PRACTICAL OBSERVATIONS

ON THE

PREVENTION, CAUSES AND TREATMENT

OF

CURVATURES OF THE SPINE,

WITH ENGRAVINGS AND WOODCUTS
ILLUSTRATIVE OF THE CASES.

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THIRD EDITION,
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PREFACE.

THE great increase of spinal distortion, particularly of late years, and its prevalence at present, together with the various opinions which have existed as to the causes of the disease and the most efficacious plans of treatment, will, it is presumed, furnish a sufficient apology for the publication of another treatise on the subject.

The facts and observations which are embodied in the following work are the result of careful investigation in the course of a practice of nearly forty years, during which the author has paid especial attention to diseases of the spine, and has had a very large number of cases of that class of affections under his care. Having had, during that time, abundant reason to conclude that his opinions and consequent modes of treatment, are founded upon correct principles; and being able, moreover, to record what may

be considered remarkable instances of success, even in some cases of the most severe character, he has thought it right to publish the results of his practice. His wish has been to give a full though condensed account of the nature of the disease and its remedies; and in doing this, he has endeavoured to touch on every essential particular; and above all, throughout the work, to give his observations a practical character. A few of the more interesting and important cases he has met with, are detailed in the course of the volume, and he trusts they are such as will repay perusal, both owing to the extent of the deformity they exhibit, the complications with which several of them were attended, and the successful issue of the treatment. They shew, also, that the improvement in the general health of the patients, during treatment, has been as striking as the amelioration in their deformity, and that in proportion as the latter has been improved, and the deformity of the chest diminished, the breathing capacity of the lungs has very materially increased.

Having been desirous of ascertaining several points connected with spinal diseases, which could only be

determined by the examination of a large number of pathological specimens, the author's best thanks are due and are cordially offered to the curators of the anatomical museums, both metropolitan and provincial, for the facilities they have afforded him in examining the collections under their charge; also to those gentlemen who have kindly thrown open to him their private collections for his inspection: the facts deduced from the examination of so large a number of preparations of the various forms of spinal disease (above two hundred and fifty having been carefully noted) will, he trusts, present some points of no inconsiderable interest.

The Engravings which accompany the cases, illustrative of the respective kinds of curvature, have been executed with the greatest care; and in order to ensure accuracy, the engravers had not only the drawings but the casts themselves for inspection. The great improvement they display in the contour of the figure, will, perhaps, be the best criterion of the favorable effects of the treatment under which such results have been obtained.

PREFACE TO THE THIRD EDITION.

SINCE the first edition of this work was printed, the author has had still further and very extensive opportunities of observing and investigating the subject of spinal disease in its various forms, and in the present edition has embodied the results of the additional experience he has thus gained; indeed the whole volume has been carefully revised, several portions of it have been entirely rewritten, and some subjects and cases of considerable interest added to the work.

The additional practice which the author has had, has likewise tended to confirm the views he then took relative to the several forms of the disease, and still further to convince him of the value of the plans of treatment which he advocated. If his views, as regards the practicability of considerably improving the form of the spine, and consequently of the chest, in many cases of angular projection, be more favorable than those usually adopted, he would merely

state that his opinions are simply deductions from the facts presented by cases which have come under his observation; and he feels certain that where the plan which he adopts is carried out with care and perseverance, it will be found that permanent improvement in the shape of the spine and relief to the symptoms may be effected in many cases of deformity which are now, too often, looked upon as capable of receiving but little, if any, amelioration from professional skill.

9, Langham Place, London.
March, 1849.

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INTRODUCTION.

NOTWITHSTANDING the advances made of late years in that department of the science of medicine, which comprises the promotion and preservation of health, or the prevention of disease, its great value is even yet insufficiently appreciated, and the laws and the practical inferences which have been deduced from its study, have been too much neglected. Yet scarcely any branch of knowledge can exceed this in importance, for, investigating as it does, the causes of disease with a view to their removal, it tends not only to the prolongation of life, but to render it more healthy and vigorous. The honor of drawing attention to this subject is justly due to the medical profession; its advancement, thus far, has been owing to the efforts of medical men; its future progress will mainly depend upon them, and on them must the public still in future rely for a knowledge of those circumstances which will render its principles of daily practical value to indivi-

duals or families. An extensive field of usefulness, therefore, is open, when it is considered how much yet remains to be done to enable the great bulk of mankind duly to appreciate their own interest in a sanitary point of view. It is only by the accumulation of experience and observation that a valuable store of varied knowledge is produced, by which mankind obtain a gradual increase of such measures as are best calculated to promote their comfort and happiness.

While the progress of civilisation has doubtless tended materially to prolong the average duration of life, and has banished entirely, or at least much diminished, the frequency of many diseases, it cannot be denied that others have sprung up in its track, which are unknown among more uncivilized nations. Man is to a great degree the creature of circumstances; his ideas, his wishes, and his pursuits are powerfully influenced by the position in which he happens to be placed; and he is apt to be almost entirely swayed and governed by the customs and opinions that are prevalent around him. Thus, many noxious practices are eagerly followed by the multitude, for no other reason than that they are generally adopted, without a thought being devoted to the consideration of their expediency or usefulness, and thus, fashions diametrically opposed to the laws of nature, and which a little reflection would shew to be most injurious to the system, are received and adopted without the slightest hesitation or consideration of their effects. Indivi-

duals do not in general act thus from deliberate choice; they do not, willingly and intentionally, prefer pain to freedom from it, or disease to health, but inadvertency and the great want of more general information on the privileges and consequent duties of existence, are the primary sources of these frequent errors, and there can be no doubt that there are numbers who would have sufficient resolution to emancipate themselves from such injurious customs, were they fully aware of their nature and tendency.

Though these remarks are obviously applicable to numerous other diseases, they are here intended to have a particular reference to those of the spine. Few diseases, if any, have more evidently followed civilisation, and those fashions in the dress of females which have accompanied it, than affections of the spine, especially that form of them termed lateral curvature. Fashion is ever characterized by its fondness for extremes; all extremes in the articles of dress are, in some respects, prejudicial to health, and are frequently productive of serious and extensive mischief. In tracing the causes of lateral curvature, which is an evil much more prevalent, in a more or less severe form, particularly among the female sex, than is commonly imagined, I have endeavoured to place in their true light the grave and injurious effects of the prevailing mode of fashionable attire, when carried to its extremes, and to shew that the mode and materials of dress, and especially the use of

improper stays, with the lacing of them to excess, are amongst the most fertile causes of this form of the disease ; particularly when these injurious circumstances are united in a young person whose constitution is either naturally delicate, or in whom it has been rendered so by injudicious management during childhood, or by attacks of disease which have materially impaired the health, and thus caused the body to be less capable of resisting any injurious influences to which it might afterwards be exposed. And a knowledge of the chief causes of the disease is especially important, for, frequent as it now is, few complaints could be more easily warded off by simple precautions —but precautions which, however simple, are, without the care, the watchfulness and the knowledge of the medical adviser, too often passed over, owing to the want of information in the parents. I have, therefore, entered into some detail on this subject, and on those means which should be adopted during infancy and childhood, in order to fortify the system and to ward off, as much as possible, a liability to such disease.

As more good is effected by stating facts, and endeavouring to draw sound and unbiassed inferences from them, than in disputing the opinions and honest convictions of others, even where they may be deemed somewhat erroneous, I have, throughout the work, avoided unnecessary discussions of the kind; but have endeavoured to express my own opinions, and the conclusions to which the results of my practice have led

me, clearly and distinctly, feeling convinced that the plans of treatment recommended are founded on rational views of the pathology of the disease, and, as will be seen by the cases narrated, are highly beneficial in practice.

CHAPTER I.

The subject of spinal deformity, which has of late years engaged so much more than formerly the attention of the profession, is justly considered as one of great importance; indeed, there are few diseases more deserving of being studied, as well on account of its general prevalence and its distressing effects, as of the interest connected with its pathology, the very various secondary disorders to which it gives rise, and the difficulties attendant upon, yet the generally very satisfactory issue of, its treatment.

The origin, symptoms and effects of the different species of this disease, although agreeing in certain points, yet differ in many and most important particulars; in order, therefore, to place the subject in a lucid point of view, and to explain the peculiarities of its different forms, it will be necessary to treat of them separately. This will be done in a subsequent part of the volume; but there are some general circumstances relative to the causes (especially the predisposing ones) of the disease, and to the means best adapted

for its prevention, which can be more advantageously introduced here than subsequently, and the consideration of which, in this place, will prevent repetition afterwards.

In most instances of the disease, predisposing causes are found to have existed, without which the exciting ones would have been insufficient to have produced the deformity; in other cases, especially some of angular projection of the spine, no exciting cause can be traced, the general cachectic condition of the system being such as to induce disease of the vertebræ, and hence deformity of the spine; while in others again, though less frequently, distortion of the spine may come on without any predisposing cause, the exciting one being either applied with great force (as a severe blow, a fall, &c.), or else acting frequently, or for a considerable length of time together (as constrained positions, a shortening of one of the lower extremities, &c.)

It is not always, however, easy to determine, in any given case, what has been the particular cause producing the deformity, or when several causes have appeared to contribute to the effect, how much is due to each; yet these are circumstances which ought to be well considered, and in reference to which a clear opinion should, if possible, be arrived at, as the view we take of the subject will necessarily influence both our prognosis and the plan of treatment to be adopted. Amongst the causes of spinal deformity which it will be well to refer to, before entering upon the consi-

deration of the particular forms of the disease, are, the injudicious management of infants and children, and those of somewhat riper age; that is, of the whole period of growth; the injurious effects of certain forms of dress, and a want of sufficient and proper exercise, more especially in reference to young females; inattention to the state of the general health and vigor of the body, and a few others, which will be alluded to under one or other of these heads.

MANAGEMENT OF INFANTS AND CHILDREN.

FOOD.

When it is considered that the subsequent welfare of an individual, as respects good or bad health, depends in many instances mainly upon the attention which is paid to early childhood, it will readily be conceded that the subject of the management of infants is one of no ordinary importance. It involves considerations which have a continued and influential effect on the whole period of human life; even the duration of that life is more dependent upon the proper management of infancy and childhood than is usually supposed.

The mortality which prevails during infancy, though not so excessive as formerly, is still, notwithstanding the advance of medical knowledge and the general

introduction of vaccination, enormously great, and vastly disproportionate to that of other periods of life.* Diseases contracted at that period, and not effectually cured, exert a marked influence on the whole of life, enfeebling its condition, and rendering it more liable to be destroyed. In constructing an edifice, it is especially necessary to be careful that the foundation be made strong and efficient, in order that the superstructure may be reared with safety; and the health of childhood being the base upon which often rests the subsequent bodily condition of the individual, it is not less necessary that this groundwork of life (if it may be so termed) should, by all available means, be rendered as strong and efficient as possible. And as spinal disease or that predisposition to it which only requires the addition of an exciting cause to develope it, often originates during infancy and childhood, it will be well to add such suggestions and precautions as may be useful both indirectly and directly in warding off the disease in question.

Amongst the various causes which, during infancy and childhood, too often lay the foundation for future bad health, and which are within the control of those having the charge of children, none probably are so

* From tables inserted in the Sixth Annual Report of the Registrar General (Fol. Ed. pp. 40 and 41), it appears that in the year 1842, the deaths of 176,594 males, and of 172,925 females were registered. Of these numbers, 74,647 males and 64,388 females died under 5 years of age. We have, therefore, a total of 139,035 deaths occurring under 5 years of age, out of an aggregate of 349,519 deaths; making a per centage of 39.77 deaths (or nearly 4 out of 10) taking place within the first five years of life.

extensive in their influence, or so formidable in their operation, as overfeeding on the one hand, and impropriety of dress on the other. In these, as in other instances, the best intentions may, if ill-directed, defeat the very end they wish to attain; and often do parents, by overloading the child's stomach with food, induce that very "weakness" and debility of the system which it was their object to prevent. The same kind and quantity of food, indeed, are not equally proper in all cases. General principles or directions may certainly be laid down as guides, and may often be followed out with great advantage; it must, however, be remembered that they are *but* general principles, and it would be doing injustice to them, as such, to suppose that they can be made applicable to every individual case; for various circumstances and conditions so modify requirements as to make general rules not always, and under all circumstances, safe guides: whenever, therefore, from want of experience or from imperfect knowledge, parents or those who have the charge of children have any doubt as to the mode of rearing them, the kinds of food children ought to take, and the precautions they require, they ought at once to refer on such matters to their medical advisers for that information which medical men alone are capable of affording, as suited to the circumstances and peculiarities of each individual case.

Viewed in the light of an important and universal duty, the proper discharge of the necessary office

of nursing is imperative on all mothers who are able to perform it; the future comfort and welfare of the individual who is the subject of it depending much on its efficient performance. Unquestionably, the mother's milk is the best, and should be the only nourishment of an infant, until it acquires teeth for the mastication of more solid food. Instances rarely occur of the failure of an adequate supply of this nutriment, when the mother possesses tolerable health, and is careful in her mode of living. It is desirable to apply the child sometimes to one and sometimes to the other breast, as it is possible, and, indeed, has been distinctly affirmed, that a want of attention to this precaution has induced in weakly children, predisposed to spinal distortion, a lateral flexure of the spine and an unequal developement of the two sides of the body. In cases where the milk of the mother or that of a healthy nurse cannot be obtained, recourse should be had to that description of aliment which bears the nearest resemblance to it.* In the first instance, barley water with a proportion of fresh cream, sweetened and administered through a suckling glass, or cow's milk

* The composition of different kinds of milk, according to Henry and Chevallier, are as follows:—

	Woman.	Ass.	Cow.
Casein	1·52	1·82	4·48
Butter	3·55	0·11	3·13
Sugar of Milk . .	6·50	6·08	4·77
Salts and mucus .	0·45	0·34	0·60
Water	87·98	91·65	87·02
	100·00	100·00	100·00

somewhat diluted and sweetened,* are some of the best substitutes, but should be varied as may be deemed necessary, according to the directions of the medical adviser. In a more advanced period, preparations of bread may be made use of, but it ought to be unfermented — biscuit powder is used by many, and is, perhaps, the most proper. If bread be used, it should first be allowed to soften for awhile in water, and should then be beaten into a very fine pulp with milk, and be slightly sweetened.

Everything that is calculated to irritate and disorder the stomach and bowels should be carefully avoided; for if articles of this description be attended with injurious effects on the health, when the body is grown and robust, the evil is necessarily much increased when the organs are delicate and their functions so easily susceptible of derangement and injury, as is the case during infancy. The inconsiderate use of opiates and stimulating liquors is highly reprehensible; such pernicious expedients may, indeed, produce a temporary respite for the wearied nurse, but the repose they procure for the infant is unnatural, as is sufficiently indicated by the convulsive starts, the raised and quivering eyelid, and the irregular motions of the muscles.

The practice of over-feeding, to which allusion has

* Burns recommends an equal quantity of new made whey and cow's milk, a sixth part of fresh cream, and a little sugar.—Principles of Midwifery, 6th edition, page 601.

already been made, is one not less common than it is deserving of censure, both as respects children and adults; nature is generally the best guide in this as in other cases, and will seldom fail to indicate when sufficient nourishment has been received. It is indeed not unusual for these indications to be slighted and a fictitious appetite induced, the indulgence of which, particularly in infancy and declining years, invites or facilitates the approach of disease, and generally contributes to shorten life. There can be no doubt that man, during the greater portion of his life, consumes much more, both of solid and of liquid food, than is necessary for the due maintenance of health and strength; and though this may, in some instances, be done under a mistaken notion that he is thereby promoting the energy of his physical powers, he is, in truth, doing violence to his constitution, and often curtailing the natural period of existence.

In reference to the infant, it should be remembered, that not having yet attained the faculty of speech, it has not the same means of denoting when it has had a sufficient supply, as is the case in childhood and youth; and even the latter, unless subjected to some salutary restraint, will often, by having food given rather to please the palate than for nourishment, be induced so to overload the stomach as to occasion derangement of the health. Children have not the same experience to guide them in this respect as adults, neither have they occasion for it, when under the care and control

of those who ought to prevent their acting wrong or receiving injury. But by improper indulgence they are often induced to eat to excess—their stomachs are distended and weakened, and the seeds of disease are thus thoughtlessly sown by those who imagine that the means they are using are calculated to promote the growth and vigor of their charge. Attention to natural causes and effects would ward off a number of those diseases, by which the lives of many are embittered, and their usefulness in the world impaired or destroyed.

It may further be remarked, that a very common practice, immediately on a child's beginning to be uneasy or to cry, is, to attempt to appease it by giving food. A healthy child, when properly nursed, will seldom cry. It will generally be found, that when children become troublesome in this way, they are at the time in a state of suffering, either from some derangement in their digestive organs, or some disagreeable restraint or annoyance in their clothing; occasionally, indeed, their fretfulness may arise from the want of sustenance, but their uneasiness is attributed to this cause much oftener than it ought to be; the true cause being removed, the distressing cry, which is the only means they possess of making known their wants or sufferings, will immediately cease; and, therefore, should a child continue to fret after sufficient food has been given, we must suspect some other cause in operation to produce this effect. Children are also

apt to acquire a habit of eating their food too quickly or eagerly, particularly fruit and other articles to which they are partial; mastication is thereby imperfectly performed, digestion impaired, and the health consequently injured.

If we direct our attention to the operations of nature, we shall find them always executed with unerring precision, and her indications are, on reflection, generally clear and easy to be understood. In all our proceedings, we ought to follow her dictates, and to keep within the bounds of reason;—whilst we do this, we shall rarely err; but if, as is too frequently the case, we act in opposition to her admonitions and disregard her warnings, we shall, assuredly, incur disappointment and regret.

EXERCISE.

The difference between the physical condition of infancy or childhood and that of adult age, accounts for the common origin of many irregularities of form which are not congenital, but occur at an early period of life when the bones being more soft and flexible, will easily give way, especially if the body be in a diseased state. In proportion, therefore, to the delicacy of the child, will be the care required in its rearing. Much has often been effected in this way by constant and persevering attention, and many weakly

and unpromising children have, by judicious management, been raised to maturity and have passed through life in the enjoyment of a considerable share of health and vigor.

A finely formed body is favorable to the enjoyment of sound health. Every one is struck with the commanding figure, the graceful appearance of a person so formed, but few enquire into the reason why others are not so gifted. Although much depends upon original conformation and constitution, much also, as has just been stated, depends on care and attention. If parents would have their offspring free from personal defects, if they would have their limbs moulded into the form indicative of grace, activity and strength, they must commence their attention to them from the time of birth; and although they may not always succeed in securing for them the highest state of physical perfection, yet they will frequently be able to effect such an improvement in their constitution as will form the basis of future health. Children should not be too early set upon their feet, but should rather be placed upon the floor, sofa or other convenient place, that, while they are thus enabled to use their limbs with freedom and to obtain the amount of motion and exercise which is necessary, the legs have not to bear the weight of the body. The practice of attempting to teach, or rather, it should be termed, of forcing children to walk when too young, is highly injurious, owing to the effects which it is likely to

produce on the form of the limbs. The various contrivances for the purpose which have been adopted (whether passing under the name of leading-strings or go-carts, &c.) ought never to be employed. If the child be sufficiently strong and in health, no fear need be entertained of its not walking at the proper age; but if it be weak, and have any predisposition to rickets, it would be very injudicious to allow it to remain long on its feet, or to walk, for which, indeed, under the circumstances, nature seldom gives the child much inclination, and which, if persisted in, could only have one tendency—to produce distortion of the lower extremities.

Especial care should be taken that the spinal column, so tender in young children, may not take a wrong direction; the manner in which a child, and especially a delicate one, is suffered to rest on the nurse's arm should be carefully attended to, and until it have acquired sufficient strength to keep itself erect, its back ought to receive proper support. By being suffered to sink into a crouching posture, with the head and shoulders inclining forwards, and the back projecting, a bad habit is soon contracted, which often leads to distortion of the spine. Neither is it in the arms alone that this attention is required; the effect is not less injurious if, when the child is old enough to do so, it be made to sit too long in a chair, as, when fatigued, it will naturally adopt that position which at the moment affords most ease. Here it is proper to notice two

very common and reprehensible modes of raising young children; the one is by the upper part of the arms, and in such a manner that the sides of the chest are pressed by the hands, or rather the knuckles of the nurse; the other, by the nurse putting her hands under the arm-pits of the child, so that the palms are placed against the sides of the chest, and the thumbs press the anterior extremities of the ribs, and thus force them forwards. By both these methods, the cavity of the chest becomes, in time, diminished; and the sternum or breast-bone pushed out—this being one of the modes by which that deformity in delicate children, commonly called "pigeon-breasted," is produced, or by which, at least, any tendency to it is very apt to be increased. The preferable mode of raising an infant or child is to place one hand under the thighs, while the other supports the chest, the child's body inclining at the same time a little forward.

In all cases where a child is delicate, and where the symptoms are such as indicate weakness of the back, and consequent incapacity to support the weight of the head and shoulders, it ought, without delay, to be minutely examined. It cannot be too forcibly or too frequently impressed upon the minds of parents and others who are entrusted with the care of children, that disease of the spine, if attended to on its first appearance, usually admits of a comparatively easy and speedy cure, but that the longer it is neglected, the greater will be the suffering, the more dubious the re-

sult, or the more tedious the recovery. The caution here given is the more necessary, as cases are of frequent occurrence, where, on examination, incipient curvatures of the spine have been detected, which were not before even suspected to exist; besides, the progress of disease in children is far more rapid than in adults, for it sometimes progresses in the former, as much in the course of two or three months, as it would do in persons of mature age, in the lapse of double that number of years.

Important, then, as the proper management of infancy manifestly is,—important, as laying the foundation of the health and well-being of the individual—nay, as involving the probability of the duration of his future life—it is much to be doubted whether this period and that of childhood receive, sometimes even amongst the wealthier classes, and very generally amongst the poor, that degree of attention which they so urgently require. If the horticulturist find unremitting attention to the tender plant necessary, and if the advantage of superior care and assiduity be perceived in rearing an improved breed of the lower animals, the advantage of such watchfulness in the case of children cannot be too highly estimated.

When there is no cause directly contra-indicating its use—while, in fact, no active disease exists—exercise proportioned to the strength of the child is not only advantageous, but it is absolutely necessary. Whatever part or organ of the body be considered, one

general law prevails, that proper exercise promotes, while inactivity lessens, the vigor with which its functions are performed; the stomach, after long fasting, cannot, with impunity, be loaded with solid food; the muscles of those confined to sedentary pursuits are lax, soon fatigued with trifling exertion, and are incapable of sustaining long-continued action; while in children and young persons who do not take sufficient fresh air and exercise, the proper nutrition of the bones which constitute the framework of the body does not take place; they are less firm and resisting than they ought to be, and are found to be deficient in earthy matter.

Thus, then, is a condition of the body induced, both as regards its muscular and osseous system, which only requires—and, indeed, in some cases, scarcely does require,—an exciting cause for the production of spinal disease. Exercise, on the other hand, gives tone and strength to the muscles, resistance to the ligaments, and density to the bones, thus tending to prevent deformity. It is no less important for the infant than for the child or adult, so that in the selection of suitable persons to discharge the humble but important duties of the nursery, regard should be had to such as possess adequate strength to enable them to give the child sufficient exercise, by keeping its body in almost constant action during its waking hours, and this should be done as much as possible in the open air. A decided preference should be given to girls of good temper,

animated countenance, and a lively disposition; and particularly to those who are fond of children, and in whom, there is reason to believe, full confidence can be placed.

For children, ample time ought to be allowed for recreation between the hours devoted to study, and the pursuit of such games as require activity and the exercise of the various muscles of the body should be encouraged. This injunction is especially needed at the present day, when there is, perhaps, too great a tendency to cultivate the intellect at the expense of the bodily vigor and health. The sports, in which boys naturally join, usually prevent those deformities which are so commonly met with in girls, in whom playful and active exercises should be encouraged. If this plan and a more proper system of dress were adopted, we should find fewer young ladies pale in complexion, inactive in character, and deformed in person. At the same time, it is an opinion attended with some degree of injustice, to attribute the prevailing cause of these evils entirely to the customs and discipline adopted at public schools; for the causes are often in operation before the period at which young ladies are accustomed to leave home for the boarding school. A remark of this nature seems the more necessary, as, although proper exercise and recreation may not always have been sufficiently attended to by them, the conductors of ladies' seminaries have often a degree of censure cast upon them which they by no means deserve.

TRAINING, CLOTHING, ETC.

There is, however, as has been already stated, a great difference in the original organization of children. The offspring of mothers who have themselves been the subjects of disease, with all its attendant weakness, frequently participate, in some measure, in the parent's infirmity, and are less strong and robust than those born under more favorable circumstances. They usually require greater care in their general training; are more subject to the diseases incident to childhood; more troublesome in nursing; and longer before they attempt to walk. On the other hand, the case is widely different with children of hardy peasants, whose employments expose them to full exercise in the open air, and thereby render their bodies strong, active, and muscular; whose wives are exempt, by their poverty, from the thraldom and mischief of stiff stays and tight lacing, and the baneful diseases that follow in their train. The children of such persons will, evidently, possess a more perfect organization, their bodies be altogether stronger, and, consequently, they will require less nursing; they early show symptoms of activity, they are more lively also whilst in the arms, they are able in a very short time to support themselves, and soon enjoy all the activity natural to infancy.

Even where a predisposition to disease exists, the amount of illness which may be warded off by care

and judicious management is often very great; while, on the other hand, numerous diseases are engendered in children by *mis*management and neglect, and among these may be enumerated indigestion, disordered state of bowels, scrofula, rickets, &c.; and, as a consequence of the last of these especially, deformities of the spine and limbs. Such complaints are often imputed to the impure air of crowded cities and towns, which has, without doubt, a great influence in the production of disease; but other concomitant circumstances, such as want of cleanliness, improper food, and other similar causes, are equally injurious agents in the production of those derangements of the digestive organs which are so constantly met with, and which are evinced by defective, and in some cases voracious appetite, large and tense abdomen, a foul tongue pale and furred, retarded dentition, &c.

Nothing is of greater consequence in the management of a child, than that it should be kept thoroughly clean: the use of tepid water is best for this purpose, or of water in which a handful of salt has been dissolved to make it more stimulating; in this the child should be immersed, or well sponged with it, morning and evening, and rubbed thoroughly dry. Its clothing also requires attention, because upon its proper management and adaptation depends, in some measure, the due development of its bodily frame. The body of an infant being feeble, and its skin fine and delicate—the materials and form of its clothing should be in ac-

cordance with these circumstances. The development of its bones being as yet imperfect, its dress should be loose and pliant, that they may not sustain any injury from pressure or restraint. Its joints, muscles, and tendons are yet weak, and require exercise to strengthen them; its attire, consequently, should be simple, so that it may readily admit of the greatest ease and freedom of motion.

During the transition from infancy to childhood, the preceding observations should be closely attended to, though they will admit of some little modification. As the child grows, nature prompts it to a variety of vigorous action, in order that its muscles may become developed, and may make the necessary increase in size and strength. Its clothing, then, should be so adapted as not to thwart the designs of nature; the feet should not be cramped by shoes of too scanty dimensions—the circulation of the blood should not be impeded, nor the symmetry of the body destroyed by any undue pressure or restriction. Socks or half hose should be used in preference to stockings, the tying of which may not be without some injurious effects—the different articles of apparel should fit easily to the body, and be frequently renewed, to suit the increase of growth. And although clothing should be sufficiently abundant to protect the body from the injurious effects of cold, yet a superfluity should be avoided,—as it has a tendency to produce delicacy of constitution.

Advancing a little further in life, we come next to

the boy and girl, taking these terms in their more restricted sense, as signifying the period that elapses between childhood and youth. As much of their future comfort and usefulness depends upon the vigor and energy of their physical powers, they should early be taught what is favorable, and what inimical, to the attainment and preservation of sound health. The injurious effects of intemperance and sloth should be clearly pointed out to them, as well as the generally happy results of activity and temperance. Cases of suffering from ill health, when the consequence of previous, though, perhaps, distant, neglect and misconduct, should be exhibited to them, as affording reasons why they should endeavour, in early youth, to lay a foundation for future years of enjoyment and happiness.

From the preceding remarks it will readily be seen that the first stages of life possess, as regards the development of spinal disease, great interest and importance, because, in proportion to the care bestowed upon the health of infancy and childhood, will be the well-being and comfort of maturer years.

Were these points generally attended to, and such care as has here been pointed out, usually bestowed upon infancy and childhood, there seems no reason why succeeding generations might not shew a progressive improvement, until the average duration of life were much increased beyond its present amount, which is, certainly, less than under favorable circumstances it ought to be.

II. ON THE INJURIOUS EFFECTS OF DRESS.

THE malformation now so generally prevalent amongst females, is, in a great measure, the result of civilization, or rather of fashion; in communities in a state of nature, it is scarcely known. The savage, unfettered by the ties of custom, acquires that activity, vigor, and muscular energy, which are the usual attendants on bodily exertion, the enjoyment of pure air, and exemption from undue restraint. In proportion as nations or communities emerge from a state of barbarism, the dress adopted usually becomes more complicated, and very often it is so made as to interfere with the proper actions and movements of the body. This is more especially the case with the attire of females; for while the object aimed at is supposed elegance and an improvement in the figure, the end too frequently attained is impaired health and deformity of body. If elegance simply were attained by the use of any particular apparel, there would assuredly be nothing reprehensible in the use of it; it is in its abuse that the error consists; as for instance, when it has a tendency to be prejudicial to the health of the wearer. There is no satisfactory reason why the attire of females should not be conformable to the preservation of the health, and the consistent display of taste and ornament.

Fashion exercises over its subjects so much influ-

ence, that it frequently leads them to extremes, which, were they really to reflect, they could not but condemn. Its power is such that it induces people to admire, as beauties, the most palpable inconsistencies. Instead of the various articles of clothing being adapted to the form or shape of the figure, which, when not injured by injudicious treatment, exhibits a striking model of symmetry and beauty, the body is thoughtlessly made to form itself to those whims and caprices of dress proclaimed by fashion as elegant and becoming. In a word, nature is made to conform to art, rather than art to nature. Notwithstanding, however, the prevalence of this all-engrossing influence, persons of refined feeling and good taste will always regard that attire as really most graceful, attractive and becoming, which is adapted to the figure, the motions, and the convenience of the wearer.

The originators of fashion are rarely influenced in their inventions by the consideration of health, fitness, or propriety; they are more frequently governed by an overweening anxiety after what is novel and eccentric. No wonder then that the extremes of fashion are so often inimical to the enjoyment of comfort and convenience.

By such disregard to the plain indications of nature, we have an instance, and a most pernicious one, of the inconsistency of mankind. It is strange that individuals should so thoughtlessly follow a fickle and

arbitrary power that leads them to displays of the most fanciful kind. It were well if the evil here complained of were deserving censure merely on account of its inconsistency; it assumes, however, a much more serious aspect when it becomes, as is too often the case, the fruitful source of debility, suffering, and deformity: for, be it remembered, that to it chiefly are to be ascribed, as an influential cause, those morbid affections and irregularities of the spinal column, which, when accompanied with debility of constitution, produce nervous irritability, dyspepsia, and a numerous train of other maladies that embitter life.

STAYS.

THE use of the zone or girdle, the type of our modern stays, is of very ancient origin, and it is probable that in all ages of civilized life, the sex has used some article of this kind, from an idea that it was convenient for the support and graceful carriage of the figure. On their first employment, stays were of simple construction, and were destitute of their present objectionable properties, being resorted to, almost exclusively, for the purpose of suspending from them other articles of dress in an easy, flowing, and graceful manner; and whilst restricted to such uses, and not drawn unnecessarily tight, they would not be likely to be attended with any mischievous effect. It is probable that most of the errors and foibles of mankind have had their rise from some motive or notion,

not culpable in itself, but deserving censure only from being carried to excess; thus, the unnatural construction and excessive compression of stays have led to an accumulation of bodily suffering and deformity, of the extent and consequences of which few were, or are, fully aware.

There are, at the present time, thousands who, ignorant of the misery they are inconsiderately providing for themselves, are daily sacrificing health, and sometimes shortening life, to the mere vanity of desiring to possess what a vitiated taste calls "a fine figure." Our promenades, public streets, and places of fashionable resort, afford abundant evidence of the sad effects resulting from the universal prevalence of this baneful practice. The notion that a woman is more beautiful with a remarkably small waist, ought long ago to have been exploded;—as well might we admire as beauties, the flattened heads of some tribes of Indians, or the extremely contracted feet of the Chinese. Genuine taste admires no such eccentricities.

That women should experience a feeling of support from the use of stays, after wearing them from early childhood, admits neither of doubt nor surprise; the only wonder is, that they should feel comfortable without them even during the hours of repose.

A moment's consideration of the anatomy of the chest, will shew still more forcibly the injurious tendency of stays, as ordinarily made, for while

the termination of the 8th, 9th, and 10th ribs in long and yielding cartilages, and the want of any attachment of the anterior extremities of the two remaining ribs, increase the mobility of the chest, it will at once be seen how readily, from this very circumstance, the circumference of the waist may be acted upon by the strings used in the dresses of children, or the stays worn by females during childhood or whilst the body is in a state of growth; indeed, it is obvious there is but little power in those parts to resist even a very moderate degree of pressure.

But modern stays are constructed with so little attention to the form of the body, that the pressure is the greatest upon the lower part of the chest, which is naturally the widest, whilst there is the most room at the upper part, where its diameter is the smallest, thus, in effect, inverting the order of nature, and causing a complete transformation of this important portion of the body, by making its base uppermost, and its apex downwards; they are also made so long as to cause injurious pressure on the pelvis, their tendency being, therefore, to turn the crest of the ilium inwards.

There are other and striking evils resulting from tight lacing; by the pressure of stays, the functions of the vital organs are injured, and the whole frame is impaired; the bones of the chest being contracted, and their natural extent of motion diminished, prevent

the free action of the lungs; the blood, not being sufficiently decarbonized by respiration, becomes deteriorated in quality, and consequently the various systems of the body suffer either in structure or function: the countenance ceases to have its healthy aspect; energy and muscular action become impaired; while palpitation of the heart, a quick pulse, and difficult respiration, with a much diminished breathing capacity of the chest, are usual symptoms where tight lacing has been long persevered in. The pressure and confinement of stays also produce great derangement of the functions of digestion, preventing the stomach from dilating in the proper direction on the reception of food, and also impeding the natural peristaltic motion of the intestines; and, in some extreme cases, entirely changing the form and position of the viscera, which are then pressed towards the lower part of the abdomen, and so compressed that their proper offices in the animal economy cannot be adequately performed. Hernia also, it is known, is sometimes induced by this improper pressure.

As the stays scarcely allow of lateral motion, or indeed of any other with freedom, the muscles of the chest and back often become atrophied, and as the spine gradually gives way, the other bones of the chest become displaced from their natural position, the sternum being in some cases forced inwards, in others the reverse; the ribs, instead of having the graceful curve which they naturally possess, become—

in that part below the axillæ—completely flattened, and their extremities, instead of being directed forward, project almost directly downwards, so that the conical form of the chest is, as has already been stated, inverted.

The author has made repeated measurements with a view to compare the circumference of the waist and the width of the stays of a great number of females, and has uniformly found a great difference between the two,—the former often measuring from two to four inches more than the latter; and as the stays are unyielding, and yet made to meet closely behind, it is clear that the difference must be made up by the compression of the body. This is an experiment which all parents have it in their power to make, and the correctness of which they can ascertain.* But it should at the same time be remembered that the difference between the circumference of the waist and the length of the stays does not represent the entire amount to which the chest is compressed, because, by the habitual use of tight corsets, the ribs become more or less *permanently* contracted, and to this contraction no corresponding expansion occurs when the stays are unlaced. The difference indicated, is really the amount of the mobility remaining when the pressure is removed—not from the ribs in their natural condition, but from a chest already more or less injured,

* The measurement should be made in the morning before dressing.

and permanently contracted by the use of the stays. Need we then be surprised that the female figure is so frequently and so lamentably deformed? Rather ought it to excite our astonishment that so many of those subject to the causes should escape the consequences.

Some unfortunate sufferers, by placing soft pads in the lateral curve, frequently pass years without its being known that such distortion exists; but their lives, under these circumstances, must be spent in a state little short of misery, on account of the languor, debility, and mental as well as bodily suffering, which they endure.

Not much less objectionable than stays, are the various instruments sometimes made use of to amend or protect the shape, which, so far from improving, they tend ultimately to injure; indeed, most of such inventions, instead of being useful in the prevention of the deformity, often accelerate its progress. If parents were acquainted with the natural state of the human body, so as to enable them to comprehend the objectionable nature of these and similar devices, they would reject the use of such restraints, and clothe their children in dresses, which would not press injuriously on any part of the frame.

If tight lacing be attended with such mischievous effects to young females and women in general, the evil is still more increased when practised during the period of pregnancy. Whoever attentively considers

how much the future health of the offspring depends upon the mental and physical condition of the mother whilst in this state, must be convinced that all undue compression of the body is highly improper: it is as inimical to the welfare of the mother, as to that of the child, not only impeding the full development of its members, but rendering its birth more dangerous in proportion as the circumference or diameter of the pelvis of the former is narrowed—modern stays, by extending so low as to embrace the hips, having a direct tendency to produce this effect. The uterus, as it increases in bulk, necessarily elevates the viscera, which, being forcibly pressed by stiff, unyielding stays, cause of course great inconvenience to the mother. Defective secretion of the milk, the food designed by nature for the infant, and so essential to its nourishment and preservation, may also arise from the same cause. The difficulty of breathing likewise, a frequent complaint with pregnant women, is greatly increased by the restraint in which the respiratory organs are placed by the additional restriction.

Notwithstanding all that has been said and written on the evil effects of modern stays as they are usually worn, and although they have been proved, in the clearest manner, to be one of the most formidable causes of diseases of the spine (*See the chapter on Lat. Curv.*), yet an attempt to induce females altogether to discard so common an article of attire, would be exacting more than can perhaps be expected.

What is to be hoped for is, that medical men, by showing the mischiefs attending their use in their present form, may induce the sex to make such alterations in their construction as will, in a great degree, obviate the attendant evils.

The chief objects to be had in view in constructing these articles so as to be innoxious are, to render the pressure on every part as slight as possible, in order that there may be the utmost freedom of motion; to admit of the greatest amount of pliability; and to ensure a proper adaptation to the figure. In growing girls, instead of the stays being tightly girt behind by laces, they should be secured in front by buttons or strings; in adults, there may be no objection to laces, provided the stays be, in other respects, of proper construction, and in this case the lacing should be in front, a strip of India-rubber webbing, about an inch in breadth, being inserted on each side the lace-holes, and a similar one, of double breadth, down the middle of the back; the gussets for the part of the stays covering the hips,* and for that supporting the breasts must be made of the same elastic material; the shoulder straps should pass directly over or upon the shoulders, and be so constructed as to lie flat upon them by being inserted obliquely into the stays. It is not necessary to enter into further details as to the material and construction of stays, except to observe that the fabric should be of a firm but not altogether

* It is still more proper that the stays should not embrace the hips at all.

unyielding nature, and that they should be constructed so as to allow free motion in every direction. The only whalebones required will be two thin ones to protect the lace-holes, and two, equally thin, on each side, to prevent the stays from puckering; by these means, if the stays are at all proportionate to the size of the body, active exercise, which is absolutely necessary for increasing the strength of growing girls, can be freely used, and tight lacing will be next to impossible.

There are other portions of female dress which are injurious as regards their effect upon the health and form of the body; these are, the strings of petticoats, aprons, &c., which are generally drawn very tightly round the waist, thus contributing to the ill effects which have been previously detailed; parents ought to be especially careful that the articles of dress be suspended by buttons and pins, and that strings should be, as much as possible, dispensed with, especially during the period of growth.

A custom at present prevails to a very considerable extent, of using a leathern belt buckled round the waist of boys when they commence wearing their clothes of woollen cloth; this practice, unless adopted with great care, has a direct tendency to produce a contracted state of the chest and upper part of the abdomen, similar in effect, though not in degree, to that produced by corsets in growing girls; it is hoped that it is only necessary to point out the evil that it may be avoided.

III. ON INATTENTION TO THE GENERAL HEALTH.

It has already been remarked that the subject of health, although of such vital importance, is, comparatively, but little attended to by the majority of mankind. If this be correct, it follows that many may be so far mistaken as to think themselves in a state of good health, when they are, at the very time, the unconscious victims of disease. Allusion is not here intended to be made to maladies of the more latent kind; these may escape the observation, not only of mankind in general, but, sometimes, even of those whose province it is, more particularly, to study their nature and mode of attack. Amongst society at large diseases of the most palpable nature often exist, without so much as being suspected. To the customary inquiries after health, it is far from being unusual to hear the reply, "very well," proceed from persons, in whose countenances the eye of an attentive observer might detect indications that disease was progressing, which was silently, but certainly, undermining the powers of life. Such individuals may not, indeed, be subject to acute pain, and they are too apt to consider mere freedom from it as a proof of the enjoyment of good health: because they are not incapacitated from attending to their ordinary employments, they do not suspect that their condition, as regards health, may be

otherwise than as it ought to be. There are, however, various degrees of health; and the enjoyment of its more perfect state, as society is at present constituted, falls to the lot of a much smaller number of persons than it might do. This enviable condition supposes something more than mere exemption from bodily suffering—it ensures for its possessor one of the requirements for the true relish and enjoyment of life. How then, it may be asked, is a person to become acquainted with the real state of his health? Perhaps, an attentive consideration of the following interrogatories may enable him to arrive at a satisfactory conclusion. Is the body active, the step nimble and elastic, the tongue moist and clean, the skin clear, and the eye bright? Is the appetite good? Does considerable exertion produce but slight and temporary fatigue? Is that fatigue soon dissipated by rest, and vigor restored to the frame? Is the sleep sound and refreshing, and does the individual arise from his repose, inclined with pleasure, to commence the daily avocations of life? Are the various functions of the animal economy,—circulation, respiration, digestion, assimilation, secretion, &c., carried on almost imperceptibly, and, consequently, without annoyance? Are the spirits lively and buoyant, and is the mind composed and cheerful. Unquestionably, these are unequivocal signs of sound health. Those who possess what thousands, however affluent, would give almost their all to obtain, ought to think highly of their pri-

vilege—it is of no ordinary worth, as it stamps an increased value upon every other worldly enjoyment. But, we may be well assured, that much, in this respect, is in our own power; good health, like most other advantages, is generally to be obtained by the use of proper means; what these means are, will be shown hereafter; but, first, it may be advisable to consider that condition which falls short of perfect health. If the body be feeble and languid—if great fatigue ensue after trifling exertion, if the cheek be pallid, and the eye void of lustre, if the various functions of the body be carried on with languor, producing uneasiness, and originating sensations of a disagreeable or painful nature, if the season devoted to repose be passed in wakefulness or accompanied with unpleasant dreams, and not followed by an agreeable feeling of refreshment and renewed vigor, if life appear a burthen rather than a pleasure, if there be a disposition to inactivity, and a consequent disrelish for lively and spirited exercises, if the temper be fretful, and the mind desponding, if the spirits be depressed, and all the usual energies enfeebled and blunted; in all or any of these instances, it is certain that the individual is laboring under a condition far short of the standard of health, that some portion of the frame is suffering, that some of the organs are in a state of derangement, not duly performing their respective functions, and that hence there is a defalcation in the amount of physical vigor, which the constitution is formed to attain

and enjoy; and the sooner this imperfection is attended to, its cause ascertained, and suitable remedies applied, the shorter will be the period which the individual will suffer under its baneful effects.

Declining years produce, of course, a deterioration of the bodily powers. As age advances, there must inevitably be a progressive diminution and decay of strength, activity, and vigor. Yet, under favorable circumstances, and when the preservation of health has been made an object of proper attention, such decay will be gradual, and ordinarily exempt from disease; even the casual observer will see this constantly exemplified around him: so far is senility from being *necessarily* a state of sickness, that the robust health of a hearty old age is attended with more lively enjoyment, and even more vigor, than is found at a more early period, when the constitution is enfeebled by disease. Numerous instances are constantly presenting themselves illustrative of this truth. The inquiry, then, is useful and important,—how may this highest physical good be best obtained, and how most effectually preserved? Happily for mankind, its possession is not limited to any degree of rank or station. It is, in a great measure, within the reach of all, and the mode of acquiring it is not generally difficult, the principal means being exercise, fresh air, cleanliness, and temperance.

The benefit of regular and active exercise in the open air must be quite obvious; it is one of the best

means of keeping the body in a state of good health. No one can doubt its beneficial effects, if he contrast the florid cheeks of a man employed in rural affairs with the wan aspect and care-worn features of the city artizan, or observe the ruddy complexion and athletic frames of stage coachmen, travellers, and others whose stated avocations give them regularly and frequently the advantage of pure and fresh air. Sufficient attention is not usually paid, particularly in crowded situations, to the ventilation of the different apartments of dwelling houses; the windows should be regularly thrown open; the linen and other articles of bed-clothing exposed, daily, to the fresh air. The air of a sleeping apartment, when of limited dimensions, soon becomes impure; of this, any one may have a convincing proof, on returning to his chamber after having been out in the open air; he will then find that the atmosphere is sensibly deteriorated, and scarcely fit for respiration; and if this be the case when occupied by a single person, the effect must, of course, be much increased when several sleep in the same apartment.

Cleanliness and temperance are equally essential to the enjoyment and preservation of health, as fresh air and active exercise. It is said of Socrates that he escaped the plague, when it almost devastated his native city, by his superior regard to these cardinal virtues,—for their love and practice of which many of the ancient philosophers were not less eminent than for their promulgation of them; the results were, in

general, a great immunity from disease, and a useful and happy old age. By observing from youth the habits of temperance and abstinence, the blood continues pure, and the body is free from those causes which are so fruitful in engendering or fostering disease: the well-known instance of Cornaro is remarkable, as shewing the effects of abstemiousness, even on a constitution which had suffered from intemperance; by restricting himself to a very small quantity of food, of such a nature as he found, by experience, to be best adapted to his constitution—by avoiding all unnecessary excitement, and everything of an injurious tendency, he continued to surmount the dangers attendant on a weakly state of the body, and extended his life, with comfort and pleasure, to upwards of a century. All may not be able to restrict themselves to the same rigid attention to rule and diet; but the generality of persons have it in their power to confine themselves to such food as is of a wholesome and nutritious nature, and to avoid excess. Notwithstanding all the scenes of destitution and misery which the world displays, where one person dies from actual want, a hundred perish from the direct or indirect effects of the use of improper and superfluous food.

Between the mind and the body there is an intimate, though inexplicable, union; a sympathy so close that if one suffer the other must, in some degree, participate in that suffering; and continued uneasiness of mind, from whatever cause arising, cannot but be

productive of great disorder and mischief to the complex organization of the human frame. It speedily, in some cases almost instantaneously, exerts a baneful influence upon the digestive organs; and these, when deranged, in their turn deteriorate the general health and communicate their morbid influence to the whole system. One great means, then, of securing the enjoyment of a sound state of health, is to keep the mind, as far as possible, calm and unruffled; anxiety has an insidious and morbid effect, and carries on its operations in a secret and undermining manner; whilst passion produces a more obvious effect, and in some cases has been known even to cause sudden death. Of the advantage of keeping the mind in a state of composure and tranquillity, the Society of Friends furnishes a remarkable illustration; from statistical accounts relative to that estimable class of Christians, it appears that longevity is greatly in their favor, and this may be chiefly accounted for by their great care in avoiding all undue mental emotion, their sobriety, their regularity, and their temperance; all which virtues are decidedly favorable to health and length of years.

Many of the employments in which individuals are engaged, in their endeavours to procure subsistence, are very unfavorable to health in the way in which they are conducted; and to none does this remark more aptly apply than to that numerous class of females, who, in addition to the injurious effects result-

ing from their own mode of dress, as described in a preceding section, have to practise an unhealthy occupation, extended to an undue length of time, in furnishing articles of clothing to others. This sedentary employment, of itself so unhealthy, is rendered much more so by its being frequently pursued in crowded and ill-ventilated apartments. The case is not much better in reference to that portion of the male sex who are similarly employed in meeting the incessant demand made by the public for the various articles of clothing, which necessity and fashion require. Indeed, all occupations must be detrimental to health, in proportion as they deprive the persons of the benefit of pure air, and the advantage arising from regular exercise. It is much to be regretted that young persons of both sexes engaged in sedentary employments, do not more generally perceive the propriety of devoting the little leisure their stated avocations afford them, in seeking to neutralize their ill effects by recreation in the open air, of which a regular and persevering use could not fail of being attended with great advantage. But individuals are prone to bestow too little thought on this important subject, until the constitution, injured by neglect, gives them unequivocal warning of its decline, when it is, perhaps, too late to hope for its entire restoration.

It is highly desirable that such information on these subjects should be generally diffused as would restrain mankind from that over-taxing of mind and body which

is so prejudicial to health: the promulgation of sound practical information of this kind cannot well be overvalued, for many would certainly be found too wise voluntarily to promote their own injury, especially if such information were implanted at an early period, before erroneous opinions had taken root in the mind. Of late years, several excellent works, having these objects in view, and intended for the non-professional reader, have been written by men highly qualified for the task, and there can be no doubt that such works as those of Dr. Combe, Dr. Southwood Smith, and others, must have had, in numberless instances, a most beneficial influence in inducing individuals to relinquish many injurious habits; and, consequently, by disseminating sound views on subjects connected with health, in promoting the welfare of the public generally.

The question will here probably present itself,—Does the human constitution, in its *ordinary or average* state, admit of improvement? Beyond all doubt, in most cases, it does. This is proved by the remarkable changes and improvements in the physical condition, that are effected during the system of training by pugilists, pedestrians and others, who are engaged in exercises which require the possession and exertion of great activity and strength. Those who are acquainted with the mode of training adopted by such persons know well that, in the course of only a few months, a most surprising alteration is effected in the appearance and vigor of those under its operation.

The skin becomes bright, clear and shining; the muscles full and prominent; redundancy of fat is diminished, and the whole frame put in a condition for the most effective display of agility and the endurance of great bodily fatigue. This is produced by the co-operation of three principal means,—medicine, diet and exercise. By the use of repeated doses of aperient and sudorific medicines, the tendency to corpulency, when it exists, is reduced; in all cases, due care is taken to free the stomach and intestines from noxious matter, and to keep the digestive organs in a healthy state. The food is restricted to those kinds which are considered to contain the greatest quantity of nourishment in the smallest compass; the drink is restricted to the smallest quantity, and that cold and of the most invigorating description, it being a settled maxim, that undue drinking encourages soft and unhealthy flesh, swells the body, and promotes perspiration. Vigorous exercise in the open air is enjoined, at least three times a day. By means like these, the body assumes its greatest degree of firmness, and is made capable of performing feats of strength and agility, to which, but a short time before, it would have been totally inadequate. Whilst, however, the object for which these preparatory measures are generally adopted, is justly to be reprobated, a salutary lesson may be taken from their excellent effects, which serve to show that the physical constitution of man, as it exists in its *average* state, is

capable of being greatly improved and strengthened by the use of proper means.

A further question may, however, be asked,—How far the physical constitution of man, *when enfeebled by disease*, is capable of restoration?

The answer to this question must depend upon a consideration of the circumstances of each individual case, and a knowledge of the causes of the disease; these may arise from various internal conditions, or may be dependent upon external circumstances. The nature of some of the latter has already been alluded to, and will be further considered when treating of the different species of deformity: on the subject of the former it would be out of place to enter in a work of this kind, except so far as they are concerned in the production of spinal disease; but when, by treatment, modified according to circumstances, and by perseverance in a graduated and well regulated course of medicine, the functional disorder or the cause of disease has been removed, the means which have already been alluded to for the *improvement* of health will likewise, in all probability, under the direction of the medical adviser, prove useful in effecting its *restoration.*

In connexion with deranged health and diseased conditions of the body, as causes of spinal deformity, it may be mentioned that in tracing the history of patients, it has so frequently occurred to me to find that the first appearance of the symptoms of

spinal affection have come on in a short time subsequently to severe attacks of scarlet fever or measles, and have been so distinctly referred to them by the patients or their friends, as to leave no doubt relative to the connexion between them, as cause and effect. Both lateral curvature, in which there appeared no disease of the vertebræ, and angular projection, in which there was, of course, caries of the bone, have thus, according to my experience, arisen from these diseases; a predisposition to the former might readily be accounted for by the weak and cachectic condition of the system sometimes left by the attack of scarlet fever or measles, which would thus render an exciting cause, that might otherwise have been powerless, sufficient to give rise to the curvature; while it is well known to surgeons, that diseases of the bones are apt to occur after scarlet fever; and it is probable that the bodies of the vertebræ are especially liable to become affected under these circumstances, in consequence of their highly cancellated structure. Some of the cases detailed in the subsequent part of this volume will illustrate the point, but it has been deemed right to allude to the subject in this place.

CHAPTER II.

ON CURVATURE IN GENERAL.

THE most simple as well as the most natural division of spinal deformities is one founded on the pathological condition of the vertebræ; and as the different forms of distortion, generally speaking, sufficiently indicate the condition of the bones on which they depend, it is likewise one which is both useful and convenient, and one which I shall, therefore, adopt in the following pages. In the majority of instances there is no necessary alteration in the composition of the bodies of the vertebræ, though, from pressure and consequent partial absorption, their *form*, in severe cases especially, is often altered, and rendered more or less wedge-shaped—the thinner edge being in the direction of the concavity of the curve. This class will include the ordinary cases of lateral curvature, excurvation, and incurvation. When, indeed, owing to the state of the health or other circumstances, there is a predisposition to this class of

spinal diseases, the formation of the particular kind of curve may be owing to various, and often to what may be called, accidental causes, amongst which may be mentioned the particular positions in which children are allowed to be in for a length of time, as sitting long while engaged in reading or other occupations of a sedentary nature, or resting habitually upon one leg more than another, the continued exercise of one side of the body, ill-formed dresses, tightly laced stays, and the like. Sometimes, these different species of curvature are found either wholly or partially united in the same case, the ribs being, at the same time, flattened and compressed in various directions. In other instances, however, the vertebræ become affected with caries, and more or less destruction of their substance ensues. If this take place to any considerable amount at the anterior part of their bodies (which is the portion most usually affected), the spine gives way there, and the angular projection which occurs indicates the nature of the pathological condition. It must, however, be borne in mind, that cancer of the bodies of the vertebræ or a deposit of tuberculous matter in them (which are however rare diseases), may give rise to an apparently similar form of distortion. When the system is affected with rickets, deformity of the spine, as well as of the other bones of the body, is apt to ensue; and the same is the case when an individual is affected with the much more uncommon disease—mollities ossium.

The different heads under which the various kinds

of spinal deformity, together with their varieties, will be arranged, are, therefore, as follows:—

I. 1. Lateral Curvature. Rotated Spine. Serpentine or Sigmoid Spine.
2. Excurvation.
3. Incurvation.

II. Angular Projection. Caries. Cancer. Tuberculous Deposit.

III. Rickets. Mollities Ossium.

The cases which are included in the first class are considerably more numerous than those of angular projection, but the latter class of deformities (dependent on caries) is common; adding together the instances I have had under my care, and of which I have kept records,* of lateral curvature, excurvation, incurvation, and angular projection, rather more than one-half the entire number have been cases of lateral curvature, one-sixth were cases of excurvation and incurvation (of each an equal number), and very nearly one-third were cases of angular deformity; but the real number of cases of lateral curvature existing bears a much greater proportion to those of angular projection than is above expressed, as an uncommonly large number of cases of the latter description has fallen under my care.

* When in general practice, I kept journals, chronologically and nosologically arranged, of all the cases of disease which came unde my carc. Were the plan generally adopted by members of the profession, it would be a great source of satisfaction and information to themselves, and an important series of statistical tables would result, which might tend much to the advancement of the science of medicine.

There is no time of life in which spinal disease may not make its attack, especially when there exists a morbid condition of the constitution, and when circumstances, such as usually induce the disease, are brought into action; yet it by far the most frequently shews itself in early life, comprising the whole of the time in which the body is in a state of growth; and sometimes, though more rarely, at a later period. Certain ages are, however, more liable than others to give rise to particular forms of spinal affection; thus, Lateral Curvature most commonly occurs in young persons, especially females, between the ages of eight or ten, and sixteen or eighteen. Angular projection is a disease of all periods of life, especially however, of childhood before the age of ten. Excurvation is, perhaps, the most common in elderly people, but then arises from very different causes to those producing it in younger persons; while Incurvation most generally first occurs in those under the age of twenty.

Sometimes spinal disease progresses to a considerable extent, and yet produces so little pain and inconvenience as to attract but slight notice, much less to point out the true seat of the affection. During its incipient stage, the signs of constitutional debility may not be very apparent; the appetite may be good, and the bowels regular; the pulse may not be particularly affected, nor the repose greatly disturbed; in fact, without care, the symptoms of incipient spinal

disease are often so delusive as not at all to draw attention to the real source of mischief. When, therefore, any of the following symptoms co-exist and continue for any length of time, attention should be directed to the spine, and this part should be examined, lest disease be progressing, which timely taken, could easily be remedied, but which, when allowed to progress for years, may baffle the best directed efforts of the practitioner to cure.

Amongst the early symptoms of the disease, there are often experienced a feeling of languor and listlessness, accompanied by a disinclination to active exercise; a sense of weariness becomes perceptible in some region of the spine, accompanied, at times, with considerable uneasiness, together, in some instances, with more or less tenderness on pressure : though the symptoms of it may be obscure, some deterioration of health is not only the usual concomitant of spinal disease, but is often its precursor and primary cause; while, on the other hand, the cachectic condition of the body is still further impaired by the deformed condition of the spine, which it was mainly instrumental in producing. The pain and sense of weariness in the back are caused and aggravated by very disproportionate exertion, and the patient manifests a tendency to lean to one side, or, if young, to lie on the parent's lap, or, at all events, to indulge in a recumbent position. The natural pressure from the weight of the upper part of the body, which, in a state of health, is not attended

with any inconvenience, becomes sensibly and painfully felt; such pressure is also much increased by the incumbrance and tightness of clothes, riding on horseback, or even by the trifling circumstance of having any article of weight in the pockets. While the disease is progressing, other serious symptoms present themselves; the important organs of digestion are pressed upon, their functions deranged, and a sensation of tightness at the epigastrium is often experienced, as if it were girt with a cord; the capacity of the chest is diminished, the circulation of the blood through the lungs is impeded, and its decarbonization more and more imperfectly performed; the respiration becomes difficult, and thus is a predisposition given to the supervention of diseases of the chest,—the particular train of symptoms depending, however, upon the previous state of the health, and, as already stated, on the species of spinal disease with which the patient is affected. If the back be now examined, it will probably be found that some of the vertebræ have undergone a change of position, producing more or less of one of the forms of curvature already mentioned; should no deformity, however, exist, it must not from this circumstance, and without further consideration, be concluded, as a matter of course, that there is no disease of the vertebræ; for caries, as will be more particularly stated in the chapter on Angular Projection, may exist, and yet produce no curvature whatever in the spine, owing either to the particular part

of the vertebræ which it affects, or to some other incidental circumstance.

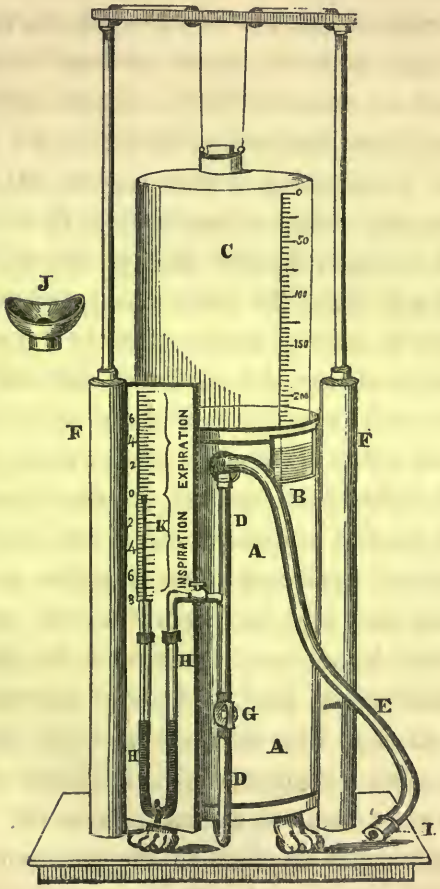
As the disease advances, the back loses more and more of its natural form, and the efficiency of its functions in the economy of animal life is injured, and not unfrequently, eventually, almost destroyed. When distortion is fully established, it usually puts a considerable, if not an entire, stop to the growth of the body, both as regards its height and stoutness; and the absolute height of the patient is often very much diminished in consequence of the shortening of the spine: the various changes which usually take place during its growth, are retarded or prevented; in the male sex, the various characteristics of puberty, such as the alteration of the voice, the growth of the beard, &c., do not present themselves at the accustomed age; in the female sex, the catamenia are often not established as early as usual, or are liable to be suspended, the natural development of the breasts does not take place, the complexion is sallow, and the countenance void of its natural degree of animation.

Amongst the most striking symptoms dependent upon deformity or projection of the spine, is the difficulty of breathing, which is seldom absent, even where the disease has made only a moderate amount of progress, but which, in severe cases, usually gives rise to very great suffering and distress, and which, with the general debility of the system, forms one of the chief causes why persons suffering from spinal disease can,

generally speaking, take but little exercise, because, on any exertion, the dyspnæa is almost always much increased. Owing to the deformity of the chest, its actual capacity is very materially decreased, and as the lungs are necessarily compressed in consequence, the amount of air which the individual is able to inspire becomes of course diminished; indeed it is only because the change in the capacity of the chest supervenes gradually, so as to allow the system to accommodate itself to it, that the danger resulting from it is not much greater. In some cases of spinal disease, the breathing-capacity of the lungs is reduced to a remarkably small amount; while, on the other hand, I have invariably found it very materially to increase as the deformity improved during the progress of treatment, and with this increase, the symptoms of dyspnæa proportionally to decrease.

In order to ascertain the change which takes place in this respect during treatment, I have measured, since 1843, the quantity of air which my patients could expire when I first saw them, and have afterwards repeated the experiment at intervals of a month or two, or longer, during the time they have remained under my care. For this purpose, I have employed an instrument, which may be termed a Pulmometer, and which, while very simple in construction, is, in practice, very efficient. It consists of a glass vessel, C, open at the bottom, and fitted at the upper part with a stopper, which can be inserted or removed at pleasure. This

vessel is graduated from above downwards into cubic inches, from 1 to 350, and is accurately suspended in



a circular tin vessel, AA, being, at the same time, counterbalanced by means of weights attached to it with cords, which pass over pullies in the transverse

bar at the top of the apparatus. These weights move upwards and downwards in the parts marked FF, according as the glass vessel is depressed or elevated: in the centre of the tin vessel there is a tube which rises so high as to be above the level of the water with which the vessel is filled, as can be seen through the plate of glass inserted in its side at B: this inner tube is a continuation of that marked DD, to which the vulcanized India rubber tubing E, is attached. Hence, if a person breathe through the mouth-piece I, the air will enter the glass vessel, and raise it in proportion to the quantity expired. To use the instrument, the stopper is removed, and the vessel C, depressed until the 0, in its scale of cubic inches, be on a level with the surface of the water, when the stopper is replaced; the patient, standing upright, then takes the deepest inspiration he is able, and immediately applying the mouth piece, breathes as much as he possibly can into the apparatus; the stopcock G should then be at once closed, and the glass vessel being a little raised until the level of the water within it is the same as that without (as seen through the glass plate B), the number of cubic inches of air contained in the vessel can at once be read off.

The instrument attached to the pulmometer is for the purpose of ascertaining the *force* of the inspiratory and expiratory actions, and consists essentially* of a

* It acts on the same principle as Poiseuille's Hæmadynameter, the instrument he employed in his Researches on the Force of the Motion of the

bent glass tube, HH, each limb of which is eight inches long, and should be half filled with mercury; the mercury, of course, rises to the same level on both sides of the apparatus. One limb communicates by means of a brass tube (having a small stop-cock at its centre), with the tube DD, so that the flexible tubing serves for both the pulmometer and this instrument; but when the latter is used, the stop-cock G must be turned so as to shut off all communication with the former. To test the *force of expiration*, the individual takes a deep inspiration, and then blows steadily and forcibly (but without any puffing action of the cheeks) through the India rubber tubing, when the mercury will be seen to sink on one side of the instrument, and to rise on the other; and a very light and slender index-rod K, one end of which floats on the mercury, will, with the other end, indicate in inches, on a scale made for the purpose, the difference in the level of the two columns of mercury; or, in other words, the height of the column of mercury which is sustained by the force of the muscles of expiration. To determine the *force of inspiration*, the person should first expire as much air as possible from the chest, and then applying the mouth piece, reverse the former experiment by making a strong and sustained* effort at inspiration, when the index,

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Blood: the present instrument might be similarly termed a Physedynameter (φύσησις, δύναμις, μέτρον)—a measure of the force of the act of blowing.

* When determining the power of inspiration, care should be taken that

sinking below the line 0, at which it remains stationary when the instrument is not in use, will shew the difference in the level of the columns of mercury. In using this instrument, a mouth-piece, such as is represented at J, will be found more convenient than that used for the pulmometer.

I have stated that the breathing capacity is very much diminished in most instances of spinal deformity: the precise quantity of air which patients can expire varies much, however, as might be expected, in different cases, and is influenced by the original stature of the individual, the nature of the deformity, and the amount to which it implicates the chest; but, in *all* the cases, I have observed, it increases as the deformity is remedied, and sometimes to a really surprising extent. Thus, in a young lady from the North of England, aged 17, and affected with lateral curvature, the breathing capacity increased in the course of nine months 52 cubic inches (viz. from 78 to 130)—in each of three others aged respectively 18, 20, and 28 years (one of these being a case of excurvation), the increase was 20 cubic inches: in a fifth instance, in which the curvature yielded rapidly to treatment, the breathing capacity was augmented from 62 to 100 cubic inches in three months: and in a sixth case, it increased from 100 to 150 inches in twelve months. A young lady, aged 16, with long

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no sucking motion is made by the checks, just as no puffing action of them must be made when ascertaining the force of expiration.

standing and very severe lateral curvature, combined with excurvation, when she came under treatment measured 4 feet 6¾ inches in height, weighed 5 stones 9½ lbs., and could expire *only* 30 cubic inches of air. At the end of a little more than 11 months, her height had increased to 4 feet 8½ inches, her weight to 6 stones 2 lb., and her breathing capacity to 69 cubic inches, being an increase of 39 cubic inches. Another, aged 13, within five months, increased 1¼ inches in height, 13 lb. in weight, and 27 cubic inches in the capacity of her chest. And to add one more, and a very remarkable case which was under my care in 1843, and in which the patient, 23 years of age, was exceedingly distorted from rickets: her height, which was only just 36 inches, increased, within six months, more than 5 inches, and her breathing-capacity, which was ascertained at intervals of about a month, increased gradually from 25 cubic inches, which was the utmost she could at first expire, to 51, 71, 79, 83, and 90 cubic inches respectively, shewing a total increase of 65 cubic inches. Such an alteration having taken place in the capacity of the chest, it may readily be conceived how it is that difficulty of breathing, complained of in cases of deformity, is usually so much relieved at the same time that the deformity is remedied: the circulation also becomes more regular, and the palpitations less troublesome in proportion as the heart's action is less interfered with in consequence of the improvement in the shape of the chest.

CHAPTER III.

ON DEFORMITIES NOT DEPENDING UPON ORGANIC DISEASE OF THE BONE.

LATERAL CURVATURE.

THAT description of curvature which is usually termed "lateral," is far more common than the other species of the disease. The most usual period of its commencement is during that which intervenes between childhood and maturity, or between the ages of eight and eighteen: there are, however, occasional exceptions to this rule: for where, on the one hand, the predisposition to it is very strong, owing to the system being much debilitated by previous disease, or affected with rickets, it may occur during the earlier periods of life; while, on the other hand, when it occurs from what may be termed accidental causes, the first appearance of it may not take place until a more advanced age. Thus, I have met with a very marked instance in a child only 1½ year old; but, in that case, the child was affected with rickets, the lower extremities were deformed, and there were also tubercles in the lungs. Verging on the other extreme was the case of a female, aged 73 years, who had been remarkably upright and tall, till within three years of that time,

when, having a hernia, she procured a truss, which fitted her so ill and produced so much pain as to make her bend somewhat to the left side, which position being almost constantly adopted, at last gave rise to very considerable sigmoid lateral curvature.

This form of the disease is, comparatively speaking, almost exclusively confined to the female sex, amongst whom it is extremely prevalent in the middle and higher ranks of society. It varies very much in form and in severity, consisting, sometimes, in a slight deviation, perceptible perhaps, only by the practised eye of the medical man; while other cases present a frightful amount of distortion, rendering the sufferer almost a burthen to herself, unable to join in society, and, in some instances, to bear the slightest exercise or even to leave her bed or couch. The disease is essentially one of a chronic character, always requiring a considerable time before it assumes a very severe form, but almost constantly having a tendency to become gradually worse, unless means be adopted to stay its progress. It should, indeed, always be remembered, that the worst cases have had their incipient stages; that, at first, they have been slight, though the early stage may have passed by unobserved, and a considerable amount of deformity have become established, before attention has been directed to the state of the spine. This arises from the manner in which the disease approaches, there being often, in the earlier periods, no pain directly referable to the spine, but only a vague

sensation of uneasiness or weakness, which is ascribed entirely to the general state of the health.

In by far the majority of cases, the earliest appearance of deformity consists in a slight curvature of the spinal column in the interscapular region.* This may occur towards either side, but it is much the most usual to find the convexity directed towards the right side, the concavity being, of course, in the opposite direction. This class of cases, in which the dorsal curve is to the right, is the one to which the following description will principally apply, but the other varieties of lateral curvature will afterwards be considered, and the differences which they present pointed out.

In the early stage, then, on examining the spine, little else is observable except a slight deviation of the spine from the perpendicular between the shoulders, and sometimes the mass of muscles between the right scapula and the convexity of the curve appears a little fuller than the rest; but there is as yet no projection of the shoulder, and the head is carried erect. In cases a little further advanced, besides the curvature becoming more marked, the right shoulder is found to

* Correctly speaking, there always exists a slight lateral deviation, from the perpendicular, of the vertebræ in the dorsal region. This is very often quite imperceptible on examining the spine of the living subject, but it may be always seen on examining anteriorly the vertebral column of a skeleton; the deviation is far the most generally to the right side, which was formerly ascribed to the presence of the aorta on the left of the column. But Beclard has proved that it depends on the fact of the right arm being more generally used than the left; and he has shewn that, in left-handed persons, the deviation is to the left side.

be somewhat higher than natural, while the left one is correspondingly depressed, so that the difference in the elevation of the two is easily recognised, and may often be perceived whether the figure be examined from before or behind: when examined in the latter position, the right shoulder appears also somewhat larger than its fellow. This depends on the scapula being raised, and its lower angle somewhat tilted upwards and backwards, in consequence of the increasing curve in the spine having, by its pressure against the heads of the ribs of the right side, bent these bones at a point an inch or two distant from their spinal extremities, into an acute angle. Those ribs are usually most bent, which are nearest the part where the spinal curve presents its greatest convexity. The ribs of the left side, which unite with the vertebræ along the concavity of the flexure, are usually somewhat flattened. The distance between the spine and the two scapulæ, which ought to be alike on both sides, becomes altered; the space, in these cases, between the right shoulder blade and the spine, being usually increased. In some instances, however, the convexity of the curve approaches very near to the right scapula, the difference in the two classes of cases depending upon the particular manner in which the ribs are bent. The commencement of a curvature in the lumbar region, with its convexity twisted in the opposite direction to the dorsal one now begins to be perceived; the left hip projects slightly, and the patient

is observed to carry the head and neck a little to the left.

If proper means be not adopted to promote a cure, the disease very seldom remains stationary, but, on the contrary, the dorsal curvature gradually increases and becomes more acute. In this part, the spine is now observed to be twisted upon its own axis, so that the bodies of the vertebræ, instead of being directed forwards, incline obliquely and sometimes entirely to the right side. Under these circumstances, the spinous processes are directed to the left; the right transverse processes look almost directly backwards, and the left anteriorly. In the lumbar region, the curvature to the left is now very marked, and the vertebræ are twisted like the dorsal ones, though in a less degree, and in the opposite direction, that is, to the left. In severe and long-continued cases, some of the upper or middle dorsal vertebræ give way to so great an extent as occasionally to be found in an almost horizontal position,* instead of being in their natural perpendicular one. They are thus driven, and hidden as it were, under the heads of the ribs on the right side. It may readily be conceived how much, under these circumstances, the ribs must necessarily be distorted; the acute angle or ridge into which they are bent at a little distance from their vertebral extremities, becomes very prominent, and upon a superficial examination

* A particularly well marked example of this condition occurred in the case of Miss W. (Case V.)

might easily be mistaken for a projection of the true spine curved towards the right shoulder. By a further examination, however, the vertebræ can be felt near the ridge alluded to, which, together with the scapula, forms the hump or protuberance of the shoulder, met with in advanced cases of lateral curvature. The ribs, thus unnaturally curved, give the right side a fuller and more rounded appearance than it ought to have, and are often so widely separated from each other as to render the intercostal spaces, especially in the axillary and infra-axillary regions, considerably wider than natural. The ribs of the right side, thus excessively prominent posteriorly, and sometimes laterally, turn acutely forward to unite, generally in an almost horizontal direction, with the sternum. The ribs of the left side, proceeding from the concavity of the curvature, are in these severe cases not merely flattened posteriorly, but, in some instances, are bent considerably inwards, so as to form a complete fossa in which the scapula lies, as it were, imbedded. Having thus lost their proper curve, the ribs incline from the spine outwards, and in a direction very much more downwards than natural, sometimes pointing directly towards the crista ilii; so that in front they often project to a much lower level than those of the right side. On the left side, the intercostal spaces are very much diminished in width, and instances have fallen under my observation where, in consequence of the peculiarity of the distortion, several of the lower ribs

have been folded or tucked under those immediately above them. Owing to these deformities in the shape and direction of the ribs, the antero-posterior diameter of the right side of the chest is found, in severe cases of the disease, to be considerably greater than that of the left; while, on the other hand, the distance, as measured from the spine to the axillary space, is much more on the left side than on the right. The right scapula is sometimes tilted backwards and upwards, as already described: in other cases, it is found on the *outside* of the hump formed by the right ribs, so that its inner border or "base" is directed backwards, and its outer or "inferior" border, anteriorly. The right shoulder is occasionally as high as the level of the ear, while the left one is exceedingly depressed, the clavicles on each side being correspondingly elevated or depressed. When the arms are allowed to hang down by the sides, the right one is seen to be in close contact with, and to rest upon the projecting ribs of that side, by which, indeed, it is sometimes pushed outwards, as in plates I. III. and V., while between the left arm and side, there is a space which not unfrequently amounts to two or three inches, and in extreme cases, to as much as four or five inches. The hips appear very disproportionate in size, the right one generally small, the left exceedingly prominent; so that if a plumb-line were dropped from the right axilla, it would pass at a considerable distance from, and outside of, the right hip; while, from the opposite axilla, it would

fall at some distance within the left iliac bone. When, in the extreme cases now described, the body is viewed anteriorly, there is usually a considerable depression of the ribs below the clavicle and to the left of the sternum, and an equal prominence of those to the right of it, while the sternum itself is often pushed somewhat towards the right: the difference in the elevation of the shoulders and clavicles, and the projection downwards of the left ribs, have already been referred to. In these instances, there is often considerable emaciation, the left breast is seldom fully developed, and the integuments over the abdomen are generally folded or wrinkled, more particularly on the left side. It is usual, also, to find the right arm much thinner than the left one, the difference between the two sometimes being very remarkable. (See Plate IX., which represents a combination of lateral curvature and excurvation, and is a very marked example of this peculiarity.)

While the solid framework of the body is thus deformed, it may readily be imagined that the internal organs will, as a natural consequence, become displaced from their usual positions, and that their functions will be deranged. Such is found to be the case, and the very forms of the viscera are likewise not unfrequently changed. In cases of considerable lateral curvature, the mediastinum is found to divide the thoracic cavity into two unsymmetrical portions. When the spinal convexity is to the right, the lung

of this side, corresponding in shape with the interior of the thorax, is much compressed transversely, whilst its antero-posterior diameter is somewhat augmented, its inner or mediastinal border is curved inwards, and its costal one outwards, so that when seen anteriorly, it presents a somewhat crescentiform appearance. The left lung, on the contrary, is compressed in its antero-posterior direction, owing to the flattening of the ribs under the clavicle, and to their natural convexity, posteriorly, being destroyed. The heart is frequently felt to beat under the sternum, or may be still further detruded to the right side. The diaphragm is forced upwards, so as to impede the action of the lungs, and encroaches still more into the cavity of the chest on the right than on the left side, in consequence of the position of the liver, which organ, in these cases, is also usually elongated; so that besides reaching high up into the chest, it generally extends some distance below the margins of the false ribs: add to these, that the stomach and intestines are, in consequence of the approximation (resulting from the spinal deformity) of the chest to the ilium, considerably compressed, and at the same time forced downwards so as to press upon the pelvic organs, and little surprise will be felt that the functions of these organs should be so often embarrassed—that digestion and assimilation are impaired—that the bowels act torpidly —that the breathing should be painful and difficult—and that palpitations of the heart should so frequently

accompany deformity of the spine. A consideration of these circumstances will also explain a number of otherwise anomalous symptoms which often occur in the progress of spinal disease.

The foregoing description applies to the most usual form of lateral curvature in its different degrees, but there are several exceptions to it which must be shortly alluded to. In the first place, there are cases of lateral curvature in which the distortion to the right commences at the first or second dorsal vertebra, or even in the cervical ones, and includes, as it were, in one sweep, the whole of the dorsal and almost all the lumbar vertebræ,—the compensating curves, under these circumstances, taking place only in the upper part of the cervical, and the lower part of the lumbar, regions. Such cases are not usually very severe ones, or accompanied with much distortion of the ribs; they most generally occur in those who, while free from the injurious pressure of dress, have occupations which require them constantly to use one side more than the other, or frequently to bend in one constrained lateral position: it is this form, therefore, which is most ordinarily found in those instances in which lateral curvature affects the male sex. Thus printers, &c., who are constantly employing one arm with considerable force to turn their presses, have, not unfrequently, a curvature of the spine in consequence; the same occurs to those engaged in certain processes of the woollen manufactory, and for similar reasons.

So also, constant confinement to writing, as in the case of copying clerks (who have frequently scarcely any intervals for exercise), may induce a similar state of the spine, as may other sedentary occupations which, besides requiring the use of constrained positions, tend likewise to enfeeble the general health; and in no business are these conditions more marked than in that followed by journeymen tailors, who often have, as is well known, very indifferent health, and amongst whom it is very common to find some lateral curvature of the spine, and elevation of the right shoulder. Both sexes are, of course, liable to be affected with rickets; and when this disease is present, the tendency to deformity of the spine becomes not only much stronger, but the curvature which takes place generally progresses more rapidly, and proceeds to a much greater extent than when the system is free from this malady.

It is very common for lateral curvature, especially in severe cases, to be combined with more or less of excurvation of the spine, so that in cases of this kind the direction of the curve holds an intermediate place between those cases in which it curves directly backwards, and those in which the deformity is to one side. This form might with propriety be called *oblique curvature*, and some of the cases of the greatest amount of spinal deformity which are met with are of this kind. Sometimes, though less frequently, incurvation of the lumbar region is found united with lateral deviation of the dorsal region; but this seldom

occurs except in cases of rickets. The disease, however, assumes such diversity of appearance, that it is rare to find two cases much advanced, which, in all their characters, are exactly alike.

But another class of cases, different from those already alluded to, is sometimes met with, in which the curve between the scapulæ is so acute that it should rather be termed a *lateral angle* than a lateral curvature of the spine. These cases are always to be looked upon as of a more serious character than even the worst of those of ordinary lateral curvature, because they depend upon caries of the sides of the bodies of the vertebræ—the same cause which, when occurring in the anterior parts of the vertebræ, gives rise to angular projection of the spine; and they may, therefore, be complicated with sequelæ, similar to those which are apt to ensue in the latter class of affections. But as caries of the lateral portions of the bodies of the vertebræ may occur in any region of the spine, so latero-angular distortion may commence either in the lumbar, dorsal, or cervical regions, and the compensating curve or curves which become established so as to maintain the body in the centre of gravity, will vary according to the part which the primary disease has attacked. I possess the drawing of a case in which the caries had thus destroyed the left side of the two last lumbar vertebræ, owing to which the remaining lumbar and lower dorsal vertebræ inclined very acutely to the left side, and a very sharp curve

became, in consequence, established in the upper part of the dorsal region. Instances sometimes occur, but are not very common, in which the head is bent to one side, from similar disease affecting the lateral portion of the cervical vertebræ. It is very important as regards prognosis and treatment, that a correct diagnosis should be made between these cases, and those of ordinary lateral curvature unconnected with caries, but the point is one not always easy to determine, especially in the early stages of the disease. In forming an opinion, the general state of the patient's health must be considered, as it is usually much more seriously affected in cases of caries; emaciation takes place, apparently, out of proportion to the amount of distortion and the duration of the affection, and there are not unfrequently other signs of scrofula present. In such cases, the bend in the spine is from the first more acute, more defined to a limited number of vertebræ, and it more frequently occurs in the *lower* dorsal and lumbar regions than in the upper dorsal or cervical: there may be very little superficial tenderness, but a peculiar, deep-seated, and very unpleasant sensation is often (though not always) experienced by the patient, if percussion be made over the affected vertebræ—a sensation but rarely experienced in lateral curvature: abscesses may form in the adjacent parts, or there may occur symptoms of paralysis from pressure on the spinal cord.

The striking circumstance that lateral curvature

is almost altogether confined to the female sex, and is particularly prevalent in the upper and middle classes of society, must obviously proceed from some corresponding causes; what the principal one is, it has been attempted in a preceding chapter to shew; yet the subject is so important as to render excusable the repetition of the assertion, that it is mainly attributable to the use of improper stays as an article of female dress. The truth of this will be more apparent when the circumstances are recollected which render the disease of less frequent occurrence amongst females in the lower walks of life, namely, their active and often laborious occupations, which prevent their lacing so tightly, and oblige them to use much muscular exercise. When, therefore, it is considered that the disease is very rare amongst males, and that of females it is principally confined to such as make use of improper stays, tightly laced, there can be little doubt as to the influence of the cause referred to; nor, as it is so frequent in its operation, can this cause be too much insisted upon, since it is one which may be easily avoided.

Though, in most cases, predisposing causes can be traced to have existed prior to the supervention of the disease, yet lateral curvature sometimes takes place in girls who seem to be but little predisposed to spinal disease, being healthy in their appearance, tolerably active in their habits, and having the advantage of favorable physical circumstances. Such cases, espe-

cially, point out how much the mischief is attributable to impropriety of dress. The other causes that have been previously enumerated, including even the unfavorable tendency of sedentary employments, would generally, in cases of this kind, be found insufficient of themselves to produce the deformity; but when there is a combination of these causes, we need not wonder that distortion is so common.

The general course which lateral curvature takes when arising from the pressure of stays, is as follows:— In the first place, after long and continued pressure upon the chest and abdomen, a deterioration of the general health ensues, the progress of which depends upon the previous state of the constitution. This derangement of the health, together with the direct pressure of the stays preventing the free motion of the spine, in time produces a diminution of the power of the muscles of the back, and a relaxation of the ligaments uniting the vertebræ. Now, corsets are usually so made, that, besides constricting the waist, the upper part of them is brought close under the arms, and being tightly girt behind, they press very much and very injuriously upon both scapulæ; these, in their turn, are forced against the ribs, and by this pressure the free use of the arms is impeded. In the ordinary avocations of life, the right arm is much more in use than the left one, especially when any exertion is to be made; but the person finding, when she uses the right arm, that the motion of the scapula is a good

deal interfered with by the constriction of the stays, naturally endeavours to give it more room for its action. The stays, however, being made of unyielding or nearly unyielding materials, this additional space can only be obtained by bending the body somewhat to the left side, while the left scapula, especially at its lower angle, is drawn nearer to the spine by the action of the rhomboidei, the trapezius, and other muscles. Thus, somewhat more space is afforded for the play of the right scapula, while the left one and the arm of that side are, consequently, but little used. Were this series of actions to occur a few times only, no serious result would probably ensue; but it is continually taking place, so that the muscles attached to the right side of the spine have, in consequence of the frequent use of the right arm, a constant tendency to bend it to their own side, while no counteracting influence is exerted on the opposite side of the spine, because the muscles there cannot, under the circumstances, be brought into play: moreover, the continual and very considerable pressure made by the tightly laced and unyielding stays on the left scapula, not only keeps the muscles of that side inactive, but is constantly forcing the last-named bone against the ribs near to their articulation with the vertebræ, and not only bending them inwards, as already described, but likewise, through their medium, continually pushing the spine and so increasing its convexity towards the right side; for in the unhealthy condition

of the system before referred to, the spine easily gives way under pressure, and at length becomes permanently deformed in that direction in which it was at first but slightly curved. It will, hence, be readily conceived how it is that in this form of spinal disease the dorsal curve almost universally takes place towards the right side, and that the right ribs are excurvated, while the left scapula is forced inwards, and bends before it the ribs of that side, thus also producing rotation of the vertebræ to which they are attached, and especially of those at the point of the greatest convexity in the curve. Hence also arises that elevation of the right and depression of the left shoulder so common amongst females in the middle and upper ranks of society. Once a curvature produced in the dorsal region, another compensating one necessarily ensues, so as to keep the body and head over the centre of gravity; while the pressure of the head and shoulders upon the now distorted spine, continually tends to increase the deformity.

Amongst other causes which may contribute to the production of lateral curvature, are certain injurious habits, such as continuing long in one position while engaged in the practice of music, writing, and other employments, in the performance of which the usual posture is of an unfavorable kind; or that of lying constantly on one side while in bed. Though these causes are instrumental in producing a certain number of cases of lateral curvature, they are not by

any means so frequently the source of it as those previously detailed, and would still more rarely produce deformity were there not a morbid state of the constitution, and did not the individuals frequently suffer from injurious pressure. Such circumstances are, therefore, far more frequently the secondary than the primary causes.

In some cases, the curvature first occurs in the lumbar region, but more usually the curve in the lower part of the back takes place, as just stated, as a compensation to the dorsal one; while another sometimes ensues, for a similar reason, in the cervical region, so as to cause a sigmoid flexure of the spine. The case alluded to, at the beginning of this chapter, in which curvature arose from an ill-fitting truss, was an instance in which the deformity first took place in the lumbar curve. So, likewise, the habit of resting with the weight of the body almost constantly on one leg, may originate a lumbar curve; and the deformity may also occur in those who, owing to accident or disease, have one lower extremity shorter than the other, and who, notwithstanding this, are obliged to take much exercise. In all these cases, it will be observed, there are causes operating which tend, in the first place, to alter the proper direction of the axis of the pelvis, and that it is often in consequence of this that the curve becomes established. In a few instances where the curvature affects the upper lumbar vertebræ, the pelvic axis may be but little out of its proper direction,

under which circumstance the projecting hip is much less prominent than in ordinary cases.

While the health continues good, the body unconfined by improper dress, and injurious postures not too often or for too long a time adopted, and while a sufficient amount of exercise is taken, the muscles and ligaments of the back will do their duty well, and, in all ordinary circumstances, will maintain it in its natural and erect position. But when the causes which have been mentioned in the foregoing part of this chapter are brought into operation, a curvature of the spinal column, to a greater or less extent, is apt to ensue. When a deteriorated state of the general health takes place, assimilation and nutrition are not adequately performed; there is a general want of tone in the system, and the muscles and ligaments, as well as other parts, participate in the general debility. This is indicated by the general muscular languor experienced by the patient, and by the comparative feebleness with which any required muscular effort is made; while the laxity of the ligaments is shewn by the unnatural extent to which the joints can be bent in unusual directions, the wrist sometimes admitting of the hand being bent backwards, so as to touch the posterior part of the fore-arm, or the fingers the dorsum of the hand. I remember the case of a young lady, who afterwards became the subject of severe lateral curvature, who was able, as she stood, to bend the spine backwards to an almost incredible extent. The

dorsal muscles, therefore, suffering in common with the others, and not properly supporting the spine, not sufficiently aiding it in sustaining the weight of the head and upper extremities, render it liable to be influenced by such injurious circumstances as have been alluded to, but which, were it not for this condition of the muscles, might not be sufficient to produce any permanent effect upon it.

The intervertebral substance, consisting of fibro-cartilage, partakes of the character both of cartilage and ligament, and possesses both compressibility and elasticity. It is firmest at the outer part, and least so in the centre, and adheres closely to the surfaces of the two contiguous vertebræ to which it belongs. It hence allows of extensive action of the spine as a whole, though of limited motion of any one vertebra with that immediately above or below it. Flexibility and security are thus made to result from this peculiar substance which serves the purposes of uniting the spinal bones to each other, of diminishing and diffusing any shock to the spine, which might occur during active exertion, and of admitting a greater extent of motion than would have been obtained, had the vertebræ been in more immediate contact. It is owing to pressure on this elastic substance that the height of the body is diminished, by the erect position during the day, and that it is regained by the recumbent position during the night. In all the motions of the spine, to what extent soever made, there is more or less compression

of some part of the intervertebral substances; thus they are compressed anteriorly or laterally respectively, as an individual bends forwards or to one side; but, under ordinary circumstances, they regain their natural form and appearance as soon as the person again sits or stands erect.

When, however, the conditions which tend to induce lateral deformity are frequently in operation, one side of some of the intervertebral substances, owing to the pressure so constantly exerted upon that part of them, becomes compressed, more dense, and less elastic—unable therefore to assist the muscles in restoring the spine to the natural erect position. Hence, a permanent but slight deviation in the direction of the column takes place, the concavity of the bend being, of course, at the side on which the fibro-cartilaginous substances are compressed. Once the curvature formed, the weight of the head and upper extremities in being transmitted downwards by the spine, must necessarily exert more pressure on the concave than on the convex side of the curvature; this pressure being thus constantly kept up, the usual consequence of pressure on a living texture takes place, viz. the process of absorption; and hence, the portions of the intervertebral substances, which were at first only compressed, are by degrees so thinned, that ultimately the vertebræ, which on one side are separated by the natural thickness of the fibro-cartilaginous substances, may, on the other side, be almost

or altogether in contact with one another; the intervertebral substances, therefore, become wedge-shaped, and coincident with this change in the direction of the spine, the ligaments and tendinous insertions of the muscles become contracted along the concavity of the curve, and stretched on the side of its convexity: a somewhat similar change takes place in the muscles of the two sides of the curvature as they gradually adapt themselves to the altered positions of their attachments, becoming shorter at its concavity, and elongated on the side of its convexity—the want of action on one side, as well as the over-action on the other, tending to induce a loss of their proper power of contraction.

In the early stages of the disease, and especially where no taint of rickets exists in the constitution, the bones may remain unaltered; but if the deformity be allowed to continue, it is not usually very long before some change likewise takes place in the form of the bodies of the vertebræ; for these being, like the intervertebral cartilages, subjected to unnatural pressure on one side, are, like them, liable to undergo a certain amount of absorption along the concavity of the curvature, and to assume a somewhat cuneiform or wedge-like appearance, while the articulating processes on the convex side become, to some extent, separated from each other, as may be seen on examining the preparations contained in various anatomical museums.

In long continued cases the pressure may cause this change in the form of the vertebræ to take place even where (as the pelvis and cylindrical bones retain their natural figure) there is no proof of there being any abnormal composition or want of earthy base (phosphate of lime) in the bones. It is probable, however, that where there has been for some time a defective state of health, a diminished deposit of the earthy portion of the bone takes place, even where the constitution cannot exactly be said to be rickety; for in various specimens of vertebræ from spines affected with lateral curvature which I have examined, the cancellous structure has appeared less dense than natural, and their surfaces have presented a large number of foramina, and consequently a somewhat cribriform appearance, in consequence of the unusual size of the Haversian canals; and this state has appeared especially marked on the concave side of the deformity. It is, moreover, well known that lateral curvature assumes a more acute form, and progresses more rapidly in the early periods of life—before puberty, at which time chemical analysis has shewn that the bones possess a less amount of earthy matter than afterwards. If the system be affected with rickets, the alteration in the shape of the bones is much more extensive than in the cases above named; this affection, however, will be alluded to in the sequel.

Another alteration which takes place in the spine, in cases of lateral curvature, is, that the vertebræ are

very often more or less twisted on their own axes; and usually, those are most so which are situated at the point of the greatest convexity of the curve, though there is not always a strict relation between the amount of curvature and this rotation of the vertebræ. In these cases, the bodies of the vertebræ, instead of being directed forwards, incline more or less outwards in the direction of the curve of which they form a part (the spinous processes of course looking exactly the opposite way); and sometimes they are so much twisted that the bodies and spinous processes are directed completely transversely, while the lateral portions of the vertebræ, including of course the transverse processes, point respectively, anteriorly and posteriorly.

When the curvature has become considerable, and in some instances previous to much deformity having occurred, nature not unfrequently makes an effort to stay its further progress by throwing out an exostosis along the concave surface of the curvature, thus uniting together and rendering the adjoining vertebræ immoveable, but at the same time strengthening the spinal column exactly in the same manner as the cylindrical bones (of the legs or arms) are in some cases prevented from bending further when affected by rickets, by a deposit of ossific matter along the concavity of their bend. While this is to a certain extent a useful process, it makes the back stiff and unyielding; and as, when it has occurred, it renders

the spine incapable of being again restored to its natural state, it is highly desirable that treatment should be adopted prior to this deposit taking place, so that when it does ensue, it may unite the vertebræ together in a favorable position.

Besides the changes which occur in the spine itself, the ribs become altered both in direction and shape; their greater separation from one another on the side of the convexity, and their greater closeness on that of the concavity, together with the mode in which they are distorted, have already been named in the general description of the curvature; but the ribs attached to the concavity (usually, therefore, the left ones), are frequently so close as to be in actual contact and to press upon one another, so that from partial absorption taking place, their shafts become much narrower and rounder than they ought to be and very different from those on the opposite side which retain more of their natural appearance. When, in the severe cases just alluded to, anchylosis of the vertebræ along the inner side of the lateral curve, occurs, the bony matter thrown out sometimes involves the articulations of the ribs with the vertebræ and prevents that motion of the former, which, during the act of respiration, ought, in the natural condition of the parts, to take place.

The pathology of those cases of lateral curvature which depend upon caries affecting the sides of the vertebræ has not been alluded to in this chapter, as

it is the same with that of angular projection and will therefore be referred to afterwards.

II. EXCURVATION OF THE SPINE.

The kind of spinal curvature unconnected with organic disease of the vertebræ, which is next in frequency to the one we have been considering, is that which, from its peculiarity of form, is called excurvation. Cases of this kind differ materially in appearance from those of lateral curvature, as instead of the sidewards bend or the sigmoid flexure, which instances of the latter present, the spine, in cases of excurvation, is arched backwards in the median plane: on the other hand, cases of excurvation may usually be distinguished from those of deformity arising from caries of the vertebræ by the more or less acute character of the spinal projection in the latter class, as compared with the general and uniform roundness of the back and shoulders in the former. Besides the deformity of the spine, there is generally found, on examining cases of this kind, a considerable projection backwards or tilting upwards of the lower angles of the scapulæ; the shoulders besides being rounded, are raised, and in some cases to so great an extent as to be nearly on a line with the ears, and therefore to give the neck the appearance of being much shorter than natural; while the same circumstance causes the outer extremities of the clavicles to be very much higher than they ought

to be: though the shoulders are thus rounded and elevated, there is very little dissimilarity in the size and appearance of them. In some instances, the ribs become flattened at the sides and project in front, so that while the antero-posterior diameter of the chest is increased, its transverse one is diminished, and that condition to which the name of "pigeon-breasted" has been given, is produced: in such cases the sternum itself may either project beyond the level of the ends of the ribs, or, owing to the costal cartilages being bent inwards, may form a hollow space between the ends of the projecting ribs.

This form of curvature arises sometimes as a consequence of long continued illness, when, from the great debility which ensues, the muscles of the back are unable to give the proper support to the spine, so that the intervertebral substances become unduly compressed; but, under these circumstances, and if the cause have not been too long in operation, the deformity will probably disappear as the strength improves, and the health becomes reestablished. In other cases it may arise from long-continued lumbago or general rheumatism of the dorsal muscles; and various occupations, such as those of shoemakers, tailors, sailors, &c., in which a stooping position of the body is often required, may likewise give rise to it. The forward bend of the back in aged people is also another form of excurvation, and in this species a bony union of the vertebræ is very apt to occur, which ac-

counts for the rigidity of the spine, the stiffness of gait and the difficulty of locomotion observable in such cases. Again, another kind of this deformity is taking place amongst the young ladies of the present day, many of whom are becoming round-shouldered in consequence of their dress not resting, as it ought to do, *upon* their shoulders, but pressing *against* the upper part of their arms—the natural and obvious tendency of which is to bring the scapulæ forward, to obstruct the free use of the arms, to cause an unsightly protuberance of the shoulders and upper part of the back, and, what is equally injurious, to produce a contracted state of the chest.

Excurvation usually approaches in an insidious and almost imperceptible manner, and often exists for years without exciting particular attention to the symptoms arising from it, and which are therefore ascribed to other rather than the real cause. The peculiar feelings to which it gives rise are not generally those of acute pain, unless it be combined with spinal irritation, but rather consist in a sensation of constant uneasiness, accompanied with languor and disinclination to active exercise, while the patient frequently complains of cold, particularly in the extremities, a circumstance dependent upon the state of the circulation, which, in some cases, is like the respiration, a good deal embarrassed. This condition is attended with an impaired state of the health, accompanied with more or less emaciation, and it is too often not until the latter

has shewn itself, or until the patient experiences considerable impediment in rising from his chair—and walking is found to be irksome and painful, that the medical adviser is, for the first time, consulted.

The alteration which takes place in the condition of the intervertebral substances, and in the vertebræ themselves is, in principle, similar to what occurs in lateral curvature, but, in excurvation the anterior parts of them, and in sigmoid flexure the lateral portions, are principally affected. In the early stages the fibro-cartilages are merely compressed, but if the cause remain some time in operation, their anterior portions become absorbed and therefore, of course, much diminished in thickness, so as to give rise to a more constant bending forward of the body. The bodies of the vertebræ likewise undergo a change, and from the appearance presented by specimens I have examined they become softer, more porous than natural, and the number of the foramina for the transmission of vessels is apparently increased and the foramina themselves enlarged; then, by the superincumbent pressure, the thickness of their anterior part becomes much diminished. What, however, they lose in thickness, they gain in their antero-posterior diameter, for the bony substance of which they are composed, appears, as it were, squeezed into ledges, which project from the margins of the upper and lower surfaces of the bodies of the vertebræ, so that a spinal column affected with this disease presents, especially when viewed laterally, a number of ridges or ledges on each side of

the intervertebral substances, which are themselves also frequently so considerably diminished in thickness, as to bring the two contiguous ridges into near or immediate contact. Indeed nature often produces exostosis, so as to unite these contiguous ledges of bone, and thus, apparently, to afford the column that degree of strength and solidity, which it previously wanted; but at the same time rendering its return to a straight position absolutely impossible, should the deposition of bone occur, while the column is excurvated. This exostosis occasionally takes place to a very considerable extent; in some cases covering one side, in others the anterior part, or in some instances even the whole of several or many vertebræ: if the curvature be lateral, the ossific deposit, as already stated, most usually takes place on the concave side, as if to support this, the weakest part of the column; so in excurvation, it is sometimes deposited on the anterior surfaces of the bodies of the vertebræ, apparently for the same object; frequently, however, in this form of curvature, the deposition takes place on the sides of the vertebræ, but is often limited to one half of their surface by an extremely well defined line, and, under these circumstances, is far more frequently met with on the right than on the left side; an interesting fact, but one which is not readily explained. Out of twenty-one cases of excurvation which I examined, in three instances there existed no exostosis, and in five others the exact seat it occupied was not noted; in the remaining thirteen, it existed principally

on the anterior part of the bodies of two only; on both sides equally in three; more on the left than on the right side of the bodies of the vertebræ, in none; but more on the right side than on the left side in no less than eight.

Exostosis occurs not unfrequently on diseased spines without there being any curvature, and indeed may tend to prevent that deformity from taking place. Thirty-nine such examples were met with, and in twenty-eight of these, notes were taken of the precise situation occupied by the exostosis, and gave results very similar to those afforded by the specimens of excurvation; in three instances, the ossific deposit covered the whole of the bodies of the vertebræ, but in none did the deposit appear principally about the middle of their anterior surfaces; in four cases, the two sides were equally affected with the exostosis; in three it had principally taken place on the left, and in eighteen principally on the right. The following tabular arrangement will, however, render these results more obvious:

	Cases of Excurvation.	Cases of Exostosis without Curvature.
No Exostosis	3	0
Exostosis covering the whole of the bodies of the vertebræ	0	3
—— covering the anterior part of the bodies	2	0
—— —— equally the two sides of the bodies	3	4
—— —— the left side principally . .	0	3
—— —— the right side principally . .	8	18
	16	28

Exostosis, in by far the majority of instances, takes place to a greater extent from the upper and lower edges of the vertebræ, than from any other part of their bodies, and so, by this means, the different vertebræ are anchylosed together, and the intervertebral substance is completely covered and hid from view,—large projections of ossific matter frequently forming themselves before these spaces. It is more rare for anchylosis to occur between the articulating or spinous processes than between the bodies of the vertebræ; but in long continued cases, this result sometimes takes place, rendering motion of that part of the spine as impossible as if the anchylosis had taken place between the bodies of the vertebræ; and any deformity, therefore, which may exist in the spine will be altogether permanent. When still more extensive exostosis takes place, anchylosis of the ribs with the vertebræ ensues, as in cases of lateral curvature, and thus their participation in the action of respiration is prevented, while that function of course becomes laboured, difficult, and often distressing to the utmost degree.

III. INCURVATION.

This form of curvature is less common than those which have been already described, but its effects, especially when occurring in the female sex, are often very troublesome, and may even, under certain cir-

cumstances, be the cause of much danger. It occurs most frequently in the lumbar region, occasionally, however, it is met with in the lower part of the cervical, or in the upper dorsal region; but in these cases it is always combined with lateral deviation, or with that form of distortion which has already been referred to, as the rotated or serpentine deformity of the spine; under which circumstances it is often attended with much disturbance of the functions of the lungs and heart. When the lumbar region is affected, the spine is so much arched forwards, that if a line were drawn from the upper part of the back to the lower part of the sacrum, a distance greater than natural and which sometimes amounts to 4 or 5 inches, would exist between it and the lumbar vertebræ. Owing to the incurvation of this region, the abdomen usually projects exceedingly forwards, and there is great rotundity above the hips; while, if the individual be able to walk at all, the carriage is exceedingly stiff and formal; but the circumstance which renders this deformity so serious to females, and on account of which it so urgently demands the greatest attention, is the fact of the superior aperture of the pelvis being frequently narrowed, owing to the projection forwards of the sacrum, together with the lumbar vertebræ, thus rendering parturition in all such cases proportionally difficult and hazardous, and sometimes even impracticable without the aid of instruments. The severe symptoms produced during the progress of a

case of this kind, are well marked in the history of a case which will be subsequently given.

The most frequent cause of lumbar incurvation is a shortening of one of the lower extremities, which may depend either upon accident or disease, but which most commonly arises in these instances from long existing disease of the hip-joint: frequently, however, it has a constitutional as well as a mechanical origin, the bones being deficient in the amount of earthy base, similar to what has been described as often occurring in lateral curvature. Sometimes incurvation only forms part of a more general deformity of the spine (or indeed of the whole body) dependent upon rickets, the spine giving way in the lumbar region, owing to the pressure on this part of the weight of the head and shoulders.

TREATMENT.

The treatment of the different forms of spinal disease which have been thus far considered must necessarily vary according to the peculiarity of the curvature—whether lateral, excurvation or incurvation—which may exist in each individual case, besides being modified by the length of time which has transpired since its commencement, the particular causes which have led to its production, and the various incidental circumstances which have occurred during its progress and partially affected the result. These are of a nature so exceed-

ingly diversified, that no two cases are in all respects alike; but the general pathological conditions on which the deformities depend (as pointed out in the preceding observations) being understood, the *general principles* of treatment will readily be seen, and will merely require to be varied so as to suit the peculiarities of individual instances of the disease and the modifying circumstances just alluded to. Besides the pathological conditions or proximate causes, the predisposing and exciting circumstances must, however, be taken into consideration, and should, as far as possible, be removed; and this being done, if the deformity be slight and of recent occurrence, but little further treatment may be necessary to aid the powers of nature in restoring the spine to its natural form, and thus effecting a cure.

The efforts of nature in counteracting the effects of accident and disease, are, indeed, truly surprising; though instances frequently occur, where, from the interposition of other causes, these efforts are inadequate to meet the peculiarity and emergency of the case. On these occasions the assistance of medical and surgical skill is required.

The influence of deteriorated health in the production of the disease has been shewn to be very great, prevailing not only as a predisposing cause, which renders the effects of the exciting causes much more mischievous, but also existing as an effect, aggravated by a continuance of that disease which it was mainly

instrumental in producing. Where this is the case, it is obviously necessary that close attention should be paid to the state of the general health, and that such medical treatment as the condition of the patient may suggest, should be adopted; the state of the digestive organs, especially, requires strict attention. In all cases, whether the predisposing causes be traced or not, the exciting ones should be sought for, and as just stated, removed if possible, or else alleviated or compensated for. Where the one cannot be effected, the other frequently may. Thus, the shortening of a lower extremity from disease of the hip joint, fracture of the femur, &c., may be the cause of lateral curvature or incurvation, owing to the oblique direction of the pelvis which it produces: in such a case, though we cannot render the limbs of equal length, we may restore the pelvis nearly to its original position, by recommending the patient to wear a high-heeled shoe, or by compensating in some such way for the shortness of the limb; and if the curvature be not already severe, it may, by these means alone, be relieved or perhaps cured. So, also, when curvatures can be traced to have their origin in constrained positions or the over-action of one set of muscles, means adapted to the circumstances of the case must be taken to obviate the former, or where the curvature is not great, to counteract the effect of the latter by bringing into action the muscles on the other side of the trunk. Should the curvature be considerable when the case first comes under notice, exercises

will of themselves be quite insufficient. Indeed, they are decidedly better postponed, and means of a different kind which will presently be described, should be adopted, in order to remedy the deformity and to bring the vertebræ into a proper position. When deemed necessary, a very useful and efficient, and at the same time, a simple plan of exercising the muscles attached to the dorsal curve, is the following: a piece of turned wood, about one inch in thickness and two feet in length, is suspended by a cord at each end from the ceiling, and at such a height from the floor that the patient can just touch it: taking hold of this, the patient is able to suspend himself by the hands and arms for a few minutes at a time, the weight of the pelvis and lower extremities acting on the spine: when the curvature is to the right, the patient, when using the exercise, should accustom himself to suspend the body by one hand only, the left, and vice versâ. Another useful plan is, to have a steel spring like that of a patent spring weighing machine, with a handle attached, fixed firmly to the wall, at about the height of the patient's arm when extended; standing at a little distance from it, taking hold of the handle (in right dorsal curvature with the left hand), the patient should several times, successively, draw out the spring as far as he is able, at the same time, on each occasion, inclining the head and neck considerably to the right. In this way, the muscles tend to draw the curved dorsal portion of the spine to the left side, and

thus to rectify the deformity. In some instances of lateral curvature, in the *early* stages, and especially where it has originated primarily in the lumbar region, advantage may be derived from the use of the lateral rocking exercise, as recommended by Dr. Duffin and Mr. Stafford. But in instances where the disease has made greater progress, when the distortion has assumed a more decided aspect, the spine becomes unable properly to support the head and upper extremities, the weight of which has a constant tendency to increase the curvature.

So long as the vertebræ, united to each other by the intervention of fibro-cartilage, and rendered firm by the addition of strong and powerful ligaments and articulating processes, retain their natural position, they form a column combining pliability and strength with lightness and elegance, and which, while it admits of the greatest variety of easy motion, is amply strong enough to bear the usual superincumbent weight of the head and shoulders: but when the spine is weakened and distorted by disease or external injury, and especially where the curvature has made considerable progress, it becomes incapable of properly sustaining, as in its healthy condition, the weight of the head, arms and shoulders; and hence, reason plainly points out, as a preliminary step to its cure, that all superincumbent pressure should, as much as possible, be removed from it, until the part affected, by judicious management, regain its natural position. A slender

prop, whilst it remains sound and in a perpendicular position, will support a superstructure of considerable weight; but should it become deteriorated by decay, or deviate from its upright position, it soon loses its power of resistance, and sinks under the weight it was before able to sustain; in like manner the spine, the great pillar of the body, when attacked by disease, or forced from its natural form, becomes weak and inadequate to the discharge of its legitimate functions.

On the subject of mechanical assistance in the treatment of diseases of the spine, there has long been a difference of opinion, for while some argue strongly in its favour, others are disposed to reject it altogether. In many cases of conflicting opinions, the truth is found about midway between the contending parties, and this may probably be the case in the present instance.

Much caution should certainly be observed in having recourse to mechanical assistance, for though there are some contrivances which have been found of utility, many others have been invented for the prevention and removal of spinal deformity, such as steel stays, back supports, headswings, and others of a similar kind, which, from their construction, not only subject the wearer to very disagreeable restraint, but are actually productive of much mischief; for while the patients naturally endeavour to relieve themselves from the uncomfortable feelings they experience, they necessarily give way to those dangerous positions which, though affording temporary relief, are yet cal-

culated to increase the deformity. Many young persons, for whose benefit such expedients have been resorted to, have become rapidly worse in consequence of their use. Indeed, the attempt to correct distortion by violent means is manifestly wrong; for although the shoulders, for example, may thus be kept back for a time, they are afterwards more liable to incline forwards, from the fatigue and debility induced by these means: all contrivances of the kind, by their pressure on the bones and muscles which support the upper part of the body in its erect position, must interfere with the natural motions of the back, chest &c.: so that when deformity is the result of debility of the muscles, or of a want of equilibrium in the muscular force, the use of steel stays, by rendering the muscles inactive, absolutely weakens them. There is, besides, another objection, which ought not to be over-looked: the greater number of these contrivances are formed to embrace the hips tightly, and to concentrate the whole weight of the head and trunk upon these parts, the effect of which, especially when there exists a rickety condition of the bones, must be a contraction of the apertures of the pelvis, produced either by the pressure acting on the crests of the ilia, or by its inducing distortion of the pubic bones—both of these being serious alternatives. The injurious effects of such contrivances may be seen by reference to the case of Miss McK. (Case I.), who made trial of a pair of steel stays of the most approved construction, but while she was

using them for a few months, the disease made greater progress than during the whole previous period of its existence.

Of all the inventions of this description which have been referred to, none are less to be recommended than what are called head or neckswings; they are attached by a steel rod, which passes over the head, to stays of the same material, supported on the loins and hips by means of pads, and are intended to support the weight of the head, while the stays are so contrived, as to press upon the shoulders and other parts of the trunk, which may project. Crutches for the support of the chin, shoulders &c., though less injurious, are as little to be recommended as far as regards the cure of the deformity, as the neckstrings.

As has been already said, however, many cases of lateral curvature come under observation which, having been neglected in the earlier stages, are so far advanced as to offer no rational prospect of benefit by the employment of exercises, and in which, therefore, mechanical assistance of some kind must be had recourse to. When this is the case, the chief indications to be fulfilled in the plan of treatment are to relieve the spinal column from the weight of the head and shoulders, which, in its diseased state, it is unable properly to sustain; to produce gradual and perfectly easy extension of the spine, which will assist the distorted vertebræ in resuming their proper position; to apply pressure in the proper direction to the projecting

or convex parts; and, at the same time, by sufficient exercise, where it appears called for, to give tone to the muscles of the back. Steel stays and head-swings, however ingeniously contrived, fail, from their very nature, to effect what is here required; and, indeed, it is only by the use, occasionally at least, of the recumbent position, conjoined with mechanical assistance, that those objects can be efficiently carried out. In accordance with these views, I have for many years employed, in such cases, an apparatus of which the following is a description; and have endeavoured to base its use, which has been attended with the greatest success, upon close observation, a strict attention to the formation and functions of the part diseased, and to the powers which nature will call forth when her actions are properly aided and supported by the necessary and powerful assistance of time. It consists of an inclined plane, two feet in breadth and six and a half in length, furnished with feet or made to rest securely upon a proper framework. At the upper part are three pullies, of which the two outer ones are raised about three inches, and the middle one five inches above the level of the plane; the former ones are about eight inches asunder, and, therefore, each about eight inches from the angles of the plane, while the centre and higher one is placed midway between them: two pullies are also attached to the lower end of the plane, and elevated, like the two outer ones at the upper part of the plane, three inches. About

one-third from the upper end, and six or eight inches from the sides, two openings are made through the plane, into which also pullies are introduced.

A very thin and firm mattress may be placed upon the apparatus, and upon this the patient reclines: the plane is also furnished with weights for extension and with compresses according to the circumstances of the case, as will be presently described. A support for the head, made of soft leather, stuffed with curled hair or cotton wool, and intended to pass under the chin and occiput, is attached to a cord, which passes over the centre pulley, to which a weight is suspended: shoulder straps, composed of the same materials, and attached in a similar manner, pass under the axilla of each arm, and over the outer pullies, having weights also, when required, adjusted to them: similar means of extension are also applied round the ankles, and occasionally in the male sex above the pelvis; these are passed over the pullies at the lower end of the plane.

In cases of lateral curvature, where the right shoulder is much higher than the other, it is advisable to use extension upwards, only on the left side, whilst on the right it should be used downwards: this may be effected by affixing a shoulder strap to the lower side, and a smaller padded strap for the wrist, on the higher. It is also very useful in cases of considerable projection of the hip or side, to have two, three, or four openings made in the plane, and pieces of wood, six or eight inches long, protected by cushions of leather, intro-

duced, so as to make a lateral pressure, at the same time that extension is used; or the pressure may be effected by steel springs affixed to the sides of the plane. The weights are so regulated that they do not, on any account, inconvenience the patient. The patient being laid upon the plane and the apparatus adjusted, will be operated upon by a double extension; the head and shoulders will be extended upwards, whilst the trunk will be drawn steadily in the opposite direction, the weights being so equipoised that the body is kept upon the plane, not having a tendency to move either upwards or downwards, whilst, at the same time, the distorted parts are gradually restored towards their natural position: hence, is completely obviated the objection of some practitioners, who think that an inclined plane is not desirable on account of the weight of the upper part of the body pressing on the lumbar vertebræ, because here, the pressure downwards is counteracted by the extension upwards.

Much advantage may be gained by combining with extension of the column a certain amount of pressure on the most projecting portions of the spine, and on the prominent parts of the ribs. This pressure may be of two kinds: either by the hands or by means of a spring compress, and each of these plans is of use. When pressure by the hands is adopted, it should be for a few minutes at a time, once or twice a-day, and in such a direction as a knowledge of the anatomical condition of the parts would indicate in order to

restore them as much as possible towards their normal position. The spring compress alluded to consists of a well-padded disc of metal, so formed as to suit the size and form of the projection, affixed to one end of a steel spring, the other end of which slides horizontally into a groove in the top of an iron rod; this rod is attached perpendicularly to the side of the plane, but so that it can be moved upwards or downwards by means of a screw. As it moves, it carries with it, of course, the compress attached to the end of the steel spring, so that in proportion as it is depressed by means of the screw, it causes more pressure on the projection of the rib, or of the spine, as the patient lies upon the plane; while, at the same time, the elasticity of the spring prevents the pressure from interfering with the movements of the chest during respiration. This mode of using pressure may be employed for half an hour, an hour, or more, at a time, twice or thrice a-day, while the patient is in the prone position, and the degree of it must be regulated by the judgment of the medical adviser. Throughout the progress of the treatment, it is desirable that friction should, at stated intervals, be regularly applied to the seat of the disease and the parts adjacent, for the performance of which the warm hand is perhaps the best adapted, especially when unctuous liniments are made use of; a proper degree of pressure should at the same time be made on the convex side of the curve. The salutary effects of friction, when properly followed up, are very consider-

able: when adopted, it ought to be most efficiently carried out, and practised with the most determined perseverance.

Those cases of excurvation which are too far advanced to admit of benefit from exercise, and in which, nevertheless, anchylosis has not yet taken place, should be treated by means of recumbency and slight extension, alternately in the supine and prone positions. When the former position is being used, great advantage is derived by the application of shoulder straps, to each of which a short cord and a weight are attached, and passed through the openings in the upper part of the plane already referred to. A similar plan may be adopted when one of the shoulders projects in a case of lateral curvature. While the patient is placed in the prone position, recourse should be had to frictions and compression on the convex part of the curve, which will be found to be highly beneficial. By these means combined, a very marked effect upon the rounded part of the spine will, generally, soon be produced; and, with the adoption of constitutional treatment, symptoms, sometimes of an apparently serious nature, will disappear. In instances of projection of the sternum (when the patient is said to be pigeon-breasted), a piece of padded leather, or other similarly firm substance, is used with great advantage, being made for the purpose of passing over the projecting part, and the pressure is gradually increased or diminished as may be found necessary. In the excurvation

of aged persons, anchylosis very speedily takes place and it is not advisable to attempt any treatment, unless at a period when the curvature first manifests itself, when, by their adopting a supine recumbent position on a firm sofa, for two or three hours daily, and having the state of the general health attended to, a great deal may be effected towards preventing its further progress, and even improving the form of the spine; under which circumstance, if ossific matter be thrown out, anchylosis will take place in the improved position, and the functions of the internal organs will be more naturally performed than would otherwise be the case.

When referring to the importance of ascertaining the causes of deformities with a view to their treatment, the mode of remedying that form of incurvation, when not very severe, dependent upon a shortening of one of the lower extremities was instanced: there are, however, other cases of this form of distortion quite independent of any such cause, and some for which no obvious cause beyond an unnaturally soft condition of the bones can be assigned. In no cases of this kind of curvature do calisthenic or gymnastic exercises appear to be of advantage excepting sometimes those in which the patient, swinging by the arms, raises the lower extremities from the ground, and so makes them and the pelvis a weight attached to the spine, which they thus tend, under the circumstances, to straighten. It is better in such cases at once to have recourse to the

recumbent supine position, with moderate weights attached to the lower extremities; and where the incurvation (as it is almost always the case), is in the lumbar region, advantage will be derived from having a broad compress, which may consist of a piece of leather, eight inches in width, and twelve inches in length, lined with carpet or other similar substance, passed from one side of the plane to the other, across the abdomen, and so arranged that, by means of straps attached to it, it can be tightened at pleasure: it will thus, when applied, cooperate with the recumbent position and the gentle extension employed in restoring the incurved portion of the spine to its natural position.

Amongst the objects to be kept in view in this plan of treatment, and the advantages to be derived from its adoption, the following may be named:—

First—By means of the inclined plane (which is equally well adapted for the supine and prone positions) with extension and pressure, gradually to bring the distorted part of the body into as near a form of symmetry as may be; and, of course, to keep it in that state.

Second—By frictions and shampooing, or, in some cases, by handswings or other gymnastic exercises, compatible with the first object of treatment, to develope those muscles which may have been inactive.

Third—During the time the patient is undergoing the mechanical treatment, there is full opportunity for adopting a proper course of medicines, the efficacy of which depends much upon steady and regular perse-

verance—the object being to improve the health, to forward the deposition of healthy ossific matter in the bones, and to assist nature in establishing the healthy function of each organ.

Fourth—At the same time, a very favorable season is offered for the adoption of a regular system of diet, which is of great importance to the beneficial operation of the prescribed remedies. Though contrary to the opinion held by many, I can confidently state, that the recumbent position, when combined with proper constitutional treatment in the cure of spinal disease, is attended with the most beneficial effects as regards improvement of the general health; for, in almost every instance which has come under my care, while the disease in the spine has been undergoing improvement, the individual has also, at the same time, become both stronger and stouter. These points are very important, because if the health be not improved, any amendment in the form of the curvature will be of little avail, as on the patient reassuming the erect position, he would probably soon relapse into his former state.

Fifth—Another important advantage consists in this—that all the pressure being by this treatment removed from the chest, the movements of respiration are more easily and perfectly performed, and the free action of the heart is less interfered with. The great expansion of the chest, and consequent increase which takes place in the breathing capacity of the lungs has been already referred to. Page 60.

Although it may be difficult to lay down a general plan of medicinal treatment applicable to all cases of spinal deformity and the accompanying disorders of the general health, yet a few remarks may be offered; bearing in mind, that the special treatment of each case must be determined by a careful consideration of the case itself. As a general observation, however, it will be found that there is, in most instances, more or less derangement of the digestive organs, amounting in some, even to a cachectic habit of body. In commencing the treatment, it will be necessary to ascertain precisely the state of the secretions; and, where defective or redundant, to pursue such a course of medicine as will be likely to restore them to a healthy condition. When, however, the patient exhibits any peculiar habit of body, as a tendency to scrofula, rickets, &c., along with such alteratives and purgatives as may be required—chalybeates, the iodides, and fresh-made syrup of sarsaparilla, used either alternately or conjointly, will be found very beneficial; great pains ought to be taken in the preparation of the latter, and its use should be steadily and sufficiently persevered in. In chlorotic and hysterical females, by a regular use of these remedies, with preparations of iodine or iron,—or the two together,—combined with a generous light diet, frictions, and well-ventilated apartments, a striking improvement is frequently obtained, even in the space of a few weeks.

A great majority of the cases of lateral curvature

are accompanied by constitutional disorders, especially in females from fifteen to twenty years of age, who have pallid complexions, furred tongues, torpid bowels, uncertain appetite, occasional headaches, irregular catamenia, drowsiness, slight emaciation, indisposition to exercise, and an unsteady or lounging gait, indicating a deficiency of vigor in the general system. Cases of this description soon experience great relief by a steady administration of the foregoing or similar medicines, with a properly regulated diet, and daily ablution of the body, using warm or cold water, according to the state of health.

Ablutions of different kinds, selected with due regard to the state of the patient, are highly salutary. In cases of extreme weakness, and where the health is in an unfavorable state, sponging the body, either partially or entirely, is an excellent practice, as is also the use of the tepid bath; but when the health is firmer and the constitution more robust, the shower-bath may be substituted with decided advantage, particularly in the summer season. Cold bathing is, beyond doubt, one of the best tonics we possess, but its good effects are often frustrated by its being employed when the patient is in an improper state for its application. Congestion of the digestive organs, a symptom which generally accompanies diseases of the spine, should be removed, and it should be ascertained that the secretions are in a healthy condition. These preliminaries being closely attended to, bathing is of

essential service, and may be practised either by means of the shower bath or immersion.

After recovery, a temporary residence in or near a maritime town is very desirable, and those spas are more particularly to be selected, the waters of which possess chalybeate qualities. The change of air, and the application of sea water to the skin, either by sponging, the shower bath, or immersion, have a very invigorating influence upon the state of health; nor is the benefit to be overlooked, which arises from the change of scene: the excitement occasioned by new objects, and the constant occurrence of fresh incidents, give the charm of novelty to the whole, and call into activity the energies both of the body and the mind.

CASES OF LATERAL CURVATURE.

CASE I.

The engravings at the commencement of this chapter illustrate a case of lateral curvature, which on account of its long continuance and great deformity, might have been considered as affording but little hope of recovery. Two of the plates, Nos. I. and III., exhibit the bust of a young lady, Miss Mc K., aged eighteen years, and resident in one of the northern counties of Scotland: they are from casts taken at the time she commenced treatment. Nos. II. and IV. exhibit the same case, after the patient had been twelve months under my care.

The following is the account which I receivd from the young lady and her mother, relative to the state of her health, and the origin and progress of the disease :—

She was a small delicate child when born, and during the first six weeks in a state of almost constant suffering; she subsequently improved, and went on much as other children do; her complexion was good, but she was never stout; she began to walk when about eighteen months old. When six years of age, that is twelve years ago, she had the scarlet fever, hooping cough, and "worm-fever," in almost immediate succession, and so very severe and long continued as to produce extreme emaciation; the danger was imminent for six weeks: the child had constant diarrhœa, the evacuations being bad in colour, and very offensive. Of these complaints she gradually recovered, but seven years ago was again confined for upwards of three weeks, with a febrile attack which left her exceedingly weak. In the spring of 1834, her mother happening to be present when she was dressing, observed such an appearance in the form of her back, as convinced her that deformity had taken place; she had, for many months before, noticed a peculiarity of gait, and an unnatural motion of her head, which she now felt assured was connected with this distortion.

Upon further inquiry it was found that she had felt very weak, and had suffered much inconvenience for at least a year previous to the time at which the appearance of her back attracted her mother's attention.* On examination by her medical adviser, it

* But from the account she gives, and the state of the spine, it is probable she had been affected by the complaint from the time she was eleven years of age.

was seen that a curvature of the spine had taken place, that the left hip was becoming large, and that the ribs on the right side protruded considerably. The patient complained of much suffering in the right shoulder and ribs; she had also a feeling of great weakness throughout the spinal column, particularly about the upper part of the curve. Several medical gentlemen were successively consulted, resident in England as well as in Scotland, who recommended friction, issues, tonics, the recumbent position, &c. Her health, at this time, was in a very indifferent state; she became exceedingly emaciated, pale and sallow, and her situation was such as to cause great anxiety to her friends. Under these circumstances, steel stays were recommended to support her back, and a pair was procured from an eminent maker in London, which she wore about five months, but during their use, became rapidly worse.

In August, 1836, her professional adviser, Mr. Hall, now resident in Glasgow, wrote to me, giving an outline of the case and requesting my opinion. In reply to this communication, I stated, that though the case was a very unfavorable one, I had no doubt that were a proper course of treatment adopted and steadily persevered in, she would obtain, if not a perfect cure, at least such alleviation of her suffering, as would be quite satisfactory; and she shortly afterwards came under my care.

When I first saw her, the deformity had assumed the serious form represented in plates Nos. I. and III. The left scapula rested in a complete fossa formed by the posterior part of the ribs, which were rendered concave instead of convex, and these, by their junction with the spine, had pushed a portion of the column under the heads of the ribs on the opposite side, four of the vertebræ having thus so far disappeared

as not to be perceptible without a careful examination; the ribs on the right side formed a curved but somewhat perpendicular ridge, which it required some degree of attention to distinguish from the spine itself, the entire trunk presenting a very extensive sigmoid distortion. The integuments on the left side had a most singular appearance, for, owing to the curve in the loins, a duplicature or double fold was formed, which extended from below the left scapula, round the hip, and across the umbilical region, towards the right side. On suspending a plumb-line from the base of the occiput, it shewed that the column had diverged four inches and a half in the dorsal division, whilst the left ilium, at its greatest projection, was distant full eight inches from the median line. The cervical vertebræ participated in the affection, having a slight curvature to the left side, with an inclination of the head in the contrary direction; this curvature constituted the upper part of the deformity, the largest curve being formed by the dorsal vertebræ to the right, while a slighter one existed in the lumbar region to the left. She had suffered exceedingly from the pain in her back, which of late had greatly increased: her health was in a very unfavorable state, she was exceedingly weak, and could bear so little fatigue that she was quite exhausted if she took but half or even a quarter of an hour's walk: she was much emaciated, and her digestive organs greatly disordered, the bowels being constipated, secretions unhealthy, and urine turbid; she complained also of constriction in the epigastric region, and of oppression in her breathing. Catamenia had not yet appeared. Pulse, eighty-six; tongue, white and furred.

On the 1st of October she commenced treatment; the recumbent position was adopted, with the use of the plane already described; the weights were gradu-

ally increased, and pressure was applied by means of compresses to the protuberant parts.

January 2nd, 1837. After three months' treatment, and perseverance in a course of alteratives, with occasional calomel purges, salines, and light vegetable tonics, very perceptible improvement has been obtained; her general health is greatly improved, appetite good, secretions more healthy, and she has gradually lost the wan and emaciated appearance which she had on her arrival. There is an increase in her weight of five pounds, and she has gained two inches and three-quarters in stature.

April 3rd. The amendment observable in her form, and in the state of her general health, is gratifying and regularly progressive. Her skin has assumed a more clear and healthy appearance; there is a considerable increase of adipose tissue, and her appetite is greatly improved: the sensibility of the spine is greatly diminished; catamenia have commenced, and she is now decidedly in a state of convalescence; all the symptoms indeed are such as to encourage a hope, that not only will the spine be restored nearly to its proper figure, but that her health will likewise be reestablished.

July 3rd. The patient continues to improve in all respects; she has become stout and healthy in appearance; is entirely free from any general symptoms, and each succeeding month she has experienced an augmentation in weight, and become proportionably taller. Her medical friend, Mr. Hall, has this month paid her a visit, and among other warm expressions said, that "had he not had an opportunity of satisfying himself, "by ocular demonstration, of the surprising alteration "that had taken place, he could not have given credit "to it."

September. An epidemic, similar to the influenza

which prevailed at the beginning of the year, is now very prevalent, of which she has had a smart attack, accompanied with considerable inflammation of the lungs; this, however, is now relieved, but it has reduced her strength considerably; in other respects she is going on very satisfactorily.

October 1st. The spine has almost regained its natural position, the folding of the integuments has nearly disappeared, her figure is proportionably restored to its natural state—her height having increased more than five inches. The complexion has improved, her countenance is more animated, all the functions are regularly performed, and the body has acquired much of what is understood by "embonpoint." She is now allowed to leave the plane more frequently and to walk about the room a little, daily; and, in the course of a short time, as she becomes more accustomed to the erect posture, will take exercise in the open air.

November 13th. She left for Scotland this day, considerably recovered from her recent indisposition, but not looking so well, nor being so strong as previous to the attack. Catamenial periods have continued quite regular.

The treatment, in this case, from the severity of the symptoms, was necessarily protracted having been continued for twelve months; its effects, however, as shown in the plates Nos. II. and IV., were great and highly gratifying. The case exhibits to how great an extent lateral curvature may proceed, when not timely checked in its progress, while it also shews that even in cases of the most serious description, it is generally in the power of medical and surgical science to afford efficient relief, if not entire recovery.

From a Cast

From a Cast

Case II.—(Plates V. & VI.)

Miss E. M——, aged fifteen years, was placed under my care on the 4th of April, 1846. She was from the county of Lincoln, the locality where she resided being well cultivated, open, and dry; she was tall in figure, of slight conformation, fair complexion, and of an active nervous temperament. There did not appear to be any hereditary predisposition to the disease, her father, mother, and only sister being very healthy.

History.—She was delicate during infancy and childhood, suffering considerably from the various illnesses incidental to this period of life. She had the measles when about nine years of age, and the scarlet fever when twelve: from the latter she recovered very slowly, and from that time her health had been much more delicate than before; she suffered much from extreme debility, accompanied with sensations of languor and faintness, more especially for two years previous to coming under treatment; during that time she had scarcely passed a day without these feelings; the latter of them had been so considerable, that if she stood long or walked much she completely fainted; her breathing likewise was short and difficult. A curvature of the spine with some projection of the right shoulder, had been observed a year before she had been attacked with the measles (*i. e.*, seven years before I saw her), but at that time it made but little progress; though it had increased somewhat before she had the scarlet fever, it was not until after this disease that the increase was considerable; from that period, however, its advances were rapid, and the deformity continued to progress to the time of her coming under treatment.

When I first saw her she still suffered greatly, was exceedingly weak, and much emaciated; when she stood up, her body bent considerably to the left side; this was owing to an extensive sigmoid flexure, occupying the whole of the spine: the largest curve included the whole of the dorsal and two of the lumbar vertebræ, its convexity being to the right side, thus raising that shoulder, and proportionally depressing the other; besides being thus curved, three or four of the dorsal vertebræ were so rotated on their own axes, that their facets of articulation with the ribs of the right side looked almost directly backwards, and those for the left ribs, of course, in the opposite direction. The ribs, therefore, of each side were necessarily very much twisted, the right ones being exceedingly excurvated backwards, thus causing the scapula over them to project very considerably, and the left ones, especially below the scapula, being equally bent inwards. So much, indeed, were the right ribs bent backwards, that from this circumstance, and the rotation of the portion of the spine already alluded to, the spinous processes of three of the dorsal vertebræ were almost entirely hidden by them; and when she laid upon her back, so that the right scapula rested upon the plane, the left one was at the distance of an inch and a quarter from it. There was a space of fully three inches and a half between the left side and the arm in its dependent position, while the projection of the hip of that side was no less than two inches and three-quarters. On a front view, the whole trunk appeared much emaciated, the transverse lines on the sternum being very distinctly visible: this bone inclined at its lower part towards the right side, having been pushed into that position by the left ribs, which were much compressed, and projected lower into the abdomen than those of the right side, reach-

ing down, indeed, below the level of the crista ilii; the left ribs, anteriorly, were more rounded, and the right ones more flattened, than natural; the breasts were very little developed, but the right one still less than the left. She did not suffer much from spinal tenderness or irritation, but greatly from a feeling of weakness along the whole course of the vertebræ; this was also much increased by walking, after which, and on the day following, she always felt languid, faint, and exhausted, besides which it was productive of much dyspnœa, and sometimes of palpitations. She was not subject to any habitual cough, nor were there physical signs either of permanent pulmonary or cardiac disease. The appetite was very defective, the bowels confined, and the evacuations tar-like in appearance.

Under the preceding circumstances, the recumbent position was adopted for the purpose of relieving the spinal column from the superincumbent weight of the head and shoulders, which, in its diseased and distorted state, it was unable to sustain. Gradual and perfectly easy extension of the spine was also employed, which assisted the distorted vertebræ to resume their proper position; pressure by the hand was also made on the projecting or convex parts to incline them to their natural direction. This plan is important, because, if we consider the anatomical relations of the deformed portions of the spine and ribs, pressure can be much more accurately applied, and, consequently, the proper direction more certainly given to the different parts by this than by any other method. These means not only maintain the advantages already obtained, but have a constant tendency to correct still further the deformity.

This patient having considerable derangement of the digestive organs, the necessary measures were

taken from the first to improve their condition, and, consequently the general health. Mild purgatives were given, with the vegetable and afterwards the mineral tonics; and the progress she made was most satisfactory. Her health speedily began to amend, and by the end of July, the prominence of the right ribs and scapula had so far diminished that, as she laid on the plane, the left shoulder touched it—the two scapula being, therefore, nearly on a level. The spine had also become much straighter; while, anteriorly, the right ribs, which were previously flattened, had assumed a much rounder appearance. She was stronger in walking, her breathing was more free, and the feeling of faintness and debility had materially diminished. A considerable deposition of adipose tissue had taken place, the abdomen was fuller, and the breasts were more developed.

Miss M—— remained under treatment until Oct. 4th, soon after which she returned home; her figure in walking being quite erect; the shoulders nearly in their natural position; the form of her chest, both anteriorly and posteriorly, good; the ribs on each side having much more of their natural curve; and the spine retaining, comparatively, only a trace of its former deformity. The incurvation of the left lumbar region had so much diminished, that the distance between the side and the arm measured only an inch; that is, very little more than on the right side; the left hip, therefore, projected very little more than the right one. The capacity of her chest had materially increased. Her health had become perfectly good, and her complexion clear; she had also gained color and flesh, was much stronger, and had lost altogether the languor, the feeling of fatigue, and difficulty of breathing she formerly experienced. When she stood or walked, she did so with perfect ease: her appetite

was good, the bowels regular, and the state of the secretions quite healthy.

In this case the curvature of the spine, and the rotation of the vertebræ in the dorsal region, were very great, while the lumbar curve was comparatively small. The influence of the attack of scarlet fever in deteriorating the general health, and in accelerating, therefore, the progress of the deformity, appears from the history given to have been very marked; while the results of treatment in remedying the deformity, and the various symptoms dependent upon it, was no less obvious.

CASE III.

The following case, although presenting at first sight, a less amount of actual deformity than some others of lateral curvature, is one of those instances of this form of the disease which offer the greatest difficulties in a remedial point of view. The spinal column was, as usual, curved to the right in the dorsal region; but the great extent to which the vertebræ were twisted on their own axes, and the consequent proportional deformity in a portion of the ribs on the right side, rendered it exceedingly difficult to restore them to their natural shape. Indeed, the distortion of the ribs, which takes place in cases of lateral curvature, not only often adds more to the appearance of deformity than the actual curve of the spine itself, but is also, in the majority of instances, considerably more difficult to remedy.

Miss O——, aged seventeen years, residing in the county of Derby, was very weak, and suffered exceedingly during childhood, having, amongst other complaints, a severe attack of croup, from the effects of which she was long so ill as not to be expected to

recover. When six years of age she had a rheumatic attack of such a degree of severity, that for three months she had to be lifted in and out of bed; from that time to thirteen, whenever she took cold, she had always a severe cough and difficulty in breathing, especially on going up stairs; the coughing would continue at times for two or three hours, so as to produce great exhaustion. She was at this time exceedingly delicate, and lost her flesh to such an extent that her medical adviser, as well as her friends, considered her consumptive. Since then she has suffered much from bilious headaches, which commenced in a morning throughout the frontal region, being attended with giddiness, and affecting the eyes so much that she could not bear to read; these symptoms generally continued the whole day, and she usually retired with them at night: but they declined by or before morning, leaving a considerable degree of nervous irritability during the following day, trembling, and much agitation from trifling causes. She had, at these times, a sensation of heat at the stomach, and very often vomited—the matter ejected being described as both bitter and sour.

The deformity of the spine was first observed about seven or eight years ago, though little attention was then paid to it. It has gradually increased to the present time, more especially within the last three years. During this period she has likewise suffered much pain in the chest and back, but most severely about the ribs of the right side, and her weakness has increased so as to cause her to be much fatigued with trifling exertion; sitting for an hour or two giving her great pain, and producing a sensation of weakness throughout the whole trunk; she also describes a peculiar soreness of the projecting angles of the ribs, when she lies upon them.

Her present general symptoms are (Oct. 16, 1844), as follow:—The complexion is sallow, the skin of her arms and back very rough, the latter having many pimples upon it (acne). She is still troubled with her cough and difficulty of breathing, which are much increased by a slight cold, or by walking up a hill. The cough continued upon her severely for nine weeks during the past summer. There is considerable lassitude on exertion; she is still subject to the frontal headaches, with giddiness, from which, as stated in the previous history, she has long suffered. The bowels are in a very morbid state, the evacuations being excessively crude, of a dark brown colour, and altogether unnatural. There is a sensation of great weakness in the spine, and the curvature presents the following appearances:—The vertebral column is curved two inches to the right, in the dorsal region, there being a compensating curve in the opposite direction in the loins. There is great excurvation of the ribs, on the right side, forming at the same time an angular ridge, which projects, posteriorly, considerably more than the spinal column. The scapula is thus forced to the outer side of this ridge, and is therefore placed on the lateral rather than on the posterior surface of the thorax; hence, in lying down, she rests on the plane, on the right ribs only—the left ones and the scapula on that side being at a distance from the plane of upwards of two inches. Notwithstanding this remarkable incurvation of these ribs, they form a prominence not less singular between the scapula and the spinal column; this is caused by the fourth, fifth, and sixth ribs especially being pushed up by the lower angle of the scapula, and thus forming a prominence as large as the half of a moderate sized orange. The scapula itself rests in a considerable hollow of the ribs, pro-

duced by its having been continually pressed against them by the firm and unyielding stays she had worn. The chest is much contracted, both arms and shoulders having been pressed forward by her dress.

Jan. 16, 1845.—Considerable improvement has taken place both in the form of her back and the state of her health. She has been very little troubled with the headaches, her complexion is clearer, and she has fewer pimples on her back and face; her cough and difficulty in breathing trouble her little, at which we may be the less surprised on account of the great expansion which has taken place in her chest; its capacity having increased from seventy-five to ninety-five cubic inches.

April 16—She has now been under treatment six months, and, considering the very unfavorable nature of the case, both as regards the deformity and the state of her health, she has improved much more than could have been anticipated. The incurvation of the left side is much less, and the protrusion of the ribs on the right side has diminished in the same proportion, so that when she is laid both scapulæ rest upon the plane; the soreness of the distorted ribs has nearly gone off, the ridge-like prominence of these bones is very much diminished, and the right scapula is more readily seen and felt when put into action. Her general health is exceedingly improved, and is now indeed good; her cough has entirely left her, and she suffers from her bilious attacks in a very trifling degree; the state of the secretions is much more natural, and scarcely anything remains of the eruptions on her back and face.

Though it was supposed she had completed her growth, she has increased in height 1¼ in., and on measuring the circumference of her waist and the

length of the stays she wore prior to commencing the treatment, there is an increase in the former of four inches.

CASE IV.

In the preceding case, the increase in the breathing capacity of the chest, consequent upon the removal of the deformity, is stated to have amounted to 20 cubic inches, but the increase is in many instances considerably greater than this; thus, a young lady aged 22, whose case was as similar as possible to Miss McK.'s (Case I.), but perhaps more severe, was only able, when she first came under my care, to expire 62 cubic inches of air, after the deepest inspiration; while, from the increased capacity of the chest, which resulted from treatment, she became able to breathe out rather more than 100—being an addition of at least 38 cubic inches. In this instance the deformity and the contraction of the ribs was such as to leave a space of full 3 inches between the arm and side, the distortion of the hips and other parts bearing the same proportion. The complaint existed when she was 14, and had gradually increased up to the time when I first saw her. The improvement in her deformity, by the treatment adopted, was also very remarkable.

CASE V.

The following case (which, owing to several points of interest connected with it, I published in the *Medical Gazette*) was one of long-standing, and of extreme deformity.

I was first consulted about the middle of October,

1847, on the case of Miss ——, aged 16½ years, residing in the county of York, and obtained the following account of the previous state of her health, and of the progress of the disease up to the time when I saw her.

History.—She was a small and delicate child when born, and during infancy was frequently ill and very fretful: she had the hooping-cough severely when three years old; when five, she complained of great pain in the upper part of one of the lower extremities, especially after any exertion, as in walking, but there was no paralysis, nor was there any disease of the spine known to exist: at the age of six, she had the measles, accompanied with severe inflammation of the lungs, from which period her growth was for some time suspended, and she was altogether delicate afterwards; when seven, it was noticed that she bent to the right side—that the right shoulder was considerably enlarged—that she was soon fatigued, and frequently fell while walking. Two years afterwards, the curvature to the right side, and the projection of the right shoulder, having increased considerably, her medical adviser recommended her to have a pair of steel stays made, which she has continued to wear to the present time. When eleven, she suffered and had done so for some time, from a severe cough, attended with difficulty of breathing and palpitation of the heart: her debility which was always considerable, continued to increase, attended with bad appetite and other symptoms of a disordered state of the digestive organs.

From the period at which the deformity was first observed, the disease and the consequent debility have gone on increasing to the present time, notwithstanding the use of the stays alluded to, and the anxious care of her parents.

Present State.—On examining this patient, I found that the head projected so considerably forward and to the left side, that on applying a plumb-line to the forehead, there was a distance of 4¾ inches from the upper end of the sternum to the plumb-line: the neck was, consequently, scarcely visible on a front view, and the chin approached very near the chest; this twisting of the neck to the left was increased by the hunch (presently to be described), which was seen projecting considerably above the shoulder.

The whole chest was greatly contracted in front, the shoulders being brought very forward, and the sternum projecting much and pointing to the right side. The ribs were considerably excurvated on the right side, while on the left, owing to the compression of the ribs by the stays, to the projection of the hip, and also to the depression of the shoulder on that side, a considerable space or arch to the extent of rather more than an inch and a half existed between the trunk and the arm. The integuments of the chest and abdomen (especially over the left half of the latter) were much wrinkled, and the mammæ flaccid and atrophied.

The dorsal portion of the spine was not only curved excessively to the right, but was likewise very much *ex*curvated, so that the spine and the ribs—which always in such cases participate in the deformity—formed a huge projection, backwards and upwards to the right; this projecting mass was marked by two ridges nearly parallel with each other, the one being formed by the spinous processes of the vertebræ (which looked to the left instead of directly backwards), and the other by the ribs of the right side, which were bent upon themselves, at about an inch and a half from their spinal extremities, into a sharp angle, so as to form the edge or most projecting por-

tion of the hump; indeed, this bend in the ribs was one of the most acute or angular I have met with, and formed a narrow but very projecting ridge (which could be taken between the finger and the thumb) of at least fourteen inches in length. On the outer side of this projecting mass, the right scapula was so placed that its posterior border looked almost directly backwards, while the left scapula was half buried in a kind of fossa formed by the ribs of that side being bent inwards to an extent almost as great as that to which the right ones were excurvated. Three of the vertebræ (the 2d, 3d, and 4th dorsal), instead of being placed perpendicularly, formed almost a horizontal line at the upper part of the dorsal curve, while the compensating curve in the lower part of the spine had its convexity of course to the left side, and was of considerable size: the left hip projected exceedingly, and the same space described as seen in front, between the arm and side, was also seen from behind, while the right arm was pushed out by the convexity of the dorsal curve being towards that side.

Her cast of countenance was heavy; her complexion not clear, there being an eruption of acne over the whole face, and on her back also. The integuments over the left side, from the clavicle to the hip, were exceedingly sensitive, so that she could scarcely bear the part touching, any pressure causing considerable nervous pain of an almost indescribable nature: there was also much pain in the lumbar region, and in the right hip as well, which was increased by walking.

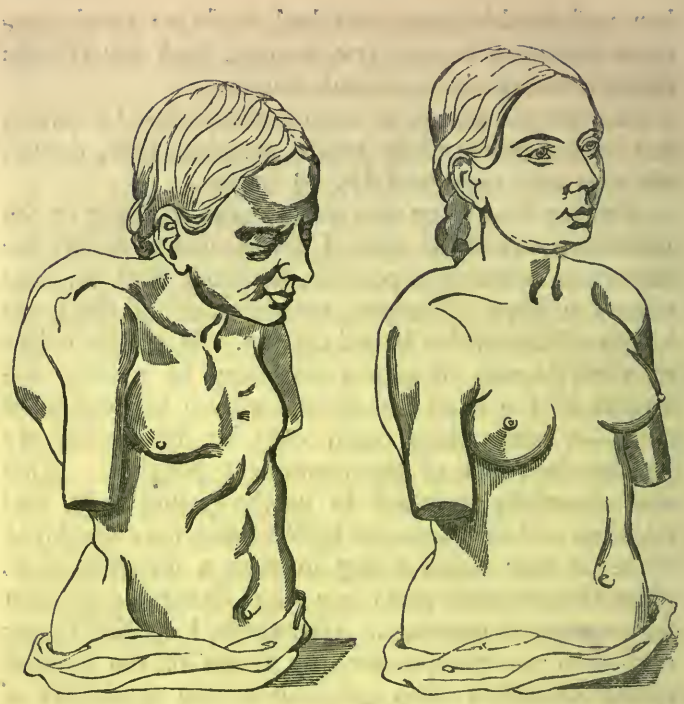
The shortness of breathing and palpitation of the heart had become much worse for some years past, particularly in going up stairs, or using any other exertion, as in walking; her cough, also, was very troublesome, especially when she laid down; indeed, her sufferings were altogether very distressing, and

her unfavorable symptoms had made so much progress during the last few months, that her friends thought her life in imminent danger.

She was considered to have entirely ceased growing, not having increased in height for some time, though she now only measured 4ft. $6\frac{3}{4}$ inches.

Finding that there was some slight mobility in the deformed part of the spine, I determined to rectify the distortion as much as possible, thinking that the case offered a hope of success, notwithstanding the great length of time which it had existed. With this object in view, it was of course necessary to remove the weight of the head and shoulders from the deformed spine—a plan which could only be done efficiently by the daily use of the recumbent position. This was cheerfully assented to by the young lady, and frictions and firm pressure by the hand were employed three or four times a day in such a direction as to place the distorted parts in a more favorable position for permanent recovery. Afterwards, I applied firmer and more constant pressure, by means of the padded spring described when speaking of the treatment of this form of curvature. A constant but very easy extension of the spine was likewise maintained during the time that the patient remained in the recumbent position, by the application of moderate weights to the head and extremities.

Close attention was paid to the state of the general health, and mild warm aperient medicines were exhibited, by which its condition was improved, and the eruption on the skin gradually removed; tonics were afterwards administered. Under the foregoing plan of treatment, the slight elasticity or mobility of the deformed part of the spine, which has been alluded to, and which gave the hope of benefit being derived, manifestly increased, and was soon followed by an



obvious improvement in the appearance of the deformity: so that, by the end of January, on examining the spine and other parts, the projecting shoulder was evidently less, the vertebræ were in a more perpendicular line, the neck was longer, and the chest was more developed. The notes I took on 25th April were, that she had continued to progress most satisfactorily, not having had a single unpleasant symptom since she commenced treatment, and that the direction of the spinal column and projection of the ribs had much further improved; her general health had likewise become very considerably better, as was also her breathing, which, from being so short that

she could not read aloud longer than ten minutes or a quarter of an hour, had so much improved that she was able to read for any length of time without feeling any inconvenience from it, and she expressed herself as feeling to have "more room in her chest to breathe with." I need not detail the progress she made from time to time, but may mention that in July both scapulæ rested upon the plane when she was in the recumbent position; while, at first, the left one was at a considerable distance from it when she was in that position, owing to the great projection of the spine, ribs, and scapula of the right side.

When she had been nearly eleven months under treatment, she was in the following improved condition:—Her head was quite erect, and had no perceptible inclination to the left side, and the neck was much longer, and well formed; the chest was more expanded, and the two lateral halves of it were nearly symmetrical, and the sternum did not project more than in an ordinarily formed chest, while the spaces between the ribs and arms were much filled up. On a posterior view, the spinal column was much more perpendicular than it had been; scarcely anything of the lumbar curve remained, and the upper one was much improved; those portions in which there was mobility before, having become much more straight, and the marked deformity only remaining in that part where anchylosis had previously taken place, and which it was of course impracticable to rectify; the form of the ribs had improved correspondingly with that of the spine. With this alteration in her figure, her health and strength had likewise increased; she could support her head with perfect ease, and walked comfortably, and with a firmer step; while before, all motion was a fatigue and pain to her. Her appetite and spirits were excellent. As stated in a

preceding part of this account, she had lost all dyspnœa, and instead of being able to expire only 30 cubic inches, as was the case when she first came under treatment, she could then breathe as much as 69 cubic inches. She had also increased in weight from 5st. 9lb. to 6st. 0¾lb.

Miss W. remained under my care four months longer in order to confirm the improvement obtained; and during that time she further increased in weight to 6st. 9¼lb.

CASES OF EXCURVATION.

CASE VI.—(PLATES VII & VIII.)

This case was that of a married lady, Mrs. P——, and it illustrates in a forcible manner, the nature and effects of excurvation of the spine.

The patient was, at the time she came under my care (September, 1829,) forty-one years of age, and had been the mother of eleven children. Her last accouchement, during the month of August in the preceding year, was a very tedious and difficult one, having continued for the protracted period of twenty hours. She had been labouring under disease of the spine upwards of eight years; her attention being first particularly directed to it about Midsummer, 1821. At that time she was unable to sit upright, walked with great difficulty, and was obliged to support herself on her husband's arm much more than she had been accustomed to do; her respiration was difficult and painful, and was of that character which is usually expressed by the term "gasping." Besides

very considerable excurvation in the dorsal region, the cervical vertebræ were so much affected, that she could not sustain the head erect, and her chin, in consequence, sunk upon her chest; the muscles of the extremities at length became so feeble that she was incapable of raising her arms towards her head or her feet from the ground, without assistance.

For the last three years she had been confined entirely to the house, and, from inability to walk was obliged to be carried to and from her room; she was, therefore, when out of bed, compelled constantly to sit in a chair; she complained of excruciating pain in the loins, back, and limbs, by which she was prevented enjoying her natural repose, not obtaining, upon an average, more than four or five hours sleep out of the twenty-four. The state of the spine at the time she came under treatment, is accurately represented in plate VII.

The excurvation in the case of this individual, who was very corpulent, was exceedingly prominent, and accompanied with considerable difficulty in breathing, so that she was scarcely able to lie on her back. In the beginning, she complained of great pain and weakness, was soon fatigued, and therefore used the apparatus but six hours a day. At the end of a month, these feelings were greatly diminished, and she was able to raise herself on her plane —a degree of exertion to which she had before been totally inadequate.

December 5th. After being under treatment nine weeks, she could use the recumbent position not only without inconvenience, but even with perfect ease: her health was now greatly improved, the curvature and projection of the shoulders had much decreased, and the whole system had become stronger. In the month of January, 1830, her chest was found, upon

admeasurement, to have diminished in the antero-posterior diameter, at least three inches, and she was an inch and a half taller. She was now better able to keep herself in an erect position, could walk about a little, and had less occasion to seek support in so doing.

March 1st. For some years past, she had been quite incapable of placing one foot before the other in attempting to ascend the stairs; this, however, she is now able to do, although still obliged to avail herself of the assistance of the banister.

April 10th.—She is so much improved as to be able to go up and down stairs without any assistance whatever, and the state of her general health is such, that she considers herself quite well. The bones of the neck have acquired sufficient strength to support the head in its natural position; and she has improved to such an extent as not only to be capable of using her upper and lower extremities, but also to use them with great facility.

July 1st. Has employed the apparatus occasionally, but not regularly, since April, and has progressively improved. She can now take exercise with considerable ease, and is more active than she has been for many years.

The whole time taken up in effecting this change, was little more than six months, though she continued to use the apparatus for some time afterwards. The improvement effected will appear on an inspection of plate VIII, which gives a representation of her figure at the close of the treatment. When the extreme state of weakness to which this patient had been reduced, is taken into consideration, together with her time of life and previous state of health, so complete a recovery may be regarded as truly gratifying.

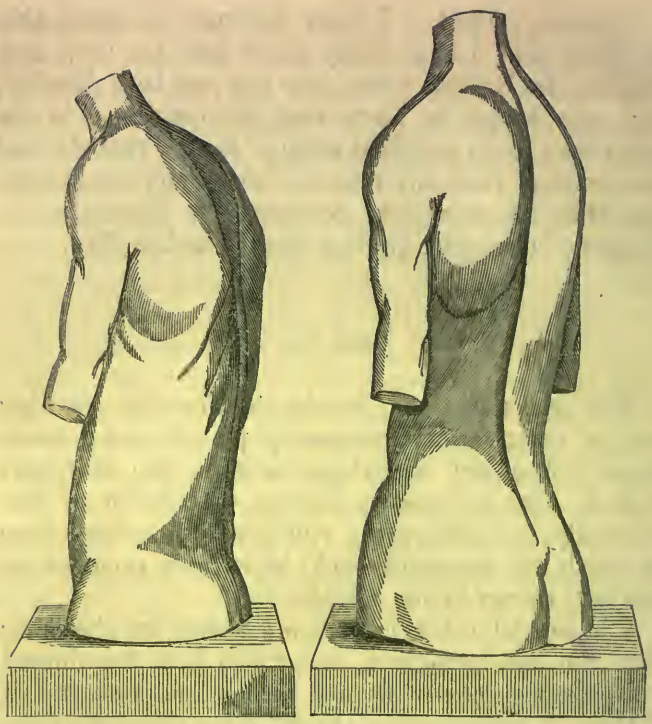
February, 1844. I have pleasure in being able to state, that I have lately heard from the lady, now residing in Bristol, whose case has just been detailed, and was happy to learn that she continued in the enjoyment of an excellent state of health, that she had been exempt from any return of her former complaints, and that she was quite competent to discharge her domestic duties with perfect comfort and facility.

CASE VII.

The accompanying wood-cuts illustrate another case of excurvation, fortunately placed under treatment before any anchylosis between the vertebræ, such as that referred to in the description of this deformity, had taken place, and it was therefore a case in which the curvature could be entirely removed, as was well shown by the result.

I have had other cases more severe in character than the one here given, and which have terminated with equal success; but not having had casts taken of them, I prefer giving the following example of the disease.

March 2, 1837. Miss S., aged sixteen years, came under treatment this day. She was always a weakly child, and is now very delicate, her weakness being such that she is constantly tired after very slight exertion; she has considerable difficulty in breathing, with palpitation, especially in going up stairs; and any noise or excitement produces severe headache and great confusion of ideas. She suffers much from a general weakness in her back and chest; she is pale or rather sallow and emaciated; appetite variable, and bowels generally torpid: she suffers also, at times, from attacks of a febrile character. It is



evident that the disease is progressing, as she has gradually got much worse within the last six months.

On examining her back, there is considerable excurvation and protrusion of the upper part of the spine and shoulders; the lower angles of the scapulæ project very much; there is great tenderness of the cervical, and eighth and ninth dorsal, vertebræ; the chest is very contracted, and the shoulders much pressed forward: to this, doubtless, the difficulty in breathing and palpitation are to be attributed.

May 1. After the commencement of the treatment, which consisted in that recommended under the head referring to this subject, a beneficial change

IX

Engd by H Adlard
From a Cast

X

Engd by W. Ellis
From a Cast

was soon observed, her figure being much more erect, and her health greatly improved. Her difficulty of breathing rarely troubles her, her chest being considerably more expanded and developed.

June 30. Her back is now perfectly straight, and her health is completely re-established; from being sallow and emaciated, she has become stout and healthy-looking; her difficulty in breathing and the palpitations have not troubled her at all for some time past. Great care is enjoined on her; she is requested not to over-fatigue herself or to use any extra exertions for the present: but it is deemed quite unnecessary to continue professional attendance any longer.

The young lady was of a delicate constitution, but was not affected with rickets, nor was there any other disease to which the origin of this one could be attributed. It had, however, been of long duration, and had gradually increased up to the period when I first saw her: it is, indeed, usually a form of disease slow and gradual in its progress.

CASE VIII. (PLATES IX. & X.)

On the 21st August, 1846, Mr. W. H. first came under my care: he was an attorney's clerk, aged 19 years, and was suffering under an excessively severe form of excurvation of the spine, together with consequent deformity of the ribs and other parts of the trunk. No other branch of the family which consisted of eleven children, eight of whom were still living, had suffered from a similar disease, nor had any of them been affected with rickets: his father and mother were living and healthy.

When about three months old, he had the measles in a severe form, after which he did not regain his

previous state of health, and there was observed an enlargement of the left shoulder. When nine months old, he had another severe illness, accompanied with an eruption like blisters (Pemphigus?), and from that period a curvature of the spinal column was distinctly observable, which has continued to increase to the present time. After this indisposition he laboured under great debility, and his recovery was so slow that he was nearly two years of age before he attempted to walk, and even then he often stumbled and fell on his knees, or full length upon the ground. He had another severe illness when nine years of age, being confined from two to three months: he subsequently became exceedingly emaciated, and his complexion was very sallow: at that time his deformity got decidedly worse, and has since made much more considerable advances than it did before; from that period he always inclined, when walking, to the right side, at the same time that he rested his hands on his knees by way of support to his body; or when standing, he would assist himself by resting against any piece of furniture or other object near him. His health has always continued in an unfavorable state: he has been very thin and feeble, and much subject to palpitation of the heart, attended with shortness and difficulty in breathing—symptoms which were increased on going up stairs especially, but indeed by any other exertion. During the last two or three years he has suffered much from pain in the right side between the ribs and hips, which, like the palpitations, has always been induced if not present at the time, or if present, made worse by exercise; sitting still in one position for too long a time would also bring on the pain.

When he came under treatment he was very much emaciated: he had excessive deformity of the spine,

consisting of excurvation of the column; the curvature projected backwards and to the left side, and included all but the two first cervical vertebræ, and the three lower lumbar ones; besides projecting backwards, the spine was so twisted that the bodies of the dorsal vertebræ looked outwards to the left side, and their spinous processes inclined inwards to the right; the ribs of the left side, therefore, were attached to the vertebræ, at what, in their altered position, was their posterior surface, so that they (the ribs) assisted very materially to increase the size of the projection,—forming, indeed, by the acute bend at their angles, a ridge which projected further back than the vertebræ themselves, and for which, on a hasty inspection, this ridge might have been mistaken.

The length of the back, perpendicularly, from the occiput to the last lumbar vertebra was only 12½ inches, while the projection itself occupied 9 inches; the prominence of the deformity was such, that from its most projecting part, posteriorly, to the most prominent part of the sternum in front, the diameter was 11¾ inches, while, on the right side, from the middle of the scapula to the corresponding part of the sternum, the diameter was only 6⅛ inches; showing a difference between the two of 5⅝ inches. The left shoulder was so high as to be on a level with the ear of that side, while the right one was much lower, the difference in height between the two amounting to 3½ inches.

The left scapula likewise was so considerably displaced by the deformity of the ribs, that it rested against the sides of the projection—its base thus looking directly backwards, and its spine outward to the left.

Owing to the deformity, he had long been unable

to use his right arm, so that he wrote &c. with the left hand; the effects of this were very obvious on the development of the two sides, for, while the muscles of the left arm and those attached to that scapula were of moderate size, those of the right arm and scapula were excessively wasted. The right hip was also much more prominent than the left, and its muscles more developed, exactly the reverse condition to what existed in the upper extremities.

His respiration was almost entirely abdominal, there being very little movement of the ribs; he complained much of rather a severe pain in the projecting part of the spinal column, as well as in the right side of the chest, especially if he exerted himself more than usual, or if he sat too long in one position—this, however, was probably a muscular pain only, for his lungs were free from disease as also was the heart, although he suffered considerably as already stated from palpitation.

The only mode of treatment which afforded a prospect of benefiting a case so severe as this, was the one adopted, and under which he improved to a very remarkable extent. In order to bring the spine towards its natural position and so to retain it, gentle extension was used, while the patient adopted the recumbent position on the plane which has been already described, and the weights employed were gradually increased in proportion as the patient got accustomed to those previously used, at the same time, firm and well-regulated pressure, by means of compresses passing from side to side of the plane over the projection, was applied while the patient was in the prone position—this and the supine position being employed alternately; and pressure and friction by the hand, were also used twice or more daily over the prominent part of the spine; he also exercised the

right arm so as to develope the muscles of that extremity. Attention was likewise paid to his general health.

It is not necssary to detail the different reports of the progress he made. The indications of treatment were kept steadily in view and persevered in with the most beneficial results, as will be seen by a comparison of the two plates IX. and X. He was under my care twenty-one months, and in that time the antero-posterior diameter of the chest diminished more than two inches and the spine increased in length upwards of three inches; his figure was, therefore, very much improved, while at the same time, the right arm became stronger and more muscular. He got much stouter and his general health was decidedly better than he had ever recollected its being before; and for several months previously to leaving my care, he had entirely lost his pain, palpitations and dyspnœa; his complexion was clear and the cast of countenance had assumed an animated expression.

CASE IX.

The next case is adduced to shew the great, or, it may be said, the enormous extent to which excurvation, accompanied with a somewhat lateral deviation of the spine, may proceed when it occurs under unfavorable circumstances, and when no means are employed to check its progress: in such an instance as this, anything like a perfect correction of the parts could not be anticipated, because a considerable amount of anchylosis had already taken place between many of the vertebræ during the long period the dis-

ease had existed; besides which, the origin of the malady was likewise traceable to mechanical injury, under which circumstance the disease is almost always of a more serious character than when it results from pressure caused by dress, from certain employments, or particular positions of the body. As, therefore, benefit was obtained in a case such as this, it gives good ground for hope of amelioration in almost all instances where the disease is of a less severe form.

Mr. J. T. E., aged twenty-nine years, a graduate of one of the universities, first came under my care on the 22d October, 1844, when the following were the notes of his case:—

He had always been weakly and subject to great lassitude during the whole of childhood and the period of his growth. When thirteen, he fell from a high tree and was caught on his right shoulder by one of the large branches; from this time he suffered much pain in his back and shoulders, especially after exercise, and became crooked in person; in the course of a year his deformity increased very considerably, and has continued to do so to the present time; his stature is much diminished, having lost four inches in height since the year 1832. For several years he has had a rattling or knapping sound of the ribs against each other, and this has been so loud as to be heard by any one walking with him. He has considered himself asthmatic, owing to his difficulty in breathing, and has been very subject to coughs, colds, and bronchial affections during the winter season, especially for two or three years past; he is much affected in going up stairs, ascending a hill, or using any extra exertion; he has also suffered considerably from nervous feelings and a peculiar faintness at the epigastrium, and his alvine functions have been much disordered. On examining his back, there is an enormous projection,

which is formed by a twisting of the spine backwards and somewhat outwards towards the right, the whole of the ribs of that side being curved at so extreme an angle, as to form a ridge or line of such an extent that the upper part of it is seen above the right shoulder, by a person standing or sitting in front of him. This deformity has doubtless been increased by a habit he has long indulged in with a view to relieve himself—viz., sitting in an arm-chair, with his right leg over one arm of it, and with his left side resting against the other. His neck is so very short and distorted, that in front it can scarcely be seen at all.

After his daily engagements, he is accustomed to lie down on the floor; but such is the size of the projection or hunch, that he cannot do this without having two large pillows, or books to the height of at least six inches, arranged so as to support his head. There is so great an excurvation of the ribs of the right side, that the arm rests completely upon them; while, on the left, there is such an incurvation, that the arm is fully two inches from them: the integuments here are also much wrinkled. The left hip projects two and a half inches more than the right, and there is a general prominence of the chest and abdomen to the right side. As respects his general health—he is of a spare habit, his complexion is sallow, and his digestive organs are in a morbid state, the secretions being unhealthy and offensive.

Besides attention being paid to the state of his health, and to the condition, in particular, of his digestive organs, gentle extension, sometimes in the dorsal and at other times in the prone recumbent position, was had recourse to, and pressure applied by compresses in such a direction as to restore the spine towards the perpendicular line. The change which took place during the next three or four months both

in his health and personal appearance was exceedingly satisfactory, and by the end of that time the projection of his spine and parts adjacent, had considerably diminished. When I first requested him to lie upon the projecting part he could not do it—that is, he could not steady himself upon it; at the end of the three months he had no difficulty in doing so, but could lie upon it nearly with the same ease he could upon the more flat part of his back; indeed, he felt more comfortable on the plane than in a bed; and when he sat up, he could do so with his head erect, which he was not able to do before. The hunch or projecting part was so much less that its highest portion could then scarcely be seen by a person standing before him. His hat, which used to rest upon this part, was also nearly two inches from it, and his coat was quite too large for him, wrapping over the projecting part very considerably. His shoulders were much lower and more elastic; he could throw the right one further back, and used it with considerably more freedom; the left hip projected less, and the incurvation in the side was much diminished. The projection of the ribs on the right side was much less painful, and the knapping of the ribs as he walked had entirely gone.

As regarded his health, he relished his food more than he almost ever recollected, and the state of his secretions had much improved. His spirits had been much more buoyant and cheerful, and his improved feelings arose, as he expressed it, from a decidedly better state of health, not having felt himself so well and comfortable for many years past; and his low nervous feelings, rarely troubled him. His chest had increased twelve cubic inches in capacity; and in height he had increased rather more than one inch;

XI.

Engd. by J. S. Coombs. From a Cast by Mondeni.

XII.

his complexion was much clearer, and he was likewise stouter than before.

Unavoidable circumstances compelled him to leave town sooner than he had intended to do, and before he had received so much benefit as he might doubtless have obtained from the continuance of the treatment; considerable improvement, however, had taken place in those parts of the column in which anchylosis had not already occurred, and also, as has been already said, in the state of his general health.

In a letter received from him in April, he said,—"I sustained my journey from London remarkably well, and am now in the best health and spirits. Previously to the late winter I suffered severely from cold, influenza, &c. Up to this time, April 7, I have not had the slightest cold, or anything of the kind. This astonishing change can only be attributed to the improvement of my general health, through the treatment adopted. I deeply deplore my leaving town; could I have continued twelve months longer, I firmly believe my figure would have been comparatively straight."

CASES OF INCURVATION.

CASE X.—(PLATES XI. & XII.)

Incurvation of the spine is well illustrated in the case of Miss B——, aged seventeen years.

The following is the account given by her mother, of the state of her health, before she came under my care:—She was a remarkably fine and healthy child, of a lively and active disposition, and occasioned very little

trouble. When six years of age she had the misfortune to fall on her hip on her way to school, by which accident she sustained so much injury that she was obliged to be carried home, and was confined to bed for a month. She then gradually recovered, but at the expiration of about a year the injured hip began to enlarge, and she suffered severe pain both from it and in her knee on the same side. These pains continued excessive for at least six months, during which time recourse was had to leeches, blisters, cooling medicines, &c. She was now in a very weak state, and obliged to keep her room altogether, being prohibited from the use of any exercise. She passed several succeeding years in a very miserable state, alternately better and worse. During the greater part of this time, she was obliged to use crutches. Two extensive abscesses formed in the hip, from which she suffered greatly, and the discharge from them was very copious. In the beginning of the year 1837, while walking out, she had another fall upon her hip, which greatly increased the swelling and pain. From this time, her back and hip, which had all along been constantly contracting, became much worse, and her injured limb was considerably shorter than the other.

April 17th. The patient was in this state when the treatment was commenced. On examination there was an incurvation of the lower dorsal and upper lumbar vertebræ, of so considerable an extent that, when she was laid upon a flat surface, there was a hollow of nearly eight inches. Plate XI represents a cast of this case. The limb on the diseased side was four inches and a half shorter than the other, and the hip was exceedingly round and prominent. When laid, she could not straighten the limb, the knee being always bent at a right angle; the state of her health was also very indifferent.

April 26th. She began treatment which was conducted on the principles already described, and a firm broad compress was used across the incurvated portion of the spine to bring it downwards towards the plane; while the recumbent position was being employed, means were taken to remedy the contraction of the knee by having an accurately fitting knee cap made, to which a cord with a weight (which could be increased or diminished at will) was attached, and which, passing through the plane underneath, had thus a continual tendency to straighten the contracted joint.

July 1st. The incurvation of the spine and the contraction of the hip are both much reduced: the limb is full one inch and a half longer. Constitutional treatment regularly continued with great improvement in the general health; occasional blisters were applied to the hip.

October 20th. The mechanical treatment is now relinquished, the spine is quite straight, and the hip and knee joint are brought into a right line. Plate XII. represents a cast of this case at the conclusion of the treatment. As, in this instance, the spinal incurvation had been mainly caused by the shortening of one of the lower extremities, and consequent change in the direction of the pelvis, it became necessary for the patient to wear a high-heeled shoe on that foot in order to maintain the improvement which was obtained by treatment.

CASE XI.

In the general description given of incurvation, it was stated that as in cases of this deformity the sacrum sometimes projects forward into the cavity of the pelvis, this

becomes narrower, and is at last so much encroached upon that parturition is attended with great danger both to the mother and child, and not unfrequently terminates in the inevitable death of the latter. The following was such a case; yet, by the adoption of the recumbent position, with gentle extension and pressure, together with medicinal treatment, not only was the curvature cured, but the patient subsequently enjoyed an excellent state of health:—

In the month of November, 1827, I was first engaged to attend Mrs. M——, on the occasion of her approaching accouchement, and was sent for about four A.M. on the 16th of January ensuing: it was soon discovered that there was some distortion of the pelvic aperture, and after waiting a proper time a consultation was held on the case with the late Mr. Chorley, when it was considered indispensable to have recourse to embryotomy, which was accordingly performed. After this operation, she recovered as well as the nature of her peculiar case would admit, but continued extremely weak, having very little power over the lower extremities. The usual remedies were employed for some weeks, but with little or no benefit.

Observing that she did not recover after the expiration of the usual time in cases of severe parturition, I was led more particularly to investigate the cause; it was then found that there was more general deformity, not only of the pelvis, but also of the spinal column, than had been previously discovered: a considerable curvature existed to the right, owing to the dorsal vertebræ being affected by lateral deformity, accompanied with a considerable degree of incurvation in the whole of the lumbar region; this was so extreme as to press the sacrum very considerably within the brim of the pelvis. The whole spine was exceedingly sensible to pressure. The disease being thus made

manifest,* the recumbent position on the plane was recommended, and a proper course of treatment was commenced without further delay, which terminated in her restoration to a state of health, such as she had not enjoyed since her first accouchement.

On discontinuing my attendance on Mrs. M——, in September, 1828, I wished her to commit to paper an account of the indispositions she had labored under previous to such attendance, which commenced January 16th, in the same year; to this she readily and kindly consented, and the following is a copy of her letter:—

Sir,—In compliance with your request I now proceed to give you a statement of the particulars of my case, in which I shall describe my feelings and state of health, as nearly as I can recollect them, for the last twelve years.

1814. Was married, and in the enjoyment of my usual state of health.

1816, October. Was very ill, and confined to bed for several weeks; from this time I became much indisposed, and felt great weakness throughout my whole frame, but more particularly in the lower part of the back, and in the hips and knees; when seated, I could scarcely rise, and not without assistance derived from placing my hands on the chair. Subsequently I walked very lame, and it was with the greatest difficulty I could get up and down stairs, but particularly the latter; was obliged to observe the greatest care, or should have stumbled over the most trifling obstacle in my way, from not being able properly to raise my feet from the ground.

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* It is somewhat remarkable that neither this lady nor her friends seemed to have any knowledge of the origin and continued cause of the long-protracted sufferings she had endured, so well described in her expressive and well written letter.

1817, April. First child born; labor-pains about fourteen or fifteen hours; recovered pretty well, without being either very lame or weak, for three or four months; when I relapsed into much the same state as before, though not quite so bad.

1818, June. Second child born; labor-pains continued three or four hours longer than before. After delivery, several fainting fits succeeded each other rapidly, and I was, for some hours, in the most imminent danger: this time I recovered very slowly, and it was several weeks before I was able to sit up at all; I was now far from being in good health, I had a poor appetite, could bear no fatigue, was much emaciated, and had pain and weakness in my back, sometimes so much so, as to occasion great difficulty in walking.

1820, February. Had a severe inflammation on the lungs, and was confined to bed for some weeks; after which, though I could sit up in an easy chair, I was totally unable to walk from weakness and pain in my back and hips; had a bad and almost constant pain in my side, towards the back, and just above the hips.

June. Third child born; labor-pains about thirty hours; after a week or two I recovered, but such a change had taken place in my personal appearance, as astonished my friends; from a tall, slender person with a long neck, I was become a little shapeless creature with my chin upon my breast: some said, "Well, were such a thing possible, I should say you "had become the head less;"—others of my young friends, who had been accustomed, as they said, to look up in my face, had now to look down; my chest was prominent, my body shortened, my neck completely lost, and my joints so weak that it was with the greatest difficulty I could walk; in short, the altera-

tion was so great that my most intimate friends could not have recognised me except by my features.

November. About this time I became exceedingly lame, and from this period to February, 1821, I continued to get worse, so that I was unable to walk without the assistance of some person's arm. I had much pain in my back and hips, my shoulders were so weak that I could not lift my hands to my head, the pain in my right side was very troublesome, and my stomach was in an extremely disordered state.

1822, April. I continued in the same weak state until March, 1822, when I had another return of inflammation in the bowels and lungs. After recovering from this illness, I could walk a little better than before, continued gradually improving until the early part of the following year, when I could walk, as I thought, in a tolerable way.

1825. Had a severe complaint in the bowels, which reduced me to a state of great weakness.

1826. Was attacked with inflammation on the brain; for three weeks was quite insensible, and my condition was so deplorable, that I was given up by my medical friends; at length I began to recover slowly, but again relapsed into my former weak state.

1827, January. Was able to walk about a little, but had a very numb unpleasant sensation in the hip and lower part of my back, which rather went off in the course of a month or two; kept improving in health till April or May, when I became pregnant and much indisposed, and continued so during the whole period.

1828, January. Fourth child born. This was indeed a most distressing labor, and lasted forty-eight hours. In addition to my former lameness, weakness and pains, my health was in so very bad a state, that

I dared not indulge myself in a hope of ever being better, or enjoying health in any degree; my friends were all despairing, and were satisfied that, without the utmost care, the worst possible consequences must ensue. I was unable to turn in bed, or to move my legs at all; the least movement in the room distracted me with pain. After a few days a slight inflammation took place, which was soon subdued, and so far as regards my accouchement, I recovered very well; I could not, however, bear to sit up; if I attempted it for more than a quarter of an hour, I had such pains in my back, as made me sick, almost to fainting; if I were raised a little in bed, I had intolerable pain in all the bones about the lower part of the body. I tried to stand, but could not support myself without taking hold of something.

I continued in this deplorable state for some weeks, until, by your recommendation, I commenced the use of the apparatus. When first laid upon the plane, the lower part of my back was bent inwards so much, that a hand might be passed under it, edgewise, without touching the extremity of the curve: my chest was so high, that when I placed my hand on my body, below the breast-bone, I could not see it as I lay on the plane. For a little while, at first, I found it rather irksome, but it soon proved very comfortable, and I even preferred it to a bed.

A great change was soon observed in my appearance, my chest lowered most considerably, and my back became nearly straight. In four or five months I was permitted to walk about a little, which I could do very comfortably, and the improvement effected in my health and appearance was truly pleasing to my friends, who told me I walked quite upright, and had nearly regained my natural form and appearance: I also measured more than an inch taller than when I

began the use of the apparatus. I was now almost free from pain, and my appetite and digestion pretty good: I have continued improving to the present time, and am now in good health, and can walk about as actively as any other member of the family. I still find my machine, which I use every day when fatigued, very comfortable, and would not on any account be without it.—I remain, Sir, Your &c.

Sept. 30*th*, 1828. M. A. M—.

This case is highly interesting and important, on account of the extreme state of weakness and distortion to which the patient was reduced, and more particularly as the disease appears to have occupied the whole of the vertebral column for some years before great deformity took place. So complete a recovery, under circumstances so exceedingly adverse, can scarcely fail to shew, in a forcible manner, the propriety and efficiency of the plan of treatment so successfully pursued.

CASE XII.

I was consulted, in November, 1840, on account of a young lady, Miss ——, aged fourteen years. She had suffered much, during infancy and childhood, from the diseases peculiar to those periods of life; the bad state of health resulting from which was probably the cause of the deformity both in the spine and extremities; no other more direct cause was traceable.

Her deformity had been getting gradually worse for several years, but especially during the two previous ones. She had suffered most distressing pains in her back, as also in the extremities, particularly in the knees, and was so weak as to render it difficult for her to walk at all; indeed, there was some enlargement in

the whole of her joints, and her circulation was so languid that her feet were almost always cold.

In 1832, when five years of age, she had a steel apparatus made for supporting the lower extremities; it passed up the outside of each leg, and fastened round the hips; it was worn upwards of six years. In 1834, an apparatus consisting of a tripod to which a head-swing was attached, was also made for an excurvation of the spine; with these contrivances she also made use of an inclined plane daily. In May, 1840, she had stays constructed which were supposed to be well adapted for her, and she wore them until within a short time of the period when I first saw her.

This patient presented an exceedingly well marked example of the kind of deformity which the present cases are intended to illustrate: the incurvation amounted to nearly three inches, and occupied the lower part of the dorsal and the whole of the lumbar region, but was greatest at the third lumbar vertebra; the sacrum also formed part of the incurvation: the shoulders were somewhat rounded, and the lower angles of the scapulæ projected more than naturally backwards, but there was no lateral deviation in the spinal column: together with the above, there was considerable prominence of the abdomen. The plan recommended, when referring to the treatment of incurvation, was adopted in this case, and attention was paid both to the local treatment and to that of the general health, which was much deranged. An improvement soon took place; the incurvation and the affection of the limbs being much diminished in the course of a few months and her health being equally benefited.

She continued to improve progressively, and persevered in the plan of treatment until May, 1841, when she took advantage of the waters of Ilkley, prior to returning home.

CASE XIII.

The following was another severe case of a similar kind to the preceding one, but it occurred in a much younger subject:—Emily, daughter of Mr. C., aged four years, came under treatment in Feb., 1842. Her mother stated that she was born a fine child, but had not any inclination to use her lower extremities until she was nearly three years of age, and then it was with much difficulty, and she was very soon tired. With the exception of the weakness, which her mother considered as congenital (but which had of late increased very considerably), she had not any particular complaints.

There was an incurvation of the lumbar and lower dorsal vertebræ to so great an extent, that on laying her on her back, a hollow existed of more than two inches between the spinous processes and the table on which she was placed; her shoulders were round, and the integuments of the left side were much wrinkled.

The general weakness, and difficulty in moving about were extreme; the abdomen was greatly enlarged, and the state of her digestive organs was unhealthy, the secretions being in a very morbid condition.

She was placed upon the inclined plane and pressure, frictions, &c., were regularly applied to the back; the necessary medicines were administered, and a plain, nutritious diet was ordered for her.

Improvement usually takes place more rapidly in children than in those who are more advanced in life; and in this instance it went on very quickly, and resulted in complete cure. Within six months the distortion was quite removed, and her health became exceedingly better—indeed, excellent; she could then

walk and play about with great activity, and returned home in excellent spirits.

In August, 1847, I received a letter from her mother, in which she says that her daughter "is as healthy, strong, and straight as we could wish her to be: I have no hesitation in saying she is the strongest one I have now, and the most likely to be a fine grown woman, if she live."

CASE XIV.

In some instances incurvation is accompanied with lateral curvature; of which form I had a well marked example in Mrs. R., aged thirty-six years, who had suffered exceedingly from pain in the lumbar region. She gave the following account of the previous state of her health:—When about sixteen years of age she was very delicate; at that time she was attacked with a most severe pain in the loins and left side, which prevented her from moving, and she has not been able to walk well since, having difficulty in placing one leg before the other, especially when ascending or descending the stairs: these symptoms were accompanied with general weakness, exercise or any extra exertion always increasing them, especially within the last two years: during which period, indeed, she has had increased difficulty in walking, or even rising from her chair. She has been married ten years, and has had three children, and in all the cases has had severe labors, it being necessary to make use of instruments in one of them: the pain at these times was at the lower part of the spine, exactly where she now complains of it, and was distressing in the extreme. She has noticed that she has been getting more deformed since the labor just referred to; her weakness has increased,

so as to prevent her leaving home, and she has great difficulty in moving at all without assistance.

On examination, there is considerable incurvation of the lumbar region, together with lateral curvature to the left side; the right hip, at the same time, projecting much more than the left one. She constantly stoops, or inclines very much to the left side. On using a plumb-line from the hollow part of the nape of the neck, the spine shews a deviation of two and a half inches from the perpendicular line; the curvature occupying the whole of the lumbar portion of the vertebræ, but especially the first and second, from which she feels great distress, "as if the bones were separating" when she walks across the room: she likewise complains much of a sensation of crackling in the ribs of the left side: the right shoulder is higher and larger than the left.

The treatment was commenced on July 26, by keeping her in the recumbent position for several hours per day, and gradually increasing the time; in two months the incurvation and right hip were greatly diminished, while the severe pain from which she suffered had nearly left her, and in the month of November she was able to walk about with comfort. The family having at this time to remove to some distance, I have not seen her since, but have heard from Mr. R. that she recovered completely, and has not subsequently had any return of the spinal affection.

CHAPTER IV.

ANGULAR PROJECTION OF THE SPINE.

Arranging the species of curvature, as was proposed, according to the pathological condition of the vertebræ, the next in succession is that usually termed "angular." This form of the disease commonly takes place in early life, and is frequently the result of a severe attack of some acute disease, as measles, scarlatina, &c., or of some other circumstance bringing into action the scrofulous diathesis; or it may arise from local injury to the vertebræ, produced by falls, contusions, and the like. In a great majority of cases, where males are the subjects of spinal deformity, it is angular projection with which they are affected: cases of this particular species of the disease are almost as frequent amongst females as in the male sex, though with the former, in comparison with the frequency with which they are the subjects of lateral curvature, it may be considered as of rare occurrence. This form of disease may occur at any part of the spinal column, but its most frequent seat is towards the lower part of the dorsal region; and it assumes the angular form owing to caries, and the

consequent destruction of the bodies of one or more of the vertebræ. When this takes place, the weight of the head and shoulders presses the upper portion of the column downwards, until the anterior part of the vertebræ above the carious part, comes into contact with the vertebræ below that part: from hence necessarily arises a posterior, and more or less angular, projection of the spine. The intervertebral cartilages and some of the ligaments are likewise, sometimes, involved in the disease, and suffer partial or entire absorption. It even occurs, in some instances, that the intervertebral substances appear to be the parts first affected; but this is rare, and without destruction or absorption, partial or entire, of the bodies of one or more of the vertebræ, it would be impossible for angular projection of the spine to take place.

When young children are attacked by this complaint, they shrink from the least attempt to move them, being constantly uneasy, and fretting almost incessantly. If the disease commence in those who are a little older, they complain of great fatigue from trifling causes, of anomalous pains about the præcordia, as if girt by a cord, and frequently also of pain in the limbs: they are incapable of active exertion, and require the almost constant attention of their parents; they appear dull and inanimate, and are, in consequence, often chided for their indolence by those who are ignorant of its morbid cause. The progress of the malady, as regards its rapidity, depends upon the nature of the

first cause, the physical condition of the individual affected, the extent of the disease which has taken place in the bone, and the degree of attention it has received : if it be the result of an acute attack, accompanied by a deteriorated state of health, the course of the disease is frequently rapid, but more usually, and especially when it occurs in elder children and in grown up persons, it is very insidious and slow in its progress.

In the course of the disease, two very formidable complications are liable to arise, the one being paralysis, and the other lumbar or psoas abscess, the latter of which is the more common, and, perhaps, the more formidable of the two. Cases of extensive caries may, indeed, continue long without either of these complications arising, while, in other instances, they occur amongst the early symptoms of the affection; this difference depending upon circumstances which may arise in the progress of the case.

When we consider the extent to which the spine is, in some cases, deformed, and the exceedingly acute angle which the projection forms in others, it seems remarkable that compression of the cord and consequent paralysis should not more frequently occur. This, however, results from the articulating processes of the vertebræ being very rarely implicated in the disease, so that no dislocation or luxation of the vertebræ, causing a narrowing of the canal, ensues, even in the most serious cases.

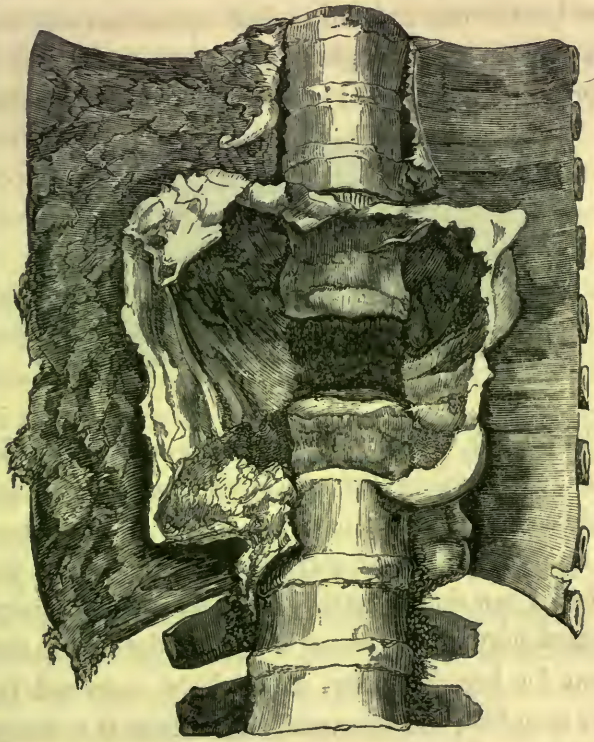
Paralysis, however, may result from caries having caused a perforation of the posterior part of the bodies of some of the vertebræ, and their permitting the admission of pus into the spinal canal with consequent pressure on the cord,—which is the proximate cause of the paralysis (paraplegia) that occurs in these cases. Exostosis into the canal also sometimes gives rise to the same result, of which it is, indeed, a more formidable cause, being one which gives but little hope of alleviation from treatment: or inflammation of the cord itself, or its membranes, may arise from the proximity of the vertebral disease; and thus, either from the deposition of lymph or pus, ultimate softening of the cord itself, or the formation of abscess in its substance—as mentioned by Carswell and others—paralysis may be induced. Loss of the power of motion is more common than that of sensation, although, in some instances, the two are combined. At first, the patient feels a sensation of weight or numbness in the lower extremities, and stumbles over any irregularities of the road;—has then increased difficulty in moving his legs, and at last either drags them after him as he moves by the assistance of crutches, or is, perhaps, altogether incapable of motion; besides which, paralysis of the bladder or rectum, or both, may supervene.

When caries takes place in the bodies of the vertebræ, and when pus is, in consequence, formed, it is generally confined to the immediate neighbourhood of

the diseased bone which gives rise to it, by a sac formed in front of that part of the spinal column, as shewn in the accompanying engraving,* where, however, the sac has been opened by a crucial incision, in order to exhibit the disease of the vertebræ within: but, in other cases, either the sac itself is not formed, or else becomes perforated; and under either of these circumstances, the pus finds its way among the contiguous muscles, and if not afterwards absorbed, at length presents itself at some external part more or less distant from the point where it originated. Thus, the matter frequently runs between the psoas muscle and its sheath, and appearing below Poupart's ligament, gives rise to what is termed psoas abscess. When the pus remains long in contact with this muscle, it becomes disorganized, is unable to contract, and consequently, the patient is incapable of raising, except with great difficulty, the leg of that side; an effect which is totally unconnected with paralysis, and must, therefore, be carefully distinguished from it. In other instances, the pus may pass down the thigh and appear at the back part of it, or abscesses may point at some part of the

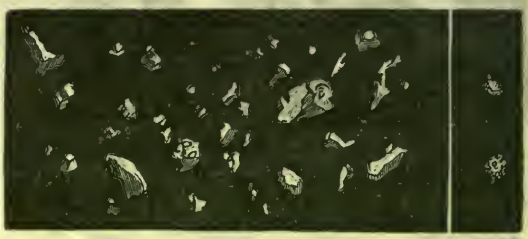
* This specimen occurred in a child aged two years, affected with angular projection in consequence of caries of the ninth, tenth, and eleventh dorsal vertebræ; it died of acute pleurisy. The right pleura was found thickly covered over with lymph, and completely full of serum, the lung being compressed closely against the vertebral column: the left pleura was healthy; a somewhat thick and very firm sac, two inches in length, and two and a half in breadth, containing a quantity of pus, covered the carious vertebræ, which, when the sac was opened, presented the appearance shewn in the engraving: the tenth dorsal vertebra was the most diseased, but the vertebra next above, and the one below the tenth, were also affected, while the contiguous intervertebral substances were scarcely at all diseased.

pelvis, or of the abdominal parieties, or in the loins,—the abscess in the latter part being termed lumbar.



Besides pus, the sacs formed in front of the diseased portion of the spine, as above described, often contain spiculæ of bone, which have become separated by the caries from the bodies of the vertebræ. If the case end in recovery, these spiculæ are either ultimately absorbed together with the pus, or if psoas, lumbar, or other abscess be formed, they may be discharged with

the pus, when the abscesses are opened. Thus, in a case I have recently seen, some spiculæ of bone were found in the discharge from an abscess connected with the diseased vertebræ, and which had opened at the inner side of the right thigh. Two of these spiculæ are represented (marked B) in the accompanying wood cut.



A B

In Case XVII. at the end of this chapter will be found a remarkable instance in which a communication had been formed between the lungs and an abscess in front of the dorsal vertebræ, so that for two years before I saw the young lady, she had frequently expectorated portions of carious bone; yet, during the treatment for her deformity, she entirely recovered from this symptom, and has remained free from it to the present time. The above engraving (marked A) shews the size and appearance of a number of the small fragments which the patient expectorated during the early part of the time she was under my care.

The bodies of individuals laboring under angular projection present appearances, varying considerably according to the peculiar attendant circumstances;

they are generally emaciated, the muscular system is weak, and the patient relieves himself by resting his hands upon his knees, leaning against a wall, or, during locomotion, supporting himself by such articles of furniture, &c., as happen to be in his way. The spine presents an angle, more or less acute, according to the number of vertebræ implicated in the caries. On an anterior view, the sternum appears prominent, and the thorax is compressed laterally, but the cartilages of the ribs are expanded, probably in consequence of their pressure upon, and the resistance offered by, the abdominal viscera; or sometimes owing to an enlargement of these viscera, which is a circumstance of not unfrequent occurrence in such cases. The ribs themselves are not so deformed as in lateral curvature, nor is the position of the scapulæ so much altered; they are, however, generally higher than natural, and in some cases the shoulders approach very near to the ears. The particular symptoms and morbid appearances may vary in almost every case, but this will only be in degree, as there is great similarity in their general character.

On any of the preceding symptoms, or other irregularity of shape or awkwardness of gait becoming observable, patients should be examined without delay, and appropriate remedies applied. The necessity of early attention to the treatment of angular deformity will be sufficiently evident from the consideration of the state of the vertebræ. After caries of the vertebræ has taken place

to a certain extent, should the general health and constitution improve, nature generally sets about a reparative process, which consists in a deposition of ossific matter on the surface of the remaining healthy portions of the vertebræ, so as to unite and consolidate the approximated surfaces of the bones, in the position in which they happen to be placed. If the ossific matter accumulate upon the vertebræ so as to unite them, while the column is in a distorted form, the restoration of that part to its natural state will, of course, be impracticable; but if it receive early and requisite attention before the bony union has taken place, if it can be made straight, and kept so sufficiently long for the ossific matter to deposit itself in the vacant space, an anchylosis, free from deformity, or nearly so, will be the result. Anchylosis is the object at which practitioners have always aimed; but, unfortunately, it has too frequently been attempted in the *crooked* position. The aim which I have in view, and to which I wish to draw the attention of the profession, is to obtain this in a *straight* one. The propriety of this plan of treatment (when nature has not already completed the anchylosis in the crooked position), will be rendered more clear by the subjoined wood cuts. The first represents an instance of caries in the bodies of two vertebræ, producing angular projection; the other shews the same vertebræ in a straight position, leaving a vacant space, which nature will partially fill up, provided the health of the patient be improved,

and the spine be kept in its corrected state; while the diseased part of the spine will be further strengthened by anchylosis taking place between the articulating and transverse processes of the affected vertebræ.

No. 1.

No. 2.

On the subject of CARIES, it may be observed that this disease may occur at almost any part of the spinal column, although certain regions seem to be much more liable to it than others. Angular projection, it is well known, is infinitely more common in the dorsal and the lumbar than in the cervical region, where, indeed, it is rarely met with; but, in order to determine more accurately than could be done by any other means, the relative frequency with which caries occurs in different regions of the spine, I have examined the specimens of this disease, contained in a large

number of the Metropolitan and Provincial Anatomical Museums, to which I have been kindly permitted access. Out of sixty-nine specimens of this species of disease, in which there was more or less caries of the vertebræ, it existed twice in the cervical region, twenty-four times in the dorsal, and twenty in the lumbar region; simultaneously in the cervical and dorsal region twice, and in the dorsal and lumbar twenty-one times.

It is exceedingly rare for a single vertebra to be affected with caries, as, far more generally, several or even many are implicated in the disease, although it is usual to find two or three of them much more deeply affected than the rest. Sometimes the caries extends to so large a number, and affects them so extensively, that it is really astonishing how life can be supported under such a load of disease.

The precise vertebræ affected were ascertained in sixty of the above cases; and the following table will shew the relative frequency with which they were found more or less carious. The first line represents the number of times each vertebra was found *much* affected by the disease, excluding those instances where there was but slight erosion of the surface of the bones, or where the disease had made but slight progress; the second shews how often the different vertebræ were affected, *including* those cases in which they were but *slightly affected* by the disease; while the third line indicates the result of the examination of eighteen cases, in which no curvature was caused by the caries.

Vertebræ.	Cervical							Dorsal.											Lumbar.				
	1	2	3	4	5	6	7	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5
Vertebræ *very much* affected with caries.	1	1	2	2	2	1	1	1	1	1	0	8	12	13	13	22	27	20	18	22	13	7	10	8
Total No. of vertebræ affected with caries.	1	2	3	2	2	1	2	2	4	6	10	14	18	20	24	27	32	28	21	25	20	10	11	10
Vertebræ in eighteen cases of caries, without angular projection.	1	1	2	2	2	1	1	1	2		2	2	1	1	1	2	3	3	3	7	6	3	6	6

From this table it will be seen, as, indeed, has been already stated, that the cervical region is much less prone to caries than other parts of the spinal column, while the disease occurs more and more frequently in each vertebra, up to the tenth dorsal, which would appear to be its most common seat, and, from which to the last lumbar it again gradually diminishes in frequency. Amongst the collections of anatomical preparations examined, twenty-eight cases of caries of the vertebral bones were met with, in which there existed no curvature of the spine (many of these were seen in the Museum at Fort Pitt, Chatham, where, as the specimens are taken chiefly from soldiers, cases of *angular projection* were not so likely to be found.) Of these, the exact seat of the disease was noted in eighteen cases; and, as will be noticed by inspecting the last line, it appears that the majority of instances of caries, unaccompanied with curvature, occurred in the lumbar vertebræ, although some were also met with in the dorsal and cervical regions.

There are several causes which may tend to prevent

deformity of the spine arising as a consequence of caries of the vertebræ. 1st, The caries may attack the surface only of the bodies of the vertebræ, thus eroding the outer lamina of the bone, without destroying it so much as to alter its shape. 2nd, The disease may attack the middle of the upper or under surface of one or more of the vertebræ, and so hollow it into a cup-like cavity, at the same time leaving the outer part intact, so that, until they are separated from one another, the vertebræ seem to be perfectly healthy. Caries, however, attacking this part of the vertebræ only, is rare; as I have met with but one example of the kind, out of the large number I have examined. 3rd, Even when the upper and lower surfaces of two contiguous vertebræ are extensively destroyed by caries, curvature may sometimes be prevented by the firm bridges of ossific matter which are thrown out from one bone to the other, thus supporting the upper one in its proper position; a mode in which the tendency that nature always shews to repair mischief is most beautifully exhibited.

The progress of caries in the spinal column, when once this part has become affected by the disease, would, doubtless, be more rapid than it generally is, were it not in some degree impeded in its course by the number of bones of which the spine is composed, and by their being separated by the intervertebral substance, which does not so easily participate in disease as bone: in a few instances, indeed, the disease

has appeared to commence in the centre of the intervertebral substance, which being destroyed, the morbid process has extended to the adjoining vertebræ; or it may have been confined entirely to the fibro-cartilage, being apparently prevented extending to the bones, by the periosteum which exists between the vertebræ and the intervertebral substances. Out of thirty-one cases in which the condition of the intervertebral substances could be accurately determined, they partook more or less of the disease of the adjoining vertebræ in twenty-three; but, on the other hand, in eight instances, the fibro-cartilages remained quite healthy while the neighbouring bones were considerably diseased.

Another circumstance illustrating the conservative power of nature, is the rarity with which caries extends so far backwards as to cause perforation of the posterior parts of the bodies of the vertebræ, and thus to injure the spinal cord. True it is, that this event does sometimes take place, and owing to the inflammation resulting therefrom, or to pressure on the cord from thickening of the membranes, or some similar cause,—paralysis of the lower extremities takes place; yet, considering the frequency of caries, this event is, comparatively, not of common occurrence. It is a still rarer circumstance for the cavity of the spinal cord to become *permanently* diminished in size from this disease, only four cases having been met with out of the total number examined for the purpose;

in three, the narrowing resulted from slight exostosis into the cavity of the spinal canal; and in the fourth, was owing to the formation of pus under the posterior ligament, pushing this membrane backwards against the cord.

Out of the number of sections of spinal columns examined, there were two instances in which the diameter of the cavity for the cord was actually larger at the most acute part of the angle than elsewhere, as if to protect it from the possibility of injury, while at the same time, in one of the instances, it was guarded at that point by a thin layer of adipose tissue.

Vertebræ affected with caries present various aspects according to the advance which the disease has made: in the earlier periods, they are usually of a pinkish or light rose color, and are softer than natural; sometimes so much so as to be indented by the pressure of the nail, while at the same time they *appear* too dense, owing to their cancellated structure being filled with a thick and tenacious or semi-gelatinous fluid,—or else permeated, more or less, with yellow and soft tuberculous matter, in which case it sometimes happens that the deposit is confined to a limited portion of the vertebra—the line of demarcation between the healthy and morbid parts being often exceedingly well defined. As the disease advances, the substance of the bone becomes still softer, till at last pus is formed, and the ossific matter is absorbed, so that the surfaces of the vertebræ thus become eroded into cavities of various

sizes, or almost altogether destroyed. A sac (formed by the anterior vertebral ligament, the thickened periosteum, &c., strengthened by the effusion of lymph and sometimes by the deposition of ossific matter in its coats) is usually found, as has been already stated, in front of the carious bones, in order, apparently, to limit the mischief and prevent the effusion of pus into, or its burrowing behind, the pleura or peritonæum.

Thus is the progress of the disease somewhat impeded, but, at the same time, it generally involves to a certain extent, some of the vertebræ above and below the one first and principally affected. Judging *a priori*, one might suppose that the vertebræ below the one where the mischief originated, would be more liable to become carious than those above it, owing to the injurious effect produced by the contact of the puriform matter (contained in the sac covering the vertebræ), which would, of course, owing to its specific gravity, come more into contact with the lower than the upper vertebræ. Observation does not, however, bear out this supposition to the extent which might have been expected, for out of twenty-eight cases examined with a view to determine this point, the progress of the disease was *equal* in the vertebræ above and below the one most affected, in seven instances; the caries had made more progress in the vertebræ *above* than below that one in nine cases, while in twelve only were its effects more marked in the vertebræ *below* the one most diseased; thus, out of twenty-eight cases,

exhibiting but three more, in which the vertebræ below the one where the disease first originated (or at least where it was most severe) were more affected than those in which the vertebræ above that point were principally implicated,—a number which comes quite within the limits of statistical error.

When the general health improves, the deposition of ossific matter and consequent anchylosis are never to be despaired of, as they have occurred in the most severe cases, even where the caries has been sufficiently extensive to destroy so large a number of the bodies of the vertebræ, that the column measured only eleven inches in height, instead of twenty-four or twenty-six inches, which is about its natural length. When left to nature, anchylosis, if it take place at all, does so by producing angular projection of the spine, as the weight of the upper part of the body naturally curves the spine at this, its diseased part. When the bodies of several vertebræ are destroyed, the greatest angle is usually found about the middle of the diseased part; but if two only be affected, and that about equally, the angle will be formed by the spinous process of the upper one of the two, owing to the weight of the head and shoulders bending the upper part of the spinal column forwards, until the remaining portion of the bodies of the diseased vertebræ come in contact,—thus tilting upwards and backwards, the extremity of the spinous process of the uppermost of the two vertebræ. A knowledge of this fact is not without its

use, as if it were necessary to apply a moxa, &c., a near as possible to the diseased part, we should be led by the above fact to apply it rather below than close to the most prominent part of the projection.

In angular projection, the spinous processes, owing to the bending forward of the body, become more widely separated than natural from one another, their extremities also projecting more backwards than they ought to do: but if the curvature have been of any considerable duration, another marked alteration takes place in those of them which project the most; for, by their continual pressure against the skin, the extremities become absorbed, so that it is not unusual to find these processes at the point of the greatest curve, quite rounded, and much diminished in length.

Cancer.—Although cancer of the vertebræ is a very rare disease, yet as it does sometimes occur, and may, when present, give rise to angular projection of the spine, it is important to bear in mind the possibility of its presence in the diagnosis of any obscure case of spinal deformity. The history of the patient (including an inquiry into his hereditary predisposition) becomes in such instances particularly important as throwing a light on the nature of the case, and aiding in the diagnosis between this disease and deformity dependent upon caries. The amount of pain which the patient suffers in the course of the cancerous affection is much greater than that usually experienced from caries of the vertebræ, while the progress

of the disease is also more rapid; and the age likewise differs at which the diseases generally affect the system, for while caries is more common in early life than afterwards, cancer more generally occurs at or after middle age: the peculiar sallow or yellowish tinge of the skin is likewise, when present, a valuable sign, and the presumption of the vertebral disease being cancerous would be materially strengthened, were any other organ or part of the body discovered to be the seat of a similar affection.

Like many other textures, the bones may be affected with any of the varieties of cancer, but the encephaloid is the one which is most frequently met with: in the bodies of the vertebræ it may occur either in the infiltrated or tuberous form, and it may ultimately replace the whole of the cancellous structure, leaving but a mere shell of ossific matter; or, destroying the latter, it may form a considerable tumor in front of the vertebræ. It is somewhat rare for the disease to be limited to a single vertebra, as far more frequently several vertebræ are implicated at the same time; in some instances, the contiguous vertebræ are affected, while in others, two or three distant portions of the column may be the seat of the disease, the intervening vertebræ remaining healthy. The bodies of the vertebræ being thus diseased and softened, the weight of the head and superior part of the trunk sometimes causes the spine to give way at the affected part, from whence a more or less angular projection of it

results, which presents an appearance, so far as the external aspect of the deformity is concerned, not distinguishable from one produced by caries of the vertebræ: in one example I have seen of cancer of the vertebræ, a double angular projection of the spine was caused by its giving way at two distinct parts —a circumstance I have not met with in cases of caries.

TREATMENT.

Before commencing the treatment of any case of angular projection of the spine, the history of the case must be inquired into, the spinal column and other parts carefully examined, and all available means adopted in order to arrive at as accurate a conclusion as possible relative to the causes of the attack and the pathological condition of the parts. If the case be recent, and if there exist any symptoms of a low form of inflammation of the vertebræ or of the surrounding tissues, it will be necessary, along with the most vigilant general treatment and entire rest, to adopt appropriate local means of relieving it. In the commencement, the application of leeches to the part affected every second or third day, will be desirable; as it is necessary that the inflammatory action (though of a low character) should be subdued: in some cases, cupping at the sides of the vertebræ may be substituted for the leeches, and may be succeeded by the applica-

tion of a blister, to be repeated as occasion may require, or to be kept open by savine cerate.

The amount to which the caries has proceeded, and the probable number of the vertebræ implicated, may be judged of by the form of the projection, the greater or less acuteness of the angle which it forms, and the extent of the spine apparently involved, guided by a knowledge of the usual condition of the parts in such cases, as referred to in the former part of this chapter. In determining the question—a most important one—as to whether anchylosis between the vertebræ has taken place, the progress of the case and the fact of the projection having recently increased, or of its having, on the contrary, remained stationary for a considerable period, must be taken into consideration; and especially the occurrence, or not, of any change in the appearance of the projection when the patient alters his posture. For this purpose, the shape of the projection should be carefully noted when the patient stands or sits up, or when he walks about; and then, again, when he is in the recumbent, prone or supine position. Should it be found, that when the patient lies down, a marked alteration in the shape of the projection takes place, we may be assured that complete anchylosis between the remaining portions of the carious vertebræ has not yet ensued, and the question then remains, in what position of the vertebræ should the anchylosis be brought about. It is universally agreed that anchylosis of the vertebræ is the object to

be ultimately aimed at in the treatment of all cases of this form of spinal disease; but it is too generally believed, that this end can only be attained by keeping the remaining portions of the bodies of the vertebræ in close juxta-position; under which circumstances, if bony union take place, a perpetuation of the deformity is the necessary result, and the individuals are rendered for the residue of life subject to the painful feeling of inferiority in regard to personal appearance, just as in those cases in which anchylosis has taken place without the intervention of art.

If, after careful examination, it is determined that anchylosis has not taken place, the object should be to rectify, as much as the circumstances of the case will permit, the shape of the spine, and to promote anchylosis in the improved position; for as amendment in the health takes place, ossific matter becomes deposited, so as to cause anchylosis between the articulating and transverse, and sometimes the spinous processes; while it likewise unites into a solid mass the remaining portions of the diseased vertebræ, as may be seen on examining the specimens of this affection in various pathological museums. When, on the other hand, it is ascertained that anchylosis has already occurred at the diseased part of the column—that firm bony union between the carious vertebræ has taken place—we must not expect from our treatment to be able to restore the spine to its natural position; for that, under such circumstances, is impracticable. I do

not state that no improvement in the general form of the back can be produced by treatment in those cases of angular projection in which anchylosis has taken place: on the contrary, I have had many such under my care, in which the alteration for the better has been very marked. This, however, has not resulted from a change in the condition or position of the anchylosed vertebræ, but from the circumstance that in long continued cases of angular projection, where no efficient remedial plan has been adopted, the weight of the head and upper extremities acting upon the spinal column after it has lost its perpendicular direction, tends to bend the portions of it above and below the anchylosed part still more out of their natural position; while, at the same time, the elevation of the shoulders, and the tilting backwards of the scapulæ which ensue, both add to the deformed appearance of the back. Now, in almost the very worst cases, these conditions of the parts admit of material improvement: the elevation of the shoulders and the projection of the scapulæ may be very much diminished, and the portions of the column *above* and *below* the anchylosed and projecting part may be brought very nearly to their natural direction, so that the projection itself becomes materially, and, in some instances, very considerably, less prominent, although the anchylosed part of the spine remains in the same condition as before, except as regards its relative direction to the other parts of the column.

The observation already made as to the desirableness of treatment being commenced in the early stages, is equally applicable and more important as regards this form of spinal disease than any other, although, as has just been shewn, cases should not be considered as beyond the reach of benefit from treatment, excepting where they are of very long standing, and where the constitution is in an extremely morbid condition. The knowledge of the benefits derived in many severe cases would be almost as beneficial to the patient as to the practitioner, by giving him that perseverance, founded on hope and belief, which, in a disease like caries of the vertebræ, is necessary to attain relief.

In this state of the disease, that is, where caries of the vertebræ exists and where anchylosis has not taken place, exercise of every kind is uniformly injurious, and has a constant tendency to increase whatever disease may already exist: and in the treatment of it, therefore, whether in an incipient or advanced stage, all calisthenic or gymnastic exercises must be carefully avoided. The object to be aimed at is to place the spine in as favorable a position as the amount of existing disease will admit of, and to keep it in that position until anchylosis has taken place. These indications can only be fulfilled by the aid of the recumbent position conjoined with attention to, so as to improve the condition of, the general health.

The apparatus I have usually employed is the plane I have already described, and which, according

to the angle at which it is placed, is equally adapted for the supine and the prone positions. At first, for a day or two, and until the patient becomes accustomed to it, he is directed merely to adopt the recumbent position; then, by means of the shoulder and head bands, and those for the feet, with the weights attached to them, a slight amount of extension is employed, its effects being attended to and care taken that no pain whatever, or even uneasiness, is given. Thus, the weight of the head and upper part of the trunk is removed from the carious part of the spine, and the patient, by this, invariably expresses himself relieved: gradually, from time to time, the weights attached to the extremities are somewhat increased, the feelings of the patient being taken as an index of the extension to be used. From the commencement of the treatment, friction with the hand, and generally with some stimulating liniment, as the Lin: Ammoniæ, or a combination of Acetic acid with the Acetum Cantharidis and Tinctura Capsici, should be rubbed in two or three times a day—a certain amount of pressure being at the same time employed. Friction and pressure on the back are, of course, used while the patient is in the prone position: and while he is adopting this form of recumbency, advantage is derived in many instances of this kind of deformity, by the use, for an hour or two at a time, of pressure by means of the spring compress mentioned when describing the plane I ordinarily employ.

As the ribs project in these cases more horizontally forwards than natural, increasing the antero-posterior, and diminishing the transverse diameter of the chest, benefit is likewise derived from the use of the padded spring applied upon the sternum, while the patient is in the supine position. By its elasticity, the spring admits of the sternum rising somewhat during the act of inspiration; but the movement of the chest in this direction being to a certain extent interfered with by it, the muscles of respiration which elevate the ribs laterally—the serratus magnus especially—are brought more into action, and have thus a tendency by expanding the chest laterally, to restore it to its natural form. The advantage, then, of pressure thus applied is two-fold, viz.:—its direct action upon the projecting sternum, and its indirect one, by bringing into play those muscles which tend to expand the chest in the direction which, under such circumstances, is desirable.

By some authors, the exclusive use of the prone position, and by others that of the supine, is recommended; but as each presents, under certain circumstances, some advantages, it is necessary to be guided by the particular circumstances of each individual case in the choice of the plan we should adopt. Thus, for example, if the disease of the spine be complicated with psoas abscess, the prone position may be the more advantageous, as, when the patient adopts it, the pus gravitates towards that part to which the abscess has a tendency to point or discharge; while a

similar consideration renders the supine position preferable in lumbar abscess. In those cases, also, where there exists that deformity of the chest in which the ribs and sternum project forward to a very considerable extent, the prone position may be the preferable one, because, under such circumstances, the weight of the body, as the patient lies upon the chest, has a tendency to compress backwards the sternum and thus to give the ribs a more natural form: the same object, however, is attained when the patient adopts the supine position, by applying the padded spring to the sternum in the manner already described. On the whole, if there were no special circumstance in a case to indicate the adoption of the prone position, and if it were necessary to adopt one plan entirely to the exclusion of the other, I believe that the supine position, employed in the manner I have recommended, would be the preferable one, both as producing a more complete restoration of the spine to its natural shape, and as effecting this in a shorter time. But in most cases in which I make the supine position the basis, as it were, of treatment, I alternate it for an hour or two a day with prone recumbency, as a change of position is, of course, sometimes agreeable to the patients, though, owing to the relief given to their symptoms by the treatment adopted, it is scarcely ever that they complain of recumbency as irksome. And as it is in children that we are most commonly called upon to treat this disease, and in childhood also that the most beneficial

results can be obtained, it is satisfactory to know that there is rarely or never any difficulty in getting them to continue the recumbent position as long as is necessary for their recovery. I have had in this class of patients, numerous cases of incipient angular curvature completely recovered by a few months treatment, during which the recumbent position was used, where there could be no doubt that a permanent deformity would otherwise have been established; and other cases also of a more severe character (a few of which will be found at the end of this Chapter), in which the progress of the disease has not only been checked, but a most marked improvement in the deformity of the spine has taken place. Indeed, the ease with which the plan is adopted—the regular superintendence of the medical adviser, and the exactness with which his directions can be carried out—the improvement in the general health which ensues, not only on account of the correction of the deformity, but also in consequence of freedom from fatigue and from pressure on the chest and vertebræ—and the other favorable circumstances in which the patient is placed—all conspire to promote his recovery. The two most essential points in the treatment of deformity dependent upon caries, can only be obtained by the use of the recumbent position; for with whatever skill and ingenuity spinal stays and supports be made, they fail in effectually removing the weight of the head and upper part of the trunk from the diseased vertebræ,

and in maintaining the spine in the most favorable position, until anchylosis has taken place; besides which they are very liable to do mischief, by causing partial and injurious pressure upon some part of the pelvis, abdomen, or chest, which ought to be carefully avoided. So convinced, indeed, am I of the advantages of the plan of treatment recommended, that I must again repeat that recumbency, properly persevered in, is absolutely necessary to effect the whole amount of improvement of which cases of angular projection of the spine are capable.

Allusion has already been made to the general treatment necessary in cases of angular projection, and which should consist in such measures as will tend to restore the secretions to their healthy state, while tonics are administered so as to maintain and improve the patient's strength; for these purposes gentle purgatives are necessary, and should be repeated until the evacuations cease to have the morbid appearance which they at first almost always present, and which they often retain for a great length of time. The vegetable bitters may then be advantageously employed, and with these the iodide of potassium: the preparations of iron are also very useful, and for strumous subjects, the iodide is exceedingly valuable. The citrate of iron is also an efficacious and agreeable form in which the metal may be given: but in many instances, the sesquioxide agrees well with the stomach, and appears as useful as any other form of the remedy.

Paralysis, when present, will often disappear as the deformity and the diseased condition of the spine become relieved: while a diminution of the chronic inflammation, and the absorption of pus may be promoted by the application of blisters to the afflicted parts; and with the same object in view, the compound iodine ointment may be rubbed in, or the Empl: hydrargyri applied near the seat of the disease.

Though the application of setons and issues have been frequently recommended in the treatment of this form of spinal disease, it is very rarely that I find it necessary to employ either the one or the other; and extensive practice and close attention to the subject, justify me in stating, that their use may generally be dispensed with: and after carefully considering their respective effects in different cases, I am quite satisfied that blisters are, generally, far more efficacious, and are decidedly the best counter-irritants. In place, therefore, of the seton or similar remedies, I recommend the application of a large blister to the part affected, once a week, or oftener, according to circumstances; being convinced, that the copious discharge from it gives more relief than the remedies just alluded to, which are always troublesome and often very distressing; and frequently, also, even long after they are healed, leave the part to which they have been applied in an exceedingly sensitive condition.

When, notwithstanding the improvement of the general health, and the employment of other means

for that purpose, the pus does not become absorbed, but makes its way to the surface and points there, the abscess thus formed ought to be opened, rather than to allow it to open spontaneously; and that is best effected by a small valvular puncture, which, while it permits the escape of the matter, prevents, if properly managed, the ingress of air, and can also be readily healed as soon as the object for which it was formed is attained: if necessary, other similar openings can afterwards be made. A psoas abscess should be punctured at the most depending point: a lumbar abscess or one appearing at any other part of the parietes, at the point where fluctuation is most distinct: this in the case of a lumbar abscess will also usually, when the patient is in the supine position, be the most depending part.

In proportion as the deformity of the spine becomes rectified by treatment—as the spine becomes straighter—the length of the back, as a matter of course, increases, and the height of the patient, consequently, is greater, even though he should not have *grown* in the interval. Thus I have known cases where the length from the occiput to the sacrum has increased from one to three inches in persons too old to grow: but (what is very important) in the cases of younger persons, where, from the disease of the spine, the growth had been altogether arrested—where, at least, the patient had not grown for a length of time before coming under treatment,—it has frequently occurred to me to find

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that, after the spinal disease had been removed, the patient has again commenced growing, and has often grown rapidly. Thus, to name one example—a yonng lady, aged 10 years, with angular projection of the dorsal vertebræ, who had not grown at all for some time previously to my seeing her, has increased in height no less than five inches since her return home after her cure, only 21 months ago.

If a case of cancer of the vertebræ come under observation, it is scarcely necessary to remark that the deformity of the spine is a matter of secondary consideration, and that the attention of the practitioner must be directed towards the relief of the general condition of the system, and of such symptoms as may successively present themselves.

CASES OF ANGULAR PROJECTION.

CASE XV.—(PLATES XIII. & XIV.)

The following case of angular projection was a very severe one, but the details of it, and the engravings—the first taken when the patient came under treatment, and the second seven years after recovery—clearly indicate the beneficial effects of the treatment and the permanency of the cure, both as regard the spinal deformity and the excellent state of her health.

1829. September 1st. The daughter of Mr. J. W., aged eleven years, commenced the use of the plan of

treatment just recommended. She had been very delicate from infancy. Four years previously, she had a severe fall, and was subsequently in a state of almost constant suffering. About twelve months after the occurrence of this accident, her mother first observed a projection of one of the vertebræ; she soon after began to incline to the right side, and her weakness and deformity increased so much, that she was unable to walk without some support. The pain in her back, of which she had complained from the beginning, now increased exceedingly; two other vertebræ became more prominent, and from this time she was unable to walk at all, except with her hands on her knees. She was much emaciated, and the only comfortable rest she could obtain was when laid on her abdomen, across her parent's lap.

The enlargement, from the projecting vertebræ to the sternum and throughout the chest and hypochondriac regions was great in the extreme; two abscesses were forming, one on the right side, the other in the left, nearly horizontal with, but rather lower than, the diseased vertebræ; the undulation of matter in the latter was quite distinct. The child's health was, of course, much impaired; her breathing very difficult; palpitation of the heart severe; her digestive organs were much deranged; and her whole frame was reduced to a mere skeleton.

December 12th. The patient has been regularly on the apparatus, except for a short time in the mornings, for washing and other necessary purposes: this has been the more rigidly attended to, as her parents have been most anxious to accelerate her recovery by every means in their power. For several weeks past, she has slept with the weights attached to her as during the day, and the improvement effected has greatly exceeded the most sanguine expectations.

1830. April 6th. A cast has this day been taken from the patient, and it is not too much to assert that nothing but the inspection of the busts,* can convey an adequate idea of the improvement which has taken place. It is needless to particularize symptoms, as the girl has no complaints to make, is very happy, and will continue the use of the apparatus so long as is thought advisable.

June 1st. The patient has now been under treatment exactly nine months; she is in excellent health, having become, in this comparatively short time, quite a robust girl. Her appetite is good; the cough and palpitation are entirely gone; her breathing and the functions of the stomach and intestines are regular and natural; when standing, she appears quite erect; nearly the whole of her deformity has disappeared, her personal appearance generally is equally improved, and the abscesses have become entirely absorbed. Consequently, it is not deemed necessary for her to sleep upon the apparatus, or, indeed, to continue its use, except in cases of more than ordinary fatigue.

This case will probably be considered as extremely important, because, in angular projection, the practice has been too general, as has already been stated, merely to encourage an anchylosis of the vertebræ in the state in which the practitioner finds them, without any effectual attempt being made to rectify the distortion. It is, indeed, rare to meet with cases in which such severe disease terminates favorably in so very short a time.

* When the young lady, whose case has been already detailed (No. 1), was brought to me, I deemed it desirable to send for this patient, then a fine young woman, who, on examination, was found so astonishingly stout and healthy (not having had a single day's illness since her long confinement), that I thought it advisable to obtain another cast, (Plate XIV.) in order to exhibit the striking contrast between it and the one first taken. This arrangement renders it unnecessary to have an engraving of the cast alluded to above

The engravings illustrative of this case, are Nos. XIII. and XIV.: the former was taken when the patient was first seen, the latter seven years afterwards; they clearly indicate the efficiency of the treatment and the permanency of the cure, both as regards the spinal deformity and the excellent state of her health.

CASE XVI.—(PLATES XV. & XVI.)

The following is an example of one of the most severe forms of spinal disease. When I first saw the patient he walked, or rather dragged himself forwards, though with great difficulty, by means of crutches; his chin rested upon the sternum, which had become much hollowed by the constant pressure; the occiput also rested upon the projecting spine, and each side of his head upon his shoulders, as exhibited in the accompanying engraving, Pl. XV.

W. F. was born in December 1832. When an infant, although he was not stout, he was yet a fine child, and his flesh was firm; he had the hooping cough while at the breast, and was subsequently exceedingly ill from enlargement and hardness of the abdomen. In June, 1834, his nurse slipped and let him fall, in consequence of which he suffered so much that it was not thought he could recover; he did, however, so far improve, that it was hoped no further ill effects would follow. In the month of September, 1835, he had the measles, and in the spring of the following year, a projection of some of the dorsal vertebræ, with an altered form of his chest, was observed in consequence of the child's walking in a singular manner, holding his head backwards, and having his shoulders much raised. Medical assistance was immediately procured,

XV

Drawn by [illegible]
from a Cast

XVI

but the disease progressed rapidly, the spine and sternum becoming more and more prominent, which they have continued to do to the present time. In the course of the summer he lost the use of his lower extremities, and for ten months had not any sensation in them even when they were pinched intentionally; the spasmodic contractions in them during the nights were most severe, his limbs being forcibly drawn up to his body. As the disease advanced, his head, which was at first thrown backwards, fell upon his chest, as he was not able to support the weight of it without some assistance; his strength entirely left him, and his emaciation was, and has been since, extreme. His whole trunk was now exceedingly deformed, being much diminished in length; his chest was greatly contracted in its transverse direction, his cough very troublesome, and his breathing most distressing, especially when asleep. He had the greatest difficulty in turning himself in bed; if he did so, he would be ten minutes or more, before he could recover from the effects of the exertion; his complexion at these times was quite livid. From this period (1837) he was confined altogether to his bed, or a chair, until 1842, when he somewhat recovered the use of his limbs, so as to be able to walk a few yards with the assistance of crutches, but his debility was such that it was painful to see him drag his limbs after him, and his difficulty in breathing continued extreme; but no symptom caused him so much suffering as his difficulty in micturition, being often twenty minutes or more in excruciating pain, without being able to relieve himself in that respect; the secretion from the kidneys was dark in color, and exceedingly strong in odor.

June 27,1843.—At present the patient is suffering extremely; his cough is very troublesome, but he has

no expectoration; his breathing is extremely difficult, being short, frequent, and altogether diaphragmatic, at times producing great lividity of the face; he is troubled with headache; his sleep is short, much disturbed, and apparently accompanied with increased difficulty of respiration; his complexion is sallow and unhealthy, his skin hot and dry; he complains of general and great lassitude and debility, rendering him unwilling, if he had the power, to exert himself, while he is so feeble, that he is not able to lift even a trifling weight. His emaciation is extreme, his limbs are wasted to the bone, his cheeks are hollow, and his countenance expressive of suffering. The spine is exceedingly distorted, presenting a remarkable example of angular projection including all the dorsal vertebræ, excepting the first and last, the most prominent ones being the fourth and fifth: there is considerable soreness on pressure in the course of the diseased vertebræ. The sternum projects forward excessively, the ribs are much flattened laterally, and project forwards and downwards, so that the extremities of the lower ones fall quite within the brim of the pelvis. The shoulders are so high that, on a lateral view, they almost prevent the ears from being seen, and the head is imbedded, as it were, in a hollow formed by them; while, by the constant pressure of the chin on the sternum, the upper part of this bone has become very much depressed. (Plate XV.)

September 27.—The patient has now been three months under treatment, having been placed on an inclined plane, and the recumbent position strictly enjoined, while slight and regulated weights, gradually increased, were adjusted to the head and extremities so as to improve the state of the spinal line, and to reduce the height of the shoulders: pressure has also been applied on the prominent part of the sternum

and counter-irritation to the diseased part of the vertebral column: the state of the digestive organs has been improved, and constitutional treatment adopted, so as to correct the general health and promote a deposition of ossific matter, while the bones were retained in their improved position. The symptoms already enumerated are all much ameliorated; his breathing is less difficult, and his sleep more composed; his shoulders, which were as high as his ears, are much lower, and he feels that when he has occasion to rise for necessary purposes, he has strength for it; he has increased in height two inches.

December 27.—A cast has this day been taken of the patient, which shews a most marked improvement both in the shape of the back and in the elevation of his shoulders, as compared with the one taken when he first came under my care. His general health is much better; his breathing, which was, to use his mother's expression, "awful," is now quite easy; he has nearly lost his cough, is much less subject to colds, he sleeps well all night, and his spirits are excellent.

February 29, 1844.—All his symptoms continue favorable; his strength has increased so much that he can walk across the room with perfect ease, and is quite erect, although some protuberance of the spine still remains; notwithstanding the development of his body generally, his chest has diminished an inch and three-eighths in its antero-posterior diameter, having increased proportionably in its transverse direction; he has grown, since September last, nearly two inches.

June 20.—The patient has now been twelve months under treatment, and is so much improved that he can run about with activity, and is in every respect better. This great change has been effected, I am happy to say, without subjecting him to a single

hour's pain during the whole time he has been under treatment. (Plate XVI.)

1845. April.—This patient has continued quite as well as when I last reported, and I am glad to state that the projection continues to diminish. He is beginning to walk out, which he has not done during the late severe winter.

The plan of treatment I adopted in this case was such as has been already described, and which I have found so eminently successful in similar ones, but varied somewhat so as to suit the peculiarity of the case; for, as no two examples of the disease are perfectly alike, so each one demands some modification of of the plan pursued for its cure. The deformity was reduced more than could have been anticipated, from the long standing of the disease, and the probable amount of the preexisting anchylosis, while the general health was gotten into a very improved state, and he has since remained almost altogether free from the many and distressing symptoms which have been already enumerated. It is very probable that, in this case, the disease had its origin in injury done to the spine by the fall which the patient had when two years of age, and that it became much developed owing to a deteriorated state of health, left by the attack of measles. Not unfrequently, indeed, in cases of angular projection, the commencement of the malady may be traced back to some such injury done to the spinal column by a fall, blow, or other accident; these exciting causes, however, in the generality of cases only producing caries and consequently deformity, when the health is in an unfavorable state, and especially where the individual is of a scrofulous diathesis.

A very serious symptom from which this patient suffered was paralysis of the lower extremities, produced by pressure on the spinal cord, affecting both

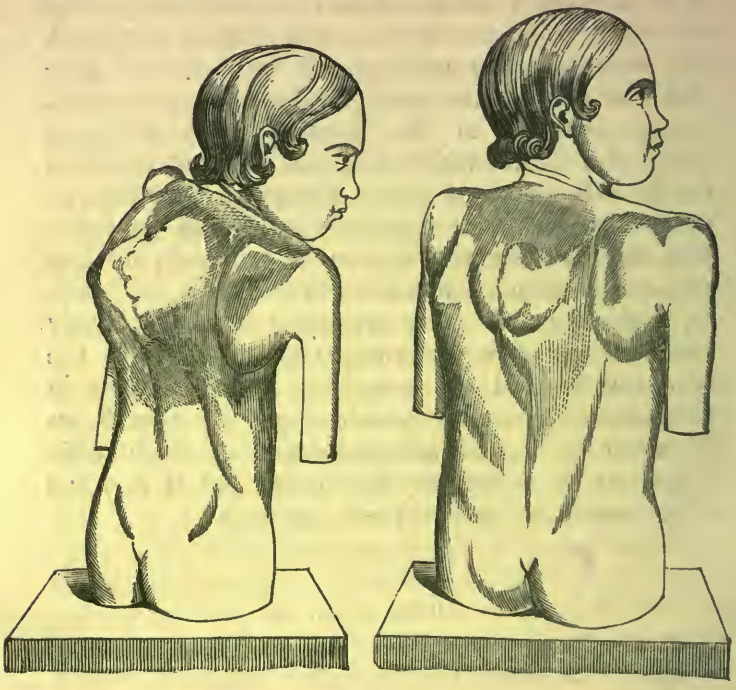
sensation and motion, and depriving him of locomotion for a long period. Frequently this affection depends, as in the present instance, upon remediable causes; but sometimes, when the caries is still further advanced, and when complete anchylosis in the deformed position has ensued, the paralysis becomes permanent, owing probably to the pressure upon the cord being of a nature which does not admit of removal; On the other hand, it almost always happens that, in those cases where the spinal projection can be remedied, the paralysis will likewise be removed; for this purpose the recumbent position is absolutely necessary, as, without it, all other treatment is comparatively valueless, and time which might be available for the cure may be said to be entirely lost. Exercise, in particular cases and in certain stages of other forms of curvature, may be advantageous, but when caries is present, it is not only not useful, but it is worse than useless—it is positively injurious.

CASE XVII.

Miss C. N., aged 13½ years, resident in the county of York, came under treatment on the 8th of October, 1845. She had good health untill attacked with measles, when between seven and eight years of age. She suffered much from this disease, which was accompanied with severe inflammation of the lungs; since then her health has been altogether very delicate, some cough and difficulty in breathing having continued long after she was considered well of the attack.

About a year afterwards, at the close of 1840, it was observed that she stooped forwards and bent towards the right side, while the left shoulder, gradu-

ally became higher than the right; she was soon fatigued from trifling exertion, and walking became



somewhat difficult, as she often stumbled, and sometimes fell from trifling causes. Attention being thus drawn to the spine, it was found that there was a projection of the three upper dorsal vertebræ, and she was ordered, in consequence, to lie down a part of every day.

In 1842 she began to lose the use of her lower extremities, and the paralysis became so complete as to render it impossible for her even to stand; it affected sensation as well as motion. This state continued some months, during which she had frequent spasmo-

dic contractions of the legs, which were involuntarily drawn towards her body: she has of late improved as regards the use of her limbs.

In 1843 she began to expectorate small spiculæ of carious bone, varying in size from pieces nearly as large as a small pea to minute portions not larger than the head of a pin; she has continued to bring up similar fragments to the present time, at intervals of a few days or a week. Their appearance is always preceded by a severe irritating cough, which sometimes continues many hours, but is always relieved when the spiculæ are parted with.

Present State.—The disease of the spine occupies the whole of the dorsal vertebræ, but the projection is formed principally from the fifth to the ninth, both inclusive, the eighth being the most prominent of all. The form of the projection can, properly speaking, scarcely be called "angular," as it is rather that of a very large and prominent oval hump, situated between the shoulders, the spinous processes of the vertebræ being very distinct, and making the surface of it very uneven. The upper part of the spinal column above the carious bones inclines much to the right side, while, owing to this circumstance, and the great projection of the dorsal vertebræ, the ribs are altered both in form and position; the left ones being rounded and prominent, while those on the right are much flattened. From these conditions it results that when standing up, she bends very much to the right side, and that between the right arm and the ribs there is a considerable space. Both scapulæ are exceedingly elevated, though the left is an inch and a half higher than the right; and the neck is so short and twisted that her chin rests upon the right clavicle. Her height is exactly four feet.

Her face, and lips especially, are exceedingly pale;

indeed, she is altogether very anæmic, and is much emaciated. She complains of great lassitude, and is therefore little disposed to move about; her gait is unsteady and trembling when she endeavours to walk. She is very subject to severe headaches and shortness of breathing, attended at times with wheezing and pain in the right side of the chest. Her appetite is very delicate and variable; her tongue is pale and furred, and the alvine secretions are dark, scanty, and offensive.

There is some dulness on percussion in the right interscapular region; over the left scapula the sound is almost tympanitic—this peculiarity being doubtless produced by the deformity of the spine throwing the chest forwards and downwards, and therefore causing the diaphragm and stomach to be higher in the chest than natural. In the right interscapular region, near the projection, inspiration is somewhat harsher than natural, but expiration is not audible: in the same region there are slight mucous rhonchi. Anteriorly, above the nipples, percussion is not so clear on the left side as on the right, except immediately below the clavicles; this is owing to the height to which the diaphragm rises in the chest, and to the heart being consequently displaced upwards: the stomach, indeed, rises as high as the nipple on the left side, below which point that side is tympanitic. There does not appear to be disease of the heart, but this organ, as just stated, is partially displaced, owing to the deformity.

In the treatment of this case, the following indications were to be fulfilled;—1st. To endeavour to bring the spine as much as possible to its natural position. 2nd. To retain it in that position until anchylosis take place. And 3rdly, to improve the state of the general health.

For the first of these,—having ascertained, by there

being some mobility in the diseased part of the spine, that complete union of the bones had not taken place, —it was necessary that the superincumbent weight of the head and shoulders should be entirely removed from the carious part of the spine. This could only be done efficiently by employing the recumbent position, whilst gentle extension was employed which had a tendency to improve the direction of the spinal column, and to maintain any improvement which might take place; pressure by the hand and by means of compresses was also applied to the projecting parts.

To fulfil the 2nd indication, recumbency was equally necessary, for the same reasons which were given when speaking on the subject of the treatment of angular projection generally.

To accomplish the 3rd indication, the state of the digestive organs was closely attended to, and by a course of alteratives and mild purgatives, followed by tonics, the health was completely restored.

Dec. 24th.—The projection of the spine has already diminished a little in size; she is better of herself; her appetite is good, she passes better nights, and is somewhat stouter than when she came under treatment.

April 2nd.—Since the last report she has continued to improve in every respect; the deformity is less, and she feels her back stronger; she has increased in height; she is considerably more erect in person, and there is consequently less space between the right side and arm: the state of her digestive organs is so much altered for the better that for some time past the evacuations have had a healthy appearance. When she came under treatment she expectorated, as has already been stated, some portions of carious bone, and continued to do so every few days or oftener until

five or six weeks ago, since which time she has not parted with any of them. I have upwards of thirty of these spiculæ, which, when expectorated, were accompanied with a most severe cough, and with a small quantity of muco-puriform matter. Since she ceased expectorating them, she has not had a single attack of her cough, and her breathing has been much easier.

June 8th. Both shoulders are now considerably less elevated, and are reduced to the same level; the chin no longer rests upon the clavicle, but the head can be freely turned in any direction, the neck being considerably increased in length. There is now none of the space between the right arm and side, owing partly to the ribs being less flattened and of a natural form, and partly to the removal of the lateral inclination of the spine. The posterior projection of the spinal column is also very much diminished both in size and in the prominence of the spinous processes of the vertebræ which compose it, so much so, that when the patient is dressed the deformity is very little perceptible. She now measures 50¼ inches, having gained 2¼ inches since she has been under treatment. Since the 2nd of April she has expectorated but three very minute portions of bone, which were brought up soon after that date; since then there has not been any return of the cough or expectoration. Her health is in the most satisfactory state.

I have had the pleasure of hearing from the friends of this young lady since she was under my care, and on every occasion have had a most favorable account of the continuance of the improvement obtained, both in the state of her deformity and general health; and have learned that there has been no further expectoration whatever of the portions of carious bone. The woodcut marked A, page 166, represents the

spiculæ of bone she expectorated during part of the time I had her under treatment.

The expectoration of small portions of bone, which formed so interesting a feature in this case, was doubtless owing to a communication existing between the sac covering the carious part of the vertebræ, and some of the bronchi. In a chest so distorted the physical signs could not, of course, be expected to be precisely similar to those in a naturally-formed thorax, even were the lungs in each case equally sound: the height to which the diaphragm and stomach rise into the chest in cases of angular deformity renders the lower part of the left side of it much more tympanitic than natural, while the heart also becomes displaced, so as to occupy a situation nearer than natural to the upper part of the sternum, producing in that region an unnatural amount of dulness; but these circumstances being taken into consideration and allowed for, do not, even in such cases, impair the value of the physical signs. Now, in this case, the physical signs were such as not to indicate any material disease of the lungs, although there was dulness on percussion, and some mucous rhonchi in the right interscapular region: the dulness in that situation might be owing to some enlargement of the bronchial glands, but it more probably arose from the sac covering the diseased vertebræ, and containing puriform matter, being sufficiently large to displace the lung in this region to a certain extent from its natural position, and thus to produce a dead sound on percussion, instead of the naturally resonant one; and it is not to be wondered at, that the sac should be larger on the right than on the left side, when it is remembered that the caries of the vertebræ must have been greater on the former than on the latter, as the upper part of the spinal column, besides bending forwards, had a consider-

able inclination to the right side, which could only arise from the circumstance just alluded to. The irritation produced by the pressure of the sac, acting as a foreign body, would be likely to give rise to some local bronchitis, and would thus account for the slight mucous rhonchi which were present in the right interscapular region; or these may have been produced by the escape of a small quantity of pus into one of the bronchi from the sac; for it seems highly probable that the communication which must have existed between them, in order to account for the expectoration of the spiculæ of bone, was on the right side of the chest, and that their passage into the trachea was through the right lung, on which side of the chest she used formerly to complain of pain.

CASE XVIII.

The next instance of the disease occurred in a young lady, aged seven years, residing in the county of Leicester.

She was very healthy until three years of age, when she had measles so severely that her life was despaired of, owing to a severe inflammation of the lungs; and she subsequently remained for a long time extremely sickly, feeble, and emaciated.

About six months after the attack of measles, a projection of the spinal column was observed at the lower part of the dorsal region, and from that time to the present the deformity has been gradually becoming worse, the projection having got more and more prominent.

In a few months she began to have great difficulty in walking, the body bending forwards and to the left side, so that, in order to balance herself the better,

she was accustomed to place her hands behind her when she moved; she subsequently complained of much pain in her right side, and when she attempted to walk would often drop suddenly and involuntarily upon her knees.

October 6th, 1845. The projection of the spine in this case is formed more particularly by the 10th, 11th, and 12th dorsal vertebræ, the 11th being the most prominent: the upper and lower portions of the spine may be considered as two planes meeting at the 11th vertebra, and thus forming an obtuse angle; the chest is consequently thrown much forwards and downwards, so that the cartilages of the false ribs fall over the iliac bone on each side, in such a manner as to give the chest at its lower part a very broad appearance, while at the same time the abdomen sinks inward, its antero-posterior diameter being thus contracted, and the length of the whole trunk much diminished; the right shoulder is higher, and the left lower, than natural; her stature is short, being but 39¼ inches in height; her complexion is sallow; she is much emaciated, is exceedingly weak; her appetite is not good; her bowels are confined, and the secretions from them very unhealthy.

In the treatment of this case the recumbent position was employed, with gentle extension and pressure, as in the preceding cases; she was also placed under a course of alterative and aperient medicines to improve the state of the secretions, and the benefit derived under this plan has been very great.

Jan. 6th. Since October a great improvement has taken place as regards the state of her spine, her body being considerably more erect when she stands or walks; she has also increased an inch in height. A corresponding amelioration has also taken place in the general health; her complexion is clearer, her coun-

tenance is more animated, she is more cheerful, and her headaches have nearly left her.

June 6th. The angle formed by the upper and lower portion of the spine at the projecting part is much less acute, and the prominence consequently considerably less marked; indeed, the projection, where it was the largest, is now trifling. The state of her shoulders is much improved, being both lower and flatter; her height is 41½ inches, shewing an increase of more than two inches since she has been under treatment. She is exceedingly well in health, not having any complaints to make; her spirits are good, she enjoys every meal, and sleeps all night.

Feb. 1849. I have lately heard from the friends of this young lady, who give a most satisfactory account of her in every respect; her health is perfectly good, and she has grown since she left London, in May, 1847, five inches.

CASE XIX.

The following is an example of a very severe case in which there were both psoas and lumbar abscesses depending upon caries of the vertebræ; the disease had been of very long standing, and had reduced the patient exceedingly before he came under my care; but, by perseverance in constitutional and local treatment, combined with the recumbent position, complete recovery was obtained:—

1841. May. Mr. M., aged twenty-three years, resident in the county of Lincoln, gives the following account of the previous state of his health:—He was delicate during childhood, having suffered much from severe attacks of croup, and other inflammatory complaints. He has been laboring under spinal disease

at least since the summer of 1832, nearly nine years; attention having been first drawn to the spine, from his feeling great weakness there and being scarcely able to walk, especially on rough road. He afterwards suffered severely in the region of the dorsal vertebræ; an abscess formed in the left groin, and another subsequently in the right. In 1838 a third abscess made its appearance on the right side of the lumbar vertebræ. In the spring of the following year another formed within the right side of the pelvis, which in the autumn, discharged at least a pint of purulent matter; the discharge has continued to the present time, and is increased when he lies upon his back. On examination, there is considerable angular projection of the spinal column, the eighth, ninth, and tenth vertebræ forming the prominent part of the angle; he has an aching pain in the two lower cervical vertebræ, and a sort of instinctive desire to support his head by resting it upon his hand, as it feels too heavy for him; he has a similar pain, but more acute, in the eighth and ninth dorsal vertebræ, which is increased on using exercise, and especially if he be at all fatigued with it; there is also considerable pain in the lumbar region, spreading over the hips, and a distressing weakness and aching throughout the spine either in standing or sitting down, the slightest twist or jerk of the body bringing on these sensations most acutely.

With the above symptoms he has extreme languor and debility, these having gradually got worse and worse every year; they are now more severe than at any previous period, being such as entirely to disable him from attending to any business; he has great difficulty in breathing, and palpitation of the heart, especially in going up stairs, when he is obliged to move with the greatest caution; his stomach is in a very dis-

ordered state; he suffers from a sensation of burning heat in the epigastric region, and is troubled with disagreeable acid eructations; the alvine evacuations are in a morbid condition, and the secretion from the kidneys is scanty, dark in color, and deposits, when it has stood a few hours, a considerable quantity of the lithates.

Every pains had been taken by his friends and medical attendants as regards the previous treatment of the disease: caustic issues were inserted on each side the projecting vertebræ, and kept open for a considerable time; he had also such other remedies as his medical advisers thought desirable.

The remedies thus far applied having been productive of little benefit, I recommended the use of the recumbent position on the plane which I ordinarily employ in cases of angular projection—the supine position being chosen in consequence of the situation of the part from which the pus discharged: and some extension of the spine was likewise adopted in order to bring the vertebræ more towards their natural direction. Salines and mild purgatives were first prescribed until all attendant febricula was removed, after which tonics were administered. By the use of these means the state of his general health was improved; the discharge soon diminished, and afterwards altogether ceased, the part cicatrizing very healthily. The following, however, are some of the reports which were subsequently taken:—

Aug. 18.—He finds the plane very comfortable; he uses it about eight or nine hours per day, and feels himself considerably relieved, being better upon it than when off. All his pains are felt in a very trifling degree; his difficulty in breathing and palpitation scarcely ever affect him, and the state of the secretions is much more natural.

Oct 28.—All his symptoms continue satisfactory; there is no further discharge of matter, and he has not the least pain or uneasiness in the part; his breathing, which used to be very troublesome, has scarcely affected him since he commenced treatment; his digestion is good—the general fulness and tightness of the stomach having quite left him; he is stronger, can walk much better, and his general health has improved in the same degree.

The foregoing case was treated nearly eight years ago, and the gentleman has not since had any return of his complaints. The last time he was in London he called upon me and stated that, since the period when I attended him, he had not had any relapse whatever, but had continued to enjoy excellent health.

CHAPTER V.

RICKETS.

As spinal deformity is seldom met with amongst uncivilized nations, so is rickets one of those diseases which follow in the train of civilization, and one which is very frequently observed in this country. It occurs almost entirely amongst children, and most generally first manifests itself between the ages of six months and two or three years. Sometimes the disease is hereditary and congenital, especially amongst the poor who have been suffering from great privations, whose food has not only been bad in quality, but often insufficient in quantity, and whose constitutions have consequently become weak, enfeebled and cachectic. Yet, where the health of the parents is bad, and especially where there exists in them (or one of them) a scrofulous diathesis, rickets may occur in the children of those whose circumstances place them far above the reach of want. Happily, however, it does not follow that the unhealthy constitution of the parent must necessarily be transmitted to the child, for the natural effect of parental diseases is often ameliorated and rendered innoxious by the fortunate circumstance of one parent being of a sounder constitution than the

other. Thus, for instance, a healthy mother will often ward off paternal disease from her offspring, or at least soften its virulence; and hence a beneficial effect is produced upon society at large, and the degeneration, as regards health, of succeeding generations, prevented. Were parents upon an equality in this respect, that is, were both equally affected with disease, a progressive decline in the mental and corporeal energies of the human frame would doubtless take place. The simple corrective now under consideration exerts a beneficial influence, and has probably greater efficacy than is generally imagined.

On the other hand, parents in whom there is no appearance of disease, and who have indeed enjoyed perfect health, may sometimes have children affected with this disease; or one child in a family may be rickety, while the others are healthy, although it is by no means unfrequent to find several members of the same family affected with this condition of the bones.

Amongst the fertile causes of this disease, in those not predisposed to it, two may be especially mentioned, viz., a supply of improper food during infancy, and residence in a low damp situation, where the atmosphere is confined and impure: these causes sufficiently account for the disease being more common in towns than in the country, and are the more liable to impair the constitution when combined, as is too often the case, with a want of sufficient exercise, and a due attention to cleanliness.

When the disease has existed long, its symptoms are exceedingly characteristic, although they are somewhat obscure in its earlier period: one of the earliest symptoms is a deranged condition of the digestive organs and of the functions of assimilation, the bowels being irregular and often confined, though in some cases they are relaxed, and the stools excessively offensive, unnatural, and of a clayey appearance. The abdomen is large, tumid, hard, and very tympanitic; the mesenteric glands may be frequently detected on examination to be enlarged, as are also the lymphatic glands in other parts of the body. The appetite is sometimes diminished, but in other instances is voracious, while nutrition goes on very imperfectly, and the child becomes gradually more and more emaciated, so that the skin, which is harsh and dry, hangs loosely, as it were, on the body: the urine is alkaline, is soon decomposed, and contains a very large excess of the phosphates. The child is now observed to be more listless, to lift up the feet less in walking, frequently to stumble, and is soon fatigued by even slight exertion: on further examination it will probably be found that although the limbs themselves are emaciated, the ends of the long bones are much thicker than natural, in proportion to their bodies, and if the disease be much advanced, almost every bone becomes, in some degree, distorted; those of the legs are usually the most so, and are first affected, owing to their having the greatest weight to

support: the femur is curved outwards and forwards, or the knees incline inwards; the tibia is likewise curved anteriorly, and in order to give a greater base for the support of the body, the ankles and feet incline outwards, while the naturally elegant arch of the foot becomes flattened; the foot itself also becomes broader, and the usual elasticity of the step in walking is thus diminished or destroyed. The arms are likewise similarly affected to the legs, though in a less degree, and the clavicles are usually much distorted. The head is frequently larger than natural, the sutures remain unclosed long after the proper period, the forehead is round and projecting; and as the face retains its usual size, although the features assume an altered and pointed character, it seems far too small in proportion to the upper part of the cranium. Rapid decay of the teeth is also a very constant symptom. The spine, no less than the other bones, participates in the disease, and being unable to support the superincumbent weight, yields and becomes distorted: the forms of curvature most common from this cause are the lateral and excurvation (and according to my experience, their frequency is nearly equal); but incurvation also sometimes results from it. In a case of lateral distortion occurring in a young female, it would be very difficult to determine, from any peculiarity in the *curve itself*, whether or not it owed its origin to rickets, but there is little liability to error, if examination be carried further, for if it depend on this dis-

ease, its effect will be manifested in the distortion of the bones of the legs, ankles, or other parts, as well as of the spine. It has just been stated that it is of common occurrence for the head to enlarge in this disease: two other cavities of the body, the pelvis and the chest, still more frequently become *diminished* in size; the sides of the former being pushed inwards at the points most pressed upon, namely, the os sacrum, and the two acetabula; while the latter often becomes pigeon-breasted, or flattened at the sides with the sternum projecting too much forwards, so that its greatest diameter is in the antero-posterior, instead of the transverse direction.

When the system is affected with rickets, the organs of nutrition do not efficiently perform their functions, and the circulating system is either inadequately supplied with the requisite materials for the deposition of the earthy part of the bones, or the capillaries do not separate and secrete the ossific matter, as they do in a healthy condition of the body. The bones are specifically lighter than they ought to be, contain far less earthy matter, and are so soft that they may be readily marked by the pressure of the nail, or cut with a knife, or bent to a certain degree, when any force is applied to them. Their cells are larger than natural, and are filled with a thick fluid, often of a pink or reddish colour, which thus gives an apparently similar tinge to the whole bone. In some instances, the exterior and naturally most compact portions alone remain

unaffected, while the cancellated parts are almost altogether destroyed, so that the dense portion of the bones may be said to be reduced to a mere shell. It will thus be conceived how, under these circumstances, from pressure and absorption, the vertebræ, as well as other bones in the body change their form, and assuming a wedge-shaped appearance, produce some one or other form of spinal distortion.

If the cachectic habit of body which produces, or it may be said, constitutes rickets, continue and progress, the child will gradually waste away more and more, and probably die ultimately of atrophy, or, at an earlier stage of the disease, fall a victim to hydrocephalus, or tubercles in the lungs.

Should, however, the health be reëstablished, the bones will assume more of their natural hardness, become more dense, and ossific matter will be deposited on their concave sides to assist in giving that degree of strength and firmness which is wanting. When the health is restored, the deposit of bony matter not unfrequently takes place on the vertebræ of persons who have been of a rickety habit, even in cases where no curvature has actually occurred; and, as has been already stated at page 92, under such circumstances, the deposit most frequently occurs on the right side of the bodies of the vertebræ. In lateral curvature, the osseous deposit is almost always found on the concavity of the curves, or on the left side in the dorsal, and on the right in the lumbar region. In excurva-

tion, the bony matter is sometimes met with in front of the bodies of the vertebræ, the anterior ligament having apparently undergone the osseous transformation, but at the same time bone is frequently deposited on the sides of the vertebræ, and in this case, as in the one above mentioned, it is far more commonly so on the right than on the left side. It may also be remarked that this peculiarity in the depositing of ossific matter is more frequently observed, and is more marked in the dorsal than in any other region of the spine.

Mollities Ossium.—The serious but fortunately very rare disease, Mollities Ossium, is in its nature allied to, and resembles in some of its features, the disease we have just been considering. In the former, as in the latter, there is a general softness of the bones, owing to an insufficiency of the phosphate of lime, which enters into their composition; but in mollities this deficiency proceeds to a much greater extent than in rickets, and is occasionally such that in some of the bones there is scarcely a trace of the earthy base to be met with, in consequence of which the limbs admit of being bent in almost any direction. Mollities Ossium is also more of an acute disease than rickets, and instead of occurring during childhood, usually takes place in adults. It is likewise much more formidable in its character; for while the latter is usually amenable to judicious treatment, the former is almost invariably sooner or later fatal. Owing to

the softening process implicating the vertebræ, as well as the other bones, distortion of the spine almost always takes place in cases of Mollities Ossium: but as, in a disease of such a nature, the spinal deformity is a matter of little importance compared with the constitutional treatment of the malady, and as my object throughout has been to make this a *practical* work on diseases of the *spine*, I think it unnecessary here to enter into any detailed description of this affection, or to add more than that while the constitutional treatment is being carried out, it would be desirable that the couch on which the patient reclines during the day, or the bed on which he sleeps at night, should, while sufficiently soft, be still firm, so as to prevent as much as possible that tendency to deformity which is so apt to take place.

Treatment of Rickets.—The treatment of this disease, as indeed of spinal diseases generally, resolves itself under the two heads of medical and surgical, both of which are highly important. When the child has lived in a low damp neighbourhood, it is necessary, in the first place, to remove it into a situation which is open and dry, and where the air is pure and salubrious. The greatest attention must be paid to the diet, which, although it should generally consist in some measure of animal food, should be such as is light and easy of digestion, especial care being taken to prevent the child eating too much at once, in order

that the functions of the digestive organs may have the best possible opportunity of assuming a healthy state. The body should be well clothed in flannel, and if much deformity of the spine have not taken place, carriage or such other exercise may be allowed as will not cause undue pressure on the lower extremities. As, however, in this disease, the digestive organs are always in a morbid state, the efforts of the medical attendant should be directed towards remedying this condition; and with proper care much may be effected in a comparatively short time. For this purpose, cathartics should be employed. A dose of Hydrarg. Chloridum, or Hydrarg. cum Cretâ, proportioned to the age of the child, and combined with Pulv. Jalapæ or Rhubarb, and a few grains of Sesqui-Carbonate of Soda, may be given at night two or three times a week, and followed in the morning by the Ol. Ricini or Syr. Sennæ. By perseverance in a plan of this kind, the abdomen will become less tympanitic and prominent, the alvine evacuations more regular in quantity, their offensive odor will diminish, and instead of their former unnatural color, they will gradually assume a more healthy appearance. It will be found advantageous at the same time to give small quantities of Iodide of Potassium, with Bicarb. of Potash or the Liq. Potassæ in Decoct. or Syr. Sarzæ; or for these the Iodide of Iron may be occasionally substituted. Iron, indeed, in almost all its medicinal forms, is a most useful remedy in this disease.

It is unnecessary to dwell here on the mechanical treatment which is to be adopted when the spine becomes deformed in consequence of rickets, because it varies little from that which is requisite for the same form of curvature arising from other causes. Sometimes, however, the chest becomes pigeon-breasted, with but little deformity of the spine; in this case, pressure should be frequently made by the hands of the attendant on the projecting part, or the patient should respire forcibly while the shoulders and arms are gently pressed backwards, by which means the pectoral muscles tend to expand the chest laterally; towards the conclusion of the treatment the use of dumb-bells will often be attended with advantage, though at an earlier period their use is sometimes injurious. In those cases in which, from the amount of spinal curvature present, the adoption of the recumbent position is requisite, pressure may be applied to the projecting chest if carefully done by means of padded springs attached to the reclining plane, and so constructed that the pressure can be moderated or increased, as to suit the circumstances of each individual case.

CASE XX.

C. O., aged twenty-three years, was born a fine child in November, 1820. When five weeks old she had a severe inflammation of the lungs, from which she was not expected to recover; this attack left her

exceedingly weak. In April, 1823, she had a fall, by which one of her clavicles was fractured; she now became very ill, having a severe bowel complaint, by which she was confined to her bed—was very much emaciated, and, subsequently, unable to walk for upwards of three months. This illness was followed by the measles, after which she had a long confinement, attended with eruptions on the face and head, the exact nature of which it is now difficult to determine. She afterwards improved somewhat, but has never since been entirely free from pain in her limbs, and indeed throughout the whole body. In 1826, so much deformity had taken place in her back and limbs, that she had jointed iron supports made, which passed round the abdomen and down to each foot; she wore them from nine to twelve months, but was obliged to give up their use, owing to the pain and inconvenience they produced.

About this time she had a fall upon her knee, which was much hurt, and soon after, another, by which her thigh was fractured; she again suffered a long confinement, and subsequently had to use crutches for nearly twelve months, being extremely weak, but especially in her limbs. In 1832, she had again the misfortune to have a fall, by which her left leg was so much injured, that she has not been able to put it to the ground since; being obliged to be wheeled about in a carriage made for the purpose, until the autumn of 1835, since which period she has not been out of the house; such, indeed, have been her sufferings, that since June, 1837, she has only been once (in November, 1842) off the crib on which she now lies, and although the removal was effected with the greatest care, she was three or four days before she recovered from the pain it occasioned.

In January, 1842, she had the influenza, and was

very ill for three weeks or a month, and had an almost constant cough for six weeks, with pain in the chest, and an increase of nearly all her symptoms, and was many months before she regained even her usual strength.

May 1, 1844. The patient this day came under my care. The distortion of her spine to the left is of extreme extent; the ribs, and especially the costal cartilages on the same side, together with the whole abdomen, project excessively; and so much is the body twisted, that the left nipple is directly underneath the anterior border of the axilla on that side, while the umbilicus is in a perpendicular line with these two parts, so that it is displaced fully four and a half inches to the left; the ribs of the right side, in curving over to the opposite side, form a deep fossa above the right hip, where the folds of the integuments, from being in continual contact and from the frequent friction which takes place between them, are often inflamed, and give rise to almost constant soreness. The right hip projects extremely, and above it there is very considerable incurvation of the spine. The bones, both of the arms and forearms, are distorted, and both thighs have an exterior curve; the lower portions of the legs are also much curved in the same direction, so that the soles of the feet are bent inwards: this, however, is much more the case with the right side, for, at about two inches above the ankle, the bones of the leg are suddenly distorted inwards at so acute an angle, that the sole of this foot looks inwards and upwards towards the left shoulder, and she can see it as she reclines on her crib.

The patient suffers from very severe attacks of spinal irritation, giving rise to extreme pain in various parts of the chest, abdomen, and head, with corresponding tenderness along the course of the spinal column, and

she has frequent attacks of hysteria. She is never able to lie down *entirely*, but has four or five pillows (generally the latter number) to support the back, and cannot rest without them. Her sufferings are, and have been, chiefly in the chest and abdomen, though her back and limbs have been nearly as bad; the pains and distress are almost unceasing, so that she has rarely any respite, even for an hour. The tongue is white and furred, appetite bad, thirst considerable, bowels irregular, sometimes not being moved for four or six days.

She was now removed from the crib which had been, for seven years, her chair by day and her bed by night, and placed upon an inclined plane, and in a few days gentle extension was made by means of slight weights attached to the feet, axillæ, and head; the use of these weights was at first limited to an hour or two per diem, but they have since been increased both in quantity and in the periods during which they have been used: besides which, frictions, compresses, and other means, were adapted and applied to the most projecting parts, and, in addition to these, close attention was paid to her general health, and the state of her digestive organs. Gentle purgatives, together with tonics and slight stimulants (quinine with tincture of cardamoms, camphor, and sulphuric æther), have with this view been administered. Great pains were also taken to promote the expansion of the chest.

June 8. Under this plan the most satisfactory improvement has been, and is, taking place. Her health is better, her appetite improved; the functions of the stomach and bowels are most efficiently performed, the spinal irritation and consequent pains in the chest and abdomen extraordinarily diminished, and of the hysterical attacks from which she has so frequently suffered, she has had but one single return. Such was the

deformity of the chest and the state of her lungs, that on the first of May, on taking a deep inspiration, she was able to expire only twenty-five cubic inches of air, while such has been the increase in the capacity of the chest, that she is this day able to expire rather more than fifty.

June 20. The form of the chest, &c., of the patient continuing so obviously to improve, I have this day a third time ascertained its capacity, and find that there is again an increase of twenty cubic inches over the number last named, as she is now able to expire more than seventy. There is much less projection of the chest and abdomen to the left, the umbilicus being within two inches of the median line, and the left nipple has resumed more of its natural position, besides which the breasts are beginning to be slightly developed, they having before been as flat as in a girl of ten years of age. The deformity of the left tibia and fibula is diminished; and, as regards the angle in the right, which before was so acute that the little finger could not be placed in it, there is now a space of at least three quarters of an inch.

The following measurements will give an accurate idea of the relative proportions of the different parts of the body, as regards the length on the *right* side. The first row of figures exhibits the state she was in on the 1st of May; the second, that on the 20th of June:—

	May 1. Inches.	June 20. Inches.
From the vertex to clavicle . . .	9	9½
——— clavicle to the hip . . .	6	8½
——— hip to the knee . . .	8	11
——— knee to bend in the leg . .	7	7
——— bend to the heel . . .	6	5
	36	41

From the above table it will be seen that the body, from the knee upwards, has increased six inches, while

the convex angle formed by the bend in the right leg, has diminished one inch, consequently the increase in the entire length of the patient, since the 1st of May, is five inches.

Sept. 7. The patient has this morning used the pulmometer a third time since the last report, and the increase in the capacity of the chest has steadily progressed; the number of cubic inches of air expired on the different occasions (at intervals of about a month) having been respectively seventy-nine, eighty-three, and ninety; her health at the same time improving, and the deformity decreasing.

Oct. 1. She has progressed very favourably in every respect, except in having had a very severe return of her former hysterical affection, which continued from the 16th to the 28th ult., and has left her in a weaker condition than she was in before it occurred.

April 21. In December last she was so much improved that she was taken down stairs, being the first time she had left her room for seven years and a half; since then she has been down several times, and is almost daily removed from her plane.

At present her general form and figure are much improved; she lies uniformly straight on her plane; the chest and abdomen to the left project only in a trifling degree, the breasts and umbilicus being nearly in a proper direction. She has no soreness from the folding of the integuments on the right side, and the twisting of the spine, as well as the incurvation there, are much diminished; the projection of the right hip is considerably less, and both feet are in a more natural direction, especially the right one, the sole thereof being no longer turned inwards and upwards.

The spinal irritation, though at times somewhat severe, is greatly diminished, the chief suffering being

in the epigastric region; the attacks of hysteria, along with this irritation, have been less frequent, but still severe when they have come on. Her general health is greatly improved; her bowels are now moved almost daily, and the state of the secretions is much altered for the better.

This case, from its long duration and from its exceeding complexity, was of a very unpromising character, and yet, as seen from the preceding report, she derived great benefit by means of the plans adopted, the body being much straightened, her limbs less bent, and her length considerably increased, while the abdomen was greatly diminished in size, and her sufferings from spinal irritation were much alleviated.

Since I have given up regular attendance upon this patient she has continued to be able to sit up daily, attending to sewing, netting, and other light work. She has also been able to ride out occasionally, and during each of the last three summers has spent from eight to ten weeks in the country.

CASE XXI.

1843, Aug. 26. I commenced attending with Mr. Weeding, of Poplar, a very interesting case of general deformity, the result of this disease. The patient, a little boy, aged four years, was observed, before he was six months old, to become gradually weak, and to lose that sprightliness and activity which are natural to healthy children of that age; the trouble of nursing him was extreme; when two years old, the deformity had made considerable progress; his head was increased in size, his wrists and ankles were greatly enlarged, and there

was considerable curvature of the spine, the convexity being to the right side. The disease has continued to progress ; at present the chest is contracted from side to side, the sternum projects, the clavicles are prominent, the ribs at their junction with the cartilages are angular, and appear to be loosened from them ; indeed all the bones seem to partake of the disease, which accounts for the child's not being able to move about, as, when he attempts to do so, he can scarcely place one foot before the other. He is much out of health, the abdomen being large and tumid, his evacuations exceedingly crude, of a dark color, and exceedingly offensive. He is extremely emaciated, and his skin is of a very sallow color; his urine deposits a very large quantity of the phosphates, and is highly alkaline.

A course of alterative purgatives was prescribed, with the necessary directions respecting diet, recumbent position, frictions, &c.

November 29. This patient has now been under treatment three months, and the improvement is very great. As he resides in the immediate neighbourhood of Mr. Weeding, he has received the closest attention from that gentleman. He is now confined to the plane not more than two hours in the day, and can run about with considerable activity. The state of the osseous system is greatly improved, and the evacuations, both fæcal and urinal, have become much more natural.

1844, Feb. 25. There is in every respect a further and very considerable improvement,—his head is much reduced in size, the angles of his ribs are less prominent, and the spine and long bones are straight; he is altogether stronger and more active; the state of his health has remarkably improved; he sleeps well, has lost the shortness in his breathing, and is

less susceptible of colds; his abdomen has become a proper size, the functions of the kidneys and bowels are quite natural—his complexion has lost its sallowness, and he has become cheerful and vigorous in his motions.

CHAPTER VI.

SPINAL IRRITATION.

ALTHOUGH much has, of late years, been done by many individuals in investigating the structure and functions of the spinal cord, a wide field of inquiry will long remain open to those whose attention is directed to this intricate subject. The length of time that must be spent in collecting and arranging the essential facts connected with it, and the close attention necessary for its efficient study, render the undertaking one of extreme difficulty and labour. While such is the case in reference to its normal state, the difficulty is, of course, much increased in endeavouring to investigate its pathological changes and morbid conditions, and to assign to their proper cause, the numerous, diversified, and often apparently anomalous symptoms, to which, when diseased, it gives rise.

It is not my intention to enter into a consideration of the numerous diseases of the spine and spinal cord which are unconnected with curvature; but as most cases of curvature of the spine are complicated more

or less with symptoms of spinal irritation, I think it well to offer some observations on a very large class of diseases, which, for want of a better appellation, have been comprised under the above term; more particularly as I have seen some of the most severe and painful of these cases, which totally incapacitated the individuals labouring under them for any exertion, improved during the course of treatment which has been so successful in reference to deformities of the spine, combined with such other general and topical remedies as will presently be detailed. It must not be understood from hence, that I recommend the recumbent position for all cases of spinal irritation, or even for many, out of the great numbers which come under the care of medical men,—but, certainly, I have found great benefit from the employment of it in some of the very worst instances of this disease which have been placed under my care.

All the reasons which have been urged for an early attention to the symptoms which attend curvature, will hold in force as respects irritation of the spine, for, if merely symptomatic of visceral affections, the earlier they are attended to, the more successful by far will be the practice; and if, as is sometimes the case, they proceed from, and are the first symptoms of caries, rickets, or of lateral curvature, it must be obvious that no time should be lost in adopting that treatment which can remove the one, and relieve, if not cure, the other.

Notwithstanding the intimate connexion between the

spinal nervous system and the brain, affections of the former seem to be, in a great measure, independent of those of the latter. The exact cause, however, which gives rise to the symptoms of spinal irritation, is by no means so easy to determine. Sometimes, indeed, the primary cause is permanent, and consists in serious organic lesions, as a tumour pressing slightly on the medulla spinalis, a collection of puriform matter around it, curvature of the spine, disease of the vertebræ, or the presence of chronic inflammation, which, in such cases, is frequently of a scrofulous character. In other, and a greater number of instances, the cause is evidently one that may rapidly supervene, or as rapidly disappear; that may remain long stationary in one part, and then suddenly change and attack another; to this the name of irritation has been given, and whatever exception may be taken against the term, we must still employ it until some better one be suggested, to express a condition distinct from, yet allied to, inflammation,—distinct from it, as, by itself it seldom produces any of those serious consequences resulting from inflammation, and yet allied to it, inasmuch as it may pass into that condition. The form of inflammation which is thus produced, whether in the spinal cord, its membranes, or in other parts of the body, is seldom, if ever acute, and if indeed it were, would produce a train of symptoms very different from those of spinal irritation; but the chronic form is probably (especially in cases complicated with caries

of the vertebræ) the cause of many of the various symptoms which are manifested.

Spinal irritation, whatever may be its pathological nature, may be induced by various causes applied either directly to the spine, or occurring in distant organs. A blow on the back, or a violent shake given to the whole column, as from taking a false step, or slipping unexpectedly down one or more steps, may originate the disease. On the other hand, it may arise from disordered function of the stomach or intestines, particularly that habitually confined state of the latter, which is too frequently allowed to take place, especially in the female sex. Suddenly suppressed menstruation, amenorrhœa, and other disorders of the uterus, congestion of the liver, anæmia, chlorosis, &c., are likewise fertile sources of the disease, which I have also often observed in connexion with incipient phthisis; in which case, it has always seemed much less amenable to treatment than under any other; temporary alleviation indeed being effected, but the disorder being still very liable to return. This disease, then, especially occurs in young females of delicate constitutions, but it is also met with in those of a more plethoric habit, at a more advanced age, and in persons of both sexes.

There is less difficulty in ascertaining what part of the column is the seat of the affection, than in discovering the exact nature of the morbid change; sometimes there is a localized pain or aching at the

part affected, or even when this does not exist—when the patient is quite unaware of the back being the seat of any unusual sensation—pain may almost always be produced in some part of it by pressing or percussing from above downwards, on each side of—not *on*—the spinous processes. Perfectly free from any uneasiness caused by pressure at other parts of the column, at one, perhaps, either in the cervical, dorsal, or lumbar region, will the patient shrink from the least touch, and almost cry out from the pain which it causes at that spot; while in other instances, though the amount of pain produced may not be much, yet by its presence is the affected portion of the cord no less pointed out. The tenderness on pressure may occur on one or both sides of the column; it may be confined to a small space of one region of the spine, or it may occupy the length of several vertebræ: there may be tenderness of two distinct parts of the column, the intervening parts being perfectly free from it: or lastly, in a few cases, almost the whole length of the spine may be tender to the touch. The situation of this local affection will be found, in almost all cases, to agree with the position of the pains complained of in other parts of the body; if it exist in the upper part of the spine, the symptoms will be found principally in the head, thorax, and upper extremities; if in the dorsal and upper lumbar regions, in the lower part of the chest and in the abdomen; while if the lower lumbar and sacral regions be affected, the pains

will usually be experienced in the pelvis or lower extremities. When the tenderness occupies the right or left side, respectively, of the vertebral column, the pain is almost always experienced in the corresponding side of the body anteriorly; cases frequently occur in which the spinal tenderness rapidly changes from one side to the other of the column, and where the pains in the chest and abdomen change exactly *pari passu*.

The symptoms of this affection are indeed so numerous and varied that it is difficult to enumerate them in such a connexion as would be characteristic of any two cases of the disease; to mention the whole of them would be to name almost every morbid feeling and sensation, almost every alteration of the motive power to which the body is liable. Nor, truly, can this be wondered at, when we take into consideration the intimate connexion which the spinal nerves have with all the essential organs of health and life, with the various tissues, and indeed with every part of the animal frame. Chronic inflammation, irritation, &c., of that portion of the cord whence the nerves arise, or of the roots of the nerves themselves will necessarily disturb the functions of the parts to which they are distributed; and hence, we are enabled to account for a variety of symptoms which otherwise would be inexplicable. Many of the nervous and hysterical affections which so frequently occur in practice, numerous disorders of the functions of digestion and nutrition, would, if

traced to their origin, be found to proceed from some mechanical or functional derangement of the spinal nerves.

Of all the symptoms of this affection, as occurring in young females, the most common, perhaps, is that of a sharp, pricking, or darting pain under one of the breasts, especially the left one, sometimes continuing but for a moment, at others, remaining fixed for a considerable period, and then leaving as instantaneously as it came; sometimes it darts backwards to one of the scapulæ, or between the shoulders; at others, it becomes more or less permanent at the epigastrium. These pains are usually much increased by motion of any kind, while slight exertion frequently induces severe palpitations, which are accompanied with an indescribable sensation of oppression and suffocation.

To enumerate the symptoms, however, in somewhat of order:—from irritation of the cervical portion of the cord, and of the medulla oblongata, there may be violent pains in the head, often assuming the form of hemicrania, tenderness of the scalp, pain in the face, neck, &c., ringing in the ears, vertigo, fainting, temporary loss of consciousness, and indeed of all the senses—of sight, smell, taste and hearing, so that stimuli have no effect upon them—while, in other cases, the feelings seem to be more affected, and the patient cries or laughs without any observable cause. Again, there may be paralysis of sensation, or of

motion; the muscles of the neck (especially the sterno-mastoid) may be attacked with either clonic or tonic spasm, lasting but an hour or two, or continuing, it may be, for several days. The organs of respiration may be implicated, and a hard dry cough is produced, with difficulty of breathing, flying pains about the chest, or globus hystericus, followed, perhaps by a violent and long-continued hiccup. When the dorsal region of the cord is affected, besides some of the preceding symptoms, there may be darting pains down the arms, and in the sides, at the sternum or epigastrium; and a sensation of sinking, of weight, or of tightness in the last named situation, is frequently complained of, or the feeling as of a cord girt tightly round the body. If the symptoms arise from irritation of the lumbar or sacral portions of the medulla spinalis, they often consist in pain, rigidity, numbness or cramps of the lower extremities, pain in the abdomen, with excessive tenderness of the surface on *slight* pressure, but which is here, as in other parts when arising from spinal irritation, almost always relieved by firmer and continued pressure. Dysmenorrhœa is a frequent symptom, while difficulty in passing the urine often attends the disease of the lower part of the spine. When pain is experienced in any part of the back, it is usually worst either between the shoulders or in the lumbar region, and is often accompanied with a sensation of heat, which, to the feelings of the patient, is an excessively

troublesome, and unpleasant symptom. In a number of cases the perspiration is also greatly increased.

Very seldom, if ever, is it that all the preceding symptoms occur together in the same individual; they frequently vary, some being present at one time, and then disappear to be succeeded by others, so that rarely does the disease, for many days together, present exactly the same features. The tongue is generally furred, the stomach disordered and frequently flatulent, the bowels constipated, the abdomen often tympanitic, and in a considerable majority of cases, there is a deficiency of the catamenia.

Instances sometimes occur in which there is considerable difficulty in determining whether such symptoms as pain in the abdomen, &c., proceed from some peculiarity in the nervous system, or are occasioned by inflammatory action taking place at the seat of the pain. As a general rule, in all these cases, it may be laid down as absolutely necessary to make an early and minute examination of the spine, when, if the pains be of a neuralgic character, or at least if they depend on a local irritation of the spinal cord, a corresponding tenderness will generally be discovered on one or both sides of the column, and on pressing at this part, a paroxysm of the pain in the chest, abdomen, or extremities may often be produced, or, if present, aggravated. The diagnosis will also be assisted by the fact of the patient having been previously subject to hysteria, by the seat of the pain being

variable, by many of the circumstances already mentioned when treating of the symptoms, and by the general derangement of the constitution being less considerable, and the expression of countenance much less anxious than in inflammation.

It has been before stated that spinal irritation is one of the symptoms not unfrequently met with at some period in the progress of cases of spinal deformity, whether lateral, excurvated, or angular ; as, however, it is still more commonly met with uncomplicated with disease of the bones, it is very important to distinguish the two classes, because errors in the diagnosis of such cases frequently lead to still greater errors in treatment. If the pains produced by spinal irritation *commence for the first time* after the age of puberty, they are much less likely to be connected with caries of the vertebræ, as this usually begins at an earlier period of life; still, however, even at that age, lateral curvature may be the cause, and therefore the back should be carefully examined to detect it, if present: again, curvature is most common in those of a strumous diathesis, and when it is present, the constitution suffers more than in simple spinal irritation: lastly, it is necessary to mention that there may be some slight puffiness of the integument at the tender part of the column in cases of spinal irritation, but this cannot be mistaken for true deformity of the spine, if ordinary attention be paid to the examination, because the puffiness affects the integuments

along each *side* of the spinous processes, and does not, of course, alter the relative position of any of the vertebræ themselves.

TREATMENT.

In the treatment of this affection, the cause producing it must always be first considered; if it depend upon a deranged state of the digestive functions, or an habitually constipated state of the bowels, the great object will be to put these into a better condition by a proper course of purgative, alterative and tonic medicines: drastic purgatives, indeed, are generally to be avoided, but mild ones are of extreme use: at first a dose or two of Hydrarg. Chloridum or the Pilula Hydrargyri may be prescribed at night, with a saline mixture during the day, and afterwards the Pil. Aloes Co., or Decoctum Aloes Co. may be given, so as to move the bowels about twice daily. If the menstruation be irregular or deficient, the restoration of this function must be promoted by such remedies as will at once suggest themselves to the medical attendant, or if, as is frequently the case, there be an anæmic condition of the system, some of the preparations of iron may be exhibited, of which, perhaps, the Iodide, where it can be borne, is best. In many cases, antispasmodics, as Assafœtida, &c., are useful, or the Infusum Valerianæ combined with Tinct. Valer. Comp.

But whilst the general treatment is essential, the local treatment is not less so. Friction over the tender part of the spine is often advantageous, especially when a stimulating liniment is employed; in many cases, however, this is not sufficient, and a more powerful counter-irritant is needed; the Ung. Antimonii Pot. Tart. of the Pharmacopœia has often proved useful, but I more frequently employ a combination of two drachms of the Ung. Ant. Potassio-Tart. with the same quantity of lard and fifteen minims of croton oil, of which a small portion should be rubbed over the tender part of the spine, twice daily, until a sufficient eruption is produced, and which is to be kept up for a few days, or longer, according to its effects. Great benefit is likewise often derived from the application of a blister to the region of the spinal tenderness. Although counter-irritants are thus to be much relied on, I do not think it necessary to use such severe remedies as Moxas, Setons, Issues, &c., in cases of spinal irritation, uncomplicated with organic disease. Several patients have come under my care, whose cases, owing to errors in diagnosis, have been treated as diseases of the spine itself, and the patients put to the pain of severe remedies, with little other effect than that of weakening the system—but which, by the employment of more gentle means and attention to the general health, have speedily recovered.

Where exercise can be borne, it is useful and should

by no means be neglected as a part of the remedial process; but in some instances the pain is so intense, as not only to prevent the patients' moving about, but to cause them to keep almost altogether in bed—and this also in cases unconnected with disease of the bones: in such instances I have found considerable advantage by inducing the patient to lie, during the day, on an inclined plane rather than in bed, by which means the system is far less enervated, and the weight of the head and shoulders more effectually removed from the spine.

When the affection under consideration depends on disease of the spine itself, the treatment must of course be directed against this, the more serious evil, in the manner already mentioned when treating of the different varieties of curvature; in many instances, however, where comparatively but little good can be effected as regards the curvature, (as in the instance of angular projection where complete anchylosis has taken place), the spinal irritation may be efficiently relieved,—while in other cases, both the one and the other may be often permanently cured.

The following are the particulars of a case, selected as one which will perhaps illustrate the symptoms and progress of the disease better than a more lengthened description:—

CASE XXII.

Miss G——, aged twenty, was, until three years of age, a remarkably healthy child. About that

period, she had an attack of scarlet fever, so severe that her life was despaired of; subsequently she has been in a very delicate state of health. It was some months before she recovered from this illness, which left a defect in her hearing that has continued to the present time.

When seven or eight years of age, she was attacked with violent spasmodic contractions in the muscles of the chest and spine, to which she has all along been very subject; she had also a feeling of numbness and coldness in her extremities, with spasms throughout her frame, particularly in the back and chest; and her head was so much affected as to occasion considerable dimness of sight.

When about seventeen, she suffered so much from her back, &c., that caustics were inserted on each side of the spine, and the sores kept open about five months; perhaps, during the discharge, the pain in the head, and the uneasy, unnatural sensation in the limbs might be said to be somewhat relieved, but she did not experience any cessation of the pain in the chest, and her health, in other respects, was decidedly worse. A seton was subsequently inserted, which was kept open for about two months; and during the ensuing half year she was frequently and copiously bled with leeches, and counter-irritation was kept up by repeated blisters. From these remedies little or no advantage was derived, and it was at length determined to try the effect of change of air, &c. For this purpose, she was removed to the North Riding of the county of York, where she remained about four months, continuing to get worse, with the exception, perhaps, of being able to take food somewhat better.

When I first saw the patient she was in a very helpless and distressing condition; her respiration was short, impeded, and difficult, with constant in-

clination to cough; she experienced great difficulty in taking her food, the act of deglutition was painful and gave the sensation as if something hard, as a marble, were passing the œsophagus; she had continual pain about the sternum and scrobiculus cordis, and yet, notwithstanding these symptoms, she had a constant desire to eat, in order to allay a gnawing sensation which she experienced at the epigastrium. She also complained of great heat and heaviness on each side of the head; indeed, owing to this and the spasmodic pains, she could scarcely be said to have any season of comfort, or freedom from pain. Of these paroxysms, which came on in the evening, she had generally an hour's notice; they were preceded by a most distressing depression of spirits, accompanied with severe nausea, giddiness in the head, and a painful sensation in the eyes. These symptoms were succeeded by acute pain in the chest, occasioning great suffering, and obstructing the respiration; it subsequently extended over the epigastrium, and from the chest to the back; she described it as resembling the piercing of a needle, or as similar to the acute pain experienced in severe attacks of the tooth-ache, and as lasting from one to two or three hours.

Such was the state of the patient when application was first made to me respecting her. She was recommended to adopt an occasional recumbent position, and was shortly afterwards placed under my care; she manifested great readiness to make trial of every suggestion which had reference to her cure; and the following extracts from notes of the case will shew the effect produced by perseverance in the plan adopted.

She commenced treatment on the 22nd of December, and was recommended, as before, to use the recumbent position occasionally,—while attention was paid, at the same time, to the state of the digestive

organs. In the course of a week, the fatigue which is generally experienced on the first use of this position passed off, and the patient began to feel her breathing less distressing.

January 22nd. She feels considerably relieved, but the nervous uneasiness or irritability is still troublesome, particularly towards evening.

March 15.—Breathing is much improved, but a little pain continues about the scrob. cordis, or under the sternum; feels very little of the severe choking sensation which used to distress her exceedingly, unless she be excited, or has taken food which disagrees with her; these unpleasant sensations are experienced only when off the plane, not when laid upon it. The painful feelings in her head and eyes are less distressing to her than she ever recollects them to have been, and in all other respects her symptoms are materially better.

March 23rd.—Miss G. returned home much improved, and in the enjoyment of a state of health to which she had long been a stranger.

May 12th.—Have had an opportunity of seeing this patient, who gives a very satisfactory account of her symptoms, but says that her repose is not so comfortable as it was during the time she used the inclined plane.

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