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THE DOCTRINE OF CHIROPRACTIC

Its Science, Philosophy and Art

In Its Application to Diseased

Conditions and Its Relation to

Other Healing Sciences.

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The Doctrine of Chiropractic



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MAN IS NOT A MERE MACHINE, though he has been built according to the laws of mechanics, physics and chemics; in fact, we believe that most, if not all, of the principles in nature are represented in the metabolism of the living organism, and each and all are kept under control by the intelligent power, the vital force, the **INNATE INTELLIGENCE**, with which every living organism is endowed from conception.

On studying anatomy, we find that man has been built very much the same way that a ship is built: by first making a frame work. Upon the strength, design and accuracy of this frame-work, the whole fabric depends, whether kite, plow, ship or man.

THE FRAME-WORK OF MAN is made up of 206 bones, long, short, flat and irregular. These are firmly joined and bound together by tough fibrous bands called Ligaments; they are non-elastic, though very pliant, so as to permit every form of motion necessary; then the whole frame is covered by layers of muscles that are attached by means of cords or

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bands (tendons) to the bones and other structures; these are organs of locomotion, and at the same time, bind and hold together the frame-work. Then the whole body is covered by a tough, elastic membrane, the skin.

THE VISCERA are contained within the cavities that are formed by the bony frame and attached and supported by means of ligaments and other membranes to the muscular and bony frame-work, so that the whole structure is absolutely **DEPENDENT** upon the frame whose foundation is the **SPINAL COLUMN**, the main shaft of man, his central axis, the keystone of the whole structure. Like the beam is to the plow, the keel to the ship, the **SPINE** is to man. And as every blow that is given to the plow, is radiated to the beam, every shock to the ship is referred to the keel, every wrench or jar that man receives is radiated and felt at the spine. So, therefore, the ship with the perfect keel, the plow with the perfect beam, or the man with the perfect spine, will be far more able to withstand the shocks, the jars and the strains of the uses for which they are destined.

But since the Chiropractor is not much concerned with the ship or plow, but with **MAN** or any other vertebrate animal, it is his bounden duty to thoroughly get acquainted with their most important part, their **FOUNDATION**, especially that of man.

THE SPINAL COLUMN of man is a bony, ligamentous column made up of a series of bones called vertebrae, bound together by tough fibrous bands called ligaments; the bones are 26 in number, and the ligaments 9 in number besides being surrounded by and affording attachments to numerous muscles.

THE VERTEBRAE are so-called, from the Latin word "vertere," meaning "to turn," because the spinal column is a flexuous, flexible column, endowed also with a considerable amount of rotation, all these to afford the individual every motion that is necessary for the normal functions of life.

The **SPINE**, proper, is that portion of the spinal column which extends from the sacrum to the base of the occipital bone, and is made up of the 24 movable or true vertebrae of the spinal column and is cone-shaped, base downward and apex upward, hence is said to resemble a thorn (spine).

THE SPINAL COLUMN, for the purpose of easier examination and study, is divided into four divisions, viz.: The cervical division, which is the upper division, and refers to the neck, is composed of seven vertebrae; the Dorsal division, which is composed of twelve vertebrae, is so-called because it refers to the back and is sometimes called Thoracic; this portion also belongs to the Thorax, the bony cage that is formed by the 12 dorsal vertebrae behind, the 12 pairs of ribs at the sides and the sternum (breast-bone) in front; the third division is called the Lumbar division, from the word *lumbo*, meaning loin, and is usually composed of five vertebrae. These three divisions, as before mentioned, constitute the Spine proper, and with the last, the Pelvic division, composed of two bones, the sacrum and coccyx, complete the Spinal Column in the normal, of 26 segments of bone.

This number of segments sometimes varies; spines are often found with eight cervical vertebrae or thirteen dorsal vertebrae or six lumbar vertebrae and some spines have been found with thirteen dorsal and only four lumbar vert.

THE SPINE OF MAN MUST BE STRAIGHT laterally, that is from side to side, but not so from its antero-posterior (from front to back) direction, as it has **THREE DISTINCT** curves which have received four different names. They are called the Normal curves, Primary and Secondary curves, Anterior and Posterior curves and Physiological curves. These are called Normal because they are necessary to maintain the equilibrium of the body in the erect position; were the spine straight the longitudinal median axis of the body, the line of support, would be thrown too much to the front and the erect position could not be maintained with comfort and without great muscular strain on the muscles of the back.

They are called **PRIMARY** and **SECONDARY** curves on account of not making their appearance at the same time; the primary, which are the two posterior, the dorsal and pelvic curves, are the first to appear, they are co-existing with the formation of the column in the embryo which has then but one curve with its convexity to the posterior, the secondary making their appearance later in life, when the child assumes the erect position; the cervical and lumbar curves

cease to have their convexities toward the posterior and throw them toward the anterior and, barring disease, will remain like this until old age when they will again disappear and the spine will reassume its original shape.

And they are called **PHYSIOLOGICAL** because, as the word implies, they have a function, a purpose, that of maintaining the equilibrium of the body. These curves may vary during life according to the different changes in the body, as for instance—during emaciation the spine will be much straighter than during corpulency and pregnancy and, of course, disease will also alter these curves.

THE SPINE IS LOCATED in the median line of the body. That means in the middle in so far as right and left is concerned, but not in the middle when considered from the antero-posterior direction, because the spine is altogether posteriorly of the median line, there being but a few layers of muscles and the skin back of the spine, while in front lies the whole mass of the body, with its whole weight, bearing the body down and forward, and this is what compels the formation of the secondary curves.

THE SPINE IS BOUNDED above by the condyles of the Occipital bone, with which it articulates, below by the base of the sacrum (the spinal column being wedged in between the innominate bones), and at the sides, in the dorsal region, it is bounded by the heads of the ribs. This plainly shows that the whole frame is dependent upon the spinal column.

THE FUNCTION OF THE SPINAL COLUMN is mainly one of **SUPPORT AND PROTECTION**; this may be divided into:—that it supports the head, keeps the body erect, forms part of the bony frame-work, and like all other bones, affords attachments to ligaments and muscles, protects soft parts, especially this most vital organ, the **SPINAL CORD** and its membranes, by forming a flexible bony canal (the neural canal), through which the spinal cord passes.

From birth to old age, the spinal column undergoes a number of changes, both normally and abnormally. **THE NORMAL CHANGES**, in their order of development are, first, the appearance of the secondary curves, in the cervical and lumbar regions, when the child assumes the erect position

(at about one year), the fusing of the five segments of the sacrum into one bone and at the same time a similar process takes place between the four segments of the coccyx, thus nine bones of the child are fused into two bones in the adult. This change takes place at about puberty (thirteen to fifteen years of age), but the fusing is protracted until maturity (twenty-five) has been reached. So that, from the Chiropractic standpoint, these vertebrae may be individually adjusted until about puberty and even later. The last normal change that takes place, if it be normal, is the disappearance of the secondary curves in old age, and the reassumption of the original rotundity of the primary curve from the base of the skull to the coccyx, which is due to the flattening of the intervertebral discs which, of course, causes a slight shortening of the spine. This change, if normal, is due to the wear and tear, or years of pressure upon the intervertebral discs, causing them to flatten and get thinner, but it may be brought about prematurely by disease also; in that case, it would not be normal.

A DIURNAL CHANGE also takes place in the length of the spine, and that is, that it is shorter at bed-time than it is in the morning; this is due to the weight that is brought on the intervertebral discs during the fifteen or sixteen hours of erect position of wakefulness; but then, during the eight hours of sleep, the rest, in the recumbent position, permits the resiliency of the discs to reassume their former thickness and the spine is thus made about one-quarter of an inch longer in the morning than it is in the evening. It is partly due to this change that certain people complain more of their ailments in the evening than in the morning, because, to some extent, the pressure upon certain impinged nerves, has been increased, yet, of course there are other reasons.

The abnormal changes that may take place in the spine are numerous and all are due to disease or trauma; among them may be mentioned, exostosis, ankylosis, caries (decay of bone, Pott's disease), fractures (breaking of some parts of the vertebrae) and the four different curvatures.

SUBLUXATIONS are slight displacements of individual vertebrae short of actual dislocation. It may be a slight gliding of one body over another either in the antero-posterior

or lateral directions, or a slight rotation of the bodies of two adjacent vertebrae in opposite directions; it may be the coming closer together of two vertebrae by the compressing of the intervertebral disc between them, either completely over the whole surface of the disc or partially at one edge, causing the vertebrae to cant over, which will be increased if the side opposite to the compressed one is increased in thickness by stretching, which will give the disc an additional wedge shape.

Subluxations are the results of the accidents, great or small, that we are all exposed to, during life. They come from **FALLS, WRENCHES, JARS, SHOCKS, STRAINS, SPRAINS, THE INTRODUCTION OF POISONS INTO THE SYSTEM AND ALSO TO SEVERE MENTAL SHOCKS**, such as great griefs, financial or domestic worries and over-application of the mental faculties on one subject, finally they are the **KINKS** which are left in the chain of small bones that is called the spine.

Many subluxations are obtained by apparently trivial accidents at a time when the body is in a state of **UNPREPAREDNESS** to meet them. A very common instance of this is when one slips on an icy sidewalk, without actually falling; a supreme effort is made to remain erect, and one is only partially conscious of the act by the instinct of self-preservation.

Some subluxations are obtained by the sudden reaction of the muscles in the shock that is received when one is descending the steps of a stair in the dark and semi-consciously concludes that the last step has been reached, when there is actually one more, and on account of the **UNEXPECTED** jar, though trivial in itself, a great strain is brought to bear on the back and may cause a subluxation not because of the step, but because it was unexpected and the body was not prepared for the strain.

Another very common source of subluxations, especially among the heavy workers, is when a heavy lift, though not beyond the normal strength of the lifter, is due to the non-observance of the law of mechanics in not placing the body in perfect relation to the object and with the direction in

which it has to be lifted. This results in certain sets of muscles being compelled to afford super-normal action, while the opposing sets are comparatively lax, thus creating a strain on some vertebrae of the spine causing a subluxation, which is commonly called by the workers, "**A KINK IN THE BACK;**" the pain may disappear after a time, but the **KINK** in the spine remains, causing a pressure, or perhaps only a strain, on some nerve leading to some organ, reducing its function and natural resistance to external or internal toxic conditions constituting disease. This may, according to the degree of pressure on the nerve, appear immediately after the subluxation has been obtained or more or less time after, leaving the cause of the disease remotely in the dark to the Old School Physician, who will attribute its etiology to a number of more or less **IDLE, FANTASTIC** and **IMAGINARY** speculations with appropriate (?) remedies to **ALTERATE** or ameliorate the symptoms, a thing which would give but little concern to the standard Chiropractor who would seek for the cause where it actually is and proceed to remove it at once by means of his art without waiting for the appearance of the rash, if the disease should happen to be one of the forms of eruptive fevers as is the case with the **OLD SCHOOL**.

THE SEVERAL DIRECTIONS in which a vertebrae may be subluxated are mainly six in number, namely: Posterior, when its spinous process is more prominent than its immediate neighbors; Anterior, when it is less so than the majority of its neighbors; Superior, when it is closer to the one above than the one below it; Inferior, when it is closer to the one below than it is to the one above; Right or Left, when it shows prominence to either of these sides of the median alignment of contiguous vertebrae; any of these six directions with any combinations of one or more of the others are listed by the Chiropractor in taking his analysis by using the first letters of these words, as: P.L.S. for posterior, left, superior, or A.R.I. for anterior, right, inferior, P.R. and P.L. for posterior right, and posterior left, respectively. This is for the purpose of abridging the labor incidental to the making of an analysis.

We are well aware of the **ADVERSE CRITICISM** to which we will be subjected because of our teaching that a

vertebra of the spine may be subluxated anteriorly, by the teachers and graduates of certain schools, who deny that such is possible on account of the overlapping nature of the vertebrae themselves, in anticipation of which we present the following reply. The fact that certain schools of Chiropractic are teaching that the vertebrae cannot be subluxated anteriorly is due to their ignorance of any method in their art whereby these anterior subluxations may be adjusted. But even if no Chiropractor possesses this necessary knowledge to adjust anterior subluxations, it is illogical for him to deny their existence, inasmuch as it would be to deny the existence of an evil which he could not cope with; for instance, would it be logical to deny death because we cannot overcome it? If a vertebra cannot be subluxated anteriorly, why can one be posterior to it? Would it be logical to say of two birds flying in the air that the first is ahead without the other being relatively behind? No—if one is behind the other must necessarily be ahead, and this applies in the same way to vertebrae, though it may be argued that in the case of the vertebrae the one cannot get behind as it is firmly attached to the other. Then if this is the case, how did the forward one get ahead of the other if it is attached to it?

No—this would be a mendacious begging of the question, and can only bring the ridicule of others on our profession. For Chiropractors to deny this form of subluxation owing to their inability to adjust it, would be to shut the door for ever to the possibility of discovering a method whereby such may be accomplished; the taking of such a position would be equivalent to saying that the Art of Chiropractic has reached its climax of development, that it is perfect and can go no further, which would be preposterous indeed.

What then, may a Chiropractor do when he is confronted by an anterior subluxation?

He must use all the means at his command, and this will only be limited to the education he has received at school (and if his school did not believe in anterior vertebrae, his knowledge will be limited), and his experience in the field.

Though no absolutely successful methods have as yet been found to adjust anterior subluxations, many are successfully adjusted by various means and, principally, by utilizing certain mechanical laws and principles that are not known to the average man, such as concussion, recoil and the latent force known as "inertia," and by these, to some extent, an anterior vertebrae may be brought back to its normal position.

RECOIL is from the French word "Recole" to draw back, a principle which takes place when of two adjacent articles, one receives a "concussion" (blow or stroke) the other will move in the direction from whence the blow came, as when on tapping on the edge of a table the articles on the top are made to move towards the edge where the tapping occurs, and if continued, the articles will ultimately fall off the table, that is, they have been **BROUGHT BACK** by concussion and recoil utilizing the law of "inertia."

INERTIA is an attribute possessed by bodies having weight. A body, having weight, though not moving—inert—possesses a resistive force to a moving one which is quite considerable, as can be demonstrated by placing a tin can on a post and shooting at it with a powerful modern rifle; the ball will perforate both sides of the can without knocking it off the post, because the inertia in the can offered sufficient resistance to permit the ball to pass through its sides and remain practically in the same place on the post. This is due to two harmonizing principles, the rapidity of the ball from its impetus and the resistive force of inertia in the can.

Now, an anterior vertebra is possessed of inertia like anything else, and besides receives direct resistance from internal tissues, such as the ribs offer against the transverse processes in the dorsal region, which is considerable, to resist and recoil against sharp concussion of forces which may be applied to either or both of the adjacent vertebrae to the anterior one. This, coupled with the natural tendency in living organisms for parts to come back to their proper places, assisted by the pulling of the other structures such as muscles, will more or less be effectual, according to the knowledge, intelligence and ability to accomplish, of the

Chiropractor, in adjusting an anterior vertebra to its normal relation with the others.

A CURVATURE is a deviation from the normal alignment of the spine, or an exaggeration or diminution of its normal curves. Curves, in the spine, apply to the normal, while curvatures apply to the abnormal. A spine which, for some reason, would be as straight as an arrow, would be declared to have three curvatures, two kyphoses and one lordosis, which would seem to be paradoxical yet is not, according to our definition.

THE FOUR CURVATURES that the spine is subject to are: Kyphosis (posterior), Lordosis (anterior), Scoliosis (lateral, either right or left), and Rotatory scoliosis, which is a rotated condition of the spine in which any or all of the other curvatures of the spine may be represented.

The vertebrae of the spine are similar but no two of them are alike; no one of them could be made to take the place of another, some of them show features that characterizes them as "peculiar vertebrae," as follows: The Atlas is the most peculiar, it having neither a body nor a spinous process, it is simply a bony ring which rotates around the odontoid process of the axis, the second cervical vertebra; then this axis is the next most peculiar vertebra, not because it lacks any feature of the other vertebrae, but it has them all, and one extra; each of the other vertebrae has seven processes, but the Axis has eight, the extra is the Odontoid, a tooth-like process which is found on the anterior superior portion of the body of the axis and serves as a pivot for the Atlas to rotate around.

There is a question as to the next most peculiar vertebra, whether it is the seventh cervical vertebra with its long prominent spinous process (V.P.), or the fifth lumbar vertebra with its wedge-shape body. The next most peculiar is the first dorsal vertebra; its peculiarity consists in its being indented by two full facets and two semi-facets for the articulation of the first and second pairs of ribs, respectively, the only vertebra so marked in the whole of the spine. It is admitted, among Chiropractors, that this vertebra is hard to move; this is due to the fact that the first and second pairs

of ribs, which are short and firmly connected to the first dorsal vertebra, hold it as in a vise.

The next peculiar vertebrae are the tenth, eleventh and twelfth dorsal vertebrae, because they are marked by only one full facet on each side of their bodies, all the others being marked by two demi facets on each side; at this part of the spine, the ribs articulate by their heads, between adjacent vertebrae and are not full on the bodies like the others.

Besides these characteristic features of individual vertebrae, **THE THREE DIVISIONS OF THE SPINE** have their characteristics as such, and they are well defined, so much so, that anyone acquainted with the spine, could pick up an odd vertebra at any time and tell to what division of the spine it belongs and also number it; and further, it is very important, aye, **NECESSARY** that the Chiropractor should be absolutely conversant with these details.

THE PECULIARITIES which characterize the cervical vertebrae, except the Atlas, are the spinous processes, from the axis to the sixth cervical are bifid, they are cleft or forked, having two prongs, and it sometimes happens that these prongs are uneven in length and would mislead the Chiropractor in his palpation of these, making it appear that the individual vertebra is subluxated to the side of the longer prong; but when one has a thorough knowledge of this peculiarity, and his sense of touch is well developed by training, he can overcome this difficulty by palpating the bifurcation itself and ascertain as to whether the cleft is in the center of the spine or not; otherwise he may go on adjusting on a normal vertebra to no purpose.

The next peculiarity of the cervical vertebrae is that the transverse processes are pierced by a foramen in every vertebra of that region with the very rare exception of the seventh. These openings are placed in apposition to one and another forming a pair of canals at each side of the spine for the purpose of passing the vertebral arteries which are destined to supply the brain with blood through the "Circle of Willis," again proving that nature has adopted every means according to law to protect vital organs. It might be asked, however: "Why did not nature protect other arteries of

similar size and importance in other parts of the body?" It would appear to be so to the casual observer, but is not in reality, because all important blood vessels in other parts of the body receive ample protection in that their courses run deep and they are thereby protected by a mass of tissue, while in the back of the neck, which is very much exposed to blows and accidents, where these vessels have their course close to the skin they would be very much exposed to injury, hence the provision for protection in a bony canal.

The other and last peculiar feature of the cervical vertebrae is that their bodies are lipped on their margin, anteriorly and laterally; the anterior lip extends from the inferior edge of the vertebra above overlapping the intervertebral disk and part of the vertebra below, and the lateral lips, one at each side, extend upward overlapping at each side the lower portion of the vertebra above, thus making with the overlapping lip below, a sort of casing or dovetailing to the whole cervical section thereby materially aiding to keep the individual vertebrae in apposition with one another, again showing the provision that has been made to protect from interference the nerves which emerge from between the vertebrae.

THE DORSAL VERTEBRAE also have certain characteristics which differentiate them from those of any other section of the spine; these peculiarities are mainly two in number, one is that the spinous processes are long, slender and triangular in shape and extend obliquely downward overlapping the vertebrae below and thus are disposed like the shingle on a roof. This peculiarity of the spinous processes of dorsal vertebrae render them very liable to fractures of some of their tips, being very slender, and when this takes place it often happens that the broken piece will be absorbed, and the remaining stub will make it appear to the palpator as if the vertebra in question was subluxated to the superior or anterior. At other times the fracture may be only a "Willow or Green Stick" fracture, that is, only bending the top of the process to one side or the other, thus making it appear as if the vertebra in question was subluxated to one side, while, as a matter of fact it may not be subluxated at all, only, to the palpator's fingers it would appear so, and this is another

difficulty which the Chiropractor meets with, unless he has been thoroughly prepared and instructed in his palpation by competent teachers and has devoted all the time possible to the study of this **IMPORTANT PART OF THE ART OF CHIROPRACTIC.**

THE OTHER PECULIARITY of the dorsal vertebrae is that the bodies are indented at each side by facets and demi-facets for articulations with the heads of the ribs. The first dorsal vertebra having a full facet and a demi-facet at each side to articulate with the first and second pairs of ribs; this feature of the first dorsal vertebra being **CLAMPED** between two comparatively rigid pairs of ribs, renders it very difficult to move and that is the reason why the Chiropractor has to use proportionate force to adjust that vertebra when it is subluxated. All the other dorsal vertebrae (with the exception of the tenth, eleventh and twelfth, which have respectively but one full facet on each side), have two demi-facets at each side at their superior and inferior margins, as the middle of the heads of the ribs, in that portion of the spine articulate with the intervertebral disks and the sides only of the heads make an indentation (facet) in the rims of the adjacent vertebrae.

The peculiarities of the vertebrae of the **LUMBAR REGION** are, so to speak, negative; that is, there is an absence of any of the peculiarities of the vertebrae of the other regions of the spine. As for instance, they have no foramina through their transverse processes, no bifurcations in their spinous processes and no lips in their bodies as have the cervical vertebrae; nor have they long spinous processes or facets on their bodies, as have the dorsal vertebrae; their only distinguishing features are that their spinous processes are flat, broad and strong, and project nearly straight backward. Their articulations also are different; the inferior articulating processes are received in a groove formed by the superior articulating processes, the two forming a dovetail or mortise, so it appears that it would be extremely difficult to produce a lateral subluxation of these vertebrae, but this is not so, as it has been demonstrated by experience; the body of one vertebra may be slightly rotated, using the articulations as a fulcrum or axis, then the spinous process

would be thrown to one side on the principle of excursion or sweep, and the spinous process becomes the only point of contact where force may be applied to rotate the vertebra back in place, as the transverse processes in that region are too small and slender to be adjusted upon with any chance of success.

Another factor which may lead the Chiropractor astray in his palpation, is growth of bone on the spinous processes making them appear to be either posterior, or to the right or left, and this may happen in any part of the spine.

THE METHOD to be employed by the Chiropractor to determine when a spinous process in the dorsal region is straight or bent, is to place the first and third fingers on the tips of the transverse processes of the vertebra in question, which will be found at about $1\frac{1}{4}$ inch above the tip of the spinous process, and the middle finger on the tip of the spinous process, and then compare the distance between the fingers; if the distance between one finger and the middle finger is less than the other, then the spinous process is bent to that side, and vice versa, but if there is an equal distance between the fingers, the process is straight and if it palpates more to one side than the other it is subluxated to that side and needs adjusting.

All the vertebrae of the spine, except the atlas, have characteristics which are common to all, and are, therefore, called **TYPICAL** vertebrae. A typical vertebra may be described as being composed of a body (centrum) and an arch, which supports seven processes, one spinous, two transverse and four articular. Taking one vertebra as a sample from the dorsal region the parts may be thus described.

THE BODY is a spongy mass of bone, practically heart-shape, and is the largest part of the vertebra; this is perforated by numerous foramina, for the admission to the interior of nutrient vessels, veins, arteries, lymphatics and nerves; the superior and inferior surfaces are flattened, slightly concave to receive the convex surface of the intervertebral disks and terminating in a sharp and more dense bony ridge at the margins, this to grip more firmly the margin of the disk, like the edges of a horse's hoofs grip the sod.

Anteriorly, it is convex from side to side and concave from top downward, while it is straight from top to bottom posteriorly and concave from side to side: this portion is so shaped because it assists in forming the neural canal which is circular in shape to afford a smooth passage for the spinal cord.

THE ARCH is formed by the two pedicles and laminae which join together in the median line posteriorly and is called the **NEURAL ARCH**, and together with the posterior portion of the body, is called the neural ring; all these rings placed on top of one another form the **NEURAL CANAL**.

THE PEDICLES, forming part of the arch, are two short and stout pieces of bone situated at each side of the posterior portion of the body. They are notched above and below so that when the vertebrae are placed in apposition, one on top of the other, the notch of the one below meeting the notch of the one above, forms a foramen at each side of the vertebra to permit a pair of spinal nerves to pass through the spinal column from the spinal cord; this obtains through the whole length of the spinal column, permitting the nerves to reach every part of the body after passing through these little windows. But when these foramina get distorted by a subluxated vertebra the nerve force cannot be distributed to the destinations.

Continuous with the pedicles are the **LAMINAE**, two broad plates of bone, which proceed downward and backward, fuse together at the median line, finishing the arch, and again proceeding posteriorly form the spinous process which varies in shape and size in the various portions of the spine; this process is the most available part of the vertebra to the Chiropractor, both in his palpation and adjusting.

From the juncture of the pedicles and laminae, proceeding laterally, to the right and left of the neural arch, are the two **TRANSVERSE PROCESSES**. These differ considerably in the different regions of the spine; they are called transverse because they extend across or transversely from the vertebra to which they belong. They are also called "Parapophyses" and they have the function common to all bones, supplying points of attachment for muscles, but those of the dorsal region have an additional purpose, there, by their length and

strength, they form a brace to support the ribs by articulating with them at a point about $1\frac{1}{4}$ inch from where they articulate with the body of the vertebra. They are only secondary to the spinous processes in their usefulness to the Chiropractor, as they become very useful to assist him to verify his palpation and often in adjusting when other means are not available, as for instance—when the spinous process is broken or when there is too much tenderness over them.

THE ARTICULAR processes are four in number, two superior and two inferior, or the pre and post Zigopophyses and they are located immediately at the juncture of the pedicles and laminae, immediately above and below the origin of the transverse processes and also form part of the notches that go to form the intervertebral foramina. It is generally the anterior portion of the inferior articular process which causes the pressure on the nerves when there exists a subluxation.

THE ARTICULATING SURFACES of the vertebrae in the different regions of the spine vary, so that they become distinguishing features from one to the other region, except at the transitional vertebrae, where, as a necessity they partake of the nature of both regions. The articulating surfaces of the articular processes of the vertebrae take practically the same slant, or direction, that their respective spinous processes take. In the cervical region they are nearly horizontal with a slight incline downward, that is, the superior surfaces face upward and slightly backward, while in the dorsal region they are much more oblique in their direction, following the line taken by the spinous processes, and in the lumbar region they have been described elsewhere under the heading of "Peculiarities of vertebrae."

THE ATLAS is the most peculiar vertebra of the whole spinal column and is the uppermost one. It is located between the condyles of the Occipital and the Axis with which it articulates; it has been so named from the demi-god Atlas whom Jupiter condemned to support the dome of heaven on his shoulder, as it also supports the globe (head). It is described as a bony ring, irregular in shape, made up of two arches (an anterior and a posterior), two lateral masses and two trans-

verse processes. The Atlas having no body like the other vertebrae, the lateral masses serve as such. The main ring is so shaped that when it is divided by the transverse ligament it is converted into two rings, a large and a small one, the former transmit the spinal cord and its membranes and the smaller receives the odontoid process of the Axis over which it rotates. **THE POSTERIOR ARCH** is easily described, it is, as the name implies, a semi-circle of bone, about $1\frac{1}{4}$ inch in breadth and a little less in thickness; its extremities are connected to each of the lateral masses. Close to the lateral masses are grooves, above and below the arch, which are analogous to the notches in the pedicles of the vertebrae and are for the passage of the first and second pairs of spinal nerves; in the centre of this arch posteriorly is a tubercle, said to be a rudimentary spinous process which is sometimes entirely absent, and sometimes a notch takes its place while it has happened that a complete gap exists instead of either tubercle or notch; small rough ridges are also present for the attachment of muscles and other structures.

THE ANTERIOR ARCH, which is the foremost part of the Atlas, with the lateral masses, complete the ring; it is the smaller of the two and has a tubercle on its anterior surface, in the median line, for the attachment of, principally, the longus colli muscle. Immediately opposite this tubercle, in the middle of the posterior surface of the anterior arch, is a facet (an oval-shaped indentation, the fovea dentalis), which serves for the reception of the odontoid process of the Axis, the pivot over which the Atlas and head rotate.

THE LATERAL MASSES form the bulk of the bone and are placed at each side between the two arches, their inferior surfaces are smooth and slightly saddle-shape and articulate with the body of the Axis over which they rotate and glide like the fifth wheel of a wagon. Their superior surfaces are provided with a pair of facets that are shaped like a bean or kidney; these concave surfaces are to receive the convex surface of the condyles of the Occipital bone, which is the only articulation between the head and the spine; these facets do not run parallel with each other but are much closer in front than at the back and if they were

prolonged anteriorly would form a V with the apex pointing towards the chin: this is to insure a firmer foundation for the head. The shape of the condyles and the superior articulating surfaces of the atlas vary considerably in different individuals, and with the length of the ligaments which connect them together determine the degree of rocking of the head. On the inside of the ring, on the inside surface of the lateral masses, are two small tubercles, like two half peas which serve for the attachment of the transverse ligament of the atlas; this is the structure which divides the atlas into the two unequal rings mentioned above.

From the external portion of the lateral masses at each side, are the transverse processes; they are much further apart from tip to tip than they are in the rest of the cervical region; like all the others, they are perforated by a foramen for the passage of the vertebral arteries. As the atlas has no spinous process it cannot therefore be palpated in the same manner as the other vertebrae, the only means whereby this can be accomplished is at the tips of the transverse processes, which extend at each side to a point midway between the mastoid process of the temporal bone and the ramus of the jaw, by gently pressing the tips of the middle finger of each hand at the point indicated until they reach the tips of the transverse processes of the atlas, and comparing the one with the other, ascertain whether they are at equal distance from the jugular foramen above, the ramus of the mandible anteriorly and the mastoid process of the temporal bone posteriorly; if not, then the Atlas is listed as subluxated, first, by its laterality, if it is more prominent on one side than on the other; then if it is higher or lower on that side, determines whether it is superior or inferior, and if it is closer or farther from the mandible determines its anteriority or posteriority respectively.

NO ACCURATE means are available to ascertain the position of the Atlas with the Axis, except, perhaps, by their transverse processes, as there are no available points of comparison between the two; though subluxations may occur there, they are rare because the odontoid process of the Axis passes through the anterior ring of the Atlas and is held firmly there by the bony arch in front and sides, and by the

transverse ligament behind solidly encircling the odontoid process, thus making a subluxation difficult.

Though the **ATLAS IS ALWAYS LISTED** as subluxated when not in relation with the bones of the head, does not necessarily imply that it is out of relation with the rest of the spine; to the contrary it is seldom so, but it is the condyles of the occipital bone which have departed from their normal relation with the Atlas. To always presume that it is the Atlas that is subluxated would be to assume that the cranium is always in the median line as if it was anchored there which is presumptuous and untrue. This is written merely to correct a common error as it does not matter much to the Chiropractor, because whether one or the other is listed, the force which he applies to the one side of the Atlas is counter acted by a similar force on the other side of the head, and results are the same.

A SUBLUXATION OF THE ATLAS must always be taken in serious consideration in any kind of disease as nerve fibres may be impinged there which may ultimately lead to any part of the body, because the whole bulk of the fibres which ultimately find their exit through the intervertebral foramina must first pass through the foramen magnum and the Atlas.

THE AXIS is the second vertebra of the spine and also the second most peculiar of the spine, it articulates with three other bones, the atlas, the third cervical vertebra and with the occipital bone by the tip of its odontoid process which is connected to the inner margin of the foramen magnum by the ligamentum odontoid. Its great distinguishing feature is its odontoid process—a toothlike process, resembling a horse's bridle tooth—which proceeds straight upward from the anterior superior portion of the body of the axis through the anterior ring of the atlas fitting in the fovea dentalis in the centre of the posterior surface of the anterior arch, and serves as a pivot or axle for the atlas and the head to rotate upon.

This motion of the head and atlas around the odontoid process is limited to only half a circle because it is stopped at each side by the check ligaments, two strong bands which

are attached to the bottom and sides of the odontoid process and are each inserted in a tubercle located on the inner side of the condyles of the occipital bone, their arrangement resembling the check lines on a horse, and as their name implies, they serve to check the motion of the head.

The atlas having to move freely around the axis, and having no intervertebral discs between the two, left it imperative to have a strong connection between the axis and the occipital bone which is met by four ligaments, first, the ligament odontoid—also called, ligamentum suspensorum or middle odontoid—the two check ligaments—already described, and the cruciform ligament which is a part of the transverse ligament of the atlas. From the transverse ligament, at its middle, is a perpendicular band which is attached at the base of the odontoid process posteriorly, then forms part of the transverse ligament of the atlas, from which it is derived, at its centre and continues upward to attach itself to the inner margin of the foramen magnum of the occipital bone. These with the posterior common ligament complete the bond of union between the occipital bone and the axis, and, though passing through and over the atlas, permits it perfect freedom of motion.

THE SACRUM is a triangular, wedge-shape bone, curved upon itself from top to bottom and slightly from side to side, its convexity being to the posterior, concavity to the anterior; the vertical curve is much more pronounced in the male than in the female though it is more curved in the female horizontally. The reason for this is obvious as the female, having a function to perform that the male has not—parturition—provision has been made in the female to insure facility of delivery by making the pelvis larger at its inlet and outlet and more rounded, all to afford an easier passage for the head of the fetus at birth; while with the male, not having to perform that important function, the outlet of the pelvis is more closed to afford better support for the viscera within.

The posterior surface of the sacrum is rough, made so by tubercular ridges which are said to be the rudimentary spinous and transverse processes when the vertebrae were separate and movable in the primeval man. The sacrum is perforated by four and sometimes five pairs of foramina for

the exit of the sacral nerves; these foramina are double as they permit the nerves and vessels to pass internally and externally, and are connected with the sacral canal an opening which runs vertically through the whole bone. The sacrum has four articulations, one at its promontory with the fifth lumbar vertebra, one at its apex with the base of the Coccyx, and two at the sides (auricular surfaces) to articulate with the two innominate bones.

Though tightly wedged in between the two innominate bones, the sacrum is **SUBJECT TO SUBLUXATIONS**, the most common being posterior base with probable anterior apex, as the tilting of the sacrum is comparatively the most frequent form of subluxation for the reason that its lower half with the coccyx may be said to be floating, that is, devoid of bony support as is the upper portion, having nothing but soft tissue attached to it, and owing to its position in the body is not subject to blows or shocks from the anterior with sufficient force to cause a subluxation; but on the contrary, 95 per cent. of the accidents come from behind and below on account of its greater exposure from these directions. The nature of its articulations with the innominate bones permits more of that form of subluxation than, perhaps any other, owing to the mass of bone at the posterior superior spine of the ilium overlapping the posterior angle of the sacrum thus preventing it, to a great extent, from moving to the posterior. Thus when a force from the posterior is directed to the free end of the sacrum this part will move anteriorly, causing the upper end of the sacrum to move posteriorly, and, of course, carry with it the lower lumbar vertebrae and thereby cause a primary kyphosis in that region, which will be followed by adaptative lordoses above, as the sacrum will be prone to swivel at the point of greatest resistance, the lowest portion of its articulation with the ilii immediately below the posterior superior spine of the ilium, which, in that case will act as axis for the rotation of the sacrum.

THE SACRUM BEING THE FOUNDATION of the spine, any of the displacements of its base, in any direction, will necessarily be followed by a curvature of the lumbar region with its necessary **ADAPTATIVE** curvature above

intensifying already existing subluxations of otherwise minor importance with proportionate attendant results. This is one of the reasons why so many Chiropractors fail to obtain results on their patients after having adjusted for considerable time on individual and specific(?) subluxations, and could continue till Doom's Day without results, as they do not remove the cause of the subluxation, the curvature, due to a tilted sacrum. When the foundation of any structure is awry the superstructure will follow the foundation with necessary consequences.

A great deal of investigation, and consequent discussion, has taken place in orthopedic circles between eminent orthopedists of different countries, relative to the sacro-iliac articulation. Drs. Goldthwait, Osgood and Albee claiming that there is undoubtedly such a thing as the "Slipped sacro-iliac articulation," and that it is the cause of spinal curvatures. This is denied and ridiculed by Dr. John Ridlon, professor of Orthopedy at Rush Med. Col. and editor of "Practical Medicine Series," notwithstanding that Dr. Albee went to the trouble of dissecting 50 subjects to prove, and succeeded in proving, that such is the case; still, the orthodox school, as represented by Dr. Ridlon, pooh-poohs and ridicules the thought, because it would make it appear that Osteopaths and Chiropractors had "slipped one in" on the Old School, which would be an impossibility(?) **AS THEY KNOW IT ALL.**

The sacrum is made up, originally of five segments separated by plates of intersegmental temporary cartilage which ossifies at about the age of puberty, and sometimes not till later in life. This fact becomes of **GREAT IMPORTANCE TO THE CHIROPRACTOR**, for two reasons. First, because it proves the possibility and probability of subluxations of individual segments of the sacrum previous to puberty, and if not corrected in time, that is before ossification takes place, a life-long trouble may ensue, and, second, this fact affords the Chiropractor the opportunity to adjust these individual segments up to perhaps the age of eighteen, as this ossification is not complete until maturity, and in some instances never takes place. It has been our privilege to have experience with such a case in our practice with a living subject where the last two segments of the sacrum were still mov-

able in a fully developed adult, the apex of the sacrum being much to the anterior.

THE COCCYX is the most inferior bone of the spinal column. It is so called because it resembles a cuckoo's beak, as its mate, the sacrum, has been called the "sacred bone" because it was supposed, at one time, to contain the soul. The coccyx is made up of from three to five rudimentary vertebrae, is supposed to be the remnant of a human caudal appendage, which, during the process of evolution has atrophied and disappeared through non-use. Whether this is so or not, the fact remains that we still have it with us, and its presence and location makes it one of the most important bones to the Chiropractor for several reasons which will be dealt with presently.

The coccyx is triangular in shape, stands base upward, apex downward, is rough externally, smoother internally, most of them are endowed with a coccygeal canal, analogous to the sacral canal, to permit the passage of the last thread of the spinal cord, the filum finale, so is sometimes endowed with a nerve fibre emerging at its very apex; it has but one articulation, its base with the apex of the sacrum; it has a pair of horns (cornua) at each side of its base which assist in forming foramina for the last pair of sacral nerves.

The British Museum is said to have a skeleton of a supposed anti-deluvian human found in the geological formations of Essex, having a coccyx with seven or eight segments in its formation; whether this be so or not, the fact remains that some are longer in some individuals than in others and that quite a number of persons are devoid of them altogether, are either so congenitally, or have lost them by accident without any apparent inconvenience except at the time of the accident which deprived them of it. It is a fact that if the coccyx is completely disarticulated from the sacrum, the tendency is that the bone will dissolve and be absorbed readily without any noticeable inconvenience to the patient; the process of elimination is the same as the elimination of pieces of bone from comminuted fractures which are separated from the rest of the bone after reset; this is done because Nature abhors useless materials as much as a vacuum.

In the practice of Chiropractic there are numerous instances on record of the coccyx having been absorbed within a few weeks upon being broken from its ankylose with the sacrum after adjustment, without any evil effect following.

SHOULD CHIROPRACTIC NEVER HAVE GIVEN ANYTHING ELSE to the world but the knowledge it has obtained of the relation of a subluxated coccyx to disease, it would be sufficient to entitle it to rank among the foremost sciences of the age, as previous to its advent this important bone received but scant attention at the hand of the physicians; it was only when the bone itself was diseased that it was considered worthy of attention.

Like the sacrum, and for the same reason, the coccyx is most often subluxated anteriorly and laterally on account of its being exposed practically and only to blows from the posterior and inferior which have the tendency of sending it only towards the anterior with a chance laterality. And it is also very common that when a subluxation occurs, it becomes ankylosed in a very short time, and, of course, becomes rigid and fixed to the sacrum and has the effect of narrowing the pelvic outlet from its antero-posterior measurement. At once one can see what effect that has to the parous female in depriving her of from $\frac{1}{4}$ to $\frac{1}{2}$ an inch of valuable space to pass the head of the foetus at parturition, often necessitating symphysiotomy (cutting open the symphysis pubes), craniotomy or cranioclasia (cutting or breaking of the cranium of the child), or a Cesarian operation, getting the child through an incision from above the pubes, any of which may lead to the death of the mother, or the child, and perhaps both of them.

Not only to the bearing female does that bone cause trouble when it is subluxated anteriorly and ankylosed, but to anyone by causing intestinal obstruction, because the rectum, the lowest portion of the large intestines, passes along the curve made by the sacrum and coccyx and in very close proximity to both bones, and it sometimes happens that the coccyx attached to an anterior apex of the sacrum and itself subluxated and ankylosed anteriorly, will interfere so much as to press on and ding the posterior wall of the rectum,

even perforate and penetrate inside that canal, thereby causing intestinal obstruction which cannot possibly be relieved by the effect of any drug, as the cause is purely mechanical and can only be reached by surgery, accompanied by danger to the patient, or by the **BETTER, SANER AND SAFER** method of the Chiropractor.

Another form of inco-ordination, that the coccyx when subluxated anteriorly, may bring about is, that by tipping at its apex, sometimes at a right angle from the sacrum, beside impinging at its base the last pair of sacral nerves, will cause a stretching, or tension on the filum finale of the cord, affecting the organ, perhaps for the whole length and may lead to disturbances anywhere in the body. So one sees that the coccyx, like the atlas, must always receive the utmost attention of the Chiropractor.

The Spinal Column, from top to bottom, is firmly held together by a series of "ligaments," tough, pliant, and for the most part, non-elastic bands, of a glistening, white fibrous tissue, which bind the vertebrae with one another and hold them in normal situ forming a flexuous, flexible column, and although tightly held together, still permit of all the motion necessary to the body such as flexion, extension and rotation and it is only when this motion is exceeded that a subluxation (kink) in the spine is produced, because, then, the over-stretched ligaments cannot bring the vertebrae back into normal situ, causing, in their turn, the distortion of the inter-vertebral foramina or windows through which the nerves emerge and create a pressure or strain upon them causing disease.

These **LIGAMENTS** are nine in number and are named as follows: the Anterior common, Posterior common, Supra-spinous, Inter-spinous, Inter-transverse, Capsular, Inter-vertebral cartilage, Ligamentum subflava and the Ligamentum Nuchae; the last two are made of yellow tissue and are elastic and therefore capable of being stretched and returning to their original length by a firm recoil movement; these are placed where the most motion is required.

THE ANTERIOR COMMON ligament is a broad, strong band of fibres extending along the anterior surface of the

bodies of the vertebrae from the axis to the sacrum, and practically surrounds the front and sides of the bodies of the vertebrae, is thicker at the front than at the sides; it is more solidly attached to the intervertebral substance, and the margins of the bodies than it is to the centres of the bodies; the fibres are separated at the intervertebral foramina to permit the passage of nerves and vessels to and fro.

THE POSTERIOR COMMON ligament is similar to the other in nature and in function; it lines and connects the bodies of the vertebrae at their posterior portion, forming the anterior lining of the neural canal and extends also the whole length of the spine. The two common ligaments practically form a sheath around the bodies of the vertebrae.

THE SUPRA-SPINOUS, as the name implies, runs over the tips of all the spinous processes of the vertebrae; it is a tough fibrous band which extends from the sacrum to the seventh cervical vertebra where it becomes continuous with the ligamentum nuchae to the external occipital protuberance.

THE INTER-SPINOUS ligaments are thin membranous bands which connect the spinous processes of the vertebrae entirely filling the space between all adjacent vertebrae from the root to the summit of the process; they are stronger in the lumbar region than in the dorsal and have only a slight development in the cervical region.

THE INTER-TRANSVERSE ligaments are bundles of fibres connecting the transverse processes of the vertebrae; they are very irregular and consist of but a few fibres in the cervical region, while they appear as rounded cords in the dorsal region and much thicker while they are thin and membranous in the lumbar region.

THE CAPSULAR ligaments are thin, loose caps which are attached to the margins of the articulating processes of the vertebrae, enveloping the greater circumference of the articulations and are completed by the ligamentum sub-flava beneath. These ligaments are lined on the inside by a synovial membrane to lubricate the joint such as are other freely movable joints.

THE LIGAMENTA SUB-FLAVA are made of yellow elastic tissue and are placed between the laminae of the vertebrae from the axis to the sacrum; they are very light in the cervical region and increase in thickness and strength as they extend downward through the dorsal region and become very strong at the lumbar vertebrae, terminating at the sacrum. Their highly elastic property serves to preserve the upright position and they assist the muscles in raising the spine from the flexed posture.

THE LIGAMENTUM NUCHAE is a continuation of the Supra-spinous ligament, but its nature is changed in that it is slightly elastic, in man, and becomes very much so in some of the lower animals to assist them in raising the head from the ground to relieve the muscles of the neck. It extends from the external occipital protuberance on the tips of the spinous processes of the six lower cervical vertebrae also sending a small slip to the posterior tubercle of the atlas.

THE INTER-VERTEBRAL CARTILAGES, Inter-vertebral fibro-cartilage, intervertebral substance and intervertebral disks are the different names given to the cartilages which are interposed between the bodies of the vertebrae. Each disk is lenticular in shape being thicker in the centre to fill up the slight concavity of the inferior and superior surfaces of the bodies of the vertebrae; they are slightly larger in circumference than the bodies themselves, this is to afford attachment to the common ligaments and the heads of the ribs. They vary in shape, size and thickness in the different regions of the spine; they are much thicker in the lumbar region than in any other; their shape accurately corresponds to the vertebrae to which they belong; they are thicker in front in the lumbar and cervical regions and slightly thicker posteriorly in the thoracic region. They form about one-quarter of the length of the spine, averaging about $\frac{1}{4}$ of an inch in thickness; they are twenty-three in number and are interposed between every vertebra from the base of the sacrum to the inferior surface of the axis; since the atlas has no body, none are found between it and the axis.

THE FUNCTIONS OF THE INTER-VERTEBRAL DISKS are about four in number. The disks are well adapted in every respect to perform these: First, being thick, and to

some extent elastic, and inserted between the centra of the vertebrae, they serve as buffers or cushions to absorb the shocks that the spine may receive during life, effectively preventing the bones from coming in contact and being injured during accidents.

Secondly, they assist by their different thicknesses at their margins in creating the normal curves of the spine. In the lumbar region, as well as in the cervical region, they are much thicker at their anterior margins forming a kind of a wedge between the vertebrae forcing them apart anteriorly, thus making these portions of the spine to curve with their convexities toward the anterior. In the dorsal region this is not needed so much and therefore the disks are more even in thickness, as the bodies of the vertebrae in that portion are so shaped that they themselves form the necessary curve; it is natural to them as this curve belongs to the primary curve formed in the foetus when the whole of the spinal column is curved with its convexity to the posterior and only changes when the child assumes the erect position, at about nine months.

Third, by their large superior and inferior surfaces being attached very firmly to the rough, cancellous tissue of the superior and inferior surfaces of the bodies of the vertebrae, they connect and hold firmly together all the vertebrae of the spine except the atlas which is held in situ by other ligaments.

Fourth, by their pliancy they permit and afford all the motions that are normal to the spine and, by their strong attachments and toughness **CHECK** that motion within normal limits, and it is only **WHEN THAT MOTION IS EXCEEDED** that a subluxation is created, causing disease and the removal of the subluxation is the work of the Chiropractor. Of course other structures, such as the other ligaments and the muscles assist in making the spinal column a very solid structure, so much so that the early anatomists on first observing it declared that it could not be put out of condition without actual fracture, a statement which has been proven untrue by Chiropractic.

CHIROPRACTIC ORTHOPEDY.

ORTHOPEDY is derived from two Greek words, Ortho (straight, erect, and sometimes used as right and correct) and Pais (child); the two taken together would mean "Straight-child"; but the two words have been arranged together in composition to make it represent the study, or science, of straightening the deformities of the body; Orthopedia. Why this science was so named was probably due to the fact that at the inception of the science practically none but children's deformities were attempted (to straighten), presumably based on the knowledge that it is practically impossible to straighten a crooked old tree, while it is much easier to straighten a young shoot, so that the most of the attention was devoted to children rather than adults, hence the name; but later on, as the science developed, the skill and the experience acquired was also applied to adults.

SURGICAL ORTHOPEDY consists in endeavors to correct by **ARTIFICIAL** means, the deformities of the body generally, whether prenatal, congenital or acquired. The method is based upon a thorough knowledge of anatomy and physiology and consists in cutting, breaking, removing, splicing and reducing tissues, especially bone, and to attempt to correct curvatures by means of **PULLEYS, RACKS, SCREWS, PLASTER JACKETS, CLAMP AND VISE, IN FACT, BY ANY DEVICE WHICH TENDS TO ACCOMPLISH THE PURPOSE BY BRUTE FORCE** which, in many cases, has proven disastrous to the patients, some of whom have been left worse than before. This form of treatment is neither rational or logical as it attempts to deal only with the correction of the effect regardless of the cause, which is often far removed from the seat of the trouble, though in some cases it has been followed by partial success when the conditions were local, or when the causes were removed by **INADVERTENCE**.

The Chiropractic Orthopedy differs from this in the essentials; it does not concern itself with the effects, but searches and ultimately locates the causes and, if possible, removes them; the same as an intelligent horticulturist would do if he found withering fruit on a limb, he would look for

the obstruction which was preventing the sap from reaching the fruit, instead of manipulating or putting braces around it to restore its shape; because if a given process in natural law leads to a certain result, the reversal of this process will proportionately reverse the result.

Deformities of the body **HAVE OR HAVE HAD A CAUSE**. If the cause has existed and is no longer present and the effect still remains owing to having existed so long that nature has abandoned the part affected, then this becomes a legitimate field for orthopedic surgery to do the best that knowledge and skill can accomplish. But in most cases the cause is present and must first be removed before any attempt at correction is undertaken (if, indeed, there is any necessity for such). But the cause is most often still existing and may be found to be some derangement of the neuro-skeletal frame, especially the result of some curvature of the spinal column which, in its turn, is due to some disturbance of the posterior walls of the pelvis as the result of accidents, prenatal, congenital or postnatal, all of which must be sought, found, analyzed and corrected by the Chiropractor, because it is no use applying salve to the vocal cords of a howling cat as long as the booted foot remains on the tail.

A fractured bone necessarily requires the skill and attention of the surgeon, because the force (cause) which produced the fracture cannot be recalled. The breaking of the bone and consequent contraction of the muscles are the result of an unintelligent force beyond the normal resistance of the bone, so therefore requires an intelligent equivalent force to overcome the contraction of the muscles and replace the bone in apposition, which requires knowledge of the parts involved and practised skill of the operator, the labor of the efficient surgeon. But his knowledge and efficiency, up to the present time, stops at that; the healing (knitting or mending), process is left to nature, which will generally take place in about twenty-one days under favorable conditions. But it sometimes happens that this important process of knitting does not take place, which is a complication that has baffled the surgeon in many instances; when such happens more surgery is resorted to, such as, the cutting of the flesh, reparting the bone and scraping the fractured ends or trying

to force them to reunite by sewing them with silver threads which is seldom effective if the all-important mending force is not present in the patient.

This non-uniting process of fractures must necesasrily have a cause since it happens in but a small percentage of cases. It has been sought for by surgeons without result because it remains attributed to one or more of many things, such as: typhoid, delirium tremens, scurvy, pregnancy, lactation and shock, among the constitutional causes. And among the local causes are given: too much disturbance of the parts after reset, too light or too loose a dressing, or the interposition of a foreign body between the broken ends of the bone.

We do not intend, at this juncture to enter into a criticism of this supposed etiology, but we cannot help remarking that if the causes attributed (except local interference) are no more reliable than the many methods indicated as treatment, then they are failures as none of them have been proven to be specific; they are to be **ALL TRIED**, and the **SIMPLEST** one first.

Were the Chiropractor to tell the surgeons that the cause of non-uniting fractures is simply due to a lack of nerve energy to the affected parts, he would probably be ridiculed and called a quack, but the fact remains nevertheless, as experience has often demonstrated in cases where medical skill had entirely failed and Chiropractic succeeded in a short time.

But how does it come about that there exists a lack of nerve force at this particular time and place? What brings about this unfortunate state of things?

The lack of nerve force exists because of a subluxated vertebra causing an interference with a nerve, leading to the part, at its very root cutting off the intelligent power from being exercised on the repair materials that are present; these materials become useless without an intelligent user, just as much as unlimited brick and mortar would be without a builder. This subluxation may have been produced at the time of the accident which produced the fracture, or may

have been pre-existing, which in either case will account for the phenomenon of non-healing of bone or any other tissue. If existing previous to the fracture, it may have been produced in a multitude of ways through the many shocks and jars of life and have existed for a number of years, but being minor in degree did not interfere with the ordinary functions of the parts to any appreciable extent; that is, there was sufficient nerve energy for the up-keep of ordinary, normal functions, but when the abnormal demand was made by the extra conditions created by the fracture, the supply of nerve force was found to be inadequate to meet the demand, hence no repair could take place.

This subluxation may also have taken place coincidentally with and by the shock that produced the fracture as the contraction of muscles, which took place in their effort to resist the outward force, would necessarily be radiated to the spine where the nerves controlling these muscles emerge and the maximum resistance would be so great as to produce that subluxation or exaggerate a pre-existing one through the concussion of forces that took place and the effect would remain the same, an impingement on the nerves cutting off the repairs. So, therefore, it becomes **IMPERATIVE** for the Chiropractor to adjust following accidents of any kind to insure the repair process, though the surgical part **DOES NOT CONCERN HIM.**

Comparatively few people are absolutely free from curvatures of some kind as they are due to varied causes; most of them are curvatures of adaptation such as positional and occupational, while others are due to disturbances of the frame or the loss of an arm or a leg and some to direct violence to the spinal column creating a primary curvature which will be followed more or less rapidly by secondary or adaptative curvatures.

A CURVATURE is defined as "a departure from the normal alignment of the spinal column." The spine is normally curved: this does not imply curvatures, though curvatures imply curves generally; they are abnormal while curves are normal; though it may seem paradoxical to say, that a curve is not a curvature, it is not really so when one considers that

the spine is not normally straight at any portion of its antero posterior axis, it is only so on its lateral aspect so that a curve to right or left is always a curvature (scoliosis), while, on the other hand should a spine become as straight as an arrow on its antero-posterior axis, it would be declared to have curvatures, kyphoses and lordoses, posterior and anterior curvatures, as the normal curves of the spine would then have departed from the normal, the anterior ones to the posterior and the posterior to the anterior.

POSITIONAL CURVATURES are those that are created by faulty positions in standing or sitting, especially in school children who are not provided with proper seats and desks and therefore assume positions which, if persisted in, will lead to the spine adapting itself to these faulty positions producing scolioses which will diminish the size of the intervertebral foramina on the concave side of the curvature and thereby exaggerating any chance subluxations which may have existed before, producing disease. In a case of that kind it becomes obvious that no permanent good can be accomplished until the faulty positions which have brought about the curvature have been eliminated to permit the spine to reassume the normal status by readaptation.

OCCUPATIONAL CURVATURES are due to conditions similar to the positional, only they are brought about by exertions while at strenuous labor with one side of the body more than the other, or by heavy strains during certain forms of labor, such, for instance, as are sustained by the horseshoer who is much exposed to unexpected, heavy pressures from the horse while in the recumbent position, causing disturbances in the lumbar and lower dorsal regions, accounting for the fact that most horseshoers suffer from kidney troubles or sciatica before they are forty years of age.

IT IS WORTHY OF NOTE that persons who are doing heavy constant labor with one arm more than the other, have a scoliosis on that side in the dorsal region and should disease appear as a result of that curvature the occupation must be reversed before a permanent adjustment can take place.

Curvatures of the spine are often the result of displacements of the sacrum or the innominate bones, as the sacrum in its articulation with the two innominate, is the base or foundation of the spine and any deviation from its articulations canting it either to the right, left, forward or backward, will necessarily carry with it the lower portion of the lumbar vertebrae to which it is attached, creating a primary curvature in that region which will be immediately followed by adaptative curvatures in the opposite direction above. It may be asked, why these secondary curvatures? It is because of the natural tendency of the living body to maintain its equilibrium by balancing the weight of the body equally on each side of the central axis, the spine. This would not take place in a corpse, but is a necessity in the living subject which can be easily demonstrated. If a corpse should be taken and seated on the plane of a flat table surface, and upheld in the erect position by placing a finger on each side of the shoulders the line of the spine would be permitted to stoop forward, then the whole spine would assume a kyphotic curvature, like a crescent with its convexity to the posterior and the reverse would take place if the head and shoulders were permitted to fall backward provided the spine was perfectly limp. There would be no adaptative or secondary curvatures because there is no life; the body is nothing more than a soft inert mass. The same result would obtain if instead of a corpse we had an unconscious person; because then no equilibrium is needed. Now, if we introduce an object such as a book under the right tuberosity of the ischium of the corpse, the rest of the body would lean to the left and the spine would show but one curve with its convexity to the right of the body, but on the other hand if we get a live subject to sit on the table and introduce a similar book under the right tuberosity of the ischium the changes which will take place in the alignment of the spine will be altogether different. The pelvis being canted to the left, carrying the lower lumbar vertebrae with it, will at once create a primary lumbar scoliosis with convexity to the **LEFT** instead of to the right as in the corpse, because then the sense of equilibrium in the live subject would immediately assert itself and by sheer force of muscular action, the upper part of the body will be brought back over the median line

leaving a curve to the left in the lumbar region and creating a secondary adaptative one in the dorsal region and this process will be slightly repeated upward until the head becomes established in the median line above, which is the ultimate of equilibrium, leaving the spine with a series of curvatures to right and left increasing in degree as they proceed downward. The reason for this is that the live subject instinctively seeks to retain the erect position with as little muscular effort as possible by throwing the weight of the body equally on all sides of the spine, which is, unconsciously perhaps, putting the law of compensation in effect.

Now everyone of these curvatures have a cause and that cause must be sought, found and adjusted before they can be eliminated; it would be absolutely useless for a surgeon to put such a torso in a plaster paris cast as this would not remove the cause and the adaptative curvatures would immediately reappear on the removal of the cast; and if the patient received any temporary benefit from this treatment it would soon disappear after the cast had been removed because the cause would still remain, ergo the effect.

If a Chiropractor, who is not up to his business, and does not thoroughly analyse, should attempt to straighten such a spine by the obsolete methods which were taught in the infancy of the science, by adjusting on the convex portions of the curvatures towards the median line, he would meet exactly the same failure as the surgeon with the plaster cast; he could keep on adjusting in that way until Doom's Day without any result, as in that case he is only dabbling with effects and either does not know or disregards the cause, which if attended to would make the effects disappear much quicker by Nature's own law of compensation.

Curvatures are also due to disease such as Pott's disease, unilateral muscular atrophy, phthisis, rickets, &c., while these diseases are also, sometimes due to curvatures, and, in that event, the case becomes much more complicated as the disease may be the cause of the curvature as well, and whichever may be the cause, it in its turn has a primary cause which must be sought and remedied or results will be nil.

To show how muscular atrophy will produce curvatures, it is necessary to first obtain a good knowledge of the musculature of the spine, and presuming that the reader already has that, it will nevertheless be profitable to review the attachments and functions of the five layers of muscles of the back.

THE MUSCLES OF THE BACK, for ease of study, are divided in five layers which comprise forty-two pairs and one muscles, which have a more or less direct action on the structures to which they are attached, especially the spine. Though all these muscles have some influence on the spine none have as direct an action as the fourth layer, the erector spinae with its many divisions, as this muscle's main purpose is as the name implies, to keep the spine erect and this is accomplished by the major divisions of this muscle, the Longissimus dorsi, Transversalis colli and Trachleo mastoid, being so placed as to form a very adequate system of guy-ropes, bracing and acting on the spine to keep it erect from behind.

NO ONE MUSCLE of the back is long enough of itself to reach from the pelvis to the head, but the three muscles just mentioned are so placed and spliced with one another to form a band or bond of union with the head, spine and pelvis, as follows:

THE LONGISSIMUS DORSI, the largest and most powerful division of the erector spinae, a thick, wide band running each side of the spine in the lumbar and dorsal regions, originates from its aponeurosis which arises from the sacrum and the crest of the ilium, and is inserted into the transverse processes, articular processes of all the lumbar and dorsal vertebrae with some attachment in the lower ribs. The action of this muscle is to keep the spine erect from the pelvis to the **FIRST** dorsal vertebra.

THE TRANSVERSALIS COLLI is practically a continuation of the first, only it overlaps the former by about six inches, beginning its origin at the transverse processes of the six upper dorsal vertebrae, thereby forming a strong connection with the other, and is inserted into the transverse processes of the four lower cervical vertebrae; action, to keep

the neck erect, similar function to the other only for a different portion of the spine.

THE TRACHLEO-MASTOID takes its origin as the previous one, from the transverse and articulating processes of the upper six dorsal vertebrae and the articular processes of the lower four cervical vertebrae and are inserted into the posterior margin of the mastoid process of the temporal bone; action, to steady the head, this against the action of the sterno-cleido-mastoid muscle in front.

From this it is easily seen that these muscles being double, one at each side of the spine, commencing from the base of the spinal column and the brim of the pelvis, firmly attached to each and every transverse process of the vertebrae at each side to the cervical region where they fork out to firmly insert themselves in the temporal bone behind the ear, and that by their normal contraction they hold the spine and head laterally and backward, so the spine, in this respect may be compared to a flag-pole and these two sets of muscles as guy ropes holding it up backward and at the sides simultaneously.

But one may ask, are there any such provisions made for the front of the spine; if there is a necessity for such a support in the back, is there not a similar one in the front? There certainly is, only not quite so complete, because the weight of the body being all in front of the spine, acts as a force to counteract these muscles in the back by the law of inertia, that is, creates a resistance by weight or gravity.

Besides this, it is firmly held by a powerful and adequate set of muscles keeping the spine from going too far backward, though their actions are not given as such by our anatomists who attribute to them other functions, but it does not take a very great stretch of the imagination to clearly see that they act as mentioned above. The fact that this extra function is not given by anatomists need not disturb the mental equilibrium of any investigator, as it is admitted by anatomists that it is unfortunately too often the case that anatomists and physiologists **ATTRIBUTE FUNCTIONS** to certain organs of the body which are purely imaginary and for the purpose **OF FITTING** the **EVER CHANGING** medical theories without any warranty for so doing.

The spine is held in front, first by the body's intrinsic weight and by a similar system of structures as the muscles of the back and act the same. These muscles are the **TWO RECTI ABDOMINALIS** which arise from the crest of the pubes and the ligaments covering the symphysis and from there extend upward at each side of the linea alba to be inserted into the cartilage of the 5th, 6th and 7th ribs close to the sternum and thereby hold the **STERNUM**, a plate of bone about 6 inches long, then this muscle is firmly connected to the pubes establishing guy-ropes from the pubes to the episternal notch. From there to the mastoid process of the temporal bone, in front, the guy-ropes are completed by the two **STERNO-CLEIDO-MASTOID** muscles which originate from the superior angle of the sternum, the proximal end of the clavicle into the anterior margin of the mastoid process; action, to depress the head, these to counteract the action of the Trachleo-mastoid behind. From this, one can see that the head and the pelvis are firmly connected by four muscular bands, two behind and two in front holding the spine in an erect position between them and still permitting all the freedom of motion necessary to the parts involved through the contractility of the muscles when acting in perfect harmony with one and another; but when co-ordination does not exist, as in the case of paralysis or atrophy of any of these muscular guy-ropes, the flexible column called the spine, between them, is bound to assume curvatures, the same as any flexible flag-pole would assume if one or two of its guy-ropes would get slack and the others tight, it would bow and the belly of the pole would be towards the slack ropes, and no amount of hammering could straighten that curvature until the slack ropes were retightened.

The same conditions exactly would take place in a living human spine if some of its muscular guy-ropes would atrophy and become relaxed, with the addition of another curvature or two through adaptation, or as a matter of compensation, as the natural tendency of man is to remain erect by equalizing the weight on all sides. So now, in a case of that kind, one can readily see how futile it would be to potter with the curvature as such, until the cause had been determined and rectified, such cause being the prolapsed muscles. But these prolapsed muscles must also have a

cause for their prolapsus, and that must also be found and rectified before they can regain their tonicity and re-establish an equal tension to the others so that the spine will again become straight.

But now, what is the cause of these prolapsed muscles? Neither the surgeon nor the physician would probably look for a cause, sufficient for them to know that such is the case and proceed at once to remedy the effect each by his respective method. The first by probably removing a piece of the muscle thereby shortening it to equalize the tension as is done for strabismus, while the physician would try to re-establish the tone by means of drugs and applications of tonics(?) such as iodine to "strengthen(?) the parts," and of course never succeed as the cause would still remain. But to the Chiropractor the finding of this cause would be his main object.

ON FIRST OBSERVING THE CURVATURE the Chiropractor would proceed to establish its cause by a thorough analysis of the whole of the condition of the patient taking into consideration the size, weight and symmetry of the patient, if necessary by actual measurements, and make a mental picture of what should be the **NORMAL** curves of a spine belonging to such an individual, a process which cannot be taught by books but must be learned by strict actual experience on thousands of subjects; because books, without actual demonstration, can be no more than a finger-board pointing the way; this can only be done properly where a large number of subjects can be obtained as in the large clinic of a Chiropractic college, under teachers who understand their subjects, have the necessary knowledge and can impart it to others.

AFTER HAVING ESTABLISHED that there are departures from the normal alignment of the spine (curvatures), that is, there exists too great or too little a degree of the normal curves to accommodate the size, weight and shape of such a body, the Chiropractor has to determine what causes them; whether it is abnormal corpulency, occupation, shortness of a leg or the loss of an arm or atrophy of the muscles of the one side of the body or the other; if the latter, then

this also has a cause which becomes at once established and is due to one or more subluxations of vertebrae impinging nerves leading to the muscles involved which can be readily located by the trained, educated fingers of the Chiropractor, who at once proceeds to adjust that or those back into normal position, because it is the primary cause, the result of which is the atrophy which produces the curvature. The adjustment of the subluxations—wherever they may be—will relieve the pressure from the nerves permitting the mental impulse to once more reach the atrophied muscles, restoring to them their tonicity, enabling them to resume their function of gyropes to the spine, making the curvature to disappear as a necessary adaptation to the new conditions.

THE SUCCESS IN THE CORRECTION of all curvatures depends entirely upon the knowledge, skill, degree of critical analysis and ability **TO DO** of the Chiropractor. What is true in this applies to all other conditions.

The normal curves of the spine are subject to certain changes during the life of the individual which may sometimes lead to serious results by producing disease, the etiology of which was heretofore unknown. Some of these changes are sometimes due to an over-development of the abdomen—pot belly, or corpulency. This increase in the size of the abdomen must necessarily be followed by an increase of the anterior lumbar curve, because in proportion to the increased weight in front the superior portion of the trunk will be thrown backward to establish the equilibrium, thus necessitating an exaggeration of the lumbar curve which may or may not be serious in itself. But if we admit a previous subluxation in that region, though of minor importance and degree it may become intensified by the extra degree of curvature now present which will cause greater pressure on the nerves, and symptoms of disease may at once manifest themselves.

This fact can be easily observed during the gestation of the pregnant female, as the fetus develops and the weight increases in front, one can easily note the effect that it has on the lumbar curve. Now if we add to that one or more subluxations, previously existing in the lumbar region, impinging nerves leading to the pelvic organs, one can at once

appreciate the effect that the extra curve will have on these subluxations by exaggerating them and reducing still more the flow of nerve force to these organs giving rise to symptoms of disease the etiology of which is now attributed to the pregnant state, which, to some extent is true, but only remotely as the **REAL**, the **PRIMARY** cause, is the subluxation in the lumbar region, intensified by the extra degree of curvature brought about by the state of pregnancy. This accounts for the fact that some individual females suffer from some recurring form of disease during pregnancy of which they apparently get well after or are much relieved of during pregnancy by lying down, which, of course, reduces the temporary curvature, and as a consequence, the degree of pressure on the nerves; but, of course, the real remedy is the adjustment of the original subluxations which are the cause of the whole trouble, as not all pregnant females suffer from disease during that period, and those who do not, are they who are comparatively free from subluxations. Hence, young women contemplating matrimony should see that their spines are made normal, as this is of greater importance than the purchasing of the wedding trousseau.

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Chiropractic leads the healing
sciences in results obtained.

DEFINITION OF WORDS USED IN THIS BOOK.

- METABOLISM**—The process by which living organisms are sustained through conversion of foods and oxygen into protoplasm.
- INNATE INTELLIGENCE**—The intelligent Vital Force, with which all living organisms are endowed. The controlling principle which governs the functions of organs into a harmonious unit. The animating principle of matter making living things possible.
- VISCERA**—Internal organs.
- FLEXUOUS FLEXIBLE**—Capable of bowing and bending.
- APEX**—Point.
- PELVIS**—The basin formed by the two innominate bones, the sacrum and coccyx.
- CONVEX**—Rounded outward.
- CONVAVE**—Opposite to convex; hollowed; having a cavity.
- EMACIATION**—Wasting of bodily tissues; getting thin.
- CORPULENCY**—Over fat; undue fleshiness.
- OBESITY**—Over fat; undue fleshiness.
- PREGNANCY**—The state of being with child, gravid, "in family way."
- ANTERIOR-LY**—Front—frontward.
- POSTERIOR-LY**—Back—backward.
- LATERALLY**—Side-ward.
- CONDYLES**—Irregular, ovoid heads on bones.
- NORMAL**—According to a set rule.
- ABNORMAL**—Not according to rule.
- PUBERTY**—The age at which one can reproduce his kind; from about 13 years.
- MATURITY**—The age of ripeness, about 25 years.
- PREMATURELY**—Before the proper time.
- DIURNAL**—Daily.
- RECUMBENT**—Prone; the lying down position.
- RESILIENCY**—The attribute of bounding back; springing.
- TRAUMATISM**—Wounds, accidents, contusions.
- EXOSTOSIS**—Bony growths or tumors.
- ANKYLOSIS**—The fusing together of two or more bones.
- CARIES**—Decay of bones (Potts' Disease).
- KYPHOSIS**—Posterior curvature.

- LORDOSIS—Anterior curvature.
SCOLIOSIS—Lateral curvature.
ROTATORY—Twisted curvature.
CHARACTERISTIC—That particular feature in an object which gives it its character, such as, color, shape, size, etc.
ODONTOID—Tooth-like.
FACET—An indentation, a slightly hollowed out surface.
BIFID—Forked, cleft.
CENTRUM—Body, main portion.
NEURAL—Pertaining to nerves.
PEDICLES—Little feet.
LAMINAE—Plates or layers.
FORAMEN—FORAMINA—Opening, openings (windows).
NEURAPOPHYSIS—Any process of bone forming the neural canal; generally applied to the spinous process.
PARAPOPHYSIS—Transverse process of vertebrae.
ARTICULAR—Parts which come together, as in a joint.
ZYGOPHYSSES—Articular processes.
INTERVERTBRAL—Between vertebrae.
TUBERCLE—A small eminence on a bone or other tissue.
RUDIMENTARY—Imperfectly developed; showing only a commencement.
MANDIBLE—Lower jaw.
MASTOID—Nipple-like.
ULTIMATELY—In the end.
MAGNUM—Largest.
SUSPENSORUM—Suspending or supporting.
CRUCIFORM—Cross-shape.
SACRUM—Sacred bone; supposed at one time to have been the habitat of the soul.
TRIANGULAR—Three cornered.
PRIMEVAL—First, original.
PROMONTORY—A projecting eminence, the broad, uppermost part of sacrum.
AURICULAR—Ear-shaped.
ADAPTATION—The process of conforming to surroundings and circumstances.
COMPENSATION—The process of equalization; making a loss good.
INTERSEGMENTAL—In between segments.

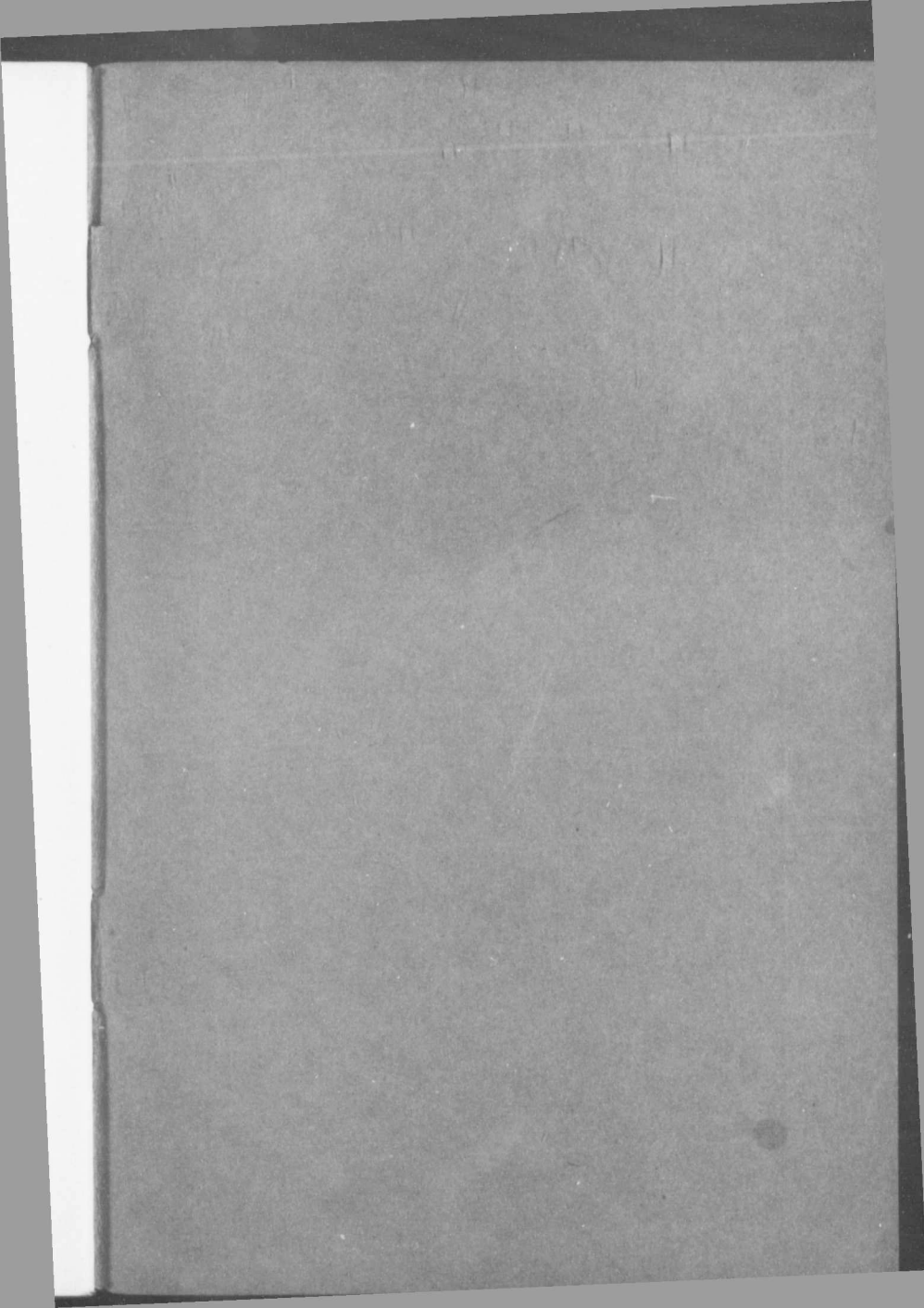
- OSSIFICATION—Becoming bone.
- CAUDAL—Like a tail.
- ATROPHIED—Wasted away.
- CONGENITALLY—From birth or with birth.
- COMMUNUTED—In small pieces.
- VACUUM—Empty; absolutely void.
- PAROUS—Bearing, pregnant, with child.
- FETUS—Unborn fruit of the womb.
- SYMPHYSIOTOMY—Cutting open the symphysis pubes.
- CRANIOTOMY—Cutting into the child's skull.
- CRANIOCLASIS—Breaking or crushing the skull.
- INCO-ORDINATION—Out of harmony.
- SITU—Position; in place.
- PROTUBERANCE—A protruding lump.
- MEMBRANE—A thin layer of tissue covering or separating parts.
- SYNOVIAL—Secreting a fluid resembling the white of egg.
- LENTICULAR—Resembling a lens. Circular in shape, but thicker in the middle than at the sides.
- CANCELLOUS—Spongy, porous.
- PLIANCY—Bending easily.
- INCEPTION—Beginning.
- ADULT—Full-grown.
- PRENATAL—Before birth.
- INADVERTENCE—By accident; without knowing.
- MANIPULATION—Doing by the hands.
- NEURO-SKELETAL—Nerve and skeleton. Meaning the parts of bones where nerves pass in close proximity.
- POST-NATAL—After birth.
- ANALYSIS—The act of determining the component parts of anything. This may be of a substance, machine, system, plot, law case, disease, etc. In Chiropractic it means the obtaining all the data (conditions, quantities, principles, of facts and factors), which go to produce disease, by reasoning in a logical sequence from effect to cause, in order to ascertain and locate such cause by means of palpation, nerve-tracing and observation of all physical signs.
- APPOSITION—The act of placing in perfect relation or position, one object with others, to obtain harmony.

- PHENOMENON**—Any sign or appearance; remarkable, unusual, extraordinary, difficult to explain, mysterious.
- INADEQUATE**—Not sufficient, either in quantity or quality. Unable through lack.
- COINCIDENTLY**—At the same time; together with.
- MAXIMUM**—The highest point, at its best. Pertaining to.
- PARADOXICAL**—A proposition contrary to accepted or received opinion.
- EXAGGERATING**—Making greater or increasing.
- TORSO**—The decapitated trunk or body; the body without head, arms or legs.
- PTHYSIS**—Consumption, tuberculosis.
- RICKETS**—Disease of the bones in which they get soft, bend and distort.
- PROLAPSUS**—Falling, becoming lax, without tension.
- STRABISMUS**—A squint, deviation of one eye from its proper direction.



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