the pancreatic duct should be bilaterally median above the umbilicus and in the umbilical area. This is not at variance with clinical experience. The hyperæsthesia of tracheitis, commonly known as "rawness in the chest," bilateral about the midline from the larynx to the level of third rib cartilages, is a matter of common experience. The pains arising from the bladder affections are mostly connected either with active spasmodic contraction or with passive resistance to over-distension; both sides of the bladder are generally concerned and its pains are bilaterally median as they should be in accordance with the bilaterally median origin of the allantois. It has more than once been hinted that where peritoneum is involved in a morbid state of a viscus referred hyperæsthesia is located in the right or left situation corresponding to the origin of that part of the peritoneum. This statement is not affected by the controversial point as to the direct sensibility of parietal peritoneum.

Of structures unilateral in origin I have little to say in support of my hypothesis: the clinical evidence is too clear to need discussion. The referred pain of ureteral colic is markedly lateral; that of the testis on which pressure is exerted no less so in the groin of its own side. The only viscus lateral and bilateral in origin and symmetrically developed, for discussion, is that resulting from the fusion of those originally lateral structures, the Müllerian ducts.

The pains of labour referred from the contracting uterus to the abdomen and back are well known. I will only draw attention to the fact that they are bilateral in order to emphasise that though bilateral they are not bilaterally median, as are the pains due to structures which I have designated median in origin. The halves of the uterus give rise to lateral pains, which, indeed, may fuse in the midline; the halves of the intestine give rise to pains about the midline which in their intensity may radiate into lateral regions. As to the pains and muscular contractions in the legs which so frequently appear in the course of labour these, which are homologous with the cramps of the legs in severe colic of the large intestine, are reflex pains set up in structures of the same segmental innervation as that of the Müllerian ducts. It seems inconceivable that so clumsy and dangerous a condition of affairs would have been perpetuated evolutionally were pressure on nerve roots in the pelvis the cause of these common cramps.

It is within the scope of this essay to speculate on those comparatively infrequent cases where the pain of stone in the pelvis of the kidney on the one side is felt on the opposite side and why, as I have observed, a patient may be operated on for appendicitis when only a ruptured left Fallopian tube is found to account for the pain felt on the right side. Is the pain felt in these cases really due to the lesion found? I would suggest that in such cases were fuller search made some structure in close relation in origin and development with the fellow to that in which the lesion exists may itself be found to be in a morbid state, giving rise to no pain but throwing the cord of its own side into an irritated condition by constant afferent impulses, a condition which if interfered with by an impulse transferred across the cord might readily give rise to pain. So correlated in origin and innervation are ureters, testicles, ovaries, spermatic cords, and Fallopian tubes. For instance, the right Fallopian tube being in a morbid state and a stone irritating the pelvis of the left kidney sufficient impulse might be transferred across the cord to explode a right-sided irritability due to the Fallopian tube to the overshadowing of the pain due to the stone on its own side.

As my thesis has developed itself two points of interest have come into view. The one is that, leaving out cases in which peritoneum has been involved in the lesion and has complicated the pains, the pains due to structures referred to as median are distributed in the regions of the anterior cutaneous nerves in their maximum intensity and are often confined to those regions, while originally lateral structures give rise to referred pain in lateral cutaneous branches of the segmental nerves or their homologues. The same median and lateral distribution of referred pain when felt in the dorsal regions is observed. Viscera originating in the lateral mass have their afferent nerve fibres in close relation in the cord with those of lateral cutaneous branches; while median structures developed beneath the splanchnopleure have their afferent fibres correlated more closely in the central nervous web with anterior fibres of the segmental nerves. As to the significance of this I can only put forward the protective theory of the origin of pain as suggested by

James Mackenzie, but if the protective theory of the origin of pain be correct it were obviously better had viscera median in origin preserved their state of the vermis stage of development median and unconvoluted and that lateral organs had never changed their position relatively to the body wall.

The parietal peritoneum with its uncomplicated orientation, be it sensitive or insensitive to direct stimulation, is only a partial corrective to the disturbance that has taken place between the relations of the visceral seat of lesion and the seat of resultant sensation in the body wall since the vermis stage of evolution. As I have shown in dealing with the medley of pains referred to the umbilical region, in that specially protective sense of leading to a rapid diagnosis the peritoneum often gives its lead all too late in the disease.

The other point is that, as regards pains, I have perforce dealt throughout with structures into the composition of which unstriped muscle tissue largely enters and that pain as opposed to hyperæsthesia is generally noticeable when that tissue is carrying out its function strenuously, either whilst in an abnormal condition or with an unusual incentive. The connexion between the working of the muscle and the production of the pain is very obvious in cases where such a cause as a pull on a mesenteric attachment is out of the question; it is on the ground of the generality of this element of muscular stress or strain in visceral pain that I reject as unnecessary a cause referred to one viscus which will not apply to another exactly comparable one. I suggest that the origins of the afferent impulses leading to pain are inherent in the nervous connexions in muscular tissue under stress or strain.

To conclude on the main subject matter. My postulate on the preservation by viscera of their embryonic nervous connexions is far from unreasonable or indefensible and my hypothesis, save where it offers suggestions to the clinician, is amply borne out by clinical facts. There appears to be a good case, when searching for hyperæsthesia, when questioning as to pain and when drawing conclusions, etiological or diagnostic, from the sensory phenomena of morbid visceral states, for the utility of taking hints from embryology on the lines laid down.

Gravesend.

ON SO-CALLED INTRA-UTERINE CRETINISM AND ITS SUPPOSED IDENTITY WITH ENDEMIC AND SPORADIC CRETINISM.

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THE object of my present communication is to show that up to the present time there is no conclusive proof for the occurrence of intra-uterine cretinism and that the cases which on different occasions have been published under this title¹ are to be reckoned as appertaining to the foetal bone disease generally known as chondrodystrophia foetalis or so-called congenital rickets. I base my conclusions on microscopical sections of the bones of cases of chondrodystrophia foetalis and cretinism which are to be found in the museums of the Pathological Institute and Clinique for Mental Diseases here, as also on slides which were kindly supplied to me through Professor Langhans of Berne (Switzerland) and on the results of the experiments of Hofmeister.²

Dr. J. W. Ballantyne had occasion at the seventieth annual meeting of the British Medical Association to point to the bewildering confusion which is caused by a too numerous nomenclature in foetal bone diseases, especially where most of the terms employed are simply synonymous. What, since the appearance of Kaufmann's monograph in 1892, now generally carries the name of chondrodystrophia foetalis has been called or described as achondroplasia, chondromalacic micromelia, foetal rickets, so-called foetal rickets, intra-uterine rickets, micromelic rickets, annular rickets, chondritis foetalis, pseudo-chondritis, osteogenesis imperfecta,

¹ THE LANCET, Feb. 9th, 1884, p. 252; Brit. Med. Jour., Sept. 12th, 1896, p. 620; Barlow, Transactions of the Pathological Society of London, 1881.

² Beiträge zur Klinischen Chirurgie, 1894, Band xi., S. 441.

congenital or intra-uterine cretinism, cretinoid dysplasia, osteoporosis, osteospathyrosis, periosteal dysplasia with osteospathyrosis, and defective enchondral ossification. Ballantyne has adopted the nomenclature which Kaufmann made use of and makes accordingly a distinction between the following subdivisions of chondrodystrophia foetalis—viz. : (1) hyperplastica; (2) hypoplastica; and (3) chondromalacica. The typical appearances of these three different diseases have been sufficiently clearly given by Kaufmann and Ballantyne.³ I will therefore without delay settle the question which I have undertaken to explain.

Since Virchow first described a specimen of chondrodystrophia foetalis hypoplastica and came to the conclusion that it was a "new-born cretin,"⁴ there has been the utmost difficulty in separating this disease from cretinism, especially as nobody dared to question Virchow's authority on the subject—in fact, the greater part of the following cases were described as "cretinism" and some authors went even so far as to refuse to acknowledge undoubted cretins as such when they did not present the features of Virchow's famous "neugeborne cretin." Having had by lucky chance the very identical specimen of Virchow in my possession I proceeded to make slides of the epiphyses and found on examination, as I expected, at the junction with the diaphysis a layer of connective tissue continuous with the periosteum. This was sufficient to stamp the case as chondrodystrophia foetalis hypoplastica. In the bones of cretins one never finds such a fibrous cap over the end of the diaphysis; the bones of cretins have only this peculiarity—viz., that their ossification takes place exceedingly slowly, exactly as with infantile myxoedema and infantile dwarfs—i.e., dwarfs whose puberty is greatly retarded. In one of my previous papers I was able to give the radiographs of the hand of a patient, aged 12 years, suffering from infantile myxoedema in whom the ossification corresponded to the conditions of a child scarcely three years of age. In the museum of the clinique here there is the skeleton of a cretin who was 32 years old and whose pelvis is separable into the three parts (*pars sacralis, iliaca, et publica*) which begin to be united at the age of six years. Even microscopically there is no great difference to be found between the bones of children whose real age corresponds to the apparent age of the cretins. The identity, from an etiological point of view, of sporadic and endemic cretinism and myxoedema has long ago been settled through Semon and Kocher, and if this fact has not had the unanimous agreement of all authors it is simply owing to the opinion that the small stature of endemic cretins was due to their cartilages becoming too soon ossified. The x rays have now shown the contrary to be the case, so that nowadays no serious objection can be brought forward to shake Semon and Kocher's theory. Cretins, sporadic and endemic, are nothing more or less than undeveloped children with the typical puffiness and intense apathy of myxoedema. On the other hand, cases of chondrodystrophia foetalis, if they happen to grow up, which, though rarely, does sometimes occur, are as regards mental faculties perfectly normal and on a par with their surroundings and differ from other people only in this—viz., that their legs and arms are very short and stunted.⁵ This shortness is simply caused through the above-mentioned strip of fibrous matter pushing itself between the diaphysis and the epiphysis and thereby putting a stop to further growth of the bone shafts. These points would be already sufficient to make a relation between cretinism and chondrodystrophia improbable. To this must be added that though up to the present time one has always found unquestionable pathologic changes in the thyroid gland of all cases of cretinism which have been carefully anatomically examined, this has never been so in the case of chondrodystrophia foetalis.

I must now mention the experiments of Hofmeister, as they have often enough aroused the opinion that chondrodystrophia and cretinism bear some relation to each other. Hofmeister performed thyroidectomy on several rabbits of various ages and found that in the diaphysis of the operated animals the cartilage cells, instead of being arrayed in regular rows as usual, were apparently thrown about in the field of view. As this is also to be seen in chondrodystrophia foetalis he came to the conclusion that this disease after all

was only one dependent on loss of function of thyroid gland—i.e., cretinism. To this point the following objection must be raised, that the typical layer of connective tissue, continuous with the periosteum, never appeared at the junction of the diaphysis and epiphysis in any of the animals upon which he experimented, and that, moreover, a certain degree of "désarroi" does appear in the rows of the cartilage cells in all diseases of the bones without being typical for any one of them.

In conclusion, from all we know up to the present time of the function of the thyroid gland we must deduce that its loss brings on (1) general arrested development and (2) myxoedema. Both of these symptoms are wanting in chondrodystrophia foetalis, in which disease we find simply short arms and legs, probably following inflammation of the cartilages during intra-uterine life. None of this is to be found in cretinism, therefore the two diseases are distinct units.⁶

Clinical Notes:

MEDICAL, SURGICAL, OBSTETRICAL, AND THERAPEUTICAL.

A CASE OF PNEUMOTHORAX WITH RAPID RECOVERY.

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THE following case, owing to the unusual course it ran, seems to me to be worthy of record.

The patient, who was a man, aged 38 years, was admitted to the City of London Hospital for Diseases of the Chest on Oct. 21st, 1903, suffering from difficulty in breathing. The history he gave was as follows. He had been attending as an out-patient at the hospital since 1897 for cough, expectoration, and occasional hæmoptysis, but with the exception of one interval during which he had been an in-patient at the hospital he had been able to follow his occupation as a clerk. Until some ten days before admission he had been in his usual health, but about that time the cough returned and there was also a little blood-stained expectoration. On Oct. 17th, after a violent fit of coughing, he noticed himself becoming short of breath and about the same time he felt a "tapping sensation" behind the sternum and also heard a noise inside his chest on the left side which he compared to the sound of a pot boiling. On the 18th he felt the dyspnoea becoming worse and on the 19th it was so bad that he could not go to his work, although he attempted to walk there. He then sent for a medical man who advised him to seek treatment at the hospital.

At the time of admission his general strength was fairly good and, though he complained of dyspnoea and could not lie on his left side, he was not suffering from much distress. On examination of his chest some impairment of movement was observed on both sides, but while the right side showed some power of expansion, on the left side there was merely an elevation of the thoracic wall when he breathed deeply, no definite expansion being present. On palpation of the left chest behind vocal fremitus could be made out from the apex to the base over an area of three or four fingers' breadth parallel to the spine; over this area the percussion note was found to be impaired, the breath sounds were somewhat harsh, and vocal resonance was present. On palpating and auscultating over the remainder of the left chest it was found that vocal fremitus, vocal resonance, and breath sounds rapidly diminished and were soon lost as the examination was made at a short and then at a moderate distance from the areas of diminished resonance, but on percussion over this portion of the left chest the note was hyper-resonant. On examination of the heart the apex beat was not palpable; no area of cardiac dullness could be mapped out (being replaced by a hyper-resonant note) and

³ Brit. Med. Jour., Sept. 27th, 1902, p. 951.

⁴ Gesammelte Abhandlungen, p. 975, Fig. 36.

⁵ It will interest the readers of Dickens's works to be informed that Miss Mowcher in "David Copperfield" is a typical case of adult chondrodystrophia hypoplastica.

⁶ I also believe that the "Cretinism in Calves," which Seligmann describes in the Journal of Physiology, 1903, vol. xxix., is only chondrodystrophia foetalis after all.