye never possesses a normal degree of retinal power. This may not be the cause of the strabismus; but it scarcely admits of doubt that the deficiency of sight is intimately connected with the irregular mobility of the eye; in other words, that they both depend on one cause, and that resident in the brain.

The slight strabismus divergens, which is observed in many cases of unocular amaurosis, is worthy of particular attention in this point of view, that it generally enables the practitioner to fix on the diseased eye without asking the patient any question as to which eye is affected. It is often the sign, however, not of a general retinal failure, but of a partial amaurosis. A part of the retina only is tolerably sensible, while the rest is often quite insensible, and this gives rise to what is termed oblique vision; that is, seeing in one direction, upwards or downwards, inwards or outwards, while an object held straight before the eye, or in any other direction but one, is as it were eclipsed.

7. *Hemiopia*.—Mr Travers uses this term as synonymous with "partial impairment of the retina;" whereas there is strong reason to believe that the affection is often cerebral, pressure on the right side of the brain giving rise to the non-perception of objects, the image of which falls on the right side of the retina, and *vice versa*. This view of the cause of the most remarkable variety of hemiopia, viz. the vertical, such as that with which Dr Wollaston was affected, has been much confirmed by the physiological reasonings of Mr Mayo. The horizontal variety derives no light from the presumed semi-decussation of the optic nerves.

8. *Fixed and Floating Muscæ*.—Mr Travers regards fixed muscæ as symptoms of organic, floating ones as characteristic of functional amaurosis. Fixed muscæ are extremely rare. We may not meet with one case of fixed muscæ for a thousand cases of floating ones. We must not be hastily led to the conclusion, that what the patient complains of is a fixed musca. If by careful experiments, we have ascertained that the muscæ have absolutely no motion independent of the motion of the eye, we may then set them down as fixed, and consider them as indicative of some organic affection of the retina. As for floating muscæ, they have nothing to do with amaurosis whatever, their cause exists in eyes, the retina of which is perfect, or even abnormally sensitive, and they are neither the signs nor the precursors of any diminution of visual power. Every one sees, or may see floating muscæ, except amaurotics. Mr Travers remarks that their magnitude diminishes as the distance is increased, to those who see them at all distances; which is exactly the reverse of the fact.

9. *Ocular Spectra*.—Mr Travers' statement, that "coloured spectra, or luminous impressions of objects remaining upon the

retina, are usually preceded by the fixed muscae, and may then be regarded as a more advanced stage of the complaint," is one of the most extraordinary in his work. Every human being sees ocular spectra, if he but takes the trouble to look fixedly at an object, the outlines of which are marked by well-contrasted colours, and then to close his eyes. If one looks fixedly for two or three minutes at a framed print for instance, the frame being light-coloured, we shall say, and the contents dark, and then closes his eyes, a spectrum will appear to him, the frame of which will be dark and the contents light. If such a spectrum were not seen, there would be no surer sign of a commencing amaurosis. With fixed muscae, ocular spectra have no other connection than this, that if a very luminous object is regarded, such as the sun, a coloured spectrum of it will remain for days or weeks, or even lead to amaurosis, as has been known to follow the looking at an eclipse of the sun with the naked eye.

10. *Nebulous Vision*.—The next symptom on which Mr Travers touches is indisputably the most common of all the symptoms of amaurosis. He says it is a characteristic of functional amaurosis, but assuredly it attends those varieties which he would consider organic, as well as those which he would call functional. He describes it as "a thin mist, fog, smoke, or gauze," "an indefinable something," "intervening between the eye and the object, which takes off the sharp edge of clear vision." Had he added, that this indistinctness is constant and unvarying, not altered by changes of light, and relieved neither by the application of glasses, nor by rest, he would have gone a good way to define one of the most remarkable symptoms of amaurosis. But he immediately proceeds to jumble up this symptom with asthenopia—a disease, which, above all others, must be carefully discriminated from amaurosis, because the treatment likely to afford relief in most cases of amaurosis is almost sure to aggravate asthenopia.

11. *Oscillatory Vision*.—Mr Travers mentions an apparent oscillation or wavering of objects as a functional affection. That this symptom may sometimes be owing to congestion seems not improbable. It must be confessed, however, that it is not a common symptom. It occurs, perhaps, most frequently in those who have suffered from syphilitic retinitis: they call it a "flickering" of objects, and compare it to the seeing through a mass of steam, or through a vibrating stratum of heated air. It must be owing to some movement in the eye different from common oscillation of the eyeball, for we meet with many cases of this, in which no complaint is made of any apparent wavering of objects. Any degree of want of support of the retina, such as might follow softening or partial atrophy of the vitreous body, or any loosening of the elements of the retina from one another, appears likely to give rise to oscillatory vision.

12. *Loss of adjusting power* is enumerated by Mr Travers as an occasional symptom of functional amaurosis. That amaurotics become in some instances extremely presbyopic, in others extremely myopic, is a fact deserving to be noted. Unquestionably, neither is the presbyopia nor the myopia a functional affection—neither of them depends on the state of the optic nervous apparatus—neither of them is a symptom of amaurosis—but only a coincident. Presbyopia and myopia must depend either on a change in the form or density of the refractive media of the eye, or on a loss of the power which the normal eye possesses of accommodating its dioptric parts to the different distances of objects. Mr Travers refers the presbyopia and myopia which occur in different amaurotic patients to the state of the retina, which is an impossibility. An amaurotic may see better when an object is held at arm's length than when it is held nearer him, or *vice versa*, but this loss of focus is not a sign of amaurosis, but only a coincidence. If the loss of focalizing power is perfectly compensated by using convex or concave glasses, and distinct vision thereby restored, the patient is not amaurotic. An amaurotic retina can derive no benefit from glasses, but an amaurotic patient may, by the correction which they afford of a coincident presbyopia or myopia. I cannot admit that the presbyopia or myopia of an amaurotic eye can depend indirectly, as Mr Travers asserts, on a loss of vigour in the retina. A loss of the power of adjustment, as in asthenopia, and an amaurosis, may exist together, and even originate in the same exciting cause, but assuredly the one cannot spring from the other. I have known many cases of loss of focalizing power mistaken and treated for amaurosis. If, by means of glasses, a defective adjustment is perfectly corrected, there is nothing wrong with the retina, functionally nor organically. If the correction by glasses is incomplete, or null, so that the patient sees just as well without glasses, or perhaps better, and we have ascertained by careful examination that there is no opacity in the media of the eye, there must be an amaurotic affection present, but this may be organic, even in Mr Travers' sense of the term, just as readily as vital or functional.

From a perusal of what Mr Travers has written on amaurosis, every reader must derive a large share of practical instruction ; but as to a distinction of the disease into functional and organic, I think it must be granted that the author has failed to establish it. I have given the above pretty full analysis of Mr Travers' views of the subject, in order that we might form a distinct idea, if possible, of the nature of what he terms functional amaurosis—of a disease depriving the patient of sight although the organ of sight was sound. We have found, however, that there are no diagnostic marks by which his functional amaurosis can be distinguished from his organic ; and that, except where he attributes the varieties,

which he calls functional, to such obscure causes as an exhaustion or suspension of sensorial power, they are attributable to determination of blood, vascular congestion, or hyperæmia, or of vacuity or anæmia, morbid conditions of the organs of circulation, which not only involve changes in the structure of the blood-vessels, but which, there is reason to believe, are often, if not always, preceded by molecular changes in the parts to which the hyperæmic or anæmic vessels are distributed.

Although the distinction of amaurosis, or, indeed, of any disease, into functional and organic, is to be rejected as irrational, are there no other distinctions, it may be asked, which, being founded on philosophical principles, are worthy of being known and received? Of such distinctions there are several, on the consideration of which I hope to enter at some future opportunity.

Amaurosis being a symptom indicative of various pathological conditions of different portions of the optic nervous apparatus, a chief matter is to determine, if possible, from the progress and character of the loss of sight, and the concomitant signs of disease, the seat and the nature of the organic affection, to which the phenomena are to be referred. The distinctions of amaurosis, depending on whether the organic cause operates immediately or mediately on the optic nerve, and whether the morbid affection has been excited by causes acting directly or indirectly on the organ of vision, have always attracted attention. Over-exertion of the eyes, for example, will cause what is termed an *idiopathic* amaurosis; disease of the uterus, acting reflectively on the brain may cause a *sympathetic* amaurosis; a tumour of the *dura mater* pressing on the neighbouring parts may produce a *symptomatic* amaurosis. Not only do the organic changes which produce amaurosis differ in degree, sufficing sometimes to impede only partially, or for a time, the function of vision, while in other cases they utterly and for ever extinguish it; but the seat of the organic changes are also different, sometimes involving the *central*, sometimes the *peripheral* portions of the optic nerves, sometimes affecting in the first instance only the *nutrient* and *protective* parts of the nervous apparatus of vision, while in other cases there is reason to suspect that they reside in the *essential* parts—the parts in which the organic change, whatever be its nature, takes place, which the stimulus of light produces, and upon which depend the phenomena of healthy vision. These and various other considerations of a similar kind, give rise to distinctions of amaurosis of the highest importance, on the illustration of which I cannot now enter, my present object being confined entirely to the exposure of a distinction which I consider to be ill-founded. If I have succeeded in this object I may be permitted to say, with Horace,

Est quòdāmodò prodire tenus, si nec datur ultra.

Glasgow, 28th July 1851.

ART. IV.—*Observations on the Dumb-Bell Urinary Deposit.*

By JOHN BACON, Jr., M.D. (Read before the Boston Society for Medical Observation, December 16th 1850.) (American Journal of Medical Sciences, April 1851, Number 42d, p. 297.)*

THE remarkable crystalline bodies, first described by Dr Golding Bird, in 1842, under the name of *dumb-bells*. (see Guy's Hospital Reports, vol. vii.) are among the rarer forms of urinary deposit. Their nature has never been satisfactorily determined. They always occur alternately with the octohedra of oxalate of lime, or mixed with them; and were regarded by Dr Bird as zeolitic crystals of that salt. The term *zeolitic* is derived from the zeolites, a family of minerals which frequently form compact spherical masses made up of radiating acicular crystals. In the American Journal of the Medical Sciences, for July 1850, is an article on the dumb-bells, by Dr Frick, of Baltimore, in which he endeavours to prove that they consist of uric acid. The question as to their chemical composition is not only one of scientific interest, but of practical importance in its bearing on the treatment of oxaluria, an affection which is probably much more frequent than is generally supposed. A fine specimen of the deposit, for which I am indebted to Dr Dalton, of Boston, has enabled me to make a microscopic examination, and a partial analysis.

In this specimen, the dumb-bells are mixed with octohedral crystals of oxalate of lime, generally very small, and some epithelium cells. They were prepared for examination by allowing the urine containing them to stand an hour or two, as the deposit subsides slowly; and after pouring off nearly the whole fluid, adding distilled water to the remainder. After another interval of repose, this process was repeated; first with water, and subsequently with dilute alcohol, in which the deposit falls more readily, until the last portions left no stain when evaporated on a slip of glass. Both the dumb-bells and octohedra are insoluble in water and in alcohol.

I. *Microscopic Characters of the Dumb-bells.*—The microscope employed is a very excellent one, made by Charles A. Spencer, of Canastota, N. Y. I have since repeated the ob-

* This paper by Dr Bacon contains a very elaborate and apparently correct and faithful account of the dumb-bell crystal deposit. The author has at the close of his own remarks given an abstract of those of Dr Golding Bird, formerly noticed in the seventy-fifth volume of this Journal, (p. 243). This has led to some repetition; but as the observations of Dr Bacon are instructive, readers will most likely not be displeased at seeing them given without abridgement. We are glad to perceive that Dr Bacon has given proper attention to the zeolitic form of these crystals; a character that was overlooked by all except in this Journal.

servations on mounted specimens, with a first-class microscope recently made by Nachet, of Paris, with the same results.

The dumb-bells, mounted dry, and examined by reflected light, are yellowish-white and semitransparent, with a pearly lustre. The surface is slightly roughened by minute tubercular projections. In Canada balsam or in water they appear by transmitted light nearly transparent and free from colour, excepting a yellow tinge. The general form is that of a dumb-bell. Many specimens have the shape of two kidneys with their concave surfaces opposed and connected by a short band. This form passes into that of a nearly circular body composed of two semicircles, nearly or quite in contact, but united only by a narrow neck. Every intermediate form between this and the dumb-bell can be found. There are also nearly circular bodies made up of four quadrants, united at the centre.

The striæ described by Dr Bird are readily seen. They radiate in two general and opposite directions from a central point in the neck of the dumb-bell, and run without interruption to the surface of the heads, which is slightly tuberculated, but shows no projecting crystalline points. The striæ are composed of exceedingly fine and close lines, and become more and more curved, as they are farther from the axis of the dumb-bell. Besides the striæ, there are faint concentric bands parallel to the outline of the heads, and generally at right angles to the striæ. These are marked by lighter and darker shades of colouring, and are most distinct near the exterior. Usually four or five are visible; sometimes as many as eight. They are present in the small specimens as well as the large, and can sometimes be traced nearly to the neck of the dumb-bell. In the nearly circular bodies they have the same characters. They probably indicate successive deposits or interruptions in the process of formation, like the concentric layers in calculi, which often exhibit a radiated structure also. The striated portion of the neck is generally surrounded by a more transparent substance, showing no structure, which fills up more or less of the interval between the heads. Specimens examined in the urine itself had the same characters.

The above is the appearance of the dumb-bells in their usual position. In thick and fluid Canada balsam, they can be rolled over and examined in different positions. In a side view the general outline is oval, the very transparent substance nearly or quite filling the space between the heads, which are considerably narrower than when seen in front. The striated portion presents the figure of an hour-glass, the striæ diverging from a central point within the transparent envelope. The concentric bands present the same appearance as in a front view. The

heads are not spherical but considerably flattened, and the end view of the dumb-bells is oval, but they cannot be retained in this position long enough to be clearly seen. Some of the specimens mounted in solid Canada balsam show an oval figure, with striæ diverging in every direction from the centre, and are probably dumb-bells seen endwise. The nearly circular bodies appear as spheroids more or less flattened in a side view.

II. *Size of the Dumb-bells and Octohedra.*—The dumb-bells in this specimen are considerably larger than those measured by Dr Bird. In the following table are given his measurements in fractions of an English inch (taken from his work on "Urinary Deposits"), for comparison with mine. The first column of figures is Dr Bird's, and the second my own measurements.

Long diameter of large dumb-bells, ...	$\frac{1}{8}\frac{5}{8}$		$\frac{1}{2}\frac{2}{8}$
Short diameter of ditto, ...	$\frac{1}{8}\frac{3}{8}$		$\frac{3}{8}\frac{3}{8}$
Diameter of some nearly circular bodies, ...	$\frac{3}{8}\frac{0}{8}$		$\frac{3}{8}\frac{1}{8}$
Long diameter of smallest dumb bells, ...	$1\frac{1}{8}\frac{5}{8}$		$\frac{9}{8}\frac{0}{8}$
Short diameter of ditto, ...	$\frac{3}{8}\frac{5}{8}$		$1\frac{3}{8}\frac{7}{8}$
Length of a side of largest octohedra, ...	$\frac{7}{8}\frac{3}{8}$		$\frac{7}{8}\frac{7}{8}$
" " smallest octohedra, ...	$\frac{7}{8}\frac{0}{8}$		$\frac{7}{8}\frac{0}{8}$

There are very few large octohedral crystals in this specimen; their average size is about $\frac{1}{16}\frac{1}{8}$ th of an inch. My measurements were made with both an English and a French micrometer, which agreed very nearly.

III. *Action on the Dumb-bells on Polarizd Light.*—Examined by the polarizing attachment of a Chevallier microscope (consisting of two Nicol's prisms), the dumb-bells appear brilliantly illuminated on the dark field, exerting a powerful action on the polarized light. The heads exhibit concentric coloured bands traversed by a dark cross, an appearance commonly presented by groups of radiating acicular crystals. These coloured bands are most distinct near the exterior, and do not appear to coincide with the structural bands seen in ordinary light. The transparent substance investing the neck polarizes feebly. In the side view an oval coloured band is seen near the outside of the dumb-bell, and the hour glass striated portion is distinctly visible within its transparent envelope. The oval bodies which I suppose to be dumb-bells, seen endwise, show one or two nearly circular coloured rings near the centre, and an oval band near the outside. The nearly circular bodies exhibit concentric coloured bands within each segment, and are traversed like the dumb-bells by a dark cross. When the field is made bright by revolving one of the Nicol's prisms 90°, the cross becomes white, and the coloured bands are faintly visible, their colours being complementary to those exhibited on a dark ground. The accompanying octohedral crystals are nearly invisible on the dark field, exerting little or no action on polarized light.

IV. *Chemical Reactions of the Dumb-bells.*—The dumb-bells were submitted to the microscope without separation from the accompanying octohedra and epithelium cells. For the micro-chemical examination, they were freed from them as far as possible by diffusing the deposit in water in a watch-glass. A rotatory motion being given, the water was poured off as soon as the dumb-bells had settled to the bottom. Being larger and apparently heavier, they subside more quickly than the rest of the deposit. The few remaining octohedra were nearly all picked out under the microscope.

Experiment 1.—The dumb-bells, heated over a spirit lamp, on a slip of the thin glass used for covering microscopic objects, darken and finally become white again at a low red heat. Under the microscope, they are now opaque, but preserve their shape perfectly. The residue is insoluble in water, as before heating. In dilute acetic acid, it dissolves with effervescence. The solution, super-saturated by ammonia, gives no precipitate. Solution of oxalate of ammonia being added, a white granular precipitate falls, and, after some time, small octohedral crystals appear in the solution.

Experiment 2.—Heated before the blowpipe, on a strip of platinum foil, the dumb-bells become opaque and retain their shape without sign of fusion, even at a full white heat. A pointed slip of reddened litmus paper being moistened and brought in contact with a little heap of the ignited dumb-bells, its blue colour is restored at the tip. Dilute acetic acid dissolves the residue without effervescence. The solution gives with oxalate of ammonia a white precipitate composed of very minute octohedra.

Experiment 3.—Dilute acetic acid does not dissolve the dumb-bells. In tolerably strong acetic acid (containing 39 per cent. of glacial acid), they become very pale and transparent, the transparency commencing at the surface, and slowly penetrating to the centre of the heads. The striæ and concentric bands all disappear, and a transparent substance is left which retains the form of the dumb-bell for a while. In half an hour complete solution is effected. The solution, left to spontaneous evaporation, deposits an abundance of zeolitic forms. They are mostly circular, and are generally composed of two semicircular bodies united by a narrow neck. Every intermediate form exists between this and the dumb-bell, of which there are many small specimens. All these bodies exhibit fine radiating striæ, but none of the concentric layers present in the original dumb-bells; nor have they the transparent substance investing the neck. There are some small oblong bodies composed of two oval zeolitic forms united by a transparent substance; sometimes

four of these ovals are connected in the shape of a cross. In polarized light all these bodies exhibit the coloured rings and dark cross more distinctly than the original dumb-bells, forming splendid objects for the polarizing microscope. Mixed with the zeolitic forms are a few groups of long four-sided prisms, which polarize rather strongly. The result of this experiment is in perfect agreement with Dr Bird's supposition, that the dumb-bells are zeolitic groups of crystals.

Experiment 4.—In dilute hydrochloric acid, the dumb-bells dissolve slowly and completely. The solution, on spontaneous evaporation, leaves groups of thin rhomboidal plates very transparent and polarizing powerfully. The rhomboids are often very long and arranged in stellate groups. These crystals are permanent in the air, and retain their transparency when thoroughly dried by a moderate heat. At a temperature above 200° F., they become opaque and white. In water, they instantly become opaque, retaining their form more or less completely. The water reddens litmus paper; and when heated in a concavity in a glass slide, covered by a slip of glass moistened with a solution of nitrate of silver, a white cloud appears in the silver solution, which is insoluble in nitric acid, but instantly disappears on adding an excess of ammonia. This reaction proves that the rhomboids contain hydrochloric acid in combination. They are readily soluble in acetic or hydrochloric acid.

Experiment 5.—In strong hydrochloric acid the dumb-bells dissolve readily. By spontaneous evaporation, many transparent rhomboidal tables, often in groups, are deposited; resembling those from dilute hydrochloric acid, and polarizing powerfully. There are also a few octohedra, which do not act on polarized light; and some small zeolitic bodies. These are mostly circular, and have the same characters as those deposited from the solution in acetic acid.

Experiment 6.—The dumb-bells, placed in a cold saturated solution of carbonate of soda (covered to prevent evaporation), gradually become opaque, and in a few hours disintegrated, while a white granular precipitate forms around them. The clear solution being poured off, and the precipitate washed with distilled water, to remove the remaining carbonate of soda, it dissolves with effervescence in dilute acetic acid, leaving a few partially decomposed dumb bells. The acetic solution, neutralized by aqua ammoniæ, yields a white granular precipitate with oxalate of ammonia, proving the precipitate from the carbonate of soda solution to be carbonate of lime.

Experiment 7.—The carbonate of soda solution (Exp. 6) should contain the acid of the dumb-bells in combination with

soda. Left to spontaneous evaporation, it affords small stellate and foliaceous groups of crystals, mixed with large isolated crystals of carbonate of soda. The whole deposit re-dissolves in water. Neutralized by nitric acid, the solution gives with nitrate of silver a white precipitate, soluble in ammonia and in nitric acid. This precipitate fails to give the characteristic reaction of oxalate of silver, which should fulminate faintly and be dispersed, when suddenly heated after thorough drying; but its quantity is too minute to render the trial satisfactory.

The small amount of the deposit in my possession was now exhausted. Experiments 1 and 2 prove that the dumb-bells consist of a salt of lime, convertible by a moderate heat into the carbonate, and of course by a high heat into caustic lime. The other reactions indicate that the lime is combined either with oxalic acid, or an organic acid nearly related to it. Octohedra, and prisms which appear to be oxalate of lime, are obtained from the hydrochloric and acetic solutions. The manner in which the dumb-bells are first penetrated, and then dissolved by strong acetic acid (Experiment 3), suggests the idea that they may contain organic matter, either as a constituent of the compound (from which it is set free by acetic acid), or mechanically intermixed with the acicular crystals which make up the zeolitic group. The acid appeared to dissolve out the salt of lime, leaving an amorphous substance of great tenuity, and less readily attacked by it. The solution did not dry up completely when the zeolitic bodies were deposited, but remained viscid after being kept for twelve hours in a closed vessel with caustic lime. Groups of acicular crystals are very liable to retain some of the substances among which they are formed, and especially in crystallizing from the urine. I have obtained tufts of acicular crystals of phosphate of lime from urine, which, after careful washing, retained organic matter enough to blacken and evolve a strong odour when heated before the blowpipe. The quantity of the dumb-bells which I exposed to heat was very small, and no odour was perceived, nor any greater blackening than is usual with pure oxalate of lime. Some of the reactions obtained are not known as belonging to oxalate of lime, and I proceeded to make some comparative micro-chemical experiments with that substance.

V. *Chemical Reactions of Oxalate of Lime.*—Pure oxalate of lime was prepared by adding oxalate of ammonia to a solution of chloride of calcium, and washing the precipitate thoroughly.

Experiment 8.—Oxalate of lime dissolves in very small proportion in dilute acetic acid, which leaves on evaporation a minute granular deposit. In acetic acid containing thirty per cent. of glacial acid, it is more soluble, a few circular zeolitic bodies

appearing on evaporation. Acid of thirty-nine per cent. slowly dissolves a considerable amount, and when evaporated rapidly by a moderate heat, leaves circular zeolitic bodies, showing the radiating striæ finely, and giving the characteristic coloured rings and dark cross in polarized light. The circles are generally fissured in a radial direction in one or two places, as if they had contained water or acid when formed, and had contracted on drying. They sometimes show two or three concentric layers, proving that these may be formed in a short time, even in a few minutes. The octohedral crystals of oxalate of lime which accompany the dumb-bells in the urinary deposit are slowly dissolved by strong acetic acid.

Experiment 9.—A solution of oxalate of lime in strong hydrochloric acid evaporated rapidly, leaves an abundance of zeolitic forms like those from the acetic acid solution. By spontaneous evaporation it yields transparent rhomboidal plates, often in groups; small octohedra and four-sided prisms, which last are sometimes in rosettes and numerous zeolitic forms. The rhomboids and zeolitic groups polarize finely, the prisms less strongly, and the octohedra not at all. In water, the prisms and octohedra, as well as the zeolitic bodies, remain unaltered. The rhomboidal crystals retain their transparency when thoroughly dried, but become white and opaque on exposure to a considerable heat. They are not deliquescent, as would be the case if any chloride of calcium were formed. In water they instantly become opaque and granular, but do not dissolve. Their angles become rounded, and minute octohedra gradually appear in the water around them. In nitric acid they dissolve readily, and nitrate of silver produces a white flocculent precipitate of chloride in solution, proving that these crystals contain hydrochloric acid combined with oxalate of lime, the combination being so feeble that the addition of water is sufficient to break it up. The prisms and octohedra appear to be pure oxalate of lime. A solution of oxalate of lime in dilute hydrochloric acid leaves, on spontaneous evaporation, rhomboidal plates, octohedra, and prisms, but no zeolitic forms.

Experiment 10.—Pulverized oxalate of lime being added to a saturated solution of carbonate of soda, and allowed to stand four hours in the cold, the deposit, which had become semi-transparent and crystalline, was separated by a filter from the solution, and washed. Dilute acetic acid now dissolves more than one-half of it with active effervescence, the residue being undecomposed oxalate of lime. The filtered carbonate of soda solution, neutralized by nitric acid, gives with nitrate of silver an abundant white precipitate, readily soluble in nitric acid and in aqua ammoniæ. This precipitate, collected and dried, is

dispersed with a faint report and a puff of smoke when suddenly heated on platinum foil. This is a characteristic reaction of oxalate of silver, and proves that a solution of carbonate of soda is able to decompose oxalate of lime without the aid of heat, giving rise to insoluble carbonate of lime and soluble oxalate of soda.

These experiments show that oxalate of lime, contrary to the usual statement, is soluble in strong acetic acid, and that it forms a crystalline compound with hydrochloric acid. When rapidly deposited from solution, it affords zeolitic forms similar to those obtained from the dumb-bells. By the slow evaporation of a strong solution, zeolitic groups mixed with crystals are deposited. A dilute solution, slowly evaporated, yields crystals only. These crystals resemble in appearance and in their reactions those obtained from the dumb-bells.

It is probable that many substances may assume the zeolitic form of crystallization, and even the dumb-bell variety of that form. Griffith, in his *Manual on the Blood and Urine*, figures dumb-bells of oxalate of soda (Plate IV. Fig. 17), also imperfect dumb-bells of uric acid (Plate I. Fig. 12). I have similar forms of phosphate of lime from stale urine, of urate of magnesia and oxalurate of ammonia, which are evidently made up of radiating acicular crystals. The mere external shape is not to be regarded as characteristic, unless the zeolitic structure is present also. Dr Frick obtained forms similar to the dumb-bells by keeping rhomboidal crystals of uric acid in water for some time, but it does not appear that they acquired the radiated structure or the polarizing action of the true dumb-bells. The well known radiated spherical masses of carbonate of lime from the urine of the horse give the zeolitic rings and cross in polarized light. Phosphate of lime, dissolved in strong hydrochloric acid affords, both by rapid and slow evaporation, circular zeolitic forms, having the characteristic structure and polarizing action. No isolated crystals are obtained from the hydrochloric solution of this salt. The typical zeolitic form is a spherical mass. Under what conditions the peculiar dumb-bell shape is assumed has not been ascertained. The concentric layers which I observed may not be present in all cases.

Since the preceding observations were made, I have seen, in the *London Medical Gazette* of Oct. 25th, 1850, a reply by Dr Bird to Dr Frick's article. In this paper Dr Bird gives the results of a few recent experiments on dumb-bells obtained from a patient whose urine deposited a large quantity of them unmixed with other crystals. These experiments, in his opinion,

render it probable that they consist of oxalurate of lime, a salt easily convertible into the oxalate; from which it differs only by containing the elements of urea in place of those of water. The following is an abstract of his reasons for this belief, 1st, In their peculiar action on polarized light and their radiated structure, they present a close resemblance to the crystals of oxalurate of ammonia, while the octohedra of oxalate of lime have no polarizing power. 2d, Water in which dumb-bells were kept for ten days at a temperature which, in the day time, seldom fell below 85° or 90° (Exp. B.), became turbid, and evolved a fetid ammoniacal odour. Some of the dumb-bells had disappeared, and large octohedra of oxalate of lime, which did not exist previously, were visible. This putrefactive change, with evolution of ammonia, indicates the presence of nitrogen. 3d, The dumb-bells became black, and evolved an odour of burnt horn, when heated in a platinum spoon (Exp. D.), and at a moderate red heat became white. 4th, A solution of the dumb bells in dilute hydrochloric acid was treated by ammonia (Exp. C.), which produced an amorphous white precipitate. On leaving the whole to spontaneous evaporation, large cubes of sal-ammoniac were obtained, and none of the usual plumose crystals. The cubic form is that assumed by this salt in the presence of urea. 5th, Boiled in strong nitric acid, (Exp. F.), the dumb-bells dissolved, and on spontaneous evaporation, large and perfect dumb-bells were deposited from the solution.

In regard to Dr Bird's argument from the crystalline form, and polarizing action of the dumb-bells, I have shown that oxalate of lime and other salts can be obtained in various zeolitic forms, of which the dumb bell is one variety. Though the octohedra of oxalate of lime do not act on polarized light, the prismatic crystals of this salt which abound in various plants possess strong polarizing power. These crystals (known to the botanist under the name of *raphides*) are classed under three general forms, specimens of each of which I have examined in this connection; 1st, isolated four-sided prisms, usually and perhaps always rhomboidal; 2d, stellate groups of prisms; 3d, acicular crystals, either isolated or in bunches. Isolated prisms from the bark of common hickory, of two species of oak, and of the grape vine, become strongly coloured in polarized light, and in some positions show concentric coloured bands parallel to the edges of the crystal. Similar crystals occur in the cells of the outer coats of the onion. In a single specimen, I found mixed with the prisms groups of radiated acicular crystals and true zeolitic forms, which gave the characteristic coloured rings and dark cross in polarized light. Whether these bodies consist of oxalate of lime or some other salt, I am unable to say. They

have a yellowish colour and show radiating lines distinctly, by which they are readily distinguished from starch granules, which also exhibit a dark cross in polarized light. The stellate groups or rosettes which abound in rhubarb root polarize finely, the projecting faces of the crystals showing coloured bands parallel to the edges. In the pulp of the fig similar groups of crystals occur, which have the same characters. Acicular raphides from the pith of the grape-vine, and those found in the outer coats of the hyacinth bulb, also in the stem and roots, show fine colours in polarized light. They appear to be very long and slender four-sided prisms. The prismatic crystals obtained by evaporating a solution of the dumb-bells or of oxalate of lime in acids, agree in appearance and polarizing action with those from plants. Octohedra of oxalate of lime sometimes occur in plants. I regard the dumb-bells as made up of very slender prisms, and not of lengthened octohedra, as Dr Bird supposed.

Dr Bird's experiments B and D indicate the presence of organic matter containing nitrogen, but do not show whether it forms a chemical constituent of the salt of lime, or is mechanically mixed with it. The resolution of the dumb-bells into octohedra of oxalate of lime, observed in Exp. B., may be a re-crystallization of the salt, with separation of the organic matter, or the acid may be decomposed. In Bowman's Medical Chemistry, it is stated that the dumb-bells are gradually converted into octohedra if kept for a length of time in any liquid medium. In my fifth experiment, octohedra were deposited from the hydrochloric solution of the dumb-bells. Exp. C favours Dr Bird's opinion that the elements of urea are present, but it cannot be regarded as conclusive. It is yet unknown whether sal-ammoniac may not assume the cubic form in presence of other organic substances besides urea. I repeated this experiment with some dumb-bells which had been mounted dry for preservation, and obtained plumose crystals of sal-ammoniac, and no cubes. It is possible that these dumb bells might have undergone some alteration, as they were exposed to a heat of 200° or more in mounting, and had been kept some time since; but they retained their transparency and other characters.

A dilute solution of oxalurate of ammonia, added to one of chloride of calcium, produces no immediate precipitate, but after some hours numerous zeolitic forms, probably of oxalurate of lime, are deposited. Among them are small dumb-bells, with radiating striæ, but the majority are circular. A part of the solution, left to spontaneous evaporation, deposited large cubes of sal-ammoniac mixed with zeolitic groups. The oxalurate of ammonia employed was not pure, and the zeolitic bodies

are coloured, and more or less opaque, but some of them give the characteristic phenomena in polarized light. They are too impure and too small in amount for a satisfactory comparison of their reactions with those of the dumb-bells. Pure oxalurate of lime is stated to form brilliant and colourless crystals, sparingly soluble in water. The dumb-bells from urine are not attacked by water unless macerated in it for a long time.

Dr Bird concludes, from Exp. F, that the dumb-bells are not decomposed by boiling in strong nitric acid; but they might give this result if they consisted of oxalate of lime, or were converted into that salt by the nitric acid. A solution of oxalate of lime in strong nitric acid affords fine zeolitic forms by rapid evaporation. If these are re-dissolved in strong acid, and the solution boiled and evaporated, they are again deposited with the same characters. The residue is not deliquescent, as would be the case if any nitrate of lime were formed.

The preceding observations prove that the dumb-bells consist of a salt of lime, containing either oxalic, oxaluric, or perhaps some other organic acid easily converted into the oxalic; but the exact nature of the acid remains to be determined by future investigation.

ART. V.—*On the Structure and use of the Ligamentum Rotundum Uteri, with some Observations upon the change which takes place in the Structure of the Uterus during Utero-gestation.* By G. RAINEY, M. R. C. S., Demonstrator of Anatomy at St Thomas's Hospital. Communicated by JOSEPH HENRY GREEN, Esq., F. R. S. Received January 15, read April 11, 1850. (Philosophical Transactions, Vol. 140, for 1850.)

PRIOR to the discovery of the striated character of voluntary muscle, about 1765, by Fontana, physiologists were unacquainted with any certain mark by which they could distinguish this variety of muscle from many other structures; and physiology being at that period in advance of anatomy, the question of the muscularity of many parts was obliged to be decided by their function instead of by their structure. But in the present state of minute anatomy, improved as it has been of late by the researches of microscopists, physiology and anatomy are made to move more in parallelism. This is especially the case with respect to the muscular system, so that if a muscle be made up of a bundle of fascicles of nearly equal size, and each one be marked transversely with parallel striæ, it is known to act either

directly in obedience to the will, or to be capable of being called into operation through excitatory influence, whilst a muscle consisting merely of an aggregation of fibres more or less distinctly nucleated, is known to act independently of the will; hence muscles are now named according to their function, voluntary and involuntary; or according to their structure, striped and unstriped. In the class of striped muscles physiologists are agreed to place the voluntary muscles, the upper part of the human œsophagus, and the heart; in that of unstriped ones, the muscular coat of the intestinal canal, the bladder, the uterus, and round ligaments. As it respects the parts included in the latter division of this classification, I am obliged to dissent altogether in reference to the structure of the round ligaments of the uterus, having found in every subject in which I have examined them (the number being about a dozen) well-marked muscular fibres of the striped variety, in fact that they correspond in all respects to regular voluntary muscles: with this conviction I am desirous to communicate the result of my observations to the Royal Society. I may also add, that I have in my possession numerous preparations, microscopic as well as ordinary dissections, in which the accuracy of the facts stated in this paper are easily demonstrable.

The so-called round ligament of the uterus, regarded as a muscle, may be said to arise by three fasciculi of tendinous fibres; the inner one from the tendon of the internal oblique and transversalis near to the symphysis pubis, the middle one from the superior column of the external abdominal ring near to its upper part, and the external fasciculus from the inferior column of the ring just above Gimbernat's ligament; from these attachments the fibres pass backwards and outwards, soon becoming fleshy; they then unite into a rounded cord, which crosses in front of the epigastric artery and behind the lower border of the internal oblique and transversalis muscles, from which it is separated by a thin fascia continuous with the fascia transversalis; it then gets between the layers of peritoneum, forming the broad ligament of the uterus, along which it passes backwards, downwards, and inwards to the anterior and superior part of the uterus, into which its fibres, after spreading out a little, may be said to be inserted.

The striated muscular fibres are not confined merely to the surface of the round ligament, as if only accessory to some more important part of it, but they form almost the whole of its substance, and are more particularly distinct near to its centre; nor do they extend completely to the uterus, but after passing between the layers of the broad ligament to about the distance of an inch or an inch and a half from its superior part, they

gradually lose their striated character, and degenerate into fasciculi of granular fibres mixed with long threads of fibro-cellular tissue. Plate 39, figure 1, is an accurate representation of some muscular fibres taken from the centre of the round ligament, where it is situated between the layers of the broad ligament, about one inch and a half from the uterus. Fig. 2 is also a representation of some muscular fibres taken from a part rather nearer to the uterus, showing the manner in which the striped muscular fibre terminates in the granular fibres above mentioned.

This structure of the round ligaments is not, as might be expected, confined to the human species. In the monkey these ligaments are composed almost entirely of striped muscular fibre which extends all along them nearly as far as the uterus. The uterus in a monkey which I examined was very small, but the round ligaments were proportionally large: the primary fasciculi of muscular fibres were pale but very distinctly striated. In the dog, as most probably in other animals in which the uterus divides into cornua extending into the abdomen considerably beyond the brim of the pelvis, the round ligaments, instead of passing downwards to be attached to the pelvis, as they are in the human subject, in whom the uterus is situated below its brim, pass from the extremities of the cornua of the uterus upwards, or rather forwards to the last rib. Hence in these instances, these ligaments, or rather muscles, may be said to arise from the last rib, and from the aponeurosis of the diaphragm, by a thin triangular expansion, partly tendinous, and partly muscular (the fibres of the muscle being pale but of the striped kind), and to be inserted into the cornua of the uterus, having the same relation to the Fallopian tubes and ligaments of the ovaries as in the animals which have a simple uterus. In the sheep and the cow the attachments of the round ligaments are similar to those in the dog, and composed likewise of muscular fibres distinctly striated. Besides striped muscular fibres these ligaments contain numerous vessels, also some nerves and absorbents. The arterial trunks are large, but the capillaries into which they ultimately divide have the same size and arrangement as those of ordinary muscle. The lymphatics are situated on the outer side of the ligament; their glands are sometimes of considerable length, and even pass through the external abdominal ring; connecting all these parts together, there is a considerable quantity of areolar tissue, especially where the striated muscular fibres are absent, or are about to terminate. In this part the detection of these fibres will be facilitated by examining the part in glycerine, which renders the fibro-cellular tissue more transparent without impairing in any considerable

degree the distinctness of the striated muscle.* It is generally said that the round ligament passes through the external abdominal ring, and "is lost in the cellular tissue of the mons veneris and labia pudendi." It is true that the vessels supplying it, and a nerve, and some lymphatics, and frequently a gland, pass through the external abdominal ring, but the substance of the ligament is situated altogether above it so as in part to close it, and thus to tend very much to prevent the protrusion of intestine at this part, whilst it would facilitate its passage through the crural ring by directing it towards Gimbernat's ligament. Hence probably the reason why females are more liable to femoral than to inguinal hernia.

Those who have written upon the office of the round ligaments of the uterus, regarding them either as made up of muscular fibres of the same kind as those of the uterus itself, or considering them as composed merely of "condensed cellular tissue," have considered their office, either as subservient to the process of utero gestation, or as acting merely as mechanical supports to the uterus, that is, as uterine suspensory ligaments. Now the presence of voluntary (striped) muscular fibre in these so called ligaments, proves that neither of these suppositions is correct; since striped or voluntary muscular fibre would be as unfit for the one purpose as it would be superfluous for the other; hence there can be but little doubt that these ligaments, or rather muscles, are concerned in some way or other with the act of copulation, rather than with those changes which are so slowly induced in the uterus during utero-gestation. Considering the position of the points of attachment of the round ligaments, and the direction of their fibres, it is evident that their

* Besides the structures just mentioned, these fibres are mixed with several pale, and much less distinctly striated ones, which resemble in all respects the tissue of the dartos. The fibres of the dartos are generally considered merely as fibro-cellular tissue, but they seem to possess characters by which they can be distinguished from other tissues. These fibres, both from the scrotum and the round ligament, the upper part especially, when examined by the microscope in water, appear to be made up of very fine threads of wavy fibre, mixed with extremely minute granules or molecules, by which their distinctness of outline is much obscured and rendered much less apparent than in the fibres of common areolar tissue; they are also more collected into bundles than is fibro-cellular tissue; but these same fibres, when examined in glycerine, become corrugated, resembling somewhat striped muscle; in some instances, indeed, the resemblance is so great, that it is difficult, if not impracticable, to distinguish between a bad specimen of striped muscular fibre and a good one of this tissue. Common fibro-cellular tissue is not corrugated by glycerine, but only rendered more transparent.

The distance to which the striped fibre extends towards the uterus, and the degree of its distinctness, differ very much in different subjects; in one subject I found it not more than an inch from the uterus. In the employment of glycerine to aid the detection of striped muscle and the corrugated tissue, it is sometimes necessary to allow these structures to remain in the glycerine a few minutes before its full effect is produced.

combined action will bring the uterus nearer to the symphysis pubis, and thus tend to draw it somewhat from the vagina, in this way increasing the length of the latter. Now the only way in which I can imagine that these changes in the position of these parts assist in sexual intercourse, is by their causing the semen to be attracted more into the upper part of the vagina and vicinity of the os uteri. [Since the communication of this paper to the Royal Society I have been informed that this opinion is not new, but that this view of the use of the round ligament had been published by M. Velpeau,* and that it is also partly in accordance with that of Maygriers.†] This supposition seems to accord with the position and attachments of the round ligaments in those animals in which the uterus extends into the cavity of the abdomen beyond the brim of the pelvis, as was noticed in the dog, the sheep, and the cow, where their action would, obviously, be the same in drawing the uterus from the vagina, and in tending to elongate the latter, as in the human subject in whom the angles of the uterus are below the level of the broad ligaments. In such an act the muscular fibres of the round ligaments could scarcely be said to be voluntary; but still they would be as much so as the other muscles concerned in the same process, that is, as those of the male organs of generation. In these instances muscles are said to act under excito-motory influence, but muscles which are thus excited have the same structure as those more obviously under the control of the will, namely, striped fibres.

Some observations upon the change which takes place in the Structure of the Uterus during Utero-gestation.

The fasciculi of fibres composing the upper part of the round ligament separate as they approach the fundus of the uterus, become spread out over its surface, and ultimately blend with its fibres. Although the fibres of the round ligament are generally said to be of the same kind as those of the uterus, I have not been able to perceive much similarity, either with those of the unimpregnated or the impregnated uterus, the fibres in both these states of the uterus being peculiar. The proper tissue of the unimpregnated uterus is so remarkably dense that there is considerable difficulty in unravelling it sufficiently to display the true character of its fibres, and sections thin enough to admit of being seen as a transparent object by the microscope, give no distinct idea of its real nature. Its characters can be best understood by breaking up portions of the uterus

* Anatomie Chirurgicale, 1833, vol. ii. p. 372.

† Nouvelle Démonstrations d'Accouchements, p. 62.

with needles, and examining them in glycerine, but still they should be first seen in water; also the arteries of the uterus should be fully injected (these are remarkably tortuous, and possessed of very thick coats), otherwise the tissue of the small vessels, and the nuclei in the coat of the capillaries, may be examined instead of, and mistaken for, the proper fibre of the uterus. Any part of the unimpregnated uterus, after having been thus treated, will be seen to be made up of fusiform nucleated fibres, contained in a matrix of exceedingly coherent granular matter; these are well represented in fig. 3. The average breadth of one of these fibres, at its dilated or nucleated part, is about $\frac{1}{4000}$ th of an inch; their length cannot be ascertained with certainty, as it is impossible to estimate the degree of curtailment which they suffer in being separated from the granular matrix in which they lie imbedded. Their structure and size are about the same in every part of the uterus from which I have taken them, so that they are easily recognizable as the peculiar fibres of the unimpregnated uterus. Now comparing these fibres with those forming the walls of the impregnated one, at the full, or at a very advanced period of impregnation, it will be seen that these fibres are become greatly increased in size, deprived of nuclei, and more loosely connected together; they lie in separate planes, which cross each other in various directions; they are accompanied with vessels of various sizes, also with more or less fibro-cellular tissue. The size of these fibres is moderately uniform, but those near to the external surface are rather smaller than those more deeply seated. A fibre detached from the rest measured about $\frac{1}{40}$ th of an inch in length and about $\frac{1}{2000}$ th in breadth at its widest part; for the breadth varies much in different parts of the same fibre, being alternately large and small; at their extremities they taper off to a very fine point; their colour is yellowish, and when minutely examined, they appear to be made up of very small irregular granules and extremely slender threads blended together without any definite arrangement (see fig. 4). Acted upon by acetic acid they give no indication whatever of being nucleated, therefore, in this respect, they differ from the common form of organic muscular fibre.* The two kinds of fibres, represented in figs. 3 and 4 were both drawn under the same magnifying power, in order to show, by a comparison of their dimensions, that the increase which takes place in the individual fibres in these different states of the uterus, is quite sufficient to account

* Professor Kölliker has described the fibres both of the unimpregnated and impregnated uterus. The latter he has described and figured as having nuclei, which I have never been able to verify although I have examined these fibres with the greatest possible care.

for the amount of augmentation of the entire organ, without supposing, as some physiologists do, that organic muscular fibres, not present in the inactive state of the uterus, are absolutely formed during the various stages of its enlargement; it also, besides being supported by the fact just stated, perfectly accords with the laws of development, and harmonizes with the changes which are going on simultaneously in the walls of the impregnated uterus and its contents; the unimpregnated uterus being, according to this notion, little more than an assemblage of embryonic nucleated fibres, wholly inactive, until after the reception of the ovum, when, being aroused by an appropriate stimulus, they are called into active operation, and become developed simultaneously and proportionally to the development of the fœtus contained within it, so that when the one has arrived at a state requiring to be expelled, the other has acquired the utmost degree of fitness necessary to effect its expulsion. Now after the expulsion of the fœtus, since, according to the laws of development, it is as impossible that these fibres of the impregnated uterus can return again to their primitive or embryonic condition, as that a full-formed fœtus could relapse into the state of an ovum, they must necessarily become absorbed, and therefore a new set of embryonic fibres would require to be formed for the expulsion of the next ovum, so that each fœtus will have, according to this conclusion, its own peculiar expulsive fibres. This view is perfectly in accordance with the late researches of Drs Sharpey and Weber on the membrana decidua; and it agrees with the same function in vegetables, in which the part corresponding to the uterus in animals is always cast off after its contents have been brought to maturity, and separated from the parent plant.

ART. VI. *Experiments on the Section of the Glosso-pharyngeal and Hypoglossal Nerves of the Frog, and observations of the alterations produced thereby in the Structure of their Primitive Fibres.* By AUGUSTUS WALLER, M.D. Communicated by Professor OWEN, F.R.S. Received November 22d, 1849. (From the Philosophical Transactions, Vol. 140, for 1850.)

THE object of the present observations is to describe certain alterations which take place in the elementary fibres of the nerve after they have been removed from their connection with the brain or spinal marrow.

The following is a brief summary of the opinions and researches of modern physiologists on alterations of the nerve-tubes.

Burdach* placed a ligature on the sciatic nerve of a frog, and after the lapse of a week found no alteration of the primitive fibres either above or below the ligature.

Steinruck† did the same, and states that in three cases the whole nerve was more slender than on the healthy side, and ascribed it to the atrophy of the neurolema.

Valentin‡ denies likewise that there is any alteration of the primitive fibres in the lower portion of the nerve.

Gunther and Schön§, whose researches are most interesting, state that the primitive fibres being examined towards the end of a week, after division of the nerve when it had lost its irritability, it was perceived that they had no longer the full round appearance of the sound ones. Here and there their contents appeared as if curdled; from eight to fourteen days after section these structural changes became still more evident, and continued to increase until the fibres appeared flat, broken up, entirely losing their transparency, their contents appearing as if disjointed.

Nasse|| states, that five months after section of the sciatic nerve of a frog, the tubes below the section were broken up into granules and small clumps; that all the nerve-tubes were strongly granulated, in some the small granules being united into oval bodies, which appeared to be surrounded by a pale cylindrical membrane, which in some was wanting, owing probably to its disorganization.

Having in a former communication to the Royal Society described the nerves of the papillæ and of the muscular fibre in the frog's tongue in their normal condition, it is my intention at present to describe various alterations, as seen under the microscope, which take place in the structure of the same nerves after their continuity with the brain has been interrupted by section. The innervation of the frog's tongue is, as I have already shown, derived from two pairs of nerves, one arising from the brain, and traversing a foramen in the posterior part of the cranium, accompanied by the pneumogastric nerve. This pair corresponds to the glossopharyngeal in man. In its course it descends until it reaches the hyoglossus muscle, when it is accompanied by the lingual vessels passing over part of the hyoid bone, and entering the tongue without giving off any

* Beitrag zur Mikroskopischer Anatomie der Nerven, E. Burdach. Königsberg, 1837, p. 42.

† De Nervorum Regeneratione. Berolini, 1838, p. 72.

‡ De Functionibus Nervorum Cerebralis, &c. Lib. iv. 1839, p. 127.

§ Müller's Archiv, 1840, Versuche und Bemerkungen über Regeneration der Nerven, p. 276.

|| Ueber die Veränderungen der Nerven-fasern nach ihrer Durchschneidung, Müller, Arch. 1839, p. 409.

branch to the throat. The other pair arises from the anterior part of the spinal marrow, traverses the first cervical foramen, and constitutes the first cervical pair of nerves. Following the example of Burdach, I regard this pair as corresponding to the hypoglossal in man, and shall apply that term to it. It takes its course towards the tongue in a similar direction to that of the former pair, giving off several branches to the muscles of the neck and throat, and when it reaches the glossopharyngeal muscle it is considerably smaller than the glossopharyngeal. After attaining this muscle, it runs parallel to the former nerve, passing below the hyoid bone in its transit to the tongue. For a more minute description I must refer to the paper of E. Burdach, of which a translation has appeared in the *Annales des Sciences Naturelles*.

Division of the Glossopharyngeal Nerve.

That division of these nerves produces some serious lesion is proved by the death of the animal, which generally takes place a few days after the operation. Considering the well-known tenacity of life possessed by these animals, this was quite an unexpected result, for which I am unable at present to afford any satisfactory reason. We can only surmise, that besides their gustatory powers, they have others connected with respiration, in regulating the action of the tongue in closing the nares, for forcing the air into the lungs. Whatever may be the true explanation, it is impossible not to regard this result with surprise, when we consider the serious lesions which this animal is capable of undergoing at other points of the frame without loss of life. The usual time which it survives is variable, and depends greatly on the season of the year. If the examination takes place in summer, death frequently ensues on the fifth day; if in winter, not before the twentieth. For the purpose of avoiding this loss of life, I adopt the plan of dividing the glossopharyngeal on one side only of the tongue, and I find that it has the desired effect of preserving the life of the animal, while we can observe the same alterations on the corresponding side, as well as when both nerves are divided. Another advantage found in the division of a single nerve is, that on the uninjured side we have constantly at hand a means of comparison by which we can judge with certainty respecting any alterations that may be produced in the divided nerve. In cases of any doubt, it will always be found of the greatest service to examine at the same time a minute fragment from each side of the tongue.

The first effects of section of a glossopharyngeal nerve at the throat are decreased power of moving the tongue, diminished

sensibility, generally very slight on the divided side, and symptoms indicative of some disturbance of the nutritive functions. The diminution of motor power is very slight, as is evident by the almost molecular tremor which still exists in any part irritated, and by the capability of retracting the tongue. The loss of sensation, which is also very slight, arises from the section of a few sensitive filaments which are contained in the glossopharyngeal nerve, and are distributed principally about the tubercular extremities. The lesions of nutrition and circulation on the side of the division are very variable and uncertain. Sometimes that half is oedematous, particularly towards the tubercle. Sometimes the papillæ are much injected and congested, while in other cases this side is more pale than the other. In many instances no difference can be detected between the two sides, until the organ has been slightly irritated, when on the divided side the vessels, and especially those of the fungiform papillæ, become congested and of a deeper red than on the other. Some of these differences probably arise from causes independent of the nervous lesion, as the vessels of the tongue which accompany these nerves are doubtless injured in some of the experiments.

During the first two or three days after section, no alteration in the texture and transparency of the tubes of the papillary nerves can be detected. Generally, at the end of the third and fourth day, we detect the first alteration by a slightly turbid or coagulated appearance of the medulla, which no longer appears completely to fill the tubular membrane, which does not appear to be affected. These alterations of the medulla are best seen in a fragment to which a little distilled water has been added to render it more transparent. When examined twenty-four hours after death, the difference between these and the nerves on the healthy side is still more evident. Commencing decomposition on the healthy side causes the nerve tubes to swell considerably, so as to attain nearly double their ordinary size. On the divided side the disorganized nerve retains nearly the same size and appearance as when fresh. Caustic potash, which dissolves all the tissues except the nerves, renders the altered nerves more transparent, and consequently the morphological changes are less apparent. Nevertheless, by comparative experiments made simultaneously, we may still detect a difference between the nerves of the two sides. In some cases, in about three or four days after section, I have traced the turbid state of the nerve from the fungiform papillæ into branches containing forty or fifty tubes, where it did not appear to terminate, but where the opacity of the nerve prevented my observing it any further. About five or six days after section, the alteration of the nerve-

tubes in the papillæ has become much more distinct, by a kind of coagulation or curdling of the medulla into separate particles of various sizes. Sometimes the coagulated particles have an uneven spongy appearance, as if the component parts of the medulla, i. e. the white substance and the axis cylinder, were mixed together. Often they appear merely like separated particles of the medulla, such as are frequently effused from the ends of a divided nerve, and present the double contour and the central nucleus characteristic of the nervous medulla. In some cases the coagulated particles are very uniform in size and appearance, averaging $\frac{1}{7000}$ th of an inch. In others, the limits between the maximum and minimum dimensions are far greater, namely, from $\frac{1}{2300}$ th to $\frac{1}{12300}$ th of an inch. The diameter of the altered tubes, examined in the ordinary manner in water, is about a fourth smaller than that of the sound ones, and in many instances the tubular cylinders appear wanting, and the medullary particles to have escaped from the cylinder, and to be merely held together by the neurilema which surrounds the whole nerve. After the application of potash, the diameter of the altered and unaltered nerves is as nearly as possible the same. This equalization of the two is produced almost entirely by a decrease in the size of the sound tubes, which swell considerably in water, and afterwards contract by the application of the alkali. It is therefore probable that the difference of size at this stage between the altered and unaltered nerves arises from the former not absorbing so much within them as the latter. Whether this arises from a ruptured state of the membrane or from a chemical change of the medulla, is not evident. After the surrounding tissues have been removed by potash, the tubular membrane offers no signs of rupture, and the medulla appears less disorganized than before the denudation. The disjointed condition of the medulla is greatest towards the extremities. A portion of each nerve-tube is frequently so disorganized as to be carried away among the tissues dissolved by the alkali. The circular rim so frequently presented by the extremity of the tubes is absent. We often observe around the healthy nervous branches, and the papillary nerve in particular, a common sheath or neurilema fitting closely to the nerve. After disorganization has attained this degree, it appears to form a kind of loose pouch around the nerve and separated from it by an interval of $\frac{1}{3000}$ th of an inch. This pouch appears to form the sole investment of the curdled medullary particles, which, as we have stated, previous to the action of the alkali, appear void of any tubular investment. As we ascend towards the brain the disorganization appears to decrease, the coagulated medulla is more apt to assume the oval form, and at some places

it presents its double contour apparently unaffected. The effect of decomposition in the unaltered and altered nerve is similar to that in the former stage. In consequence of the above changes the disorganized nerve is more opaque than the unaltered one. In the tubercles some of the ramifications of the tubes belonging to common sensation become disorganized after the section of the corresponding glossopharyngeals. These alterations take place in the same period and in the same manner as in the papillary nerves. With this exception, all the other nerves of the tongue, which comprise those of common sensation and of muscular action, remain unaltered. The muscular fibres of the papillæ are slightly altered at this period; their transverse striæ are not so distinct as on the healthy side, while their longitudinal ones are more so. The fibre itself is usually paler, narrower, and more wavy in its course.

The capillaries are either much congested with dark blood, or they are completely empty and scarcely to be detected.

The epithelium and the ciliary filaments are unaltered.

On the seventh, eighth, and ninth days the disorganization of the nervous structure continues to progress. In the papillæ the curdled particles of medulla become still more disconnected, and in parts are removed by absorption. The tubular sheath also is ruptured and disorganized near the extremities of the tubes. In the other ramifications of the glossopharyngeal, the medulla becomes more and more disjointed and collected into oval or circular coagulated masses.

On the tenth day and upwards we perceive another morphological state of the medulla. The coagulated particles lose their amorphous structure and assume a granulated texture. The granules, retained together by slight cohesion, are dark by transmitted light, but of a light white colour by reflection, and average $\frac{1}{200,000}$ th of an inch.

About the twentieth day the medullary particles are completely reduced to a granular state. The condition of the papillary nerve is represented in plate 31, fig. 2, where we find the presence of the nervous element merely indicated by numerous black granules, generally arranged in a row like the beads of a necklace. In their arrangement it is easy to detect the wavy direction characteristic of the nerves. They are still contained in the tubular membrane, which is but very faintly distinguished, probably from the loss of the medulla and from atrophy of its tissue. The resistance of these granular bodies to chemical agents is most remarkable, for they remain unaffected by acids, alkalies, and the ethers, which have so great an influence over the nervous medulla. These granules may be detected within the papillary nerves for a considerable period

of time. I have seen them apparently unaltered in the papillæ upwards of five months after division of the nerve, reunion not having taken place.

Division of the Hypoglossal Nerve.

When the hypoglossal nerves are divided at their exit from the spine, all movements of the throat and tongue are abolished, and the process of respiration entirely at an end. The tongue may be drawn from the mouth remaining completely inert, pinching or cutting causing no appearance of pain. Hence we may conclude that this nerve is of a mixed nature, containing sensorial as well as motor filaments. Another experiment, which shows this more plainly, consists in dividing one hypoglossal nerve near the spine on one side, and on the other the glossopharyngeal at its exit from the cranium. Pinching and other modes of irritation cause no pain on the side where the hypoglossal is divided, while on the other undoubted pain is caused.

After division of the hypoglossals at the throat, the motor and sensorial powers of the tongue are not entirely lost. When drawn out of the mouth, the extremity only remains fixed between the jaws, flaccid and powerless. At the inner half the fibres are still contractile, on account of their belonging to the hypoglossus, which at its lower half receives a branch from the hypoglossal nerve above the point of section. By this means, aided also by the mylohyoid muscle, which is left unaffected for the same reason, the inner half of the tongue still enjoys contractile powers.

Respiration is hurried and laboured, and death is the inevitable result of division of these nerves, whether made at the spine or at the throat. In summer, the animals died at the end of two or three days.

Division of a single hypoglossal only causes paralysis of the corresponding half of the tongue, complete when the section is near the spine, and imperfect when at the throat. The animals generally survive after the section of one nerve.

The peripheric extremities of the hypoglossal nerves are most easily found at the inferior surface of the tongue. By removing a minute fragment at this region, we can observe, without any further preparation, ramifications of nerves, which are gradually reduced to a network of single tubules on the surface, among the capillary network. At the same time, among the muscular fibres are other ramifications, either crossing them in a transverse direction or running parallel. Like the former, they are reduced to single fibres, running in all directions without form-

ing any free ends. It is at the under surface that the alterations of the hypoglossal must be studied.

During the four first days, after section of the hypoglossal nerve, no change is observed in its structure. On the fifth day the tubes appear more varicose than usual, and the medulla more irregular. About the tenth day the medulla forms disorganized, fusiform masses at intervals, and where the white substance of Schwann cannot be detected. These alterations, which are most evident in the single tubules, may be found also in the branches. After twelve or fifteen days many of the single tubules have ceased to be visible, their granular medulla having been removed by absorption. The branches contain masses of amorphous medulla.

We are naturally led to inquire whether extraneous circumstances have any influence over the removal of the tissue. We find that in the summer-time, when the renewal of the tissues must be considerably more active, in consequence of the increased respiration and activity of the animals experimented upon, that the alteration is more rapid than in winter, when they are in a state of torpor and hybernation.

At present we have restricted our observations to the alterations which take place in the ramifications originating from two trunks, but we cannot suppose that this is a local phenomenon, and that other nerves do not participate in similar alterations, and that the brain itself, composed in great part of tubular fibres, must be excluded. Experiments on other nerves already enable me to affirm that such is not the case, and that they are to be found on other nerves, such as the sciatic, &c., and, moreover, that they are as extensive as the nervous system itself.

It is impossible not to anticipate important results from the application of this inquiry to the different nerves of the animal system. But it is particularly with reference to nervous diseases that it will be most desirable to extend these researches. If one conviction impresses itself more firmly on the mind than another, it is that what we term functional diseases of the nerves are in reality owing to certain organic and physical changes in the tubular fibre, which it will be the province of the microscope to ascertain. If a few days' inactivity of a nervous trunk, such as is produced by ligature or section, is sufficient to cause such disorganization of the medulla, how can we refuse to admit of its being altered in cases of prolonged paralysis?

ART. VII.—*Observations on Healthy and Morbid Articular Tissues*. By JOHN BIRKETT, F.L.S. F.R.C.S., &c. Read before the Physical Society of Guy's Hospital, March 18, 1848. (From Guy's Hospital Reports, Second Series, Vol. vi., Part I, p. 36, October 1848.)

[THE present short paper by Mr Birkett it was our intention to have noticed in the article on the subject of Ankylosis in volume seventy-fifth, (p. 405); but the observations which it contains appear so important and instructive that they require to be noticed by themselves. They are, therefore, given nearly in the words of the author; and whatever seems necessary to be added in further illustration of the subject of ankylosis is snbjointed afterwards.]

The growth and nutrition of the cartilage covering the articular extremities of bones has been the subject of many valuable and elaborate papers by observers in various countries; not to the extent, however, which the importance of the subject demands: for before studying the morbid changes taking place in the tissues of the body, I hold it to be essentially necessary that their normal and healthy condition should be as fully established as possible, not only in regard to their form and elementary composition, but also in relation to their stages of development or nutrition. The tendency of the pathology of the present day is, not to rest satisfied with the mere outward changes in the physical characters of organs, but, armed with more powerful instruments for observation, the pathologist engages himself with the examination of the changes and metamorphoses taking place in the materials effused as products of hyper-nutrition or of inflammation. Hence, it is necessary to obtain, as far as possible, some insight into the appearance and condition of a tissue when in a healthy state of nutrition, to trace the metamorphoses which the blastema undergoes to arrive at a perfect stage of development, and fully to comprehend the appearances presented by any tissue of the body in its perfect state of health.

As it is now an undisputed law that all tissues of the body, whatever their form or consistence, have undergone, step by step, fixed and definite changes from the moment when the peculiar blastema was effused as a fluid, and any deviation from which must be regarded as essentially detrimental to the perfection of the fabric; so it is required now, more than ever, to pursue with earnestness and patient observation the various phases of nutrition presented in a healthy state.

With this view I venture, not without fear of being regarded
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by some here present of stating facts with too great minuteness, and of describing appearances only visible to the assisted eye, to occupy the attention of the Society, by describing, as briefly as possible, the appearances presented by sections of articular cartilage, and to deduce from these observations such truths as may induce us to regard this structure as enjoying a more highly vitalized position (if I may use this term) among the tissues than at present is accorded to it.

I need not remind the members of this Society that the absence of vessels carrying the red globules of the blood is not any objection to the view here entertained of the constant and sustained, or even transitional nutrition of these structures.

The situation of this substance involves its constant exposure to pressure and attrition, and it must therefore become, after a time, in spite of the secretion formed for its lubrication, wasted and thinned, unless it enjoy either a most remarkable power of sustained nutrition, or, in the absence of this, a power of reproduction.

This reproductive function, I hope to prove, is enjoyed by the articular cartilages in common with other tissues, commonly designated by the terms non-vascular or extra-vascular, and which all belong to the extensive class *EMTHELIA*.

Now, there are so many forms of epithelia, that I must for one moment draw the attention of the Society to the following observations. They are all essentially nucleated globules originating in effused fluid blastema, but having arrived at this point, they then undergo definite metamorphoses.

1. They break up, discharging their contents under the form of secretions.

2. They become, either by absorption or desiccation of the surrounding matter, and by a process of flattening and cohesion, the laminated tissues ; horns, hair, nails, epidermis.

3. They undergo transformations either in the walls of the globules, or the matter surrounding the nucleus increases and becomes changed into the basement or intercellular substance, or hyaline portion, as in cartilages.

4. There are the tessellated or protective epithelial tissues.

5. There is the pyramidal form, with or without cilia.

All these forms of epithelia pass through their matamorphoses with more or less rapidity in reference to the function they have to perform in the economy. The most rapid evolution occurs in the secretive ; the more slow, in fact the slowest, in the cartilages.

It is scarcely necessary to describe minutely, although I must request the members of this Society to recall to mind, the changes which take place in the various layers of the epidermic

cells; of the anatomy, in fact, of the corium and of the subcutaneous cellular tissue.

Analogues of these parts we find in the extremities of bones which enter into the composition of joints.

The subcutaneous cellular tissue is represented by the cancellous structure.

The corium and basement membrane is represented by a very peculiar and remarkably hard lamina between the cancelli and the cartilage; and

The epidermis has its representative in the cartilage layer.

Analogy may even be carried further; for we find marrow occupying the cancelli as fat does the areolar spaces of the subcutaneous cellular tissue, and the blood-vessels ramifying on the osseous lamellæ in the same manner as in the areolar laminae, continuing even until they form reflected loops, just as occurs in the corium.

We might also regard the articular cartilage as a peculiar modification of that epithelium which invests the internal surface of the loose fibrous capsule; a modification to serve a particular end, namely, the prevention of concussions. There is no distinct continuation of the epithelium of the fibrous capsule upon the surface of the cartilage, so far as I have been able to discover, supported, as stated by some authors, upon a layer of fibrous tissue. But the appearance of epithelium is owing to a metamorphosed condition of the cartilage corpuscles, which, as they advance from their attached or osseous, or, I may say, early stage, to one more advanced or perfect—to their free surface, become flattened and arranged in a very definite manner.

This progressive arrangement it is which requires explanation.

If a thin section of articular cartilage be made with a sharp razor in a direction vertical to the articular surface of the bone, and including a portion even of the articular surface of the bone itself, the following appearances will be observed with a power of half-inch focal distance. The cartilage cavities near the bone will be found to have their long axis in various directions, some being placed vertically, some horizontally, and some obliquely, inclining either to the right or to the left, and this apparently unimportant diversity of direction is maintained to a considerable extent throughout the thickness of the cartilage. But as the free surface is approached, the direction of these cavities assumes a very definite and uniform course; no longer do we see an indiscriminate arrangement, but one which at once strikes the mind of the observer as determined and fixed. In fact we now meet with that portion of the cartilage layer which corresponds with the more external or outermost laminae of the epidermis; a portion which has been pushed upward,

as it were, by a continual but slow development of new cartilage tissue, which in its turn assumes the same regular arrangement, and is itself worn off or wastes by attrition in the movements of the limb, or in consequence of being disposed at so great a distance from the principal source of nutrition,—the vessels of the cancellous bone tissue.

Without some generative force of this kind, how can we explain those appearances regarded as cicatrices in cartilage? how the increase in superficial extent? how the thickness, which certainly varies in infancy, adolescence, and adult periods of life?

Fully corroborating the statements of authors, to the effect that articular cartilage never, in a normal condition, is penetrated by vessels carrying red blood, I cannot but claim for it that power of nutrition which is derived from the inherent and peculiar vital force enjoyed by the nucleated globule; a force as powerful in it as any with which the most highly vascular tissues are endowed: for were there time sufficient, I think I should be able satisfactorily to demonstrate that a high condition of vascularity is immediately connected with a more rapid, but not a necessarily higher degree, in kind, of development.

Independently of the peculiar power enjoyed by the lowermost nucleated globules, or rather those nearest to the bone, there yet exists another structure which probably possesses some peculiar endowment beyond mere solidity and hardness. This is the osseous lamina to which allusion has been made by authors, but with very great want of accuracy. It does not present the usual characteristics of bone at all. It is true that there exist in it, as in bone, lacunæ, and that these lacunæ are occupied by nuclei; but I do not find the beautiful arrangement of canaliculi leading from these lacunæ. The disposition of these spaces is very regular; and the substance of this tissue, which is extremely dense and hard, varies very considerably over the irregular surface of the true bone. It may be described in either of two ways: in the one, that this hard material is deposited between the projecting capillary vessels enclosed in their osseous canals, or that these osseous canals, with their vessels, extend into the hard tissue. However, whatever may be the function or mode of nutrition, or relation of this to the growth and development of articular cartilage, it always appears to exist; and in the present state of our knowledge it must, I believe, be admitted, as already stated, that the nutritious fluids pass through this thin lamina before reaching the cartilage.

The peculiar manner in which the capillary vessels pass from

the cancellous tissue into tubes formed of true osseous tissue, although not new probably to the members of the Society, is well displayed in a preparation from which this drawing has been made. The looped form of capillaries has been described; but I am not acquainted with any description at all answering the appearances presented by the preparation from which the drawing was made. It will at once bring to mind the arrangement of the capillaries in the papillæ of the cutis, and the same function performed by them; namely, the part they play in the development of the epidermic scales may have its analogue in these capillaries of the articular extremities of the bones, and the generation and nutrition of the articular cartilage by means of them.

Briefly, in recapitulation, I would ascribe, then, to articular cartilage a higher degree of nutrition and development than is usually assigned to it, and arrange in three periodical series the appearances presented by it.

In the first, gradual increase in superficial extent and thickness, accommodating itself to the increase in the size of the articular extremities of the bones.

In the second, the power of sustained nutrition, or a something superior to this, by which the loss, necessarily arising in consequence of attrition and the constant disintegration and removal of tissue, is supplied, and new cartilage formed.

In the third, when all the powers of regeneration are diminished, and this tissue, as others of the body, becomes to a certain extent disorganized, softening, or even loss of this substance results,—atrophy of old age.

If this view of the nutrition of articular cartilage be admitted, I think it will more satisfactorily explain the connection between the diseases of the cancellous tissue of the articular extremities of bones and the destruction of the cartilage covering them, especially of that kind in which small perforations form in the centre of the articular fossæ or surfaces, and which are filled up as the disintegration, from loss of nutrition, proceeds by the vascular new formation.

It is now an established fact that there is no such morbid process as ulceration of cartilage, the process of ulceration being of such a nature that it cannot take place in a tissue organized in the manner of cartilage. The destruction of this tissue depends upon a loss of nutrition, a disintegration, in which the development of fat plays an important part.

Any mischief, then, which is sufficient to excite great action in the vessels supplying nutrition to the cartilage, and which nutrition in a normal state takes place by the effusion of blastema fitted to generate cartilage tissue, tends to interfere with or in-

interrupt the healthy functions of the parts, and the results of inflammation are manifested in the separation of the cartilage from the bone (as the epidermis from the corium), and the effusion of a blastema in which is generated a fibre tissue, which at last receives within it capillary vessels, and which continues to increase so long as the destruction of the cartilage proceeds, and there is space formed for it to insinuate itself between the bones or cartilages, as circumstances may arise.

These vascular new formations, when attached either to the synovial membrane of the capsule, or arising from the osseous surfaces, have their origin in the effusion of blastema, and are closely connected with the normal vascular arrangement of the parts from which they grow. It is, I believe, necessary that even the thin and delicate lamina immediately beneath the cartilage be destroyed before they can be developed from bone, for then they are closely in contact with the vessels of the cancellous tissue.

The term *ankylosis* does not at all indicate the condition of the parts which once constituted the moveable joint. Modern surgery, in fact, should repudiate the term, as it implies a condition of the limb which it is to be hoped does not often now occur. Derived from the Greek, it signifies a bending or curvature of the joint—a condition likely enough to occur in cases if neglected. But a word used by Professor Rokitsansky, *synostosis* (συν & ὀστίον), most fully indicates that condition of the articular extremities of two bones by which they become immoveably connected together by the blending of the cancellated tissue, and a total destruction of the articular lamellæ.

This state is seen in some cases; but, even when very far advanced, spaces may be found where portions of the articular lamellæ are remaining, and in which points no bony junction has taken place.

Imperfect ankylosis, as it is termed, results in a great degree, I believe, from the persistence of this delicate articular lamella, the continuance of which prevents the complete amalgamation, as it were, of the cancella of the two bones, but allows of the effusion and vascularization of a fibrous tissue, in which earthy matter is not deposited in consequence of the articular lamella interposed between it and the capillaries carrying nutritious fluids to the bone, and from which the earthy matters are deposited.

I do not allude to stiff joint depending upon the condition of the parts surrounding the joints—the tendons, fasciæ, &c., from a desire to confine the observations to the ends of the bones themselves.

In conclusion, I hope that the desire to condense this com-

munication as much as possible, and the endeavour to avoid all unnecessary detail with which only those may be conversant who will condescend to extend their powers of observation by mechanical appliances, have not thrown obscurity over the remarks. I subjoin, however, the following recapitulation.

That articular cartilage enjoys a power of slow but continual growth ; and that as the layers upon the free surface become destroyed their place is supplied by the generation of a new tissue from the articular ends of the bones.

That this nutrition of cartilage is sustained by the peculiar arrangement of the vessels in the bone immediately beneath the articular laminæ, somewhat in the same manner as the epidermic scales are generated upon the vascular loops of the corium.

That the destruction of the articular cartilage depends chiefly upon a diseased state of these capillary vessels, whereby its nutrition is suspended, and that then disintegration, simply, and not ulceration, takes place.

That this disintegration is mainly attributable to a metamorphosis or conversion, first of the nuclei, and then of the intercellular or hyaline substance, into fat.

That as the disintegration of the cartilage tissue advances, a fibre tissue, in which capillary vessels become developed, supplies the loss, and increases in consequence of the nutrition supplied by the neighbouring vessels.

That after the destruction of the cartilage, the thin, delicate, and peculiar lamella of the articular extremities of bones must be destroyed before synostosis, or perfect osseous union, can result.

*Examination of a Knee-joint, amputated by Mr Cock,
February 22, 1848.*

The joint examined was the left knee.

The outlines of the bones forming the articulation were lost in consequence of the swelling of the surrounding tissues. A sinus opened upon the outer side of the joint and communicated with the cavity. The joint was laid open by reflecting the patella and attached soft parts. The latter were infiltrated with plastic effusion. The ligaments, internal and external lateral, were firm and apparently healthy in texture, likewise also were the crucial, but they were covered with the peculiar flocculent matter thrown out into the joint. The sinus was lined with a very vascular, soft, and flocculent growth. A few traces of apparently healthy synovial membrane were seen upon the anterior portion of the capsule. The patella was imbedded in soft, vascular, and flocculent tissue, and could scarcely, from this condition, be detected : all its cartilage had disappeared.

The head of the tibia was entirely deprived of articular cartilage—not a trace was discoverable; and the interarticular fibro-cartilages were also entirely destroyed. Upon the external tibial fossa a portion of necrosed and moveable bone was felt and seen, with a very polished surface about the size of a fourpenny piece, its edges very irregular and worm-eaten, and with the vascular fringes surrounding it, just as they surround or encroach upon cartilage in a state of fatty degeneration. This piece of bone exhibited the thin layer of compact tissue of the articular fossa, and around it only the cancellous tissue of the bone was seen. This description suffices for the internal fossa, except that here no loose necrosed portion of bone existed, a portion of compact shell alone being surrounded with the vascular fringes. Under the external fossa there appeared to be, upon dissection, within the bone a mass of scrophulous deposit. The bone was soft and very fatty.

The condyles of the femur were very nearly deprived of the whole articular cartilage which had once covered them, and vascular fibrous tissue occupied its place, of more or less thickness. The outer side of the external condyle was in a state of at least commencing necrosis, and surrounded and overlapped by the red flocculent fibrous tissue.

This most interesting case exhibits several processes adopted by nature in the reparation of diseased joints, for synostosis must be considered as the reparative action of nature.

1. The destruction of the cartilage.
2. The development of vascular fibre tissue.
3. The destruction also of the compact articular lamina.
4. A development of fibre tissue.
5. The deposit of earthy matter in this, almost cartilaginous, fibre tissue.

From the foregoing observations it results that Mr Birkett differs from many of those practical authors who have written on this subject, and agrees in some respects with Mr Mayo and all those who disapprove of the present vague use of the term *ankylosis*. Mr Birkett, indeed, admits only one kind of ankylosis; namely, that which takes place in disease and destruction of the cartilages sufficient to expose the denuded articular ends of the bones, and form a new union without the medium of cartilage. This corresponds with the bony ankylosis of Mr South, and even with *soft ankylosis*, as defined by Mr South, and the three forms described by Mr Mayo. Mr Birkett further rejects entirely the form of the infirmity called False, Spurious, and Incomplete Ankylosis. False ankylosis, indeed, is, as we have already said, no ankylosis at all. It is a condition of the joint in which

Immobility is most commonly the effect of some form, stage, or degree of inflammation, and which accordingly goes off, in proportion as the inflammatory state is subdued and subsides. This inflammation may affect, *1st*, the aponeurosis or fascia outside the joint, and passing from the one bone to the other; *2d*, the capsule or general covering; *3d*, the lateral ligaments of such joints as the knee-joint and the elbow-joint, or the wrist; *4th*, the inter-articular ligaments; *5th*, the synovial lining; and, *7th*, the cartilages; or two or more of these textures altogether.

The affection varies according to the nature of the inflammation. In what is called disease of the joints, it is in general the synovial membrane that is first affected, and then the cartilages; and, as in the case of the first being inflamed, lymph is effused within the joint, the union of the two articulating ends is of a more general nature, and obstructs more the free motions of the joint than when either the fascia or the capsule is affected.

The ligaments are not very often inflamed, unless in consequence of injury, or after inflammation of the synovial membrane, which lines one side of them. When synovitis is extensive, either spontaneously, or in consequence of injury, the inflammation always almost extends to the ligaments, and renders them thick, soft, and brittle, so that often they are altogether destroyed. This is often observed in disease of the hip-joint, in the circumstance of the round ligament being destroyed and disappearing altogether. It does so in consequence of inflammation. Neither can these ligaments be said to be destroyed by suppuration. The process is rather a species of disintegration. They first become soft, thick, flaccid, and brittle; then their fibres are separated and broken asunder; eventually they crack and are absorbed. The action, or rather non-action, is a species of atrophy dependent on previous inflammation.

The capsule is inflamed not only in disease of the joints, but in rheumatism and gout. But the inflammation is rather secondary in the case of disease of the joints; while it may be primary in that of gout or rheumatism; that is to say, the capsule is the part originally affected, and thence the inflammation extends to the synovial membrane, and sometimes to the periosteal and perichondrial coverings. This action produces not only thickening of the capsule, and rigidity and immobility of the joint, but effusion of sero-albuminous fluid within the joint, sometimes effusion of sero-albuminous fluid into the pericapsular cellular tissue.

This is manifestly a form not unfrequent of what foreign authors vaguely call false, spurious, and imperfect ankylosis.

The stiffness and immobility of the joint is the effect of the inflamed and thickened state of the capsule and of the other morbid secretions; and providing this inflammation is subdued in sufficient time, to prevent serious injury from being inflicted on the synovial membrane, and causing the agglutination of its contiguous surfaces, the stiffness and immobility may be diminished, and finally removed; and the ankylosis is then said to be cured. It is, notwithstanding, clear that this condition is not genuine ankylosis; and the facts communicated and the distinctions established by Mr Mayo, Mr South, and Mr Birkett, ought to be sufficient to show that the name ought not to be applied in this manner.

There is yet another condition of certain textures connected with joints, which, either associated with the last mentioned, namely, the morbid thickening of the capsule, or some of those previously noticed, or occasionally alone, may give rise to the state denominated false and incomplete ankylosis. This is thickening, induration, and contraction of the fascia, in consequence of chronic congestion and inflammation. This condition most commonly affects the popliteal fascia in the case of the knee-joint and the bicipital fascia in the case of the elbow-joint. This thickening, induration, and contraction of the fascia may occur as an effect of capsular and synovial inflammation, either separately or conjointly, and as such is seen after strumous inflammation of the knee and elbow-joint. But it also takes place in rheumatism, in gout, and in rheumatic gout, and indeed more or less of it is seen in almost every form of these disorders. Its tendency is to induce a slight but permanently bent state of the joint, so that it cannot be extended without pain, and without more or less injury to the fascia, and sometimes to other parts, if the inflected state of the joint have been of long standing, or is considerable in degree. In general this may be recognized by the peculiar appearance of the joint, the impaired and limited degree of mobility, and by the circumstances attending the origin and progress of the disorder. The figure and consistence of the swelling should also be attended to, as it is often possible to recognize, upon careful examination, thickening of the capsule and fascia, with that sort of puffy enlargement which denotes the presence of fluid within the cavity of the joint.

The cause of this peculiar inflection and incapability of extension seems to be manifold. Unquestionably the affection of the capsule and the synovial membrane contribute much to it. But independent of this, the irritation within the joint causes indirectly the flexor muscles to contract, in order, apparently, to diminish somewhat the painful sensation arising from the extended state of the joint. Whether this be the fact or not,

it is a fact that, in the majority of cases of articular and intra-articular inflammation, the flexor muscles act in a constant and steady manner in inducing and maintaining the limb in the inflected condition; and in this condition it is always less painful than in the extended state. It is possible that this condition may also be influenced by the inflammatory and hyperemic orgasm being more intense in the extensor aspect of the joint than in its flexor aspect.

This, however, is not the sole cause of stiffness and immobility. A very considerable amount of these phenomena is certainly dependent upon the thickening, induration, and contraction of the fascia. Mr Wickham speaks of contraction of the muscles; and others, especially Dr Little, have attached great importance to contraction of the tendons. It is possible that the tendons may be contracted, and in some instances they are so. But by far the most general lesion in this form of stiff-joint is the thickening and contraction of the periarticular fascia.

The affection may even proceed from the fascia to the periosteum connected with the articular ends of the bones.

This lesion is most common as a consequence of rheumatism, and what is called rheumatic gout. That affection is seated originally in the fascia, and thence proceeds to affect the capsular and the synovial membrane, and other parts of the articular apparatus. After some time it gives rise to an irregular deposit of earthy, or animal and earthy matter, over the extremities of the bones; and this deposit also tends to limit and impair the mobility of the joints. This deposit it is of which Mr Corfe speaks, as in rheumatism, causing locking of the joints. Without adopting his idea as to the original cause of this, which may be found in his book, Mr Corfe is quite right as to the fact that the joints are as it were locked or limited in motion in consequence of the disease.

These considerations will, we trust, tend to afford some explanation of what is really meant by false and incomplete ankylosis, and of the modes in which that infirmity is occasionally cured, or seems to be cured, and disappears. Even in the last-mentioned form, where the limited motion depends on the state of the fascia, much may be done to restore the joint. Under favourable circumstances, such joints recover their mobility under various methods, and sometimes methods apparently opposite. It has been seen that M. Fleury cures joints in this state by the systematic application of cold water. M. Gros, on the other hand, employs iodine embrocations. In some instances, cases of this kind derive benefit from the use of Buxton waters; in other instances, from those of Bath; and certain cases, which

derive benefit from neither, are improved under the use of the waters of Aix-La-Chapelle.

The advocates of the cold water method of treatment say, that local means and applications are of little avail unless the general health is amended; and hence, that all local treatment may be neglected provided attention is given to improve the functions of the skin and the digestive organs by the copious use of cold water internally and externally. It is impossible to deny that the substitution of cold water for the several stimulating and hurtful drinks in common use, must be beneficial; and the employment of cold water externally may also be advantageous if administered under the eye of an intelligent physician, who sees that there is no chance of inducing by this agent such internal disorders as *pericarditis* or *endocarditis*, or *meningitis* or pneumonia. Unless, however, this precaution is taken, such a remedy indiscriminately employed is very likely to do harm.

Of local remedies there are multitudes; but all are uncertain. Those which operate by abating inflammation and inducing counter-irritation are the most useful; and of the latter, the actual cautery or the potential caustic is by far the most efficient.

ART. VIII.—*Report on the Fevers of New Orleans—particularly the Yellow Fever of 1849.* By E. D. FENNER, M. D., of New Orleans, &c. &c. (Southern Medical Reports, &c. Vol. i. p. 109. 1849.)

IN New Orleans we have met with all the forms of endemic fever which were familiar to us in the country (West Tennessee, Mississippi and Madison Parish, La), with the addition of yellow fever and ship fever or genuine typhus. We have found those common to the city and country to prevail at the same season and in a similar manner, excepting that we met with a more rapid and malignant congestive fever in the country than in the city, and the bilious remittents of the country retain their character throughout, more than they do in the city. Here, in the summer and autumn, they have a decided tendency to *crisis* by *hemorrhage*. This makes *yellow fever*;—it forms the true characteristic difference between the high degrees of summer and autumnal fever in the city and country, and must depend on locality and attendant circumstances. We have intermittent, remittent, and continued fevers, alternating in type, and running into each other, just as they do in the country. Intermittent fever prevails here throughout the year as it does in the country. During the healthiest years it predominates over all other types; but during the sicklier years, in the country, it runs into

remittent, bilious and congestive, whilst in the city it runs into yellow fever.

Dr Harrison testifies that he had often observed malignant intermittents immediately to precede the outbreaks of yellow fever epidemics.

The New Orleans Charity Hospital is probably the most extensive fever hospital in the world. Let us see how far the statistics of disease at that institution will sustain our observations. It appears from the records, that in a period of nine years, from the 1st January 1841 to 1st January 1850, there were admitted into this hospital 73,216 patients; of which number there were admitted for all the different forms of fever, 33,381 (and among these last), for intermittent fevers, 17,217.

It would thus appear that nearly one-half of all the patients admitted into this hospital were for the different forms or types of fever—and that more than half of these were intermittents.

It should be mentioned that this vast number of patients includes a lunatic asylum, having from sixty to ninety inmates, up to June 1848, when it was removed to Jackson; that the large number of fever patients includes many that were imported by sea, and brought from the neighbouring countries; and that the intermittents include the different species known as simple malignant, pernicious and congestive. If we take into consideration that the intermittents are mostly our own, *i. e.* they originate in the city and surrounding country, whilst the continued fevers are mostly imported, the preponderance of the former will be still more striking. Let it not be forgotten, too, that during the time specified there was but one single year (1845) in which our city was exempt from yellow fever.

The following statement will show the prevalence of intermittent fevers at the different seasons of the year for the time specified:—

Int. Fever.	Spring.	Summer.	Autumn.	Winter.	All Fevers.	Yellow Fever.
1841	112	403	177	92	1991	severe.
1842	114	453	394	135	1758	little.
1843	85	208	413	137	2222	severe.
1844	117	469	732	231	2207	little.
1845	180	353	664	206	1763	none.
1846	236	569	1045	218	2603	little.
1847	391	508	691	602	6901	severe.
1848	282	689	874	535	6361	moderate
1849	420	1701	3738	1275	7575	do.
Total,	2443	5353	7728	2331	3381	

It will thus appear that intermittent fever prevails here all

the year round; gradually increasing from the winter up to the autumn, when it begins to decline. It will be seen, however, that there is considerable variation in the amount, as well in the different seasons as in different years. The proportion is greater in the healthy years; but intermittents are never entirely absent, even when yellow fever is raging. During the nine years specified, on selecting the month in which yellow fever was worst, we found the following relative proportion of intermittent fever at the Charity Hospital:—

1841, September—Yellow Fever	682	Intermittent	18
1842, ...	247	...	144
1843, ...	365	...	128
1844, ...	68	...	255
1845, ...	0	...	279
1846, October,	83	...	376
1847, August,	1611	...	74
1848, September,	597	...	299
1849, October,	520	...	720
	4133		2293

At the very same time we also find more or fewer cases marked remittent and bilious fever. Cases are seen every sickly year, commencing as intermittent or mild remittent, and wanting those strongly-marked diagnostic symptoms which have been said to distinguish yellow fever; yet which, if neglected or maltreated, terminate in hemorrhage and black vomit. In these cases the advocates of the specific character of yellow fever contend that the patients contract a new and different disease; but we think improperly. We believe it is all the same disease, differing only in degree and stage. The attack was of its mildest form, and if promptly and properly treated, it could have readily been cured in that form, just as it is done in the country; but if neglected or maltreated, it runs into the hemorrhagic stage.

This brings us to the consideration of the distinguishing feature of the summer and autumnal fevers of this locality. A vast majority of cases in their mild forms, and the early stages of the more intense, are exactly such as are seen all over the southern country. The more malignant forms, and the advanced stages of the mild, have a decided tendency to terminate by hemorrhage. This constitutes what is called yellow fever, and is the main feature that distinguishes it from the endemic fevers of the country. Physicians may say what they please about being able to distinguish a case of yellow fever as soon as they examine it: we do not believe it possible, according to their ideas. Rarely does a summer pass, in which we do not hear of

some intelligent and experienced practitioner being perfectly astonished at seeing what he had pronounced a case of intermittent or remittent bilious fever terminate in black vomit or other hemorrhage. Now what causes this tendency to hemorrhage in the summer and autumnal fevers of New Orleans, and occasionally in other southern localities, we do not pretend to say, for we do not know. But that it depends on something connected with the locality is beyond a doubt.

Seeing, then, that all the forms of idiopathic fever met with at this locality prevail together, and are frequently seen to interchange, and run into each other, we are led irresistibly to the conclusion that they are merely modifications of disease springing from one and essentially the same general remote cause. All authors agree that the intermittent and remittent bilious fevers of the country, in the summer and early autumn, spring from the same remote cause, and consequently are but varieties and grades of the same disease. Now we contend that the yellow fever of New Orleans holds the same relation to its intermittents that the severe bilious fever of the country does to the intermittents there;—they are therefore in the same category. We do not agree, with Rush and others, that yellow fever is nothing but a high degree of bilious fever; for we admit that the latter is sometimes the most malignant of the two, without displaying the characteristic features of the former. Our position is, that yellow fever is only one of the forms of endemic fever (malarious, if you will), which derives its characteristic features from the locality and attendant circumstances where it prevails. Admitting that all these fevers proceed from remote causes closely allied in their essential nature, though not precisely identical, and that the milder forms and the early stages of the more intense forms are very much alike, we are still presented with the remarkable difference in their mode of fatal termination. The fevers of the country cause death by inflammation of the brain or of the gastro-intestinal canal, or by that strange lesion of the nervous system which is called congestion;—the fevers of the city produce such an alteration of the blood and the solids as leads to fatal hemorrhage and jaundice.

We might go still farther, and say that the very same remedies which have been found so beneficial in the fevers of the country, are equally applicable to the fevers of the city, though they require to be differently administered. We have found them so; but as there exists much difference of opinion on this point, we will reserve it for more extended experience.

We do not believe that yellow fever can properly be classed amongst epidemics, if there be any strict and real distinction in the meaning of the terms epidemic and endemic. Epidemical

diseases, such as measles, scarlatina, pertussis, influenza, and cholera, may prevail in any region or climate; but endemical diseases are confined to the localities where they habitually prevail, and depend upon circumscribed influences. Under this view of the subject, yellow fever is just as much an endemic disease in New Orleans and other places where it prevails, as remittent bilious fever is in the country. We have no other objection to the common acceptance to the term epidemic, as applied to express the extent to which any disease may prevail, than that it may be giving too much latitude to the definition of our nomenclature. In our allusion to yellow fever, we shall continue to use the term as it is commonly understood.

After seeing the statistical facts which have been presented, writers should not dwell too strenuously upon the distinction that yellow fever is a disease of cities and towns, whilst intermittent and remittent bilious fevers belong to the country. We have demonstrated the fact, that in New Orleans, one of the favourite abodes of yellow fever, we have all the forms of summer and autumnal fever met with anywhere;—and yellow fever has been seen in very small villages, sometimes even in the country.

The forms of summer and autumnal fever common in the country are met with in all our southern cities, from Vicksburg round to Norfolk. These places likewise, at intervals, have epidemics of yellow fever. Nor does yellow fever confine itself to these ports of entry. It sometimes prevails at small towns in the interior of the country, and remote from navigation. Time was when these southern cities, New Orleans, Natchez, Mobile, Augusta, Savannah, Charleston, Norfolk, and others, with a goodly population too, were strangers to yellow fever: they were subject alone to the ordinary endemic forms of the country. But in the course of events this new type made its appearance in an unaccountable manner. Why did not yellow fever prevail at Mobile and Natchez previous to 1817, at Vicksburg before 1841, and at Rodney before 1843? We know not, for we are ignorant of its cause; but there stand the facts, and we must account for them in the best way we can. Something must take place in these localities to produce occasionally this modification of endemic fever. Whatever be the essential nature of the remote cause of fever, it must be subject to modifications. Like causes produce like effects; but it is notorious that the prevailing fevers of successive seasons vary considerably at the same place. These variations, therefore, must be attributable to modifications of the cause; which is certainly a more rational supposition than to attribute the various types of concomitant fever to the simultaneous action of separate, distinct, and specific causes.

But we will pursue the subject no further at present. Our object has only been to present some of the facts and the results of our own observation. The conclusions are our own, and have been arrived at after patient and deliberate investigation. They coincide with many of the best writers on yellow fever, and we are happy to know they are entertained by some of the most intelligent and experienced physicians of this city.

Having published in the 3d, 4th, and 5th volumes of the New Orleans Medical and Surgical Journal full accounts of the yellow fever which prevailed here in 1816, 1847, and 1848, we shall now proceed to give a brief report on the disease in 1849.

The Yellow Fever of 1849.

After the decline of cholera in June, the endemic fevers of this locality rose in the ascendant, and prevailed to but a moderate extent, and we think in the mildest form of their different types ever seen. Seldom have the physicians of the city had less to do during the summer and autumn than in 1849. This is more particularly set forth in the monthly journal of our General Report. Yellow fever attracted but little attention, and was never spoken of as an epidemic; yet it will be seen that 769 deaths from it were reported to the Board of Health.

The admissions for fever into the Charity Hospital were quite numerous, and the mortality from yellow fever considerable. A great majority of the deaths from fever in the city occurred at this institution. The ratio of deaths to the number of yellow fever cases admitted into this hospital was about as great as usual; which would appear to contradict our remark as to the mildness of the prevalent disease; but, as paradoxical as it may appear, we think this great mortality may correctly be attributed to the mildness of the disease. It is notorious that the class of people who go to the Charity Hospital for yellow fever is composed chiefly of robust labourers and mechanics, who generally defer applying for admission as long as their sufferings are endurable,—often too late for successful treatment. This is the principal cause of the greater mortality at this hospital than in private practice every year. These people have no idea of prudence or discretion, and are ignorant of the vast importance of early treatment both in yellow fever and cholera. They keep about their business as long as they can, or stay at home and do nothing until they become dangerously ill, before applying for medical aid. If a violent disease, with urgent and distressing symptoms, be prevailing, they are driven in earlier; but if a disease equally dangerous, though mild and

insidious in its attack, be prevailing, they still wait to become really ill before calling for relief. Now it is admitted that yellow fever may assume either of these types, and yet certainly lead to death, if not promptly and judiciously treated. It matters not whether the fatal stage has been arrived at by the mild or the violent type; it is then the same thing, and they will all likewise perish with black vomit or other hemorrhages. During this season nothing was more common than to see patients admitted from the third to the sixth or the seventh day of fever. There was then no difficulty in the diagnosis, and these were pronounced yellow fever. In fact many of them were but little better off than if they were in the collapse of cholera. Cases not so far advanced, or of milder type, were promptly relieved, and discharged under a different name. The table we shall presently insert will show an unusual number of other fevers admitted during the prevalence of yellow fever.

The cases of fever seen in private practice were of the same character,—most of them so mild, and so easily cured, as not to be called yellow fever; but those that terminated fatally generally presented the characteristic features in the end. If death, or a near approach to it, be required to enable us to make a diagnosis, we can never expect to get much credit for our skill in treating yellow fever. But the fact is, there prevails much error upon this point. During the yellow fever season in New Orleans, any attack of fever, be it intermittent, remittent, or what not, in an unacclimated person, if neglected or maltreated, is liable to terminate in hemorrhage and yellowness of the skin, and then no one will hesitate to call it yellow fever. If properly treated and promptly relieved, it is called intermittent or remittent bilious fever.

The following table will show the relative proportion of the different types of fever admitted into the New Orleans Charity Hospital during each month of the year 1849:—

Fever.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Monthly Totals.
Intermittent	109	114	138	117	69	155	368	592	763	720	360	684	4439
Typhus		127	193	140	128	65	43	44	49	21	23	58	891
Typhoid	79												79
Remittent	5	10	13	14	30	49	72	166	223	116	76	50	824
Bilious	6	6	19	9	6	10	39	20	11	3			130
Yellow							2	28	374	520	130	6	1060
Ephemeral	4	8	18	18	6	2	7	8	7	1	2	1	82
Congestive					1	4	2	6	8	8	4	6	39
Pulperal						1		9					4
Scarlet											1		1
Bilious	6	6	19	9	6	10	39	20	11	3	1		130
Cerebral	1				1				1				3
Continued	1					6	6	1	2	1		1	20
Total.	205	265	381	298	241	293	540	869	1418	1392	806	806	7575

Here we may note the great preponderance of intermittents, over all the others put together, and over any other type at all times; also the prevalence of various types of fever at the same time; besides other points which we need not mention. These statistics certainly substantiate the views we have set forth.

The yellow fever of this year commenced about the last of July, when, as will appear above, those marked remittent and bilious were quite rife. The following table will show how the first cases of yellow fever appeared at the Charity Hospital. Some were seen in private practice fully as early.

A table showing the date of admission, length of residence in New Orleans, the time sick when admitted, date of discharge, and the result of the first fifteen cases of yellow fever at the Charity Hospital in the year 1849:—

Date of Admission.			Residence in New Orleans.	Sick when admitted.	Date of Dis- charge.	Result.
1st Case	July	28th	3 months	1 day	July 30th	Died
2d "	August	1st	9 years	unknown	" 11th	Recovered
3d "	August	5th	2 years	5 days	July 6th	Died
4th "	August	6th	7 months	7 days	October 24	Recovered
5th "	"	6th	3 days	2 days	August 9th	Recovered
6th "	"	6th	2 years	5 days	August 9th	Died
7th "	"	11th	1 month	unknown	" 12th	Died
8th "	"	12th	1 year	2 days	" 23d	Recovered
9th "	"	18th	7 months	4 days	" 22d	Recovered
10th "	"	18th	5 months	2 days	" 20th	Died
11th "	"	22d	3 months	unknown	" 22d	Died
12th "	"	22d	18 years	"	October 16th	Recovered
13th "	"	24th	3 years	3 days	August 25th	Died
14th "	"	24th	4 months	1 day	September 1st	Died
15th "	"	24th	4 months	4 days	August 28th	Died

There were thirteen more cases admitted during this month; but these are sufficient to show how the disease commenced. From this time the number of cases steadily increased until October, after which month it rapidly declined.

The annual report of the Charity Hospital will show the relative number of admissions, discharges and deaths, from the different fevers, during the year.

We were in attendance at the Charity Hospital during the months of September, October and November, and saw cases of intermittent, mild remittent and dysentery, run into well-marked yellow fever. Dr Brickell informs us that he had a case in his ward, which entered as an intermittent, and was relieved; but before leaving the hospital a relapse occurred which proved to be decided yellow fever. This was also relieved, but before convalescence was established the patient fell into distinct intermittent fever again. An experienced medical friend

told us of a case of intermittent fever in private practice, which most unexpectedly terminated fatally with black vomit. Late in the season the fevers were slow in their progress, in many cases not coming to a crisis till the 9th, 11th, or 13th day, as occurred in 1846.

We saw no fatal case in private practice. Those which we saw early in the attack we found no difficulty in relieving promptly—a few which were far advanced when we were called, made narrow escapes.

We shall now offer some of our views on the pathology and treatment of yellow fever. They are somewhat novel on both points, but we believe them correct or we would not publish them. They are necessarily brief and imperfect, but will be enlarged at a future time, when we will candidly report the results of further experience.

Treatment.—The various plans of treatment approved by the different physicians of the city were pursued this year, and we presume with satisfactory results. We will not undertake to describe them. As for ourself, in furtherance of the views set forth in our accounts of the epidemics of 1847 and 1848, we trusted fully to what we have termed the “abortive method by quinine,” and with results entirely satisfactory. When called to a case within twenty-four or thirty-six hours of the attack, we seldom failed to cut short the fever by large doses of the sulphate of quinine in combination with opium or morphia, frequently followed by a little blue mass or calomel. Our usual mode of proceeding in this stage is, to order at first a hot mustard footbath and a purgative enema—then give to an adult 20 or thirty grains of quinine with 25 or 30 drops of laudanum, or one or two grains of opium, or the fourth of a grain of sulphato morphiæ, at one dose. This would generally reduce the vascular and nervous excitement completely in the course of a few hours, throw the patient into a profuse perspiration, relieve all pain and produce sleep. The bowels were kept open by some gentle means, and more or less quinine was repeated as occasion required. We recollected but one fever patient that required cupping, and we did not have a single one bled from the arm.

In the early stage of yellow fever the derangement of the system is entirely functional, and consists chiefly in lesion of innervation. In the advanced stages it is altogether a different affair—organic lesions have then taken place, and the blood is altered. As soon as the attack is fully developed, the indications are, to reduce nervous and vascular excitement, relieve pain, and keep the principal emunctories (skin, liver, kidneys, &c.) in steady and free action; thus arresting diseased action in the incipient stage. Experience has proven that all this can

be done by the remedies just mentioned, if resorted to early enough. In the advanced stages you have a different state of things—you have to contend with engorgement of the gastrointestinal mucous membrane and of the liver, spleen, kidneys and brain, a sluggish circulation of altered blood, and an arrest of all the most important secretions. The nervous centres, which first suffered and complained, now become calm and composed; the intellect generally retains its natural clearness, and the patient is often lulled into an illusive sense of safety, whilst the experienced physician knows that irreparable injury has been already done. In these latter stages, the physicians should abstain from attempting to do too much. The main reliance must be upon the energies of the constitution, which are to be aided and fostered with the utmost circumspection. The indications are, to husband carefully the remaining strength, to keep the circulation and excitement as well equalized as possible, to restore the suspended secretions, and to keep up the process of nutrition. To fulfil these we endeavour to enforce the most perfect quietude, and resort to blisters, warm sponging, fomentations, carminative antacid mixtures, gentle stimulants and mild nourishment.

We would by no means be understood as intending to denounce or proscribe sanguineous depletion in the treatment of yellow fever. On the contrary, in violent attacks upon persons of plethoric habit, we look upon it as of great value and importance. Free depletion is applicable to the same stage that quinine in large doses is, and is a valuable adjuvant to that remedy. We merely wish to state, that since 1847 we have learned from actual observations, that liberal doses of quinine and opium, given early in the disease, and during the exacerbation, will subdue the fever and permanently and safely cut it short of its natural course, in a great many cases, without resorting to blood-letting in any manner. We know that this is incredible to those who have not witnessed it;—we could not believe it ourself till we had seen it done over and over again. If what we state be true, however, should it not be made known generally? Is it not desirable to avoid, if possible, all the pain, exhaustion and anxiety, (not to say danger), necessarily incurred whilst slowly and cautiously conducting a case of yellow fever through all its natural stages? Is it not an object of vast importance to cure the disease “*cito tute et jucunde*?” If we are labouring under false impressions and have not viewed aright the phenomena which have fallen under our observation, we trust we shall become convinced of the error. We have witnessed the various plans of treatment ordinarily pursued in this city, and we know that our experienced and skilful physicians do

manage all sorts of cases with commendable success by their own methods, when they have a fair opportunity. Every one has some favourite general plan, and we only claim the same privilege, after having tried most of the others. If we did not think our own plan the best we would not follow it. We may endeavour to demonstrate its superiority without condemning or denouncing that pursued by others. That large doses of quinine and opium, given improperly, may do much mischief, is unquestionably true; but the same may be said of Epsom salts, calcined magnesia, or any thing else that possesses any power whatever. Nothing is more true than that any medicine which has great power to do good, is likewise endowed with corresponding capacity to do harm, if misapplied.

In presenting these views relative to the therapeutic action of the sulphate of quinine, as yet novel, if not incredible, to the great body of the medical profession, we are aware that we are exposing ourself to much animadversion; but conscientiously believing them to be correct, we shall not shrink from proclaiming them. They will not appear so novel or astounding to many of the ablest and most successful practitioners of the South; though to the extent we have gone they are neither generally known or received. The sedative powers of large doses of quinine, given during the early exacerbation of our summer and autumnal fevers, both remittent, bilious and yellow, have been proclaimed by some of the physicians of this city, by the army surgeons, and by the physicians of the Southern States, in the Medical Journals, for the last ten years. We perceive that these views are gradually extending to the North, and will certainly take there if properly tested; but it will require some time to prepare the minds of our northern brethren for such a revolution in therapeutics as they must effect when established.* The wonderful powers of the sulphate of quinine over the yellow fever of New Orleans are briefly but forcibly set forth in the essay of the late Professor John Harrison, to be found in the second volume of the New Orleans Medical and Surgical Journal. Also by Dr J. Beugnot, a prominent French practitioner of our city, in the first volume of the same Journal. Dr B. informs us, in a recent conversation, that notwithstanding the favourable mention he then made of the abortive method, by large doses of quinine immediately after free blood-letting, he did not

* See the "discussion on the powers of quinine in remittent fevers" in the Philadelphia County Medical Society meeting of December 1849; published in the Medical Examiner for Feb. 1850. The remarks of Drs Parrish, Jewell, and John Bell, are decidedly favourable to large doses, whilst the President, Dr S. Jackson of Northumberland, clings to the old notions. If these gentlemen could see a few practical illustrations of the "abortive method" they would doubtless be delighted as well as astounded.

adopt it, but relied chiefly on the lancet alone. He says he is now strongly inclined to think that the former is the very best practice that can be followed in yellow fever. The older physicians, both North and South, may be expected to set their faces against them as they have ever done against all innovations; but the younger ones will be apt to adopt them if they practice in the South. Quinine is given in five or ten grain doses by a number of physicians of this city and the Southern country, who have not yet adopted the abortive method. This is a great improvement, but they will go farther after a while. We saw twenty grain doses with twenty-five or thirty drops of laudanum given at the Charity Hospital, in the early stages of yellow fever, by physicians, this season, who would have shuddered at such a prescription three years ago.

We had not expected to say so much about quinine as we have done in this article, but made it the subject of a special report. Our pressing engagements, however, do not allow time to prepare such a report for this volume. The addition of another year's experience will qualify us better for the performance of this duty.

We have said all that we deemed necessary about the yellow fever of 1849. We are entering upon a year which, if it correspond with that which followed the previous great overflow in 1817, will afford extensive opportunities for investigating every thing relative to yellow fever.

The foregoing report is an important document, in giving confirmation to the opinions entertained by Dr John Hunter, Dr Jackson, Dr Bancroft, and similar able observers, on the relation between yellow fever on the one hand, and intermittent and remittent fever on the other. The facts furnished by the experience of New Orleans for nine years leave no doubt in the mind of Dr Fenner, that yellow fever has the same origin, telluric and atmospherical, as intermittent and remittent fever. It is only a degree more intense, and depending upon a more concentrated form of the same poison. The inference is unavoidable, that it is not contagious nor susceptible of exportation, any more than ague and remittent.

It is further important to observe, that Dr Fenner has the candour to admit, that it is quite impossible in the early stage to say, whether any given attack is to be merely remittent, or to turn out yellow fever.

Regarding the application and use of the term epidemic we see no difficulty. We can understand what all experience has proved, that in certain seasons these fevers are merely endemic, that is, arising from the soil and confined to the locality; but that, in other seasons, marked by peculiar characters, these distempers acquire an epidemical character, that is, prevail extensively in a community and affect great numbers, yet without acquiring contagious characters. The air simply is distempered.

The efficacy of quinine given without delay in these disorders has been demonstrated by several physicians, but recently by Dr John Imray in the 70th, and Dr J. C. Cameron in the 71st volumes of this Journal.

PART II.

CRITICAL ANALYSIS.

- ART. I.—1. PHARMACOPŒIA COLLEGII REGALIS MEDICORUM LONDINENSIS.** LONDINI MDCCCLI. 8vo. Pp. 196.
2. *A Translation of the New London Pharmacopœia, including also the New Dublin and Edinburgh Pharmacopœias, with a Full Account of the Chemical and Medicinal Properties of their Contents ; forming a Complete Materia Medica.* By J. BIRKBECK NEVINS, M.D., London, M.R.C.S., and L.A.C.; Medical Officer to the West Derby Union Hospital; Lecturer on Chemistry in the Collegiate Institution, and on Botany in the Medical School, Liverpool, &c. London, 1851. Large 12mo. Pp. 780.
3. *A Compendium of Materia Medica and Pharmacy, adapted to the London Pharmacopœia, embodying the New French, American, and Indian Medicines, and also comprising a Summary of Practical Toxicology, with the Abbreviations used in Prescriptions.* By J. HUNTER LANE, M.D., F.L.S., F.S.S.A.; Corresponding Member of the Calcutta Medical and Physical Society; Member of the Royal College of Surgeons, &c.; formerly President of the Royal Medical Society, Edinburgh, &c. Second Edition. London, 1851. Small 12mo. Pp. 310.
4. *The Prescriber's Pharmacopœia, containing all the Medicines in the New London Pharmacopœia of 1851, arranged in Classes according to their Action, with their Composition and Dose.* By a PRACTISING PHYSICIAN. Fourth Edition. London, 1851. 32mo. Pp. 132.
5. **THE NEW LONDON PHARMACOPŒIA.** *Translated and arranged in a Tabular form, with the Edinburgh and Dublin Pharmacopœias ; showing at one view the Differences in the*

FORMULÆ of the Three Colleges, together with the Tests given by each College for the Purity of the several Preparations ; with Practical Remarks. By PETER SQUIRE, M. R. I., Chemist on the Establishment of the Queen, H. R. H. the Prince Albert, H. R. H. the Prince of Wales, and the Royal Family. London, 1851. Large 8vo. Pp. 174, with Appendix of pp. 25.

THE art of preparing, compounding, and combining medicines for the cure of diseases has at all times of the history of medicine formed an important branch of medical study. The reader of Celsus may see in the first twenty-five chapters of the fifth book, and in various chapters of the sixth book of that writer, the usual combinations which were employed among the Greek and Roman physicians. Scribonius Largus, who is understood to have flourished, according to some, during the reign of Augustus and Tiberius, according to others during the reign of the Emperor Claudius, has left, under the title of *Compositiones Medicæ*, a work of the nature of a dispensatory, which appears to have been translated from the Greek.

A considerable source of anxiety with the ancient physicians appears to have been the dread of poisons, their sudden and violent operation, and the search after such means as might most certainly oppose and neutralize their effects. Part of this dread most probably originated with the poets, to whom the reputed effects of the poisons of Æson and his daughter Medea formed a most indispensable stock for poetical invention. If we judge from the treatises written on the means of counteracting the effects of poison, we shall infer that they occupied quite as much, if not more attention, than the means of curing of diseases and ordinary wounds. The subject was divided by the ancient physicians into two parts,—one *Alexipharmaka*, or the means of counteracting poisons, and preserving against their effects ; the other, *Theriaka*, or the means of curing the effects of the wounds of animals reputed poisonous. On these two subjects, Nikander, a native of Colophon, one of the earliest authors, who flourished about one hundred and thirty-seven years before the birth of Jesus Christ, composed poetical treatises, which were highly esteemed by his successors, and from which almost all of them copied more or less freely.

From this circumstance it has resulted that almost all those who have treated of *Materia Medica* have treated of poisons, and all those who have written on poisons have communicated more or less of the ideas of the day on medicines and their uses.

Pedanius, or Pedacius of Anazarba, a town in Cilicia,* known

* Sometimes Anazarbus.

most commonly by the patronymic of **Dioscorides**, was a naturalist and botanical writer, who lived in the reign of Nero. The extant works of Dioscorides consist of five books on *Materia Medica* and Pharmacy; one treatise on Alexipharmacks, or antidotes to poisons; one treatise on Theriaca, or the Means of Counteracting the Effects of the Poisons of Poisonous Animals; and two books on Euporistics, or medicines of easy preparation. In the first book of the treatise on *Materia Medica*, (Τῆς Ἰατρικῆς), he gives accounts of all the plants, trees, and shrubs, from which were produced aromatic substances, oils, ointments, liquors, and balsams used in medicine. In the second he treats of the animals from the bodies of which are obtained various substances, as honey, milk, various sorts of oil and fat, and different animal secretions and products employed by the apothecary; and afterwards he describes various vegetable substances employed either as food, as condiments, or medicine, not described in the preceding book, especially the cereal grains, and the ordinary garden culinary vegetables. The third book is devoted to the history of the roots, juices, herbs, and seeds possessing medicinal properties; and some of the aromatic plants, as mint, different sorts of thyme, origanum, dill, anise, carraway, cinnamon, fennel, and similar articles. In the fourth book this history is continued and completed. In the fifth book he treats of the different vines and its varieties, the grape and wine; water, fresh and salt; vinegar, oxymel, and the medicated wines and vinegars; and concludes with the description of the metallic bodies and mineral substances used in ancient practice.

The Treatise on Euporistic Medicines, or those of easy preparation, corresponding in many instances to extemporaneous preparations, contains much useful information, and shows how much attention was anciently bestowed on this subject.*

The work of Dioscorides must be allowed to be the most systematic and comprehensive treatise on *Materia Medica* and Pharmacy in ancient times.

The voluminous work of Pliny the Elder (*Major*), which was intended as a sort of general history of the material world, contains, further, much information regarding the alleged medicinal uses of various articles; and, if it were possible to make the selection from a work so large and so desultory, the notices regarding the ancient *Materia Medica* would form a very respectable volume, and one not unserviceable.

Galen, however, is the great depository of all the medical

* Πεδανίου Διοσκορίδου τοῦ Ἀνταχείου τὰ Σύντομα Ἀνταχία. Place not mentioned. 1598. License of publication dated at Vienna, 1582.

learning of antiquity. In the edition of his works, as published by Chartier, the last part contains his labours on *Materia Medica* and Pharmacy. Three treatises or chapters, the first on the properties of simple medicines, the second on the composition of medicines according to the diseases in which they are indicated, and the third on the composition of medicines according to their physiological effects, contain the main facts which this laborious writer had been able to collect from personal experience and that of his predecessors.

Themison is supposed to have invented the compositions called *Dagridium* and *Diacodium*. Apuleius Celsus of Centorbi, in Sicily, among other antidotes, describes one against rabies, of some celebrity, consisting of opium, castor, pepper, and similar substances. Herennius Philo of Tarsus acquired reputation in devising a soothing or quieting composition to which the name of *Philonium* was afterwards given. According to Galen this preparation, which was employed chiefly in allaying the pains of colic, was composed by uniting in different proportions, opium, saffron, the root of pellitory, euphorbium, white pepper, hyoscyamus, nard, and Attic honey.

The Arabian physicians, and the European followers and pupils of these authorities devoted great attention to the subject of the selection, preparation, and combination of medicines ; and while they were by no means anxious about elucidating the true nature of diseases, either by anatomy or by observation, they were most solicitous to find in the products of the vegetable world, the mineral kingdom, and the bodies of animals, substances which they believed might exercise a powerful influence over the diseases of the human body. Various circumstances led them to the study of chemistry ; and though it was in their hands a rude and imperfect art, formed higher pretensions than nature allowed, their knowledge of it led them to devote much time and attention to pharmacy. With them originated the great problem of the transmutation of metals, or the conversion of the common metals into gold and silver. In the eighth century flourished Geber, to whom is ascribed the composition of a work on alchemy, which still passes under his name. From this performance, which is probably to be regarded as a collection of the alchemical and chemical knowledge of that time, it appears that various preparations of mercury, as corrosive sublimate and red precipitate were known, that nitric and nitro-muriatic acid, or *aqua regia*, and nitrate of silver, were also familiar articles. The deep impression which the alchemical and pharmacological knowledge of the Arabians left upon the art of dispensing medicines may be inferred from the number of terms which, more or less immediately deduced from the Arabian language, are still in use in various European lan-

guages. Such terms as *alkohol*, *alkali*, *julep* or *gulab*; *lohoeh* or *looch* from *alkuak*; *naphtha* from *nefth*; *camphor*, from *kafour*; *syrup* from *schirab*; *hedeguar* from *bedawar*; *bezoar* from *badezohr*; and others too numerous to recount, must be regarded as the vestiges of that knowledge, which was supposed to be most familiar to the Arabian doctors.

It is further stated upon the authority of Abulpharagius that the Arabian physicians were the first who united in composing *formulæ*, or directions for the preparation of compound medicines; and that Sahor-Iben-Sakel, director of the school of Gondisapour, published during the second half of the ninth century, under the title of *Krabadin*, the earliest dispensatory known. This was followed by others; of which that by Abu l Hassan-Hebatollah Iben O Talmid, bishop and physician to the Caliph of Bagdad, enjoyed in the twelfth century high celebrity, and was used as the standard guide for the Arabian apothecaries. These treatises were under the immediate inspection of the government, which it is said took particular care to enforce two conditions quite incompatible, that the medicines should not be adulterated, and should not be sold at too high a price. According to the same authority, the Governor General Afschin visited personally the dispensing magazines of his army, in order to be certain that these establishments contained all the medicines specified in the dispensatories.

All the Arabian physicians distinguished themselves by peculiar doctrines regarding the alleged virtues and uses of medicines. Mesues the elder was partial to the use of mild purgatives, excluding the active medicines used by the Greek physicians. Alkhindi endeavours to recognize geometrical relations in the degrees of medicines. Rhazes appears to have made use of arsenical preparations externally, and even to have administered the less active ones occasionally in dysentery. All of them ascribed to medicines, virtues and properties, which, trusting to observation only, it will be difficult to admit.

The most authoritative authors on *materia medica* and pharmacy among the Arabians were Serapion the younger, and John Mesues of Damascus, commonly called Mesues the younger.

The former, who is supposed to have lived in the end of the tenth century, some time after Aben-Gnefith and Rhazes, has left a treatise which combines at once the knowledge of the Greeks and the Arabians on the natural history and reputed powers of medicines. The work of Serapion is entitled *Liber Aggregatus de Medicinis Simplicibus*, and was translated from Arabic into Latin by Abraam, a Jew of Tortosa, and *Simeon Januensis*. The author informs his readers in the beginning of this treatise, that he had seen the treatise of Dioscorides and Galen, and that he

considered them sufficient in information; but that they were separate; and that it was his intention to write a work which should unite the information of both the Greek physicians with the more recent matter of the Arabians. He divides his discourse into three parts; the first on simple medicines derived from the plants; the second on simples derived from minerals; and the third on those derived from animals. The first division is the most elaborate and ample.

The method of Serapion is to give in general first what Dioscorides and Galen state of each article, and then to subjoin his own additions and comments, which may be understood to represent the current doctrines of the Arabian physicians. The Arab titles of each article are given, and along with them the Latin equivalent.*

It may be here mentioned that there is a treatise published by John, the son of Serapion, entitled *De Antidotis* and *Antidotarium*. This treatise, which forms the seventh and last part of the same author's work on Practice of Medicine, is a system of *Materia Medica* and Pharmacy, and is in all respects similar to the other productions of this period. The tractate, or book, is divided into thirty-seven sections or chapters, in which John treats successively of simple medicines and compound preparations, and gives full directions for preparing electuaries, confections, pills, tinctures, and similar articles; and in the thirty-seventh he describes the weights and measures employed.† The term *Antidotarium* to designate a system of *Materia Medica* and Pharmacy is in these days, as we shall see, in frequent use. It is afterwards defined by *Jacobus Sylvius* in his commentaries on Mesues as "that which contains descriptions of antidotes, that is medicines which are not applied externally, but which are taken into the system and heal its disorders."‡

It has been seen that there are in the history of Arab medicine two persons bearing the name of Mesue or Mesues, corresponding to Moses of the Israelites,—the elder and the younger. The person best known, if not the only one known by his writings, is John Mesues of Damascus, who is represented to have been a pupil of Avicenna, and to have lived at Cairo with the Khalif Alkaken. He died in the year one thousand and twenty-eight of the Christian era. He is said by Sprengel to have been the son of Hamech, and to have been born at Maridin, in the banks of the

* Liber Serapionis de Simplicii Medicina. Impressum Venetiis mandato et expensis Nobilis Viri Domini Octaviani Scoti Civis Modoetiensis per Bonetum Locatellum Bergomensem. 17 Kaliendas Januari 1497. 16th December 1496.

† Practica Joannis Filii Serapionis Dicta Breviarium. Extat apud Eundem. This forms the first part of the volume referred to in the previous note.

‡ Antidotarium est vocatum quod contineat descriptiones Antidotorum, hoc est Medicamentorum quae non foris admota corpori, sed in corpus recepta, affectus medentur. Jacobi Sylvii, Annotationes, in Joannis Mesuae, Grabadin, p. 84. Lib. Primus.

Euphrates. The accuracy of this statement is questionable. What is certain is that one of his treatises commences in the following manner :—" In the name of the merciful God, by whose nod speech receives favour, and learning acquires perfection, be the beginning of the words of John, the son of Mesues, the son of Hamech, the son of Hely, the son of Abdela, king of Damascus." It thus appears that Hamech was the grandfather, not the father of John of Damascus. He is called by his commentators John Mesues of Damascus; and one of them, Francis of Piedmont, charges him with absurdity and vanity, because he traces his descent from Abdela, the king, or Khalif rather, of Damascus.

His works are certainly the most ample that the Arabians have left upon the subject of *Materia Medica* and Pharmacy; and it is manifest that they were accounted of high importance and value both by contemporaries and successors.

On these subjects two works are extant. One is on the simple purgative medicines, which are distinguished into three orders; *Cholagoga*, *Phlegmagoga*, and *Melanogoga*. From this it appears that the term *purgative* was used in a more general sense than by the modern writers. The treatise consists of two books, one entitled *Canones Generales*, on the general effects of this order of remedies; in the other, the second book, he treats of the effects of individual purgative agents. This first treatise, though translated anciently by one of the Jew interpreters, was again translated by *Jacobus Sylvius*, and was illustrated by the commentaries of John Costaeus, Mondinus, and Manardus.

The most complete work, however, of John Mesues is that which is denominated GRABADIN, GRADIN, or GRABATIN, which corresponds to the Latin term *antidotarium*, and which the translator interprets as *Compendium Secretorum Medicamentorum*. In short, GRABADIN or GRABATIN is simply Dispensatory. In the first or ancient translation GRABADIN is rendered *Aggregatio et Antidotarium Electuariae Confectionum et Aliorum Medecinarum Compositarum*. In the GRABADIN of Mesues, the author, treats of electuaries, opiate medicines, solvent or laxative medicines, preserved medicines, that is, fruits, rinds, roots, and extracts preserved in sugar; loochs or linctuses, (eclegmata); robur or inspissated juices; syrups; infusions and decoctions; lozenges; powders; pills; ointments and plasters; oils, simple and medicated; pouches, a species of sacculated poultices; inunctions; sternutatories; epithems and clysters; and lastly, ptisans, or the vegetable infusions and decoctions. Upon the directions contained in this treatise notes, additions, and commentaries were written by Christopher Georgius de Honestis of Florence, Jacobus Sylvius, John Costaeus, Manardus, and other learned persons, so that the text of Mesues, with these explanations formed a complete system of knowledge on *Materia Medica* and Pharmacy.

The additions of Peter de Abano on the first performance of Mesue, and those of Christopher de Honestis, on the GRABADIN, were written and published about the close of the fifteenth century.* Those of Costaeus, Manardus, and Sylvius were published at Venice in 1623;† and it is manifest, from various circumstances, that in the whole of the sixteenth century, and at least the early part of the seventeenth, the *Materia Medica* and *Pharmacy* of Mesues were held in high esteem among physicians. The authority of Mesues is repeatedly quoted by the writers of these times; and several of his prescriptions and combinations are given in terms of commendation. This appears particularly in the writings of Valerius Cordus, which shall be afterwards noticed.

It seems to have been the opinion of John Mesues, that the GRABADIN, or Dispensatory, a mere description of medicines, and their uses and modes of administration, would be incomplete and unserviceable, unless the morbid states of the human body in which they were required, were also explained in sufficient detail. In the second book of the performance, accordingly, he gives a short view of all the infirmities and diseases incident to the human body, and the most probable methods of curing them; or, as he expresses it, the remedies suited to the diseases of the individual parts of the body. In this discourse, however, there is little upon the distinctive characters and nature of diseases. Mesues still adheres to his great object of combining and administering medicines.

It may be here mentioned, that there are extant several other Arabian treatises of some authority; one by Al Ben Gnefit, that is, the son of Gnefit; and the other by Al Chindi; ‡ and a third,

* Mesue cum Additionibus Francisci de Pedemontium et Additionibus Petri de Apono. Et cum Commento Dini super Canones Generales. Et cum Commento Christophori de Honestis super Antidotarium Mesuae. Platearius super Antidotarium Nicolai et Saladinus de componendis medicinis, pp. 291. Explicit Tractatus Synonymus Impressus Venetiis per Peregrinum de Pasqualibus Bononiensem. Anno Domini 1486, Die secundo Decembris. Regnante Inclyto principe Augustino Barbadiia.

At end of another tract in the same volume called *Servitor*, by Bulhasin Benabrazin, is the following:—*Impressa Venetiis per Peregrinum de Pasqualibus de Bononia sub Anno Domini 1491, die 18 Mensis Julii. Duce serenissimo et inclyto Principe Augustino Barbadiia.*

† Joannes Mesuae Damasceni Medici Clarissimi Opera. De Medicamentorum purgantium Delectu, Castigatione et Usu Libri Duo. GRABADIN hoc est Compendium Secretorum Medicamentorum Libri Duo; Quorum Prior ANTIDOTARIUM; posterior de appropriatis vulgo inscribitur. Cum Mundini, Honesti, Manardi, et Sylvii Observationibus. Venetiis apud Juntas. MDCXIII. Folio, pp. 252.

‡ Al Ben Gnefit Libellus in quo de simplicium Medicinarum et ciborum virtutibus in generali et speciali brevissime et ordinatissime pertractatur. Extat apud supplementum Mesuae Operum.

† Jacob Al Chindi Auctoris praestantissimi de Medicinarum compositarum gradibus investigandis Libellus. Extat cum eodem.

the book called the **SERVITOR** of Bulchasin, Ben Ab Erazerin.* The first two are mostly upon certain numerical relations, according to which these authors wished to arrange medicines. The third is more of a dispensatory or pharmacopœia.

The times at which the authors of these writings lived are not perfectly ascertained. Al Ben Gnefit is supposed to have preceded Serapion, because the latter mentions an author of that name.

Towards the end of the thirteenth century lived John, the son of Zachariah, physician at the court of Constantinople, where he bore also the name of **ACTUARIUS**, a title occasionally conferred by that court on physicians. Besides a compendious treatise on medicine, founded chiefly on the Greek physicians, he wrote a small treatise on compound medicines, which may be regarded as the most useful and judicious that had for a long period appeared. Though not free from the faults of the period, it has the advantage of being more condensed than previous works, and communicating all the necessary information.†

Actuarius is the first among the Greeks who mentions and describes the milder sorts of purgatives, as cassia, manna, senna, and myrobalans. The two last medicines, he states, were imported from foreign countries, namely, Syria and Egypt, into Constantinople. What he states concerning these medicines he allows he derived from the Arabians, who certainly first employed them.

The Arabians appear also first to have introduced the practice of conserving medicines by means of sugar and honey, and forming *condita* or conserves, syrups and juleps; and upon these preparations Actuarius is the first European authority who speaks at large.

Another article, not mentioned by the Greek pharmacologists, is that of distilled liquors, which appear to have included not only pure distilled spirits, but the essential oils either alone or combined with alcohol. Two articles make a considerable figure among the authorities; the one is *Rhodostagma*, and the other *Intyhostagma*. The first is supposed to have been a distilled liquor from rose-leaves, the other a similar preparation from endive. But the truth is, that the Arabian pharmacologists have many preparations of this kind; and there is little doubt that, by means of Actuarius, and contemporary or subsequent writers, the knowledge of these was introduced to the apothecaries and physicians of other European countries.

* Incipit Liber **SERVITORIS**, Liber xxviii., Bulchasin Ben Ab Erazerin. Translatum a Symeone Januensi. Interprete Abraamo Judeo Tortuosiensis. Estat apud Mesuræ Opera Venetiis, 1491.

† Actuarii Joannis Filii Zachariæ, Operum, Tomus iii. De Medicamentorum Compositione. Lugduni, 1556. 12mo.

When medicine began to be practised by the monks, ecclesiastics, and other Europeans in the fifteenth century, the traces of Arabian habits, Arabian doctrines, and Arabian nomenclature were still predominant, and deeply marked. During that century, indeed, many European authors seem to have copied very closely the books of the Arabians, either because they believed that these books contained all that was requisite to be known, or because they thought it not safe to depart from them. This at least is true of several of those whose writings have been preserved.

We first encounter, in studying to disentangle the history of these times, some confusion with regard to one person, whose name has been associated with the earliest European antidotaries. Nicolas or Nicolaus, surnamed *Praepositus*, which in these times is equivalent to prefect or provost, was director or head of the school of Salerno in the first half of the twelfth century. This person compiled an *Antidotarium*, at the solicitation, he states, of certain persons wishing to study practical medicine, that he might teach them properly the method of preparing and dispensing. This performance is not entitled to much praise. It is avowedly compiled from the Greek and Arabian authors, not very judiciously. It was, however, at that time the only dispensatory; and it was not only the ordinary guide to the physician and apothecary at that time, but it was long afterwards translated into English, and under the name of *Praepositus's Practice*, became a sort of text book to English practitioners. Soon after the *Antidotarium* was written it was thought worthy of various commentaries. The first was the *Expositiones* and *Glosses* of John Platearius, who is supposed to have been Professor at Rome in the fifteenth century.* Along with this exposition are mingled the annotations of an anonymous German author. Lastly, John de Saint Amand, a canon of the Church of Tournay, in Belgium, wrote upon the Antidotary a continuous exposition, which shows much learning and knowledge.

Nicolaus, surnamed *Praepositus*, must be distinguished from another physician of the same name, who is known as Nicolaus of Alexandria, and who is believed to have practised at Constantinople in the thirteenth century. The *Nicolaus Praepositus* is called by the authors of the Report of the College of Physicians, presented in 1745, *Nicolaus of Tours*, and they seem to regard him as different from Nicolaus of Salerno. But it is probably sufficient to observe, that whether there were two

* The first edition of Nicolaus' *Antidotarium*, with the Commentary or Glosses of John Platearius was published at Venice in 1489.

† *Expositio Joannis de Sancto Amando Tornacensis Ecclesiae Canonici supra Antidot. Nicolai, extat in Supplemento Op. Mesuae.*

distinct persons or not, the *Antidotarium*, meagre and imperfect as it is, is regarded as the earliest European work on Pharmacy.

Subsequent to Nicolaus comes Saladin of Asculo, physician to the Prince John Antony of Balzo, Ursin of Tarento, great constable of Naples. This writer assigns as the reason for his writing on pharmacy the following. "Because the ignorance and unskilfulness of spice-dealers (*aromatarii*), or apothecaries,* is wont very often to lead the most famous doctors and the most learned physicians to infamy and loss, with great peril to themselves; therefore, moved by piety towards physicians, and that I might comply with the entreaties of several druggists, and especially that of a most skilful person, the most worthy druggist of my master, the Prince of Tarentum, I, Saladin, doctor of arts and medicine, physician to the same prince, have undertaken to compose this treatise, which I wish to be entitled *The Compendium of Druggists* (*Compendium Aromatariorum*), showing how these druggists ought to be examined; and if they are found sufficient and expert in art, I wish that they be approved by the most skilful physicians; but if they are incompetent and ignorant, and shall have failed in examination as imperfect, then that they be altogether disapproved of, and visited with condign punishment."

The Druggists' Compendium by Saladin is divided into seven parts.

The first consists of questions to be proposed to druggists to ascertain their competency, and various doubts and queries regarding the Antidotary of Mesues then in use.

The second is on the names of the compound medicines described in the Antidotary of Nicolaus.

The third part is on weights and doses of medicines.

The fourth part treats of the methods of preparing confections, electuaries, juleps, syrups, ointments, and similar compounds; a branch of art to which, at that time, very great importance was attached.

The fifth part gives instructions for the collection of herbs, flowers, seeds, and roots, and specifies the time and the month of the year in which each ought to be collected.

The sixth part treats of the preservation of simple and compound medicines, according to the rules delivered by Mesues, Serapion, Nicolaus, the Servitor, and the author himself.

The seventh and last part is on the method of arranging medi-

* Literally perfume dealers. But *aromatarii* means properly Druggists and Apothecaries. *Aromatarius* is literally Dealer in spices, and, as such, it has equivalents in most of the European languages; *Epicier* in French, *Spetiali* in Italian, *der spezerey-handler*, *gewurzhandler* in German. In the English, grocer, alone, it appears to have lost its original signification. But this is probably more apparent than real; for the grocers were originally apothecaries and druggists also during the twelfth and thirteenth centuries, before druggists existed as a separate body of dealers; and they were then denominated *Pepperers*.

cines in the laboratory or shop, (*in qualibet Aromataria vel apotheca*); with lists of the same after Mesues, Serapion, Nicolaus, Al Rhasi, and Avicenna.

This treatise, which is believed to have been written about the year 1447 or 1450, contains ample and satisfactory information regarding the state of pharmacological knowledge at that time. The facts which it records say little either for the science or the common sense of the day. But in forming a judgment, we must not forget the state of society and the general ideas then prevalent. Many parts of it are composed in the form of a catechism, with questions proposed and answers subjoined; yet the answers often show much ignorance. Saladin mentions that to every druggist at that time seven books were necessary; namely 1 and 2, the two books of Avicenna and Serapion on Simples; 3, the book of Symeon Januensis on Synonymous terms; 4, the book of the SERVITOR, which contains the preparations of almost all the articles necessary for druggists; 5, the book of John Mesues; 6, the *Antidotarium* of Nicolaus of Salerno, of which, he says, there are two, the large, which, though the best, is little used, and the small *Antidotarium*, which all are in common use; 7, the book entitled from the beginning words *CIRCA INSTANS*, of which also he speaks favourably; and lastly Dioscorides and Macer.

Saladin inculcates strongly on the apothecary the necessity of having good moral principles; that he should be upright, just, and pious, particularly to the poor; that he should not be an extreme lover of money, nor sell articles at a higher than just price; that he must not give to a pregnant female medicines to induce abortion; and that neither through dread of superiors or for money he should sell poisonous medicines, or prepare poisoned draughts, or presume to employ honey in preparing medicines which ought to be made with sugar.

These trifling facts show the state of society as well as the state of pharmacy in these days. Saladin himself observes that if any one wishes to know whether the foetid odour can be removed from opium, he answers that this may be effected by means of garlic; that is by pounding one ounce of opium with two heads of garlic, and then distilling the mixture by means of an alembic. Of the distilled liquor thus resulting, doses may be given at discretion, because it wonderfully induces sleep, and is free from the strong odour of opium. "And if any one," he adds, "shall use this secret with nefarious intent, except to the purpose of medicine, let him be accursed of God."

"No apothecary," he states, "should be permitted, in preparing a medicine, to substitute one article for another; and if he has not any simple article required, he must obtain the dispensation and authority of a most learned and faithful physician." He adds,

that in his time, the illustrious sovereign of the Aragon severely punished and condemned at Naples an apothecary whom the physicians of his majesty had ordered to prepare a cordial electuary. One of the ingredients of this electuary was white coral; and the apothecary, who had no white coral, burned some red coral, which was thus rendered white. For this substitution, which came to the knowledge of his majesty, he was sentenced to pay a fine of 9000 ducats, and prohibited in all time coming from ever exercising the function of the apothecary.

Such was the justice of the mild and sagacious government of Sicily in those good old times. It is scarcely necessary to observe that red coral is carbonate of lime and some animal matter, and that when burned it is converted into quicklime, which, without doing harm, might be more efficient as an antacid than the carbonate. Of this, however, the apothecary was not permitted to judge.

The treatise of Saladin is formed principally after the model of that of Nicolaus of Salerno, to whom he often refers, and upon whose formulæ he generally merely comments.*

With regard to the treatise called *CIRCA INSTANS*, above-mentioned, these were the first words of a treatise, *De Simplici Medecina*, by John Platearius. "*Circa instans negotium de simplicibus medecinis nostrum versatur præpositum.*" This treatise is in alphabetical order, and is a sort of dictionary of *Materia Medica*.†

From the circumstance of his mentioning this, and the other works above enumerated, as necessary to the apothecary, it seems that Saladin did not look upon his own performance as so complete as entirely to supersede these books. It is more probable that he composed it as a short guide to the apothecary in the ordinary operations of his calling, who was expected to read and refer to, when requisite, the other authorities then in use.

Another work which has been mentioned as written on *Materia Medica*, during the fifteenth century, is the treatise of Santes Ardoynus, a physician of Pesaro, on Poisons. This person practised at Venice, where, according to the testimony of his editor, Theodore Zuingger, he wrote his treatise as early as about 1426. The treatise is divided into eight books; the first on the nature of poison and its differences, its causes and symptoms in general;

* Domini Saladini de Aseulo, Serenitatis Principis Tarenti Physici Principalis Aromatariorum Compendium feliciter incipit. Extat apud Mesue opera. Impressa Venetiis per Pelegonium de Pasqualibus de Bononia sub anno Domini 1491, die 19 mensis Julii. Folio. P. 15.

† Incipit Liber de Simplici Medicina Secundum Joannem Platearium Dictus CIRCA INSTANS. Impressum Venetiis. Mandato et Expensis Nobilis viri Domini Octaviani Scoti, Civis Modoctiensis per Bonetum Locatellum Bergomensensem, 17 kalendas Januarias 1497. Extat cum Practica Joannis Serapionis.

the second on particular poisons, especially the metallic ones; poisoned waters and poisonous air or vapour; the third on the vegetable poisons; the fourth on the animal poisons; the fifth on the general preservation against and the treatment required to counteract the effects of poisons, and among others poisoned wounds; the sixth on the poison of reptiles and fishes; the seventh on bites of men and animals, and wounds from the talons of birds; and the eighth on the poisons from minute insects.

This work, which is an elaborate compilation from the principal Greek, Roman, Jewish, and Arabian authors, cannot, properly speaking, be styled a work on *Materia Medica*. It certainly contains the information collected up to that time upon almost every substance employed either as poison or as remedy, and many of the reputed poisons were substances employed, as in the present day, in the treatment of diseases and the alleviation of painful complaints; and in this sense it unquestionably embraces the knowledge of the day on *Materia Medica*. But the main and professed object of the author is the explanation of the effects of poisons and the proper means of obviating them. It must also be allowed that many of the articles of which Santes Ardoynus treats are not poisonous. His work on the whole must be allowed to be a fair compendium of the knowledge of the day, containing much curious information, more elaborate than judicious, and certainly much tinged with credulity and fanciful speculations.*

Of this author Sprengel has made mention in such terms that they are calculated to make the reader think, that he must have obtained his information from some doubtful authority, and without having seen the work. The name Santes Ardoynus he converts into Saint Ardouin.*

It is to be observed that during the whole of the three centuries now referred to, from the end of the twelfth, to the end of the fifteenth, the business as well as the knowledge of the apothecary was in a very rude and imperfect condition. Excepting in Italy during the fifteenth century there was scarcely in any European country such an establishment as an apothecary's shop kept by an apothecary. In the towns of Germany and France medicines were kept chiefly in the shops of the spice-dealers or grocers, who dispensed them, often at very high prices, to the inhabitants who wanted these expensive luxuries. Another trade often exercising the calling of the apothecary was that of confectioners, who, in many of the towns of Germany, were ordered, as a reward for the license of selling drugs, and preparing medicines, simple or compound, to supply the common chambers of the town with a cer-

* Santes Ardoyni Pisaurensis Medici et Philosophi præstantissimi, Opus de Venenis, a multis hæcenus desideratum et nunc tandem castigatissimè editum. Basileæ, Idbus, Januarii 1562. Folio, p. 514.

tain quantity of preserves and confectionary. One of the earliest notices of an apothecary's shop is that which is mentioned as being kept by a citizen of Munster, named Willeken, in the year 1267 in that time. The first persons who opened druggist shops at Leipsic were certain emigrants from Prague in the twelfth century; and it is probable that these persons were Jews, who at that time were at once the depositaries of much of the learning of the day, and who often practised medicine, and supplied remedies for the cure of diseases. It appears further that in the year 1285 there was a druggist's or apothecary's laboratory at Augsburg. This, however, some persons regard as resting on uncertain authority. The earliest authentic fact of the existence of an authorised apothecary's shop is that established in the town of Halle in 1493. In the instructions which Simon Puster, the first apothecary of this town, received from the magistrates, it is stipulated, "that for the permission, he must, and will, give to us, and to our descendants, two collations during Lent, and to the Town-House, eight pounds of sugar, well confectioned, as a suitable accompaniment to these collations."*

In Paris it appears from the facts ascertained by Astruc and Félibien that certain persons had united themselves as apothecaries in the fifteenth century, and that the statutes regarding their proceedings were promulgated in the year 1484. At this time it appears that all medicines and drugs were brought from Italy, partly because there the apothecaries were, on the whole, a better instructed body, partly because from the large towns of Amalfi, Venice, Leghorn, and Genoa, being the usual entrepôts of the merchandise of the East, all the most valuable exotic medicines were there most easily procured. A few medicines might be brought overland by Constantinople to the towns of Eastern Germany; but the great amount of articles required by the apothecary were brought first to Amalfi, Venice, Leghorn, or Naples, and thence distributed over Europe.

In London for a long period, probably several centuries, the same practice was followed. Spices, drugs, and aromatics of various kinds, the productions of eastern countries, were imported in considerable quantity in the end of the eleventh and in the course of the twelfth and thirteenth centuries, because these articles were much used by persons of rank and fortune in the preparation of various articles of food and drink, and by physicians in the composition of their medicines.† "The Sabeans," says Fitzstephen, "import into London frankincense and other spices; and from the rich country about Babylon they bring the oil of

* Dreyhaupts Beschreibung der Zirkel de Saal, Band ii. Seite, 561.

† Astruc Memoire, p. 32. Félibien Histoire de Paris, vol. ii. p. 927.

‡ Du Cange Voce *Species*; *Aromata*. Henry's History of Great Britain, volume iii. 4to. Book iii., chapter vi.

palms." The spice-trade formed a branch of commerce so important in the eleventh and twelfth centuries that merchants in general are often called *Speciarii*, in the barbarous Latin of those times.* This term *speciarius* afterwards became the Italian *Speziali*, and the French *Epicier*, to denominate the grocer. In England at this period the equivalent term was *Pepperer*. These pepperers or spice-dealers were all over Europe during the eleventh, twelfth, and thirteenth centuries, the only furnishers and venders of medicines. When compound medicines were required, they were usually prepared by an ecclesiastic, who was supposed to possess the requisite learning, or by some of those who acted also as physicians and surgeons.

Anderson observes that Edward the Third settled on *Coursus de Gangeland*, who is said to have been an apothecary, an allowance of sixpence per day for the care and attendance which the said *Coursus de Gangeland* bestowed upon the king, while he lay ill in Scotland. This illness was in the year 1336, and the grant was made from Westminster, 10th of October 1345.† Though this person is said by Rymer and Anderson to be an apothecary, yet in all probability he was such a medical practitioner as these times afforded.

In the time of Queen Elizabeth, Bucklesbury, or Bucklersbury, as it is sometimes named, was inhabited by chemists, druggists, and apothecaries. Mouffett, in his Treatise on Food, calls on them to decide whether sweet smells correct pestilential air or not; and adds that Bucklesbury, being replete with physic, drugs, and spicery, and being perfumed, during the time of the plague, with the pounding of spices, the melting of odoriferous gums, and the making of perfumes for others, escaped the great plague which produced such a large mortality.‡

It is probable that the number of persons who sold drugs and compounded medicines must have been very much increased in the following reign; for we find that a charter of incorporation was granted to the London apothecaries in the year 1617.

Within the precincts of Blackfriars was erected in 1670 Apothecaries' Hall. Previous to this time, consequently, there was no Apothecaries' hall; and whether there was any body or corporation of apothecaries, Pennant thinks is not ascertained. From an entry, however, in one of the editions of the Chronicle of Stowe, it appears that, in December 1617, the apothecaries of London obtained from James the First, for themselves and their successors, a charter of incorporation by letters patent, constituting them a body politic and corporate, and directing all persons professing the art and mystery of apothecaries within London and its suburbs,

* Muratori Antiquitates, tome ii. Dissertatio 30, p. 881.

† Rymer's Foedera, v., 486. Anderson's Historical and Chronological Deduction of the Origin of Commerce. London, 1764. Volume i., p. 175. Folio.

‡ Pennant's Illustrations to History of London, p. 444.

and within seven miles compass thereof, to be ordered and governed by the master, wardens, and society of the art and mystery of the apothecaries. The first Master was Edmond Phillips; and the first Wardens were Stephen Higgins and Thomas Fanes.*

Though the College of Physicians had existed since the tenth year of the reign of Henry the Eighth, it appears that several years elapsed before they undertook to issue any directions regarding the sale and composition of medicines. This duty, indeed, was first attempted by a foreign city.

We have seen that in the fourteenth and fifteenth centuries the number of books intended to serve as guides to the apothecary and druggist was considerable. These were, nevertheless, very much repetitions of each other, and they contained not a few formulæ, which, though prescribing many ingredients to enter into the composition of their respective medicines, differed, notwithstanding, little in the essential articles. These circumstances doubtless led physicians and those in authority to consider whether it might not be more eligible to have one common Register of Formulæ, which might serve as a standard guide to regulate apothecaries and druggists in the preparation of medicines. This appears to have been carried into effect in more than one of the cities of the Italian peninsula, at that time the most learned, and, upon the whole, the most civilised country in Europe, in the course of the fifteenth century. The *Ricettario di Dottori dell' Arte e di Medicina del Collegio Fiorentino*,† or Prescription Book of the Doctors of Art and Medicine of the Florentine College, prepared at Florence in 1448, is mentioned as one intended to guide the members of the Incorporation of Spice-Dealers or Druggists of that city. This, however, could not have been published or made generally known at that time, as the art of printing was not then invented, or in a state to be generally useful.

The first Pharmacopœia or book concerning the preparations and composition of medicines, which was promulgated by any public authority was that by VALERIUS CORDUS, published under the sanction of the senate or municipal body of Nuremberg, in the Upper Palatinate, in the year 1545. This VALERIUS CORDUS was the son of EURITIUS CORDUS, a person described as a celebrated physician. Valerius had been in Italy pursuing his studies, and there had acquired an intimate and correct knowledge of the works principally used by the apothecaries, and of the preparations and compound medicines in most general use. On his return he had come to Nuremberg, and there becoming acquainted both with the learned men and the physi-

* Chronicle of John Stowe. Edited by Edmond Howes. London, 1632. Folio, p. 1028.

† *Ricettario di Dottori dell' Arte e di Medicina del Collegio Fiorentino*, all istituto dell' Signori Consoli dell' Università degli Speciali. Firenze, 1448.

cians of the city, he had explained to them the advantages which he thought would result from having a compendium of the medicines most commonly required by physicians and surgeons in the treatment of diseases. He had already, indeed, prepared from all the best authorities a dispensatory or work of the kind, and which had met with the approbation of several physicians, and had been accordingly used in some of the towns of Saxony. This was probably about the year 1542. This performance, after being improved and illustrated by annotations, Cordus presented to the Senate of Nuremberg, who again placed it before the College of Physicians of that city in the presence of Cordus, with the view, that if that learned body had any changes in it to propose, these might be admitted, both with his knowledge and consent. After the book had undergone this ordeal, it was published by a decree of the College, and recommended to the use of the apothecaries. In the meantime, Valerius Cordus had returned to Italy, where, while he was diligently pursuing his studies, he was cut off by early death. He died at Rome on the 25th September 1544. The *Pharmacopœia*, meanwhile, was published by authority of the Senate of Nuremberg, first in 1545, as already stated, afterwards at Venice in the year 1556, and at Antwerp, on the 1st of March one thousand five hundred and sixty-eight (1568). It was afterwards published in folio at Nuremberg in the year 1612, and in a small form with the *Scholia* of Peter Coudenbergh and Matthew Lobelius in the year 1637.

The Dispensatory of Valerius Cordus is compiled avowedly from the writings of Avicenna, Rhazes, Mesues, Nicolaus, Actuarius, Ætius, and other authors who had previously written on the same subject. The arrangement is the following; Confections, aromatic and opiate; Preserves; Conserves; Lenitive and laxative medicines; Pills of various kinds, mostly purgative; Syrups; Robs; Lohochs; Lozenges; Plasters; Ointments; Oils; and the preparation of certain simples.

It may have been and probably was a valuable performance, if we consider the time at which it was published, and that it was the first attempt to publish in Europe after the origin of the art of printing, a formulary of directions for the guidance of the apothecary and druggist. But if it be examined with the eye of common sense, it will scarcely be entitled to a high rank. The compound medicines consist, like the compounds of some of the ancients, of a great number of simples, several of which must be useless or must neutralise each other; and often they contain expensive articles, which can exercise no physiological action upon the animal body. The *Electuary of Gems* from Mesues contains twenty-four articles, among which are white pearls, sapphire, hyacinth, emerald, red coral, ivory shavings, silver leaf, and amber. The *Diaxyloaloes* of Mesues contains in like manner,

twenty-five ingredients. The *Confectio Liberans*, namely, the Confection delivering from the plague, contains thirty ingredients, among which are, Armenian bole, *terra sigillata*, pearls, white coral, red coral, ivory shavings, ashes of burnt ivory, emerald, hyacinth, camphor, musk, and amber. This is said to possess great power against the plague. The Tryphera of Nicolaus, a medicine supposed capable of curing pain in the stomach, frenzy, and melancholy in females, rheumatism and pneumonia, consists of nineteen ingredients;—opium, mandragora, and hyoscyamus being combined with cinnamon, cloves, ginger, and fennel. In the *Aurea Alexandrina* of Nicolaus are fifty-two ingredients, among which are boiled gold, silver leaf, pearls, bone of the stag's heart, and ivory shavings. He gives prescriptions for the Theriaca of Andromachus, which contains fifty ingredients, the Mithridate of Damocrates, which contains thirty-three ingredients, and one from Cleopater and Antipater, as transcribed by Galen and Aetius, containing forty-eight ingredients.

It is nevertheless not without interest to observe, that he has two different formulæ for pills against gout, and that both contain hermodactyls or meadow-saffron. The one are the *Pilulæ de hermodactylis majores*, from Mesues; and the other the *Pilulæ arthriticæ* from Nicolaus. In the former of which it is said, *adversus podagram, et arthritin prosunt*,—the chief ingredients are hermodactyls, myrobalans, aloes, turbith, colocynth, sagapenum, castor, euphorbium, opopanax, rue seeds, parsley seeds, and saffron. The arthritic pills of Nicolaus contain besides hermodactyls, turbith, and aloes, cassia wood, spikenard, olives, ginger, mastich, fennel, anise, and rock salt. Mastich and aloes, which make so great a figure in the modern dinner pills, are common ingredients in many sorts of pills in the Dispensatory of Cordus. He has pills of *Lapis Lazuli*, and pills of Armenian bole, both of which are represented to be serviceable against melancholy disorders and persons supposed to labour under what the physicians of those days called burnt bile. *Pilulæ sine quibus esse nolo* (p. 186) of Nicolaus, which may be rendered indispensable pills, are composed of aloes, five sorts of myrobalans, rhubarb, scammony, senna, mastich, wormwood, roses, violets, agaric, and dodder. These are said to purge choler, phlegm, and melancholy; to be effectual against cataracts and dimness of the eyes; preserving the sight, and to heal pain in the ears.

Many of these formulæ repeat so often the same ingredients, that it seems wonderful that, even at this early period, physicians and compounders did not discover that it was possible to employ one good formula instead of many containing the same substances, only arranged and combined in different modes.

In the ointments bear's grease is a frequent ingredient, and

fowl's grease an occasional one. Hog's lard is mentioned in two ointments; the *Unguentum Citrinum* of Nicolaus, and the *U. Populeon* of the same authority. In the former ointment it is combined with goat's fat and hen's fat.*

The authoritative publication of the Dispensatory of Valerius Cordus, with all its defects and objections, satisfied physicians, and official persons generally, that it was most desirable to have standard guide books for regulating the preparation and composition of medicines upon general principles; and the appearance of the Nuremberg Pharmacopœia was soon followed by others.

To the *RICETTARIO* of Florence reference has been already made. The edition of that work which we have seen, appeared at Venice in the year 1560, under the authority of the College of Physicians of Florence. The work, which is in the Italian language, consists of three parts. The first, after treating of the qualifications and duties of the good apothecary, is chiefly a history of the simple medicines derived from the vegetable kingdom. The second division of this part is devoted to the explanation of the most important processes and operations of the druggist. The third and concluding division relates to the method of preparing preserves and conserves, infusions, decoctions; robs, juleps, and syrups, loochs, antidotes, powders, pills, lozenges, oils, ointments and plasters.

The second part of the *RICETTARIO* contains the formulæ for the preparing and compounding of all the medicinal compositions then in use.†

The third part contains the rating of the weights and measures; and a list of *succedanea*, or medicines to be employed as substitutes or surrogates.

The *Antidotario* of Florence, written in Italian, was published in Latin language at Antwerp, from the Plantin Printing House, in the year 1561.‡ The *Antidotarium* of Bologna was published at that city in the year 1615.§ The *Antidotario Romano*, originally written in Italian, was published in Rome in 1639, with a Latin translation by Hippolito Ceccarelli, with explanations, and with the annotations of Pietro Castelli, a learned Roman physician. Though this work appeared in this form in 1639, it is manifestly not the first edition, which probably appeared in the previous century. At all events, as it is inscribed to Pope

* *Dispensatorium hoc est Pharmacorum Conficiendorum Ratio.* Valerio Cordo autore. Appendix ex Scriptis Jacobi Sylvi. Nunc denuo omnia a quam plurimis mendis expurgata Venetiis, MDLVI. 12mo.

† *Ricettario Utilissimo et molto necessario a tutti gli Spetiali, che vogliono preparar le Medicine regolatamente* In Venetia 1560, 12mo, pp. 174.

‡ *Antidotarium sive de exacta componendorum miscendorumque medicamentorum ratione Libri Tres Omnibus Pharmacopœiis longe utilissimi. Ex Græcorum, Arabum, et Recentiorum Medicorum Scriptis collecti. Nunc primum ex Italico Sermone Latini facti.* Antverpiæ. MDLXI. 12mo.

§ *Antidotarium Bononiense*, 4to. Bononiæ, 1615.

Gregory the Thirteenth, who died in the year 1585, it is clear that it must have been published previous to that time. It is one of the best of the Pharmacopœias of these times, and contains many new formulæ from different sources. The author gives a discourse on the conditions and rules belonging to a good apothecary. The annotations of Castello show considerable acquaintance with natural history, botany, and the chemistry of the day, much knowledge of Medicine, and a considerable amount of sense and judgment.*

In the year 1564 appeared the *Pharmacopœia Augustana*, the Pharmacopœia of Augsburg. This, by adopting a more clear arrangement, and diminishing, in several of the formulæ, the number of ingredients, acquired considerable celebrity; and in the year 1646, the eighth edition appeared, with a *Mantissa Hermetica*, or collection of instructions for the preparation of chemical medicines, and a *Taxa*, or tarif of prices at which medicines were to be sold. In this pharmacopœia are many formulæ taken from the Nuremberg Dispensatory.

The circumstance that contributed most to improve this pharmacopœia was, that it was illustrated and amended by the notes and animadversions of John Zwelfer, a learned physician of Vienna. The work in this amended form first appeared at Vienna in the year 1651, under the name of PHARMACOPŒIA AUGUSTANA REFORMATA. In the original Augsburg Pharmacopœia all the preparations and compositions had been arranged in twenty classes. Zwelfer made upon each of these classes some general observations, chemical, pharmacological, and physiological, which were calculated to be very serviceable both to physicians and apothecaries. He made also on each preparation remarks which show considerable shrewdness and reflection. In some instances the remarks are justly severe, especially upon articles and directions, which, though suited for the warm climate of the East and of Italy, became quite unsuited to the cold and uncertain climate of Germany. Of this his remarks on quince-juice and pomegranate-juice in the larger mint syrup of Mesues are an instance. When the formulæ for compound medicines consisted of many articles, as in the case of the preparations called *Theriaca* and *Mithridate*, he analysed the whole, distinguishing the individual medicines into classes according to their effects, real or attributed, and specifying the weight of each class. He pointed out with justice the absurdity and inutility of these much vaunted compositions, as well as that of the antidote, as it was named, of

* Antidotario Romano Latino, et Volgare. Tradotto da Ippolito Ceccarelli. Li Regionamenti et Le Aggiunte dell' electione de Semplici, et Pratica delle Compositioni. Con le Annotazioni del Sign. Pietro Castelli Romano. E Trattati della Teriaca Romana et della Teriaca Egittia E Nuova Aggiunta di Molte Ricette publicate dal Collegi de Medici di Roma. In Roma MDCXXXIX. 4to, pp. 359.

Matthioli, equally celebrated for the multiplicity of its ingredients (one hundred and twenty-eight in number) "If we had not," he says, "in the case of the pompous compositions of the *theriaca* and *mithridate* treated at sufficient length, and even to the displeasure of readers, of the unwonted combination both of simple and compound medicines, we could scarcely refrain from inveighing still more severely against the *antidote* of *Matthioli*, which not merely equals the above-mentioned compositions in the number of its ingredients, but exceeds them in many absurdities. But it is irksome to resume this unprofitable subject; and I refer to my observations already made upon the fore-mentioned antidotes, more especially as any one may see at first glance that this antidote abounds in errors." Many examples might be adduced of the freedom as well as the sense of his critical animadversions. Indeed it cannot be doubted that the observations of Zwelfer must have been of essential service in simplifying the pharmacy of the seventeenth century.

Zwelfer states in his prefatory address that he was occupied sixteen entire years in the labour of examining, correcting, and improving the formulæ of the Augsburg *Pharmacopœia*. As this address bears date the first of May 1652, he must have commenced his labours in the year 1636.

While John Zwelfer was making trial of his powers in the illustration, rectification, and amendment of the original Augsburg *Pharmacopœia*, he was induced by many circumstances to publish a new dispensatory of his own. This appeared under the name of *Pharmacopœia Regia, seu Dispensatorium Novum Locupletatum et Absolutum*, at Vienna on the 16th of June in the year 1652, and again in 1666. In the introduction to this performance, he tells us that, as upon accurate examination he found the state of Medico-Pharmaceutical art to be inefficient, imperfect, superfluous, and inelegant, he acted on the principles of selection. He retained the good, rejected the bad, set aside useless and ludicrous articles; deficiencies he supplied; he suggested improvements, and confirmed by his own experience whatever was deserving in the labours of others. "This prerogative, further," he adds, "I claim within the limits of modesty, that I have been the first to animate with life the shapeless mass of the Dispensatory. And of this new Dispensatory, in which I have been desirous to place not a collection of words but remedies, I boldly affirm, that it is not compiled, borrowed, and scraped together from different quarters, and decorated with the writings and fragments of others, like the jackdaw in borrowed plumes, but elaborated by my own exertions as a new Galeno-Chymical treatise.*

* *Proœmium ad Lectorem*, p. 483. Edit. 1672.

Zwelfer makes nineteen classes of compound medicines. The work is certainly much improved upon the Augsburg Pharmacopœia, and contains a large amount of judicious criticism, sensible information, and such chemical knowledge as was then accessible. The formulæ for compound medicines were simplified; the number of the ingredients was greatly reduced; superfluities were retrenched; useless and inert substances were in general rejected; and all were attempted to be rendered more neat. In short, the Dispensatory of Zwelfer was a great advance in the right direction.

The first edition of the *Pharmacopœia Regia* or *Dispensatorium Novum*, appeared at Vienna in 1652, a second in June 1666, which is indeed subjoined to the annotated edition of the Augsburg Pharmacopœia. A folio edition of the *Pharmacopœia Regia* was published at Nuremberg in the year one thousand six hundred and seventy-five.*

The Nuremberg Pharmacopœia and the Augsburg Pharmacopœia for a long time divided the suffrages of the German physicians and apothecaries.

One good effect of the labours of Zwelfer appeared in an improved edition of the Nuremberg Pharmacopœia, which, after being subjected to the labour and examination of the college, was published in the year 1666, by the conjoined authority of the college and republic of Nuremberg. The fellows of the college state in their preface that they are aware, that many of the formulæ in the original Pharmacopœia of Valerius Cordus were antiquated and useless; these they discarded and substituted in their place others which they hope are more suited to modern taste. They allow that they have borrowed various hints from the researches of Zwelfer; and if, say they, any one is dissatisfied with the changes which they have introduced, they recommend him to have recourse to the lucubrations of Zwelfer; adding that they have no desire to think, that nothing is right but what they themselves have done.

It is remarkable, nevertheless, that this learned body did not perceive the folly and unprofitableness of such complicated preparations as the *Theriaca* and the *Mithridatium*. They give at the beginning of their work two formulæ for the *Theriaca*, and two for the Mithridate or Confection of Damocrates.

In the improved Nuremberg Pharmacopœia all pharmaceutical preparations are arranged in three classes or general divisions; the first, that of medicines prepared without boiling, whether

* *Pharmacopœia Regia, seu Dispensatorium Novum Locupletatum et Absolutum, annexa etiam Mantissa Spagyrica. Cui Accessere Bini Discursus Apologetici. Authore Joanne Zwelfer Palatino, M. D. Noribergae anno MDCLXXV. Folio, pp. 418 et pp. 267.*

simple or compound; the second class, that of medicines, simple and compound, prepared by decoction; and the third, that of medicines prepared by distillation and chemical processes.

Each of these classes is then subdivided into sections.

The editors give a very full list of substances, both simple and prepared, which the apothecary and druggist should possess. These are arranged under the usual heads of the Vegetable, the Animal, the Mineral Kingdom, and articles furnished by or obtained from Marine Bodies. Though Germans, they were not aware or were not prepared to recognise the importance of the aerial or gaseous kingdoms, which it was reserved for a modern professor to do. The list of animal substances is at once absurd and not a little loathsome. Dried toads, human skin, human skull, warts from the hoof or heel of the horse; the tooth, bowels, and liver of the wolf; mummy; the lung of the fox; the dung of the pigeon and peacock, that is guano; cob-web; and the penis of the bull form some of the principal articles. Fatty substances are taken from fowls, quadrupeds, and reptiles; and nothing is too small or too difficult to be obtained, which does not furnish fat for the uses of the apothecary. *

Many of the formulæ, doubtless, are the original ones of Cordus. A few, however, from other sources are introduced. To several of the formulæ in this and other Pharmacopœias may be traced some of those remedies and formulæ which were used in more recent times for the cure and alleviation of various formidable diseases. The *Pulvis Epilepticus Rubeus* contains what the editors call magistrery of the human skull. The *Pulvis ad Strumam* or scrofula powder, contains burnt sponge, bone of cuttle fish, rock salt, sponge-stone, that is carbonate of lime, with galls, pepper, ginger, and cinnamon (p.44) We have noticed in the first Nuremberg Pharmacopœia the presence of meadow-saffron in gout pills. We have now to observe that the noted Portland Powder is found in this Pharmacopœia in the shape of *Pilulæ Arthriticæ* or Gout pills. These are directed to be made from powder of *Teucrium chamæpitys*, *Teucrium chamædrys*, less centaury, Aristolochia, rhubarb, gentian, hypericon, human skull, with chicory and red sanders wood, all to be incorporated with Cyprian turpentine.

The necessity of continuity in tracing the progressive advancement of pharmacological knowledge and pharmacopœia literature has obliged us to advance much further in the course of the seventeenth century than chronological justice to other bodies would otherwise have warranted. A body which speedily followed the

* Dispensatorium Pharmacorum Omnium tam Galenicorum, quam Chymicorum quæ hodie in usu potiore sunt. Authore primo Valerio Cordo. Nunc Vero Opera et Studio Collegii Medici Inclytæ Republicæ et Norimbergenis, Emendatius et Selectis compositionibus auctius redditum et quarto publicatum. Norembergæ. Anno MDCLXVI.

example of Nuremberg and Augsburg was the faculty and municipal government of Cologne; a town during the sixteenth century of great political consequence, both as an independent ecclesiastical bishoprick and as a great literary publishing station. The first Pharmacopœia of the city of Cologne appeared in the year 1565, one year after that of Augsburg. In the course of sixty years this publication underwent several corrections and received not a few improvements; and an edition of it, which appeared in the year 1627, is announced as containing many emendations, and serviceable additions.* It is nevertheless greatly charged with complicated and idle formulæ; and it is too manifest that the Cologne Pharmacopœia had appeared previous to the emendations of Zwelfer.

As a contrast to this in some degree may be mentioned the *Pharmacopœia Brussellensis*, or Brussels Pharmacopœia. It is stated that the first edition of this work appeared in the year 1641. This was certainly not a very perfect performance. It was thirty years afterwards that the Brussels College published a Pharmacopœia, which they thought was entitled to the confidence of the Flemish physicians and apothecaries. This book, nevertheless, is too similar to those of that period in general to require us to dwell upon its contents. Numerous medicines, simple and compound, for healing all diseases and infirmities, formulæ consisting of multiplied ingredients, often very useless, great complication and little efficiency, seem to be the leading characters of the work. It contains like the Augsburg Pharmacopœia a taxed list or tariff of prices for medicines and medicinal compounds; a measure which could have no other effect than that of causing the apothecary to substitute bad for good medicines, and to practise adulteration in all the rare, valuable, and expensive preparations.†

Meanwhile the attention, which was every where given to the subject of pharmacy and the attempts to introduce uniform principles, had been of great service in making both physicians and apothecaries more fully and intimately acquainted with the subject. We have in our seventy-first volume endeavoured to explain the difference between *Materia Medica* and Pharmacy, and the relation which the latter bears to the former.‡ It is now necessary to notice the meaning of certain terms which came into use in the sixteenth and seventeenth centuries, in treating of medicines and medicinal compounds.

Medicines were ipstinguished at this time into two great orders ;

* *Pharmacopœia sive Dispensatorium Coloniense*. Jussu et Auctoritate S. P. Q. Agrippinensis Revisum et Auctorum labore Cl. et Exp. V. D. Petri Holtzemii, Com. Palatini. Colonie Agrippinæ, 1627. Folio pp. 102.

† *Pharmacopœia Auctior et Correctior*, jussu Nobilissimi Amplissimique Senatus Bruxellensis Edita, Opera et Studio Sex Collegii Medici Assessorum. Bruxellæ, 1671, Folio 237.

‡ *Edinburgh Med. and Surg. Journal*, Volume lxxi. April 1849, p. 485.

Galenical medicines, and Chemical, or, as they were occasionally denominated, Spagirical medicines. The former were those which consisted chiefly of such simple medicines and their combinations as were used by the ancient physicians; and as many of these were vegetable products, the term Galenical often corresponds, accidentally indeed, with medicines obtained from the vegetable world. The Arabians introduced a more complicated and elaborate mode of preparation, that by means of chemical processes; distillation, precipitation, elutriation, cupellation and similar methods. Hence all the medicines obtained in this manner and by chemical processes are designated by the names either Chemical or Spagirical. At the same time, it must be observed that all do not exactly understand chemical medicines in the same sense. Zwelfer classes under Spagirical or Chemical medicines the preparations of the metals; vitriol, sulphuric acid, sulphuric ether; sulphur and its preparations; nitre and substances prepared from it; and tartar, or the salts of potash. Under the head of chemical medicines, the Nuremberg Pharmacopœia of 1666 classes all the distilled waters, all the vinegars, the preserved vegetable liquid juices, the inspissated tinctures, spirit of nitre, spirit of salt, hartshorn, all the essential oils, and the metallic preparations. The Brussels Pharmacopœia makes a head of some Spagirical medicines only; and under this the editors place the different metallic preparations; vitriol in all its forms, including not only the sulphates of zinc, copper, and iron, but sulphuric acid and sulphuric ether; salts of various sorts; nitre; tartar; including various sorts of potash and tartar emetic; and the caustics, potash and nitrate of silver.

Next after the Nuremberg and Augsburg Pharmacopœias came that by the London College, first published in December, in the year one thousand six hundred and eighteen. The royal mandate issued at Whitehall by James the First of England is dated the 26th of April 1618.

The Pharmacopœia contains a list of the fellows of the college, thirty-four in number, of whom Henry Atkin was president; Sir Theodore Mayerne the eldest fellow; a table of weights and measures; a catalogue of simple medicines; an interpretation, or glossary of certain common terms; a list of distilled waters in ordinary use, and the usual formulæ for the preparation of compound medicines.

These are divided into *AQUÆ COMPOSITÆ*; Medicated Wines; Medicated Vinegars; Decoctions; the Simple and Compound Syrups; the Medicated Honeys and Oxy-mels; the Robs or Inspissated Juices; the Linctuses or Lohochs (*Eclegmata*); the Preserves, Conserves, and Confections; the Powders, which pass by the twofold name of *Species* and *Pulveres*; Electuaries; Pills;

Troches or Lozenges (*Trochisci*); Expressed Oils; Simple Oils by expression or decoction; Compound Oils, most of which are complicated mixtures of the essential and aromatic oils; Ointments, simple and compound; Plasters and Cerates; Chemical Oils, that is those obtained by distillation, including, however, such strange substances as the Oil of Bricks, Oil of Arsenic, Oil of Bay Salt, Oil of Amber, Oil of Sulphur, Oil of Vitriol; certain chemical preparations, as Oxide and Wine of Iron, Cream of Tartar, Flowers of Sulphur, Caustic Potash, Calomel, Sugar of Lead, Turbith Mineral, Glass of Antimony, and a few others heterogeneous in nature and in the methods of preparation.

Though several formulæ are adopted from the old authorities, Avicenna, Mesues, Haly, Nicolaus, Valerius Cordus, and the Augsburg Pharmacopœia, not a few are taken from Fernel, who by this time had become an authority something potential in the arrangement of formulæ, and the due admixture of compound medicines. Other authorities are Renodæus, Fabricius ab Aquapendente, Andreas Aurifaber (Orfebre or Goldsmith)? Andernach, Vigo, Peter Abano, and similar writers.

Among new and little known formulæ are the following. VALENTIA SCABIOSÆ JOANNIS ARDERNII *ex oppido Newark in Comitatu Nottingham; Chirurgi exercitissimi; qui floruit, anno 1370, tempore Eduardi tertii Regis Angliæ; ipsissimis verbis ex antiquo manuscripto excerpta*. This ointment is formed from the juice of the scabiosa mixed up with hogs' lard.

TAPSI VALENTIA *ejusdem authoris*. An ointment from the juice of the *Thapsus barbatus* (*Verbascum thapsi*) mixed with lard.

TAPSIMEL *ejusdem*, an ointment made from the juice ofcelandine and thapsus, mixed with honey, burnt vitriol, burnt alum, and ink. This ointment is said by the author to be *nobile unguentum contra pruritum ani*, as also in other parts of the body.

The London college appears to have exerted themselves laudably in making a selection of good prescriptions from the most eligible sources. But they appear also to have collected and copied too slavishly. We find still the *Antidotus Magna Matthioli adversus venena et pestem*, consisting of its multiplied ingredients, the Mithridate of Damocrates, two formulæ for the Philonium, the *Theriaca* of Andromachus, the *Theriaca Londinensis*, the *Electuarium reginæ* of the Cologne Pharmacopœia, and many similar complicated and unprofitable prescriptions, of no other use apparently but to incur expense to the purchaser. For much of the complication and diffuseness of the formulæ, the London Pharmacopœia was indebted to Sir Theodore Mayerne, a great lover and practitioner of prolixity and complication in prescription.

The College seem further to have been perfectly willing to gratify the taste of the public by showing how to prepare palatable, though most pernicious liquors. They give formulæ

for the preparation of *Usquebach*, *Aqua mirabilis*, and *Aqua rosa solis* or *rosis solis*, all strong spirituous compounds, highly flavoured with aromatics and essential oils, and which in those times were much used. They even go so far as to give a formula for distilling from beer and wine lees, a cheap spirit, which, with a few anise-seeds in it, is for the use of the poor, and sold every where. This is the Dutch anise-seed water. A more complicated and expensive stimulant for the special use, it is presumed, of wealthy dram-drinkers, is prepared from weak spirits of wine with anise-seed, fennel-seeds, caraway-seeds, cloves, cinnamon, and ginger.*

In the original Arabic Medicine Books of Mesues and Serapion, the Antidotaries of their European followers, and the first European dispensatories of Nuremberg and Augsburg, the practice was to give not merely formulæ for the preparation of the medicines and medicinal compounds, but to subjoin notices, more or less ample, of the infirmities, and diseases, and conditions of the human body, in which each medicine was to be administered. These Pharmacopœias, in short, were systems of *Materia Medica*, with information on the physiological properties, and therapeutic effects of the medicinal agents. This was carried to a length still greater by Zwelfer, who, both in the Reformed Augsburg Pharmacopœia, and in his *Pharmacopœia Regia*, or Dispensatory, introduced a great deal of matter, sometimes didactic, sometimes controversial, yet rarely void of interest, not only on the physiological properties and therapeutic effects of medicines, but on the chemistry of the combinations and formations.

In the London Pharmacopœia, as it first appeared in 1618, all this matter was discarded. It was a pharmacopœia, or record of formulæ and prescriptions, and nothing more. Since that time, Pharmacopœias have been regarded, with few exceptions, in most European countries as formularies; the respective colleges leaving to the dispensatories to explain the reasons for the mode of combination, and to state the physiological properties and therapeutic effects and uses of the medicinal agents.

The third edition of this Pharmacopœia was published on the 19th October 1626.

After this period no edition of the work appears till the year one thousand six hundred and fifty, probably by reason of the unsettled state of public affairs. In the year 1650, that namely following the death of King Charles I., a new edition was published in folio, and a small reprint of the same in 1651.† This edition can scarcely be said to be any improvement upon that of

* *Pharmacopœia Londinensis in qua Medicamenta Antiqua et Nova usitatissima, sedulo collecta, accuratissime examinata, quotidiana experientia confirmata describuntur Diligenter revisa, denuo recusa. Emendatior, Auctior, Tertia Editio. Opera Medicorum Collegii Londinensis.* London, 1627. Folio, pp 204.

† *Pharmacopœia Londinensis Collegiarum Hodie viventium studiis ac Symbolis ornatio.* Londini, 1650, folio, pp. 212, et 1651, 12mo, pp. 371.

1626. It contains the same long complicated prescriptions, the same amount and number of articles of doubtful properties, the same traces of slavish copying, the same superstitious veneration for antiquity, and the same want of judicious selection. It must be allowed, indeed, that all these errors and defects were very much the result of the state of medicine and chemistry at that time. Chemical knowledge was rude and barbarous, and not untinged with superstition. The philosopher's stone and the universal medicine were still objects of research with some. Medicine, especially its practice, was encumbered with foolish and superstitious observances; and it must, doubtless, have required considerable energy indeed to shake off the authority of the old Arabian and philo-Arabian physicians. It is manifest that this energy was either not possessed by the physicians of the seventeenth century, or the time for its exertion was not yet arrived.

It would be tedious, without being either agreeable or profitable, to follow the progress of the College in this dark, confused, and little-cultivated path, during the latter half of the seventeenth and greater part of the eighteenth century. It is sufficient to say, that in 1653 appeared the harsh and censorious commentary of Nicolas Culpepper, a person who wanted every qualification for the duty of amending and improving the formulæ of the Pharmacopœia, except a considerable degree of self-esteem, or what might more justly be called conceit and assurance. The Pharmacopœia was sufficiently open to criticism, it may be to censure. But how was this to be judiciously and effectively administered by a person, who, besides much ignorance, was a believer and practitioner in judicial astrology. It would have required a person well-conversant in natural history and a good chemist to write a proper and instructive commentary; and to neither of these characters was Nicolas Culpepper entitled. If his annotations and comments are still occasionally read, it is chiefly to show the strange properties ascribed at that time to medicines, the odd fanciful doctrines taught in explaining their action, and the useless and unserviceable consequences which result from substituting for the observation of nature and the statement of facts, fancies, superstitious ideas, and imaginary conceits.*

New editions of the London Pharmacopœia appeared in 1662, 1667; and in 1691 appeared the New London Dispensatory, containing the Pharmacopœia translated by W. Salmon.

On the 2d September 1720, the sanction of the college was given to a new edition under the respectable presidency of Sir Hans Sloane, and while Mead and Freind were among the censors of

* *Pharmacopœia Londinensis*; or the London Dispensatory. Farther adorned by the studies and collections of the Fellows now living of the said College. By Nicholaus Culpepper, Gent., Student in Physic and Astrology, living in Spittle-Fields near London. London, 1653. Folio, p. 325.

the body. There is, nevertheless, little effected in the way of retrenchment of superfluity and restoration of simplicity in this edition. The noted standing compositions of the Theriac and Mithridate, occupy their wonted places; and along with them is placed another compound of the same stamp, the *Confectio Raleighana*. The only change of much moment is that the electuaries are distinguished into the alterative and purgative; and consequently this section appears less lengthened and less confused than in the early editions.*

Nearly the half of the eighteenth century was elapsed before the College began to think, that the Pharmacopœia contained many things which might be discarded, and was destitute of several which ought to be introduced. A committee of revision had been appointed, and in the year 1742 they presented an interim report on the actual state of the Pharmacopœia, with a draft containing sundry proposed changes, in publishing a new Pharmacopœia. This report is the first example of sound thinking applied to the business of preparing a Formulary. The reporters admit the superfluity of formulæ, the complication in their construction, the great numbers of useless medicines, the improper and unscientific preparation of others, the dangerous character of some of the antimonials, the fatal effects resulting from the irregular preparation and dispensation of cherry-laurel water, the luxuriant and redundant composition of the syrups and electuaries, the uselessness of many of the ointments and plasters, and various errors in nomenclature as well as irregularity in the denominations of weights and measures. They maintain that though the writings of physicians had become more rational and philosophical, yet all the Pharmacopœias in Europe, either from inattention or too great a reverence for preceding times, still remain encumbered with operose and incoherent compositions. Even the new forms, they remark, which have from time to time been introduced, prove often rather innovations than amendments, as they have usually been the invention of private persons, and transcribed into public pharmacopœias from the original receipts, without the examination requisite, before they should have been so solemnly authorised.

In 1745, the same Committee presented another report, which was to be final; and, upon its recommendation, the New Pharmacopœia was constructed. Much was done in the way of simplification, in retrenching superfluities, and lopping off what was redundant. All the Formulæ are shortened and improved. In short, a new era was evidently commenced in the preparation of Pharmacopœias. The whole class of loochs or linctuses was summarily discarded, certainly to the confusion and perplexity of the intellect, down to the present time, of all English students who

* Pharmacopœia Collegii Regalis Medicorum Londinensis. Londini, MDCCXXI. Folio, pp. 154, et 1724. 12mo, pp. 176.

visit and observe the practice of the Continental hospitals, in which these remedies are still retained. Matthew's pills were turned out without ceremony. The *emplastrum sticticum*, or German stich-plaster, not sticking-plaster, but wound-plaster, was also dismissed. Many ointments and plasters, in like manner, received a mittimus.

Several unnecessary, and not very wise articles, nevertheless, are retained. Besides the immovable Mithridates and Theriaca, there were viper-wine and viper-broth, *pulvis bezoardicus*, amber lozenges, and brick-oil, prepared by immersing heated bricks in oil, then breaking the bricks in fragments, and distilling the fragments in a retort. The *Confectio Raleighana*, simplified and curtailed, appears under the name of *Confectio Cardiaca*.*

In the next edition, which appeared in the year one thousand seven hundred and eighty-seven (1787), considerable changes took place. Chemistry was more studied, and the chemical constitution of various metallic and saline bodies was better understood. This tended both to simplify the formulæ and to remove some of the old names and substitute in their place those which were supposed to be more accordant with their composition. Hence great changes in nomenclature took place, and were mere harbingers of what was eventually to be attempted and accomplished in this way. To prevent these changes from causing inconvenience, a double index was given, presenting both the old and the new denominations. The college state that their chief object was to discard names chargeable with folly and unmeaningness, and to substitute others which might indicate in some manner the nature of the substance. Thus *Ethiops mineral* becomes *hydrargyrum cum sulphure*; *causticum antimoniale*, *vulgo* butter of antimony, becomes *antimonium muriaticum*; lunar caustic becomes *argentum nitratum*; *flores martiales* become *ferrum ammoniacale*; *mercurius dulcis sublimatus* becomes *calomelas*; *nitrum vitriolatum* becomes *kali vitriolatum*; *sal absinthii* and salt of tartar (subcarbonate of potash), becomes *kali*; Glauber's salt becomes *natron vitriolatum*; spirit of Glauber's nitre becomes *acidum nitrosum*; spirit of salt becomes *acidum muriaticum*; all the potash salts become *kalis*, with the appropriate acids, acetic, vitriolic, tartaric, and nitric; and in like manner of other articles.

The Pharmacopœia of 1787, however, was distinguished by changes and improvements much more important than those depending upon mere changes in nomenclature, though the latter, as implying more correct knowledge of the chemical constitution of the saline bodies, were to be respected as symbols and effects of advancement in science. The dawn was approaching in 1746, though the light was not yet sufficiently strong to dissipate many of the phantoms and monstrous productions which the long night

* Pharmacopœia Londinensis. Londini, 1746.

of superstition, ignorance, and prejudice, had engendered. In 1787 came the morning light; and with that disappeared most of those strange preparations which had so long been suffered to stand in the Formulary. Not only are the mixtures, syrups, and electuaries, greatly diminished in number; but the Theriacs, Mithridates, and old complicated confections are no longer visible. There are only three electuaries—those of Cassia, Scammony and Senna. The long list of pills in the former editions is reduced to only six; two forms of laxative pill, the gum pills, mercurial pills, opium pills, and squill pills. The powders, also, forming a most exuberant department, stand at the number of eighteen of the most necessary compounds, which the physician has most occasion to employ. Lastly, the reader sees no oil of bricks (*oleum lateritium*), no Mosaic gold, no viper broth or viper wine, and no bezoar powder. Various new articles also were introduced, such as magnesia, the carbonate and calcined, the lemon and lemon juice, the Seville orange and a few more. The long list of distilled waters was advantageously shortened to eight in number. In short, the Pharmacopœia of 1787 must be regarded as denoting the commencement of a new era in Pharmacological literature; an era at which simplicity, sense, and experience, began to take the place of complication and confusion, fancy, presumption, and ignorance.*

A useful table was subjoined, stating the proportions of the fundamental drug in various powerful mixtures, so as to enable prescribers to regulate the dose with accuracy.

The London College continued to publish new and improved editions of their Pharmacopœia, as the progress of chemical, pharmaceutical, and medical science demanded; in 1809, in 1815, in 1824, and in 1836.

That of 1809 was remarkable for still greater changes in nomenclature, and a more decided approximation in its directions to the chemical and rational knowledge of the day.

This edition was criticised in the year 1811, with no small degree of asperity, by the late Richard Phillips, a man who, to accurate chemical knowledge, united a large amount of acuteness and sagacity. If Mr Phillips could have performed this duty without employing language and expressing opinions which too often were indications of a peculiar temper and a considerable facility of finding fault, in a spirit not always very becoming, his services would have lost none of their utility, and his purpose of amending the processes of the pharmacopœia would have been attained with equal facility.

The grounds on which Mr Phillips proceeded in pronouncing his judgment, were the following.

When instructions are given by a public body associating itself

* Pharmacopœia Collegii Regalis Medicorum Londinensis. Londini, 1788, 4to, pp. 182.

with the legislative and executive government of the country for conducting any processes of art in a particular manner, and in accordance with certain rules, these instructions ought to be perfectly correct and free from any considerable or manifest error. They ought also to be consistent with themselves ; and their practicability and the possibility of carrying them into effect, both on the small scale and the large, ought to be previously examined with care, and ascertained. If directions of this kind are given by individuals or persons without authority, they have no other effect, than that they are set aside, and others more eligible are substituted in their place. When, however, the president and fellows of a College, with the authority of his majesty and privy council, publish a Pharmacopœia containing erroneous directions for the preparation of medicines, directions in which several articles are wasted, others cannot produce the articles expected in the proper form and purity ; and when all this is enjoined to be done by the apothecaries of a whole kingdom, under the threat of the infliction of pains and penalties, if these directions are not obeyed, it becomes a duty to expose these errors, not only to warn the less expert against them, but to show how these errors may be avoided and corrections introduced, and to furnish reasons for the deviation from what is given forth with an authoritative tone.

This is not the place to examine the merits of the critical observations of Mr Phillips. It is sufficient to say, that all of them rested on good foundation, and that the amendments which he suggested, and which arose out of careful experiments, not unfrequently repeated, were most of them adopted in the subsequent edition of 1815. Mr Phillips found, that in most of the chemical formulæ the quantities of materials employed were incorrect, one or two being in larger amount than was necessary, sometimes leading to waste of articles employed, sometimes to imperfect and badly-prepared products. Such was the case as to the directions for the preparation of muriatic acid, nitric acid, in which the sulphuric acid was too large, and carbonate of ammonia, in which he found that the lime was in unnecessary excess. Upon the directions for preparing *liquor ammoniæ*, Mr Phillips pronounces a censure equally just. And the instructions for the preparations of antimony are shown to be liable to objections equally strong. In short, the general result is that the Pharmacopœia of 1809 in all its chemical formulæ was incorrect, and very often gave impracticable directions,* and directions for processes which the Fellows of the College had not previously submitted to experiment. Mr Phillips further accuses the College, in no very equivocal language, of having borrowed from the Edinburgh and Dublin Pharmacopœias, without acknowledgement, every change that can be

* An Experimental Examination of the last edition of the Pharmacopœia Londinensis, with Remarks on Dr Powell's Translations and Annotations. By Richard Phillips. London, 1811. 8vo, p. 148.

considered as an improvement. Mr Phillips, in short, arrived at the conclusion, that the Pharmacopœia of 1809 was so generally and irremediably erroneous that it required to be speedily and thoroughly revised. Presuming this to be necessary, and that the College would be sincerely desirous to substitute actual for conjectural emendations and improvements, Mr Phillips, who it seems had previously offered to assist the College, now repeated the offer of his services, if it appeared from the examination then submitted, that he was qualified to forward in any way the business of publishing a correct formulary for the use of the apothecary.

It is not irrelevant to remark, that in the preparation of this Pharmacopœia, the College occupied two entire years; and that the President was Sir Lucas Pepys, Baronet, a physician who acquired a peculiar species of distinction in connection with the military expedition to Walcheren.

Meanwhile, the observations of Mr Phillips had shown the Society of Apothecaries the necessity of obtaining for their institution the services of an able practical chemist; and Mr Brande was placed over the chemical department of the Hall. The College of Physicians, however, neither followed the example set by the Apothecaries nor took the advice of Mr Phillips. The person who became chemical adviser to the College on the occasion of publishing the Pharmacopœia of 1815 was Mr Hume of Long Acre.

Whether this choice was judicious or not, whether it was justified by the necessities and position of the College, or by the merits of the individual selected, we need not give any opinion. If we believe Mr Phillips, the profession formed an opinion of their own. The result, indeed, might have been foreseen. The edition of 1815, which was called *Editio Altera* of 1809, though amended by the adoption, it is said, of several of the suggestions of Mr Phillips, as well as others, was still a most imperfect, and, if we believe Mr Phillips, a most erroneous guide in the chemical department. Here, however, we find that time and experience are the great teachers. Mr Phillips himself, in an examination of the Pharmacopœia, admits that he was wrong in several instances in his former remarks, especially in regard to muriatic acid and nitric acid. Tartarized antimony is still in 1816 a very troublesome substance to prepare, and becomes again the subject of lengthened criticism. At the same time, as Mr Phillips was always at pains to try the processes, and to discover why they gave results different from those expected, his observations always contained a large amount of useful information. His researches were distinguished by accuracy and patience,* and must be allowed to have greatly improved chemical pharmacy. Most of the errors as to the union of chemical substances Mr Phillips ascribes

* Remarks on the *Editio Altera* of the Pharmacopœia Londinensis, and on Dr Powell's Translation and Annotations. By Richard Phillips. London, 1816, pp. 64.

to the neglect of consulting the scale of chemical equivalents by Dr Wollaston.

These successive criticisms on the pharmacopœia and its translations by Dr Powell appear to have convinced the college that their author was a fit person to be consulted in preparing any subsequent editions of that work. It is not certain whether Mr Phillips was consulted or made a constant authority in the preparation of the edition of 1824. All that is certain is that he published the same year a translation of the work with notes and illustrations, containing full explanations of the chemical processes, and conveying a large amount of correct information. There was a slight deviation in arrangement. But on the whole the work furnished a tolerably just view of the actual state of chemical pharmacy at that time.* The introduction of diagrams to explain the actions taking place in double decomposition must have been highly useful to the student. The notes were further most useful in specifying the properties indicating the qualities of many medicines, and in describing the means which might be adopted for the detection of impurities, whether accidental or artificial. The utility of this knowledge was so apparent that the most important part of it was introduced into the next edition of the pharmacopœia, which appeared in 1836.

No information is given in this translation to what extent it had the authority of the College, though internal evidence shows that it was in truth the Pharmacopœia of the College. In the advertisement, however, to the last edition of 1836, Mr Phillips informs us, that, at the request of the Pharmacopœia Committee of the College, he either conducted or inspected the preparation of almost every medicine which had been introduced, and in many cases repeated the processes which the Pharmacopœia already contained. It is impossible to doubt that the services of so accurate a chemist must have been of great advantage in giving the formulæ and processes the necessary correctness.† Accordingly, the Pharmacopœia of 1836 is much more free than its predecessors from any of these serious chemical errors, which brought so much discredit on these two editions.

We know not whether the late Mr Phillips performed to the present edition of the London Pharmacopœia, during the course of its preparation, the same duties which he rendered to the last. Most likely his engagements, which latterly must have been onerous, prevented him from doing so. Nor does it appear that Mr Phillips had contemplated preparing an annotated translation, as formerly, of the present Pharmacopœia. Mr Phillips, at all

* A Translation of the Pharmacopœia of the Royal College of Physicians of London. 1824. With Notes and Illustrations. By Richard Phillips, F.R.S.I. et E., &c., Lecturer on Chemistry to the London Institution, &c. London, 1824. 8vo. Pp. 326.

† A Translation of the Pharmacopœia of the Royal College of Physicians of London, 1836. With Notes and Illustrations. By Richard Phillips, F.R.S.L. et E., &c. By Permission. London, 1837. 8vo, pp. 392. Second edition, March 1837. 8vo, pp. 421.

events, departed this life in May 1851, and no translation by him was announced. Had life been prolonged to this active chemist, we have no doubt that any translation coming from him would have been received with great satisfaction by all branches of the profession, and with that confidence which his reputation justly inspired. Of the works that have been published since the appearance of the Pharmacopœia in February 1851, that of Dr Nevins we understand to be the substitute for the translation by Mr Phillips; and it consists not only of a translation, and notes on the uses and applications of medicines, but includes also the corresponding formulæ of the Dublin and Edinburgh Pharmacopœias, and thus forms a sort of complete system of *Materia Medica* and Pharmacy.

The work of Mr Squire is well entitled to attention as presenting in like manner a comparative conspectus of the formulæ of each of the three Pharmacopœias, London, Dublin, and Edinburgh. It is, however, little more than a conspectus, though it gives short notes on the therapeutic uses of medicines. The performance of Mr Squire makes some approach to a National Pharmacopœia.

The foregoing sketch will suffice to show those progressive stages through which the Pharmacopœia of the London College has passed, from its first appearance in 1618 in the reign of James the First, to its recent advent in the year 1851, in the reign of Queen Victoria. It will communicate also some idea of the efforts that have been required, and those that have been made, during the last sixty-three years to keep it on a level with the advancement of chemical and pharmacological knowledge, and to make it perform its functions as a safe guide to the physician and apothecary. Of such a work it would be impossible in this place to present anything like a full account; much less is it possible to make a minute examination of the merits of all its chemical processes; since to do so in a becoming manner it would be requisite to write a commentary larger than the book itself. Such an undertaking must be left to the process of time, in which all things are examined and many things are proved. It is merely proper here to advert to some of the leading characteristics of the Pharmacopœia in relation to the present state of pharmacy.

First after the usual designation and distributions of weights and measures in the first part, comes the catalogue or list of the articles of the *Materia Medica* recognised by the College.

New Articles admitted in
Pharmacopœia of 1851.

Articles of Pharmacopœia 1836
not admitted into Pharmacopœia of 1851.

Acidum aceticum pyroligneum.
Benzoicum.
Citricum.
Ga Illicum.

Abietis resina.
Acetosella.
Acorus.
Allium.