

REFERENCES.

<sup>1</sup> Colman, *Section-cutting and Staining*, p. 101; Lee, *Microtomists' Vademecum*, p. 380. <sup>2</sup> Marinesco, communicated to the Société de Biologie, reported in *Gaz. Méd. de Paris*, July 11th, 1896. <sup>3</sup> Ballet, *Le Progrès Médical*, May 16th and June 27th, 1896.

**CERTAIN POINTS IN THE CAUSATION AND TREATMENT OF SPINAL CURVATURE.**

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II.

In my previous paper on this subject<sup>1</sup> I referred at some length to a cause of lateral curvature which in 1895<sup>2</sup> I had briefly mentioned under the name "amesial pelvis." One of the illustrations given (Fig. 2) was that of a young girl who

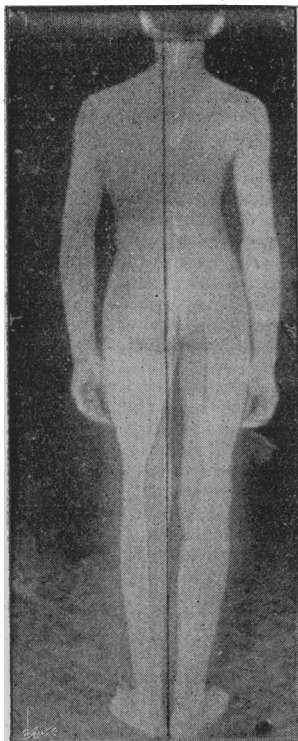


Fig. 5.—Scoliosis with pelvis amesial to right. Note.—The edge of the plate is in the same parallel; the white line of tape has inadvertently been cut away.

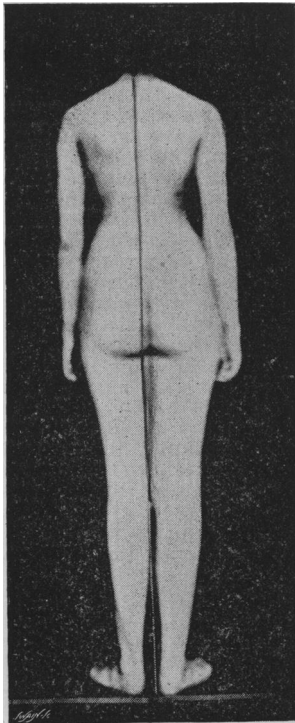


Fig. 6.—Girl with slight scoliosis, pelvis amesial. Note.—In this figure the perpendicular has been drawn a little too much to the right.

manifested this condition in exceptional severity; but it must not be supposed that amesiality in somewhat lesser degree is rare. On the contrary, it is very common as a cause of lateral curvature and of failure in such treatment as is directed to the spine only, ignoring the malposture of the lower parts of the body. To those, therefore, who have to do with spinal deformities the matter is of great importance, but has escaped notice because the figure is rarely uncovered lower than the level of the hips, the rectitude of lower limbs and pelvis being taken for granted—that is, the middle of the latter, most clearly indicated in external marking by the intergluteal fold, is assumed to lie in the middle line, while the lower limbs, or rather the centre of the space between them, is considered to be perpendicular. When about ten years ago my then newly-invented scoliometer<sup>3</sup> revealed that herein lay a noteworthy fallacy, I instituted a more extensive series of observations, and took, as opportunity offered, photographs of patients of various age and sex. A very restricted number of them are reproduced here, but they suffice to show the condition insisted on. It is, however, first necessary to say how a true horizontal,

the white line by the patient's heels, was obtained. A piece of tape was secured to the floor, and the centre marked by a carpet pin, at each side of which even lengths—say two-foot—were accurately measured. The middle of a cord was held at the centre of the camera lens; here a knot was tied, from which absolutely equal lengths of the string were cut and the ends secured to the two-foot marks by driving carpet pins through string and tape into the floor. Thus was procured an exact isosceles triangle, the apex of which was at the lens, while the mid-point of the base was between the patient's heels. An imaginary line therefore drawn from the centre of the lens to this mid-point of the base formed with the tape exact right angles. Furthermore, in order to avoid error arising from minuteness of image two of the figures (5 and 6) were enlarged in printing. On these 9-inch images perpendiculars were drawn by means of an accurate steel square, and from these points photographic negatives were taken. The perpendiculars on the other two negatives were cut with a sharp knife through the gelatine of the plate, but their accuracy was verified also on enlarged images.

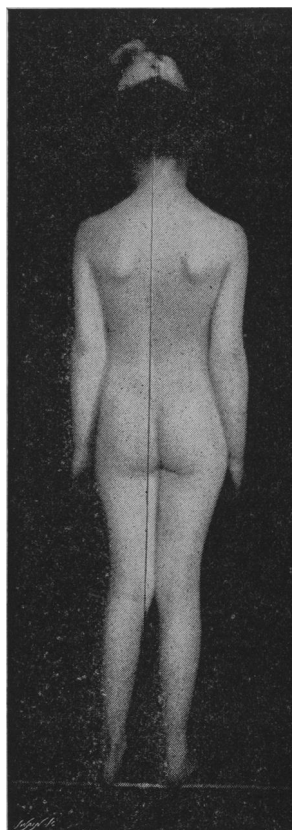


Fig. 7.—Child with markedly amesial pelvis and incipient scoliosis.

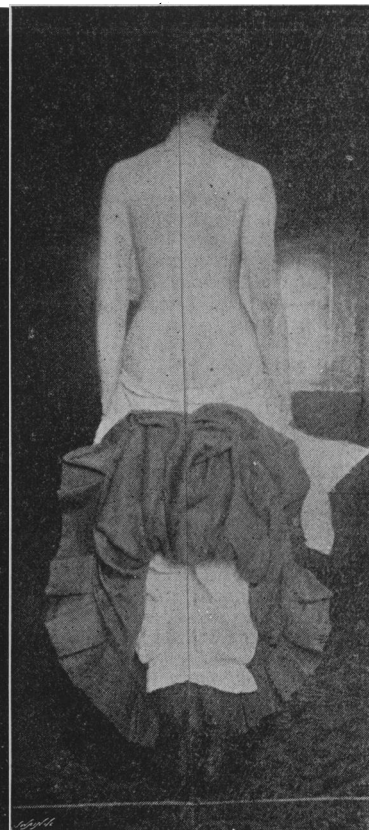


Fig. 8.—Amesial pelvis. Mode of investigation.

In estimating the variation it must be remembered that these figures are  $3\frac{1}{2}$  inches long. The man stands 5 ft.  $10\frac{1}{2}$  in., the girl 5 ft. 10 in., so that  $\frac{1}{20}$  inch on the plate represents 1 inch on the body, or  $\frac{1}{10}$  inch about the aberration in these two illustrations means  $1\frac{1}{2}$  inch of real displacement. Moreover, if the rima narium is  $1\frac{1}{2}$  inch from the perpendicular there is that amount of pelvis too much on the one side and the same too little on the other, therefore that bone as a whole lies  $2\frac{1}{2}$  inches out of the straight.

My room is so arranged that when I have fully explained how my patient is to stand I leave until all is prepared. I then enter from behind, expose the plate, and quit the room again while garments are resumed, without ever going in front of the patient; but save in the case of young children a aid for investigation sa'te entire ludity is unnecessary.

Fig. 5 is that of a man, aged 19, with marked lateral curve, whose parents had long thought he was not straight, but surgeons, both here and abroad, had negatived the existence of spinal curvature. The pelvis is amesial, that is, the rima natium lies to the right of the perpendicular to the extent in the 4-inch plate of  $\frac{1}{8}$  inch, therefore on the patient's body nearly  $1\frac{1}{2}$  inch. The probability is that this amesiality gave rise to the crookedness which the parents noticed and which examination of the back alone failed to detect; that is, the cause of the subsequent scoliosis had not as yet begun to operate.

Fig. 6 is from a young lady not yet 13 years old, but ft. 10 in. in height. The pelvis is amesial to the right to rather a less extent. The condition, that is, projection of right hip, was noticed some eighteen months ago. One shoulder was noted as unduly prominent about ten months ago. The commencement of curvature must be dated some short time anterior to this latter observation.

It must not, however, be supposed that pelvic amesiality is confined to adults; it is, on the contrary, frequent and very marked in children, so much so indeed that I have strong reason for believing that the habit commences almost always during childhood.

In Fig. 7 the left knee is slightly more valgus than the other, therefore the mid-point between the heels lies a little to the left of the true central perpendicular. I have on an enlarged print 8 inches long corrected this, and find that on that enlargement the error amounts to  $\frac{1}{8}$  inch; on the  $3\frac{1}{2}$  plate, therefore, it is about  $\frac{1}{2}$  inch. This is hardly sufficient to make an appreciable difference in the truth of the illustration, which shows a very amesial pelvis with commencing total curve to the left. This curve, be it noted, is only incipient, because the amesiality itself is recent.

The malposture is generally, though by no means always, to the right; a certain number of my photographs show it to the left. The perpendicular lies upon—in a few cases only skirts—the inner aspect of one or other limb, the left when amesiality is to the right, and *vice versa*; in most cases it cuts a piece of the calf, of the inner condyle, and more or less of the thigh. The condition is, after a certain time, always followed by a lateral curvature, commencing in the segment of the spine immediately above the pelvis, and always in a direction contrary to the misplacement—right amesiality induces lumbar or, after an interval, total curvature to the left, left amesiality causes right curvature. The total curve generally becomes sooner or later an S curve. The curves are very seldom, probably are never, fully compensatory of the pelvic malposture. If the reader will measure accurately a midpoint at the neck, about the level of the vertebra prominens, and will stretch a fine thread between it and the mid-point of the tape between the patient's heels, he will find the rima natium still to the side, though on these minute prints it is much more difficult to verify the aberration than on enlarged ones.

I must forego any attempts at showing what neuro-muscular condition it may be that induces a child to stand and sit, for it is also evident in sitting with the pelvis thus laterally displaced and the lower limbs aslant; occasionally it appears to originate in standing habitually on one and the same limb the other being bent and supporting no weight. Anyone may, however, convince himself that it is not a difficult posture to assume. Let the experimenter stand, the feet being turned a little out with one side, say the left, against a straight wall with which the toes and shoulder of that side must be in contact. His hip will be nearer to or further from it according to breadth of the ilium. Now let him sway the pelvis away from, while still keeping toes and shoulder in contact with the wall; he can do this easily to a considerable extent, and judging from my personal sensations, without throwing extra weight on either foot, or if any, not more than a slight inclination of the head will equalise. Now this fact, the crucial tests of the true perpendicular and of the thread stretched between the mid-point of the neck and of the tape, show conclusively that pelvic amesiality is not a mere imaginary condition, but is a highly important reality, inasmuch as my photographs from children 10 years (Fig. 2 in last paper) and 7 years old (Fig. 7) show that it is a common and efficient cause of spinal curvature, and when so of frequent recalcitrance.

Knowledge of and ability to recognise this condition is,

therefore, necessary. Suspicion may be aroused, even before any garments are removed, if a hip undoubtedly project, while no very severe deformity of the back is noticeable. Still more if, on further examination, the slope of each side of the pelvis is asymmetrical, and one great trochanter project more sharply than the other. If these signs be found, investigation must be carried further, but complete nudity, save in the case of young children, is neither necessary nor desirable. I have only resorted to it for the sake of study. One can bare the back, as in Fig. 8 to the level of the hips, raise and pin the skirts to the vest or other under garment, so as to expose the heels. Then the surgeon, standing ten feet or more straight behind the patient, holds up a plummet, so that in his line of sight the cord falls on the mid-point between the heels. Keeping hand and head very still, he notes if it also correspond with the mid-line of the pelvis, or, failing to do so, fall on the gluteal region on either side. In the figures the perpendicular dark line may be taken to represent the string of the plummet.

I submit that a little consideration will show it to be impossible to correct a curve caused by this malposition of pelvis while that condition continues. Let us suppose a pelvis amesial to right, curvature, lumbar or total, to left. All curves have two limbs, one leading from the chord (in this case the middle line) to the most salient point, the other back from that point to the chord; but in these curvatures the chord itself has got awry, and the question is, shall we try (and fail) to force the spine into the line of that deviated chord or correct that deviation itself by pressing its lower end back into its normal place. Success in achieving this indication will go far towards correcting the spine above by the very necessity of balance. Indeed, in incipient cases that measure will suffice; other assistance is wanted in further advanced cases. But I must not outrun my allotted space, and hope to enter into more detail about treatment next year, when a few more columns may be granted.

It cannot be but that some will differ from these views. That is unavoidable, but I may express a hope that they will not be attributed to some other surgeon, English or foreign. I say this because in 1867 I devised and published a description of a certain "sloping seat" which, strangely enough, has since been named Volkmann's, although it was years later that he published his description, and although he actually borrowed my illustration to explain the appliance.

## REFERENCES.

- <sup>1</sup> BRITISH MEDICAL JOURNAL, July 17th, p. 132. <sup>2</sup> *Causes and Treatment of Lateral Curvature of the Spine.* <sup>3</sup> *Clin. Soc. Trans.*, vol. xxii, p. 314. <sup>4</sup> The mother of one of my patients sits with the pelvis awry, and tells me she has to her knowledge always done so.

## ON THE IMMEDIATE REDUCTION OF THE ANGULAR DEFORMITY OF SPINAL CARIES.

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OUR attention having been drawn to this matter by an account of some cases of angular deformity of the spine arising from caries, which had been treated by immediate reduction by Calot of Berek-sur-Mer, and Réard of Paris, we deemed it expedient to satisfy ourselves as to its feasibility and safety.

We must confess that we regarded the accounts received from France in a somewhat sceptical spirit, being considerably embarrassed and influenced by the authoritative statements contained in textbooks, that the only safe way of treating carious disease of the spine is by a long course of rest, every effort, of course, being made to prevent deformity in the early stages by complete recumbency, and in the later stages by suitable supports. But that when deformity follows, as it very frequently does, in spite of all the precau-