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 narium 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 valgous 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 $\frac{1}{16}$ 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 narium 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.

- ¹ BRITISH MEDICAL JOURNAL, July 17th, p. 132. ² *Causes and Treatment of Lateral Curvature of the Spine*. ³ *Clin. Soc. Trans.*, vol. xxii, p. 314. ⁴ 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-

tions, it must be accepted as a lamentable but unavoidable sequence of the disease.

Then, again, to us it seemed probable that the immediate result of forcible rectification might be paralysis, or at least paresis, temporary or long continued; and arguing on the analogy of what has sometimes occurred after reposition of limbs subsequently to tuberculous arthritis, we felt it was possible that so novel a proceeding in the spine might be followed either by suppuration or by an acute dissemination of tubercle. But when we come to reflect on our experience in dealing with a large number of these articular cases, we could not altogether recall more than three or four cases in which it could be distinctly affirmed that forcible rectification and acute dissemination of tubercle stood in the relationship of cause and effect. Nor has our combined experience been small.

With the statements, therefore, of the French surgeons Calot and Rédard before us, and duly considering the various possibilities, we decided to put the question to a cautious trial. After personal observation of the methods adopted in the clinics abroad, and noting the details, we commenced to operate. During the last two months we have together treated 11 cases of angular deformity. In 6 of them we obtained immediate and complete reduction. In 2 of these cases, which were extremely deformed, the reduction was very remarkable on account of the facility with which it was effected. In 5 of the 11 cases we obtained partial reduction, and of these latter cases in three of them the angle was sharp, and the area of disease limited to two or three vertebræ. In the remaining two it was prominent but obtuse, and extended over six or seven vertebræ, and was accompanied by much thickening of the tissues at the site of disease.

Among the 5 cases of partial reduction were the 2 on which we first tried this method, and we felt it to be unwise to use such force at the first sitting as we now know to be necessary to completely reduce the deformity. The remaining 3 cases of partial reduction were so consolidated as to resist a large amount of force. But we can say that in all 5, although the deformity was not entirely reduced, there was considerable lessening of the projection, we should say about three-fourths; and what is very much to the point there was an increase in the length of the spinal column from an inch upwards. This lengthening was not due to mere extensibility of the normal portion of the spine, a source of fallacy we took care to guard against in our measurements, but to the unfolding of the spine at the site of former disease.

Our method follows that of Calot, and in view of the difficulty of sometimes obtaining a sufficient number of assistants we have devised a special apparatus, by which traction is simultaneously made upon the head, arms, and legs. After steady extension of the spine, either by the aid of assistants or by the apparatus, for a few minutes, with the patient in the prone position, care being taken that the pull should be equal in all directions, downward pressure is made by the surgeon's hands upon the projections, counter-pressure being afforded by the open palms of an assistant placed on the abdomen. It is advisable to have the patient's bowels well emptied before the operation, and then the assistant's hands readily support the anterior aspect of the spine, and so prevent too rapid reduction of the deformity. When the projection is dorsal, counter-pressure can be indirectly made through the chest walls. The patient is kept under an anæsthetic from the first, and as this must be administered while he or she is in the prone position, it is a little difficult. But we have found that it is better to get the patient well under before proceeding to operate, and then but little more is required after the prone position is assumed.

Reduction, partial or complete, having been obtained, a plaster of Paris corset is put on, and is carried up over the head and neck, merely leaving the face exposed, care being taken that pressure is maintained during the application of the jacket on the site of deformity. It is well to note that a very important point in the adjustment of the plaster of Paris corset is that the spine must be maintained in hyper-extension. We have found it easier to put the bandages on the head and neck if the patient is suspended from a Sayre's apparatus.

Now as to results. In not one of the cases, despite the complete or partial reduction of the deformity, has there been

either paresis or paralysis following the operation, nor has there been in four cases which have been carefully watched for two months any untoward signs, either of suppuration or a renewed outbreak of tubercle in those cases in which we presumed it to be the *fons et origo mali*. And our experiences accord with those of Calot, who has gone a step further and excised some of the projected laminae. We should mention that in some cases we have used a modification of the double Thomas's hip-splint, with a head-rest and leg-support, so constructed as to keep the spine in extension.

We submit, then, that, although the method is still on its trial as to its ultimate results, it seems to afford a good prospect of reducing the deformity without incurring dangerous consequences. This article should, however, be regarded as a preliminary statement. We hope to publish a more detailed account of the cases in a few months' time. At any rate, the lesson which has been brought home to us is that the correct way of preventing deformity from arising or increasing in Pott's disease is to maintain the spine in hyper-extension by suitable support beneath it, and not simply to place the patient upon a bed or straight splint, which favours rugging of the spine at the site of disease and increase of intervertebral pressure.

In conclusion, once we can be fully assured that no symptoms of a serious character follow these manipulations, it becomes an easy matter when the spine is rectified to maintain it in the corrected position.

REMARKS ON DR. KOLLE'S REVIEW OF MY ARTICLE—"PROFESSOR KITASATO'S ANTICHOLERA SERUM."

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I WAS rather surprised to find that Dr. Kolle has, at this date, had the kindness to review the brief account of Dr. Kitasato's work on the serumtherapy of cholera, which appeared in the BRITISH MEDICAL JOURNAL of July 18th, 1896.¹ That Dr. Kolle is not satisfied with its contents is natural enough if one takes into consideration the fact that I purposely avoided going into the details of the experimental part of the work especially. For this reason I expected Professor Kitasato would, a little later, publish his report in German or English. Consequently I did not wish to anticipate too much of what he was going to write himself.

But as Dr. Kolle now wishes to know if the control experiments with the sera of healthy animals have been made I feel it my duty to translate that part of the original report (published in Japanese) which bears on this point.

Experiments Showing the Absence of the Antitoxin in the Serum of Healthy Animals.

No.	Guinea-pig Body Weight.	Toxin.	Serum (Normal).	Result.
	Grammes.	C.cm.	C cm.	
45	242	2.0	0.5 (S.)	Died during the night.
46	262	2.0	0.5 (H.)	Died the next evening.

N.B.—The minimum fatal dose of the toxin is 1.5 c.cm. (intraperitoneal). Toxin and serum injected simultaneously. (S.) sheep; (H.) horse. It is to be borne in mind that 0.2 c.cm. of the anticholera serum was found to neutralise 2.00 c.cm. of the same toxin.

Dr. Kitasato concludes from the above experiments that the antitoxic property is not present in the sera of healthy animals, at least to the extent claimed by Professor Pfeiffer. I have no intention to enter into that discussion. I might add here that Drs. Behring and Ransom published their report when Dr. Kitasato's work was already in progress. The report of MM. Metchnikoff, Roux, and Salimbeni appeared in the *Annales de l'Institut Pasteur* of much later date.

Dr. Kolle states that an "unbefangene" reader must, from reading my article, get the impression that I was reporting a new discovery. If that was the case, I am extremely sorry that I should have created such an impression. For we are