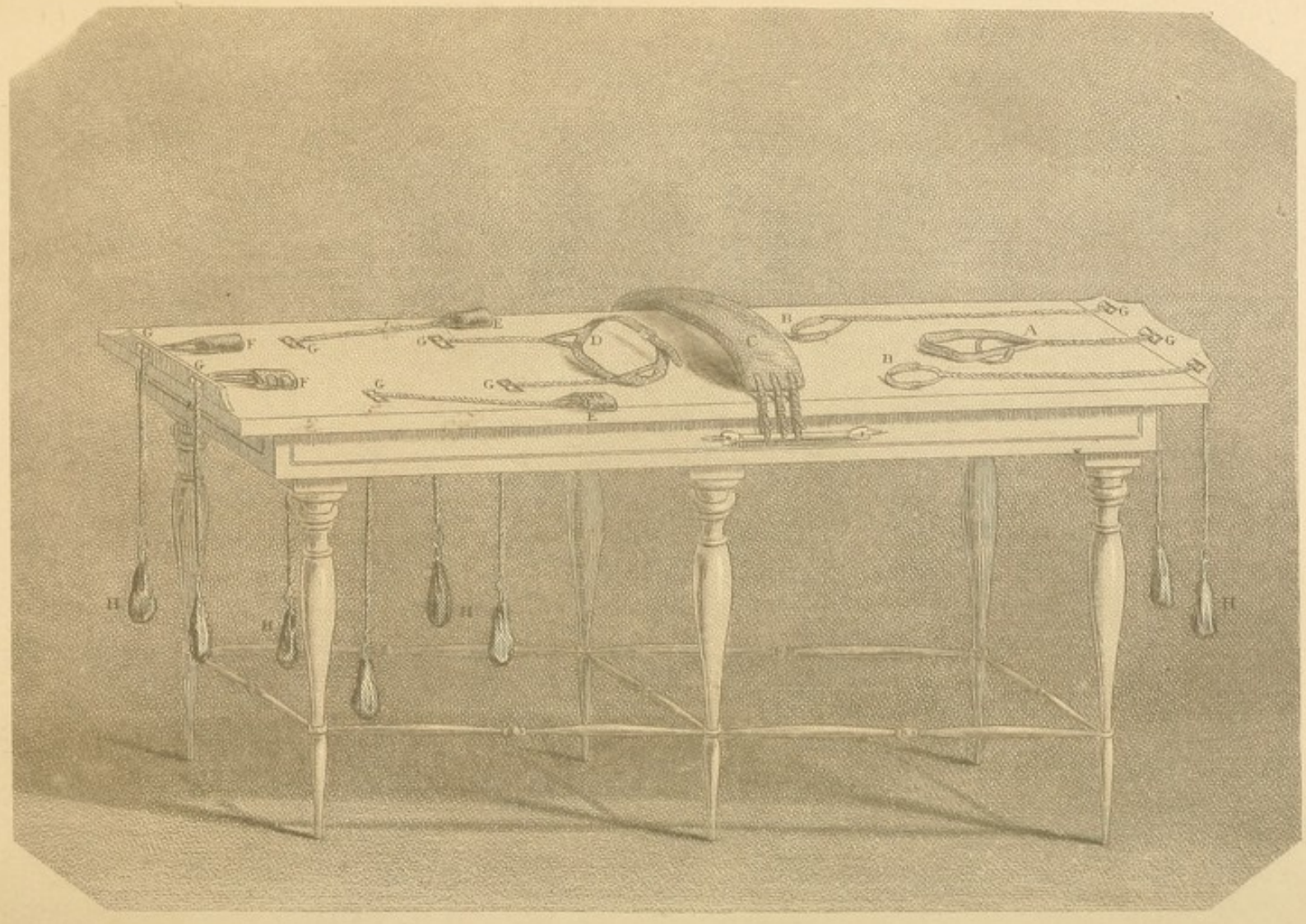
Practical observations on the prevention, causes, and treatment of curvatures of the spine : with an etching and description of an apparatus for the correction of the deformity / by Samuel Hare.



A. Head Straps. B. Shoulder Straps. C. for compression on the Sternum & Abdomen. D. to be placed above the Hips.
E. Waist Straps. F. Ankle Straps. G. Pulleys. H. Bags for Weights.

K

PRACTICAL OBSERVATIONS

ON THE

PREVENTION, CAUSES, AND TREATMENT

OF

CURVATURES OF THE SPINE,

WITH AN ETCHING AND DESCRIPTION OF AN APPARATUS FOR THE CORRECTION OF THE DEFORMITY, AND ENGRAVINGS ILLUSTRATIVE OF THE CASES.

By SAMUEL HARE, Esq. Surgeon.

SECOND EDITION.

REVISED AND ENLARGED.

London:

JOHN CHURCHILL, PRINCES STREET, SOHO.

EDINBURGH: MACLACHLAN & Co.

DUBLIN: FANNIN & Co.

AND MAY BE HAD OF ALL BOOKSELLERS.

MDCCCXLIV.

TO

SIR BENJAMIN COLLINS BRODIE, BART, F.R.S.

SERGEANT SURGEON TO THE QUEEN,

LATE SENIOR SURGEON TO ST. GEORGE'S HOSPITAL,

&c. &c. &c.

SIR,

To you, as one of my earliest Instructors in Anatomy and Surgery, I dedicate the following treatise with the liveliest feelings of respect, as a small token of the high sense I entertain of your talents and worth.

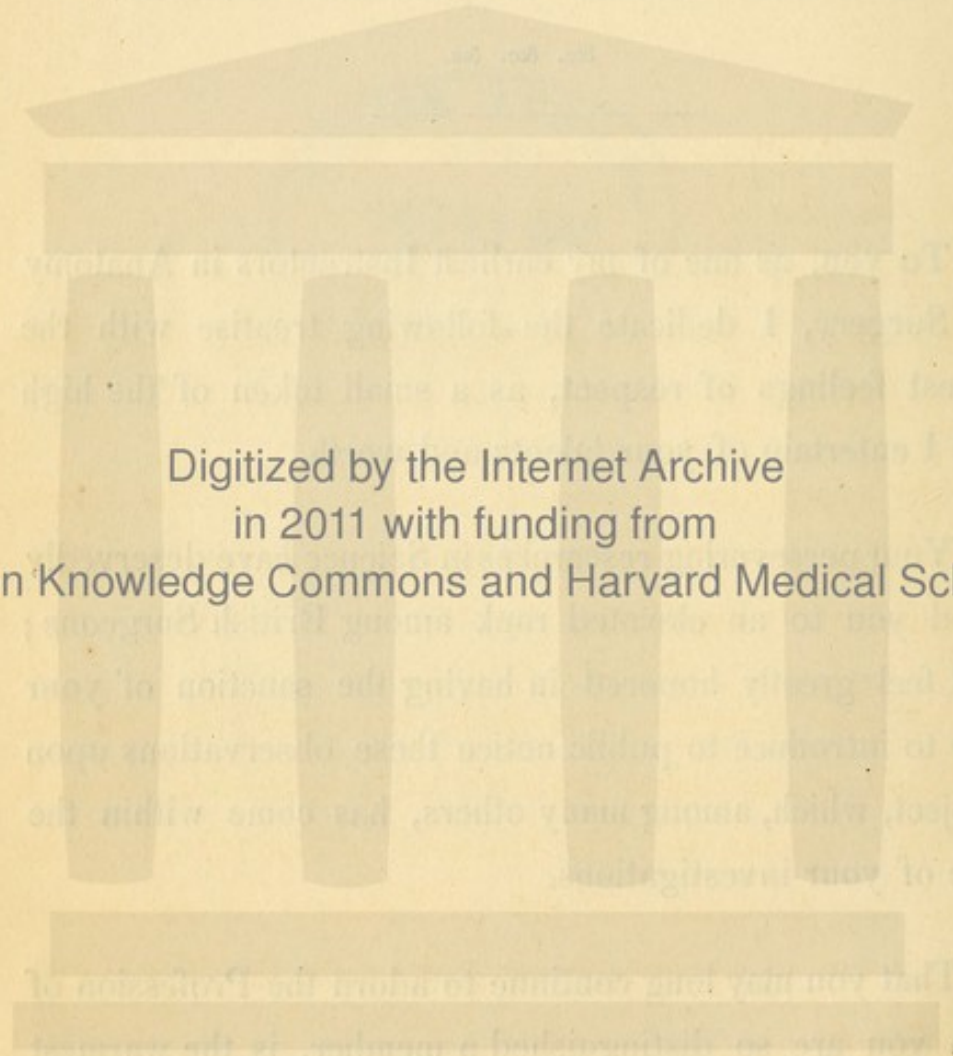
Your persevering researches in Science have deservedly raised you to an elevated rank among British Surgeons; and I feel greatly honored in having the sanction of your name to introduce to public notice these observations upon a subject, which, among many others, has come within the scope of your investigations.

That you may long continue to adorn the Profession of which you are so distinguished a member, is the warmest wish of,

Sir,

Your sincere Friend and Servant,

SAMUEL HARE



TO CHARLES ASTON KEY, ESQ.

SENIOR SURGEON TO GUY'S HOSPITAL,

LECTURER ON SURGERY,

&c. &c. &c.

SIR,

NEARLY fifteen years ago, I had the pleasure of laying before you the principles of the treatment recommended in the following pages, of which you did me the honor to express your approval, accompanied with the hope that they would soon be presented to the Profession.

My experience during the period which has since elapsed, has only tended more fully to convince me of the correctness of these views.

To you therefore, conjointly with the distinguished individual whose name appears in a preceding page, I dedicate this work, and feel honored in being enabled to submit my thoughts to the professional world, under the auspices of characters so distinguished for scientific acquirements.

I have the honour to be,

Sir,

Your's very faithfully,

SAMUEL HARE.

PREFACE TO THE FIRST EDITION.

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

The author's attention has been particularly directed to the study of this disease, from the circumstance of his having been, some years ago, afflicted with a morbid sensibility of the spine, during the progress of which, his sufferings were very considerable, and necessarily productive of great inconvenience. The facts and observations which he now submits to the consideration of his medical brethren, are the result of careful investigation, both as respects his experience in his own case and in those

of the patients who have been under his care. Having had, in the course of a long continued practice, (more than forty years having elapsed since he first entered the profession,) abundant reason to conclude that his opinions and consequent mode of treatment are founded upon correct principles; and being able, moreover, to record what may be considered surprising instances of success, even in cases of the worst description, he is led to conclude that it would be neglecting an obvious duty, were he longer to refrain from giving them publicity. Some of the most important of these cases are detailed in the course of the volume, and he is inclined to anticipate, that they will be perused with some degree of interest by the profession, and also by those who are suffering from the baneful effects to which they refer.

In treating of the causes of distortion, he has endeavoured to impress upon the minds of his readers, the indisputable fact, that the principal source of the production of one species of the disease, and that the most common, (the lateral curvature,) is to be attributed to the improper adaptation of modern female attire, and more especially to the injurious pressure occasioned by the excessive constriction of corsets.

It is to be hoped, that the repeated admonitions and warnings which have, from time to time, been given by medical men, on the pernicious tendency of the prevailing custom of tight lacing, will, at length, have some effect in opening the eyes of young females and their mothers to the danger of the practice.

In the chapter on Treatment, which will be regarded as an

important part of the treatise, the author has considered it requisite to be somewhat particular in his directions: in the part relating to mechanical treatment, he has given a description of an apparatus, which he has found of the most decided advantage in the various cases of spinal affection which have come under his care.

The chapter on spinal irritation, under which term are included those affections of the spine which have their origin in nervous irritability, and which, though not always accompanied with deformity, are yet highly distressing to the patient, and occasion mental and corporeal suffering of a very peculiar and painful nature, can scarcely fail to be interesting to such as are unhappily under the influence of such a morbid state.

The engravings, which are inserted at the commencement of the chapters on the respective species of the curvature to which they refer, and which are intended to illustrate the disease and its treatment, have been executed with the greatest care, and may be altogether relied upon for their fidelity.* The surprising improvement they display in the contour of the figure, will be the best criterion of the merit of the treatment under which such favorable results were obtained.

In offering his work to the profession, the author can truly affirm that he wishes the labours of others, no less than his own, to receive that deference and encouragement to which they are

* To ensure this, not only the drawings, but the casts themselves, were sent to the Engraver.

entitled. His object has been not so much to produce a large book, as to give a full, though condensed, account of the nature of the disease and its remedies; in doing this, he has endeavoured to touch on every essential particular;—some may, perhaps, think with too much minuteness—while others may imagine he has been too concise.

In respect to the execution of his undertaking, he would bespeak the candour and indulgence of the reader. The avocations of a busy life have left him little leisure for its composition; he has been enabled to devote to it only small portions of time taken from more urgent and pressing duties. He does not, therefore, think so highly of its performance, as not to be conscious that the critical reader may find in it some faults and imperfections. Perhaps, in some instances, there may be in the expressions, a similarity of language or of opinion, for the writer felt loth to destroy the force of facts for the inferior purpose of critical nicety, thinking it better to incur the risk of repetition, rather than fail to place an important truth in a prominent point of view; hence, public utility, rather than literary embellishment, has been his aim,—being anxious by every means in his power, to effect a diminution in the sufferings of a large and interesting class of society, whose condition, as regards the disease under consideration, he cannot but consider as capable, in most cases, of complete and permanent cure, and in almost all, of great and and satisfactory amelioration.

29th September, 1838.

PREFACE TO THE SECOND EDITION.

SINCE the first edition of this work was presented to the profession, the author has had very extensive opportunities of observing and investigating the subject of spinal disease in all its various forms, and in the present edition, has embodied the results of the additional experience he has thus gained.

The entire volume has been carefully revised, and a few additional cases have been added; their number might have been considerably increased, but it has been deemed desirable not, unnecessarily, to enlarge the size of the volume, as those given sufficiently attest the value of the treatment recommended.

The author's best thanks are due, and are cordially offered to the curators of those museums, both Metropolitan and Provincial, which he has had the pleasure of examining; also to those gentlemen who have kindly thrown open 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.

Langham Place, London.
March, 1844.

INTRODUCTION.

THE human body exhibits indubitable evidence of consummate skill. The more attentively its component parts are studied, the more deeply will the conviction be felt, that it is the production of a Being of infinite power and wisdom.

Nor is the goodness of the Creator less conspicuous than his other perfections. The body is as perfect in its design, as it is wonderful in its formation; it is not only pre-eminently distinguished for the symmetry of its proportions and excellence of its mechanism, but also for its adaptation to the convenience, the comfort, and the enjoyment of its possessor. None but a Being, whose essential attribute is boundless beneficence, could have originated a performance so benevolent and complete.

In the splendid chain of animated existence unfolded to view by the master-hand of nature, Man occupies the highest position. Our view is indeed limited in its range, and obscure in its perception; nevertheless, it exhibits an almost endless variety of beings, rising one above another in the scale of progressive gradation; displaying different degrees of corporeal and instinctive excellence; and terminating in himself,—being vastly superior to the rest in intelligence, and the delegated master of them all. Whatever, then, materially affects the welfare of a being so eminently distinguished by his Maker,—whatever tends, in an especial manner, to meliorate

his condition and promote his happiness,—must be considered as all important, and worthy the attentive consideration of every rational being.

In its natural state, a state of health, this grand animated machine performs, with ease and freedom, all the various operations of active life; and, when not enfeebled by disease, weakened by improper management, or injured by intemperance, displays the highest degree of vigour, grace, and beauty.

Possessed of a frame so admirably adapted and kindly contrived, it is much to be lamented, that man, either through ignorance or folly, should be instrumental in causing the derangement, and defacing the beauty of such excellent workmanship. He does not in general act thus from deliberate choice—he does not, knowingly and intentionally, prefer pain to pleasure—disease to health—misery to happiness; inadvertency, and the want of more general information on the privileges and consequent duties of existence, are the primary sources of these frequent errors.

Man is, to a great degree, the creature of circumstances. His ideas, his wishes, his pursuits are powerfully influenced by the position in which he happens to be placed. His temper, disposition, and indeed his entire character receive a tinge from those of the individuals by whom he is more immediately surrounded. He is too apt to be swayed and governed by the customs and opinions that are prevalent around him.

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. But there can be no doubt, that there are numbers who would have sufficient resolution to emancipate themselves from such unnecessary thraldom—such self-imposed fetters—were they fully aware of their nature and tendency.

These remarks, though obviously applicable to numerous other diseases, have a particular reference to those of the spine.

In tracing the origin of spinal distortion, an evil much more prevalent, particularly among the female sex, than is commonly imagined, an attempt will be made to point out the grave and injurious effects of the prevailing mode of fashionable attire. Fashion is ever characterized by its fondness for extremes—and all extremes in the article of dress, are, in some respects, prejudicial to health, and are even sometimes productive of serious distress and extensive mischief.

That the mode and materials of dress have an intimate connexion with these subjects, will, it is presumed, be rendered sufficiently obvious by the arguments adduced in the following pages; and particularly when it is clearly understood that *one* of the principal causes of curvature of the spine, now so alarmingly prevalent, is the use of improper stays, and the lacing of them to excess.

The enjoyment of a sound state of the constitution, and its necessary concomitant, good health, is the greatest sublunary good. Destitute of this paramount, this master blessing, all other advantages lose their natural relish, and become, comparatively, joyless and insipid. What does it avail the sick to possess all the gaieties and splendour of affluence? they cannot, of themselves remove disease, alleviate pain, or communicate that tone and buoyancy to the spirits, which the poor but healthy labourer enjoys amidst all his toil. Equally impotent are the dignities of rank and station, to confer immunity from the casualties and sufferings attendant upon the common lot of human-kind. Nor does disease pay any deference to distinctions of this nature, which are powerless in shielding the possessors from its indiscriminating attacks. Hence, it ought to be a source of constant satisfaction to the poor, amidst all their sufferings and apparent inferiority in the general distribution of temporal happiness, (often more apparent than real)

—that, in the most essential and truly valuable blessings, all ranks of mankind are much upon an equality.

Has the great Creator, then, displayed such amazing knowledge, power and goodness in the formation of the body he has bestowed on man, and shall not he, on whom so rich a gift is conferred, proportionably value it? Ought he not carefully to abstain from whatever is injurious to it? Ought he not, by every means in his power, to seek its preservation and to promote its welfare?

That department of the science of medicine which comprises the promotion and preservation of health, commonly expressed by the term, Hygiène, is as yet but very imperfectly understood by the generality of mankind. An extensive field of usefulness is here presented to the mind of the philanthropist, when we consider how much yet remains to be done, by means of the diffusion of plain, practical information of this nature, to enable the great bulk of mankind duly to appreciate their own interest. It is by the accumulation of experience and observation throughout succeeding ages, that a valuable store of varied knowledge is produced, by which mankind obtain a gradual increase in such practical measures as are best calculated to promote their comfort and happiness.

This book assumes, indeed, no exclusive merit, for the author would have the full meed of praise bestowed on the labours and industry of others, which is their undoubted right; even where he may differ from them in his views, he has avoided unnecessary discussion on the subject, as more good is effected by stating facts, and endeavouring to draw sound and unbiassed conclusions from them, than in disputing the opinions and honest convictions of other authors, even where they may be deemed somewhat erroneous. Throughout, the author has endeavoured to express his own opinion clearly and distinctly; as he is convinced that the plan of treatment he recommends is both founded on rational views, and (as will be seen by the cases narrated) is highly beneficial in practice.

The writer who labours to induce mankind to pay proper attention to the subject of health, has the satisfaction to reflect that he advocates the cause of the happiness and virtue of the human race, because health is most fully enjoyed by the temperate, the active, and the moral. To recommend mankind, therefore, to study how best to attain and preserve so great a blessing, is to allure them into the paths of morality and virtue, and consequently, to insure their happiness. And, as education becomes more and more extended, and knowledge, in consequence, more widely diffused, this branch of information, as well as others affecting the true interests of the great family of man, will doubtless be more generally cultivated, and therefore be better understood, and more highly appreciated.

Rapid advances have, particularly of late, been made in the dissemination of general information, and its attainment is gradually becoming more easy; knowledge will ultimately overcome the obstacles that may retard its progress; and its possessor, feeling the superior advantages resulting from its culture, will redouble his exertions in the acquisition of solid information.

ANALYSIS.

CHAPTER IV.

CHAPTER V.

CHAPTER VI.

CHAPTER VII.

CHAPTER VIII.

CHAPTER IX.

CHAPTER I.

CAUSES OF THE DISEASE.

SPINAL diseases originate in a variety of causes. Among the principal may be enumerated,

1. The injudicious management of infants, children, and those of somewhat riper age; i. e. throughout the whole period of growth.

2. Falls, blows, and other similar accidents.

3. Impropriety of dress and want of sufficient exercise, more especially in reference to young females.

4. Inattention to the state of the digestive organs, and to the general health and vigour of the body.

Other minor causes, accessory to the production of the deformity, will be discussed in the progress of the work. They are such, however, as will comparatively, seldom be able to effect much mischief, unless the constitution be previously in a state of disease. The great predisposing cause is a deterioration of the health, arising either from congenital organization, or in consequence of some of the infantile diseases, which, not having received requisite attention, have left the body in a debilitated and cachectic state.

SECTION I.

MANAGEMENT OF INFANTS, ETC.

When it is considered that there exists in infancy the rudiments of the future man, and that the subsequent welfare of the latter, as respects good or bad health—enjoyment or non-enjoyment of the great boon of existence,—depends mainly upon the attention which is paid to early childhood, it will readily be conceded that the subject 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. Diseases contracted at that period, and not effectually cured, exert a morbid influence on the whole of life,—embittering its condition, and rendering it more liable to be prematurely destroyed. A prudent architect in constructing an edifice, is especially careful that the foundation be made strong and efficient, in order that the superstructure may be reared with safety: and shall the ground-work of the noble fabric of life be deemed less worthy the assiduous care of those under whose superintendence it is placed? Shall the erection of the great structure of human existence be considered of less value and importance, than that which is inanimate and void of sensation?

The mortality which prevails during infancy, to an extent vastly disproportionate to the other periods of life, is, notwithstanding the advance of medical knowledge, and the general introduction of vaccination, still so large, as to call for the serious consideration of parents and the profession.* And though this disparity may not be so great as in former times, still the period under consideration is a critical one, and one of deep solicitude; and any suggestions, which will be calculated to smooth the path of duty, and render its performance more agreeable and its end more secure, cannot but be received with interest by all parents.

FOOD.

THROUGHOUT the whole range of animated existence, the young of no species is so helpless, or continues so long to require assistance as that of man; and among no other animals is there so great a mortality during the early period of life. These facts show in the most forcible manner, the necessity of well directed parental care. The love of offspring is a feeling so deeply implanted in the human breast, that there are very few who do not wish to perform their duty in this respect. The neglect of it arises more generally from defective information, than from want of inclination. Viewed in the light of a great, impor-

* From the abstract of the parish register for the United Kingdom, for 1831, printed by order of the House of Commons, 2nd April, 1833, (vide vol. 3, page 488,) it appears—that out of every thousand who died during eighteen years, —1813,—1830,—345 were under five years of age—i.e. one third and seven sixty-ninths.

tant 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.

To the tender infant, a supply of food is furnished exactly suited to the nourishment of its delicate frame—a frame comparatively feeble, yet containing within itself the elements of future strength and stability. 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 lives in a proper manner. 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 small proportion of fresh cream, sweetened, and administered through a suckling glass, is one of the best substitutes,* and 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.

Every thing that is calculated to irritate and disorder the stomach and intestines should be carefully avoided; for,

* 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.

if articles of this description be attended with injurious effects on the health when the body is grown and robust, the evil must be necessarily and is vastly increased, when the recipient is but just commencing its career of life, when its organs are delicate, and their functions easily susceptible of derangement and injury. The inconsiderate use of opiates and stimulating liquors is highly reprehensible; such pernicious expedients may indeed produce a temporary respite for the jaded and weary nurse, but the repose they procure for the infant is unnatural, as is sufficiently indicated by the convulsive starts, the raised and quivering eye-lid, and irregular motions of the muscles.

Another very common practice, and one equally deserving of censure, is that of OVER FEEDING: both as respects children and adults, nature is an unerring guide in this, as in other cases, and will not 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; this doubtless he does in many instances under a mistaken notion that he is thereby promoting the energy of his physical powers, while in truth he is actually doing violence to his constitution, and 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 eating to excess that which pleases the palate, so overload the stomach as to occasion a temporary derangement of the health. Children have not the same experience to guide them in this respect as an adult, neither have they occasion for it, being under the care and control of those who ought to prevent their acting wrong or receiving injury. By improper indulgence they are often induced to eat to excess; —their stomachs are distended and consequently weakened, and the seeds of disease are thus thoughtlessly sown by those who vainly imagine, that the means they are using are calculated to promote the growth and vigour of their charge. Attention to natural causes and effects would doubtless 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 it 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 digestion, &c., 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 the last cause much oftener than it ought to be; the cause being

removed, the distressing cry, being the only means they possess of making known their wants or sufferings, will immediately cease ; and, therefore, should the child continue to fret after sufficient food has been given, we must suspect some other cause in operation to produce this effect. Children are 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, —her indications are, on reflection, always clear and easy to be understood. In all our proceedings, we have only to follow her obvious 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, bring upon ourselves disappointment and regret.

EXERCISE.

Widely different is the physical state of an infant, from that of an adult; the newly formed bones of the former are soft and flexible, and may easily be made to assume any form, especially if the body be in a diseased state. This accounts for the common origin of many irregularities of form, which are not congenital, but occur at an early period of life. In proportion, therefore, to the delicacy of the infant, 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 vigour. A finely formed body is favourable 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 all are not so gifted. 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 generally 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, nature adopts a wise and proper course in not giving the desire to walk at the usual period, which, under the circum-

stances, 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 sit 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 the child be suffered to sit 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, the sternum or breast-bone pushed out, and that deformity in delicate children, commonly called "pigeon breasted," is produced.

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, 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 result or the more tedious the recovery. The propriety of this caution 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 the 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, especially among the poor, anything like that degree of attention, which they so urgently require. If the horticulturalist 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, ought man to be indifferent as to the means of effecting improvement in his own species? Surely, if the remark of a celebrated poet, that

"The proper study of Mankind is Man."

be allowed to be correct, whatever has a tendency to amelio-

rate his condition, and to effect an improvement both in his mental and bodily constitution, should be carefully studied. Much might be effected in the improvement of the human race as respects its corporeal state, were public attention more forcibly directed to the subject; and it is hoped that the remarks contained in this volume, will, amongst those under whose notice they may fall, be in some degree instrumental in effecting so desirable an object.

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 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 by trifling exertion, and are incapable of sustaining long continued action; while in children and young persons who do not take sufficient exercise, the proper nutrition of the bones which constitute the framework of the body does not take place; instead of being dense, firm, and resisting, they are soft, yielding, and de ficient 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 such a decided tendency to cultivate the intellect at the expense of bodily vigour and health. The sports in which boys naturally join, usually prevent those deformities which are so commonly met with amongst girls, whose temporary cessation from application to books, the piano, or the harp, can scarcely be called relaxation, for seldom does it include that of which growing girls have so much need —active exercise. Nor does their accustomed walk, at one slow and uniform pace, without anything to engage the mind or occupy the attention, by any means make up that amount of exercise which they *ought* to take, and which is necessary for the due performance of the functions of the body ; such monotonous walks invigorate neither the mind nor the body, and very far better would it be, were the time thus spent,

devoted to active games in the open air, for then the interest taken in them, would give an impulse to exertion, and all the muscles would be properly exercised. If this plan, and a more rational system of dress were adopted, we should cease to find so many of the young ladies at our boarding schools, pale and wan in appearance, inactive in character, and deformed in person.

TRAINING, CLOTHING, ETC.

There is a vast difference in the original organization of children. It cannot but be supposed that the offspring of mothers who have themselves been the subjects of disease, with all its attendant weakness, must, in some measure, participate in the parent's infirmity, and be less strong and robust than those born under more favorable circumstances. They will require greater care in their general training; be more subject to the diseases incident to children; 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 will require less nursing; they speedily 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 early enjoy all the activity natural to infancy. This is no exaggerated picture, the contrast is obvious and striking, and ought to force itself upon the attention of parents.

Even where a predisposition to disease exists, great is the amount of illness which may be warded off by care and judicious management; 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. These are often imputed to the impure air of crowded cities and towns: this, no doubt, has great influence in the production of disease, but other concomitant circumstances, such as want of cleanliness, improper food, and other similar causes, ought to be taken into consideration, as they are still more active 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 it should be immersed, or well sponged with it, morning and evening, and rubbed thoroughly dry. Its food and clothing also require attention, because, upon their proper management and adaptation, depends the due development of its bodily frame. The body of an infant is

feeble,—its clothing therefore should be soft, that it may not chafe its fine and delicate skin. 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. If the infant be an object of care and solicitude to its parents, not less so is the lively and active child; its limbs having now obtained a considerable degree of strength and firmness, nature prompts it to a variety of vigorous action, in order that it may make the necessary increase in size and strength. Its clothing, then, should be adapted to encourage and assist nature, in carrying on her beneficent designs;—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 injury — the different articles of apparel should fit easily to the body, *and be frequently renewed, to suit the increase of growth.*

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 another step in the career of 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 vigour 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 unhappy 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 forcible 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, in every point of view, great interest and importance. In proportion, generally speaking, to the care bestowed upon the health of infancy and childhood, will be the well-being and comfort of maturer years. Let parents consider this; let them, as the natural and responsible arbiters of the future destinies of their, as yet, helpless offspring, diligently acquaint themselves with those subjects which so imperiously demand their attention. Then may we hope, that the rising generations, as they successively appear on the great stage of human existence, will shew a progressive improvement, both in corporeal and mental excellence.

SECTION II.

ON IMPROPRIETY 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 wild, untutored savage, unfettered by the tyranny of custom, acquires that activity, vigour 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, a taste for finery, a love of embellishment, a fondness for admiration ensue; there is nothing directly culpable in this; there is no crime in dress being made neat, becoming, or elegant. The Almighty has clothed all the works of creation with incomparable beauty: he has invested every thing with the inexplicable charm of variety and loveliness. When properly examined, there is nothing, however humble, calculated to excite unpleasant feelings; there is nothing offensively gaudy; there is nothing superfluous or absurd; from the minutest leaf, to the most stupendous planet rolling in the immensity of space, there is throughout, one continued display of perfection. Assuredly, then, there is nothing reprehensible in the use of elegant or even fanciful apparel: 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 comformable to the preservation of the health, and the consistent display of taste and ornament.

The empire of fashion exercises over its subjects unbounded sway, and incites them into excesses, which, in their more thoughtful moments, they could not but condemn. It possesses a sort of magic influence, that, for the time, captivates the fancy of its votaries, deprives them, in some respects, of the proper exercise of their reasoning powers, and leads them to admire as beauties, the most palpable inconsistencies. Instead of adapting the various articles of clothing 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 the whims and caprice of dress, proclaimed, by the sovereign goddess 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 overwhelming and 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 inconsiderate disregard to the plain indications of nature, we have an instance, and a most pernicious one, of the inconsistency of mankind. Strange! that human beings, endowed with reason, should so thoughtlessly follow a fickle, arbitrary, and self-created power, that leads them to displays of the most fanciful, I had almost said, ludicrous kind. It were well if the evil here complained of, were deserving censure merely on account of its extravagance and inconsistency: it assumes, however, a much more frightful and alarming aspect, and is too often 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.

In hazarding the foregoing remarks, the author has no wish to make use of expressions that may be deemed unnecessarily harsh or severe. He is satisfied that few will deny the evils resulting from a too ready compliance with the present mode of dress; and his only desire is to bring the subject before the notice of the profession and the public in such a manner, that females may not remain ignorant of that, with which it is their duty to become acquainted.

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, would not be likely to be attended with any mischievous effect. It is more than probable, that almost all 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 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 not unfrequently 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 absurd 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 child-

hood, admits neither of doubt nor surprise; the only wonder is, that they should feel comfortable without them even during the hours of repose.

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, the crest of the ilium being, not unfrequently, turned inwards.

The evils resulting from tight lacing are numerous and appalling; by the pressure of the stays, the functions of the vital organs are injured, and the whole frame impaired; the bones of the chest, being contracted, and their natural extent of motion being 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. Health is no longer depicted on the countenance, energy and muscular action become impaired, while palpitation of the heart, a quick pulse, and difficult respiration are usual symptoms attendant on such chronic cases. The pressure and confinement of stays also produce great derangement of the functions of digestion, preventing the stomach from dilating on the reception of food, and also the proper peristaltic motion of the intestines; and, in some

extreme cases, entirely changing the form and position of the viscera, which are not unfrequently pressed down to 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 said, is often produced by this improper pressure.

As the bones and muscles continue to increase in growth until the period of puberty, they are, by the continual pressure and rigidity of stays, which scarcely allow of lateral, or indeed any other motion, prevented from becoming fully developed; and the pressure is not unfrequently so great as to displace the bones 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 axilla—completely flattened, and their extremities, instead of being directed forward, project 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 so great a difference between the former and the latter, as to be convinced of the serious injury which must result from the use of stays of the ordinary description: this is an experiment which all parents have in their power to try, and the correctness of which they can ascertain.* Need we, then, be surprised that the female figure is so

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

frequently, and so lamentably deformed? Rather ought it to excite our astonishment, that any 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.

Equally, perhaps more objectionable than stays, are the various instruments sometimes made use of; as, for instance, back-boards and braces, education chairs and other contrivances to amend or protect the shape, which, so far from improving, they tend ultimately to destroy; indeed, most of such inventions, instead of being useful in the prevention of the deformity, are absolutely injurious. Parents should acquaint themselves sufficiently with the natural state of the human body, to enable them to comprehend the objectionable nature of these and similar devices; they would then reject the use of such disagreeable 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 disastrous effects to young females and women in general, how greatly must the evil be 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, must, of course, cause great inconvenience to the mother. Defective secretion of the milk, the food designed by nature for the infant, and so essential to its preservation and nourishment, may probably, in some cases, arise from the same cause. The difficulty of breathing, 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 and tight lacing, and although they have been proved, in the clearest manner, to be the most formidable cause 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. The utmost that can be hoped for is, by showing, in a plain and familiar manner, the mischiefs attending their use in their present form, to 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 support and give grace to the person, at the same time to allow the utmost freedom of motion; the pressure on every part

being very slight, so as to admit of necessary extension, pliability and nice 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 Indian-rubber belting, 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 would be a work of supererogation to enter into any details as to the material and construction of stays, further than to observe, that the fabric should be of a firm but elastic nature, and 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 exceedingly improper, as regards their effect upon the health and form of the body; these are, the strings of petti-

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

coats, 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.

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, and that parents will at once see the necessity of avoiding it.

SECTION 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. Such is the almost general ignorance that prevails in society upon subjects of *hygiene*, that even diseases of a more 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,—was silently, but certainly, conveying its destined victim to a premature grave. There is

something affecting and melancholy in such considerations, and they loudly proclaim the advantage to be derived from some knowledge of these important subjects.

The individuals alluded to, may not, indeed, be subject to acute pain, and are apt to consider mere freedom from pain, 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 only a favoured portion of the human race. This enviable condition supposes something more than mere exemption from bodily suffering,—it raises its happy possessor to the true relish and enjoyment of life. How then, it may be asked, is a person, whose attention has hitherto been but little directed to subjects of this nature, 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 vigour restored to the frame? Is the sleep sound and refreshing, and does the individual arise from his repose, disposed, with lively 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 im-

perceptibly, 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. Let those who possess what thousands, however affluent, would give their all to obtain, think highly of their privilege—it is of no ordinary value;—let them be grateful for the inestimable blessing, and cherish it as that great advantage of life, which stamps an increased value upon every other created good. Let all be assured, that much, in this respect, is in their own power; good health, like most other mundane 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 langour, 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 vigour—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 animal spirits be depressed, and all the usual energies enfeebled and blunted;—in all or any of these instances, the inquirer may be assured, that the individual is labouring 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 vigour, 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.

It is by no means intended to assert, that declining years do not necessarily cause a deterioration of the bodily powers; the benumbing influence of age is readily admitted; at its approach there must, inevitably, be a progressive diminution and a perceptible decay of strength, activity and vigour; yet, under favourable 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 actually attended with more lively enjoyment and even more vigour, 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 earthly good be best obtained, and how most effectually preserved? Happily for mankind, its possession is not limited to any degree of rank or station; the monarch upon his throne having little better means of attaining and securing it, than the labourer in his cottage. It is, in a great measure, within the reach of all, and the sacrifices it requires are not costly; the principal means are exercise, 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 the 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 bring them regularly and frequently in contact with the refreshing and invigorating breeze. 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 the atmosphere sensibly deteriorated, scarcely fit for respiration; and if this be the case when occupied by a single person, how greatly must that be 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 result was, in general, an immunity from disease, a useful and happy old age, extended to a period that would almost seem incredible to the luxurious and enervated epicure of modern

times. By observing from youth the habits of temperance and abstinence, the blood continues pure, and the body is free from those vitiated humours which are so fruitful in engendering or fostering disease: the well known instance of Cornaro was remarkable for 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, hundreds perish by 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; 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, in turn, by the numerous sympathies and close affinities by which they are united, communicate their morbid influence to the system in general. One great means,

then, of securing the enjoyment of a sound state of health, is to keep the mind 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 tranquility, 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 favour, 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 favourable to health and length of years.

Many of the employments in which mankind are engaged, in their endeavours to procure subsistence, are indeed unfavourable 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 resulting 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 for 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 mankind 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 mankind should possess such general knowledge on these subjects, as would restrain them from such excesses of mind or body, as are prejudicial to health; the promulgation of sound and practical information would be a powerful incentive to morality, as few would be found, 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 all the systems of the body, which are conducive to the production of health or the initiation of disease, the most important is the alimentary canal, and the organs connected with it. An attentive consideration of the process of digestion, to the illustration of which our subject now leads, will show the propriety and truth of the preceding remarks. The digestive apparatus, which may be described as a long winding cylindrical tube, running through the trunk of an animal, having greater or less dilatations in its course, and

being furnished with various subsidiary organs, possesses definite functions, which may be arranged under the three heads of mechanical, chemical and vital, but none of them purely independent of each other. The first process is evidently mechanical—the reception, mastication and deglutition of the food; these actions are performed by organs adapted to the particular kind of nutriment, and the mode of obtaining it: they consist of the mouth, with its furniture of teeth and tongue, and a beautifully formed locomotive apparatus for conveying the comminuted mass of food safely into the stomach, where the second or somewhat chemical action commences. The stomach forms the largest dilatation in the course of the intestinal tube, and, in general terms, may be said to be of an oval form; in structure it consists of a mucous or villous lining, surrounded by muscular fibres, longitudinal and circular, with blood vessels and nerves distributed along with these, and myriads of glands secreting a peculiar fluid termed gastric juice, to be mixed with the food. The muscular fibres, though not under the influence of the will, give various contractile or vermicular motions to the organ, and the nerves convey vitality to it; these nerves arise from very different sources and convey very different influences, being connected with the ganglionic, the spinal and cerebral systems; hence, arises that universal sympathy which this organ possesses with all parts of the body. In it, the food, as before stated, undergoes a mixed chemical and vital action, not readily explained in a short sketch; the result, however, is that the food becomes converted into an uniform pultaceous mass, named chyme;—after a time this passes from the stomach, and the third process commences in the intestines, which, like the stomach, possess a muscular and mucous coat, with blood-vessels and nerves;

—they are divided into two portions, the small and the large intestines; the functions of the former being the digestion and absorption of food, that of the latter, the removal of effete matter from the system; in the former, the separation of the chyme into two portions,—the chyle or nutritious part and the fæcal or excrementitious portion, takes place; this is effected by the agency of various fluids, which are poured from the associated glands, particularly the bile from the liver. The chyle is absorbed by vessels called the lacteals, with which the course of this portion of the intestine is furnished, and these, uniting into one trunk, the thoracic duct, form the medium by which new matter is introduced into the animal frame, and having gone through the course of the circulation, is assimilated with it; whilst the excrementitious matter passes into the larger intestine, and is ultimately expelled. It will at once be evident, since the large intestine conveys the refuse matter from the system, that great attention ought to be paid to the functions of this part of the canal. The appearance of the excretions will best evince whether the organs of digestion are in a natural and healthy state; indeed, they furnish the most certain criteria by which to judge; and of such importance is a close and regular attention to these particulars, that the professional attendant should not be deterred, by motives of delicacy, from making himself fully acquainted with their condition; it is indeed absolutely requisite that, all persons who wish to acquire and preserve a good state of health, should pay strict attention to the functions of the large intestine. The alvine evacuations are liable to become either too lax or too confined, and either condition, when suffered to proceed to an extreme, is productive of serious effects, which ought to be carefully guarded against; accordingly as they

are of a proper or improper consistence, or as they are in excess or deficiency; as they approach to, or recede from, a natural colour, or as they are more or less fetid, will the parts from which they proceed, be judged to be healthy or otherwise.

When the digestive organs are in a disordered state, and consequently incapable of efficiently discharging their several functions, various maladies may be expected to result; these are frequently affections of the cutaneous and glandular systems; and, when there exists a delicate habit of body, either congenital or acquired, co-operating with the other special causes of spinal disease which have been alluded to, they will originate, or, at all events, accelerate the progress of its deformity.

The question will here probably present itself to the mind of the reader—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 structure, 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. Daily and 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 will, however, naturally be asked by the valetudinarian—How far the physical constitution of man, *when enfeebled by disease,* is capable of restoration? To this enquiry it will not be improper shortly to allude. It is here necessary to explain that the state of constitution meant, is not merely that which may predispose or render an individual liable to an attack of disease, but

includes also that in which there exists some real cause of disease. The possibility of renovating the constitution must depend greatly upon the nature of this cause, which may arise from within, or be dependent upon external circumstances. The nature of some of those which are external has already been alluded to in the foregoing pages; if internal, is it dependent upon structural changes, or upon a state of long continued functional disorder? Does it consist in that very general one, a more or less cachectic habit of body, or in depravation of one or more of the secretions? This, itself an effect, is by far the most general cause of enfeebled health, but it is, at the same time, one, for the alleviation of which, much can be done. The means which have already been alluded to, for the *improvement* of health, will, under the direction of the medical adviser, and the use of such remedies as may be adapted to restore the particular secretion which is depraved, to its healthy state, prove equally successful in effecting a *restoration* of health. The treatment must of course, be modified according to circumstances, but it is only by perseverance in a graduated and well regulated course of medicine, that success can be hoped for. Indeed, there can be little doubt, if the healthy body be capable of so great improvement by the use of medicine, diet and exercise, that the diseased body will, in a proportionate degree, be obedient to similar influences.

Having thus endeavoured to trace the origin of spinal disease, it may be desirable, in the next place, to furnish a slight sketch of the anatomy of the spine, in order that the subsequent part of the treatise may be more clearly understood.

CHAPTER II.

SKETCH OF THE ANATOMY OF THE SPINE.

THE spine or vertebral column, derives the former of these names from certain projecting portions of the chain of bones of which it is composed, and which form a continued range, —their union by strong ligaments and muscles being so complete, that the same term is applied to the entire projection, as is used in describing that of a single bone. This range or pillar is composed of twenty-four different pieces: from the circumstance of their having a kind of turning motion on each other, they are called *vertebræ*, and hence, the term *vertebral* is applied, indiscriminately, with that of *spinal*, to the whole column. These bones are distinct and moveable, and, on that account are termed *true* vertebræ; they are disposed one above another, and considered as a whole their base rests upon the sacrum, which is composed of five vertebræ united together, hence called *false* vertebræ, and which are closely impacted between the bones of the pelvis.

The true vertebræ are divided into three classes, those of the neck, the back, and the loins :

1. The cervical, or those belonging to the neck, are seven in number ; their bodies are smaller than those of the rest of the column, they are thicker anteriorly than posteriorly, —are concave on the superior, and convex on the inferior surfaces, and their spinous processes, with the exception of the seventh, which, in its character, approaches closely to that of a dorsal vertebra, have very little projection ; they are also susceptible of greater extent and freedom of motion, than is found in the other divisions of the column.

2. The dorsal, or those appertaining to the back, the number of which is twelve, are larger and stronger than those of the neck, yet inferior in these respects to the lumbar division ; they are severally locked together and strengthened by their connexion with the ribs, by the particular direction in which their articulating processes are placed, and by their spinous processes being laid one over another : this division of the spine requiring, from its position, and from being the part from which the ribs derive their principal support, but a limited degree of motion, is the firmest and the least pliable of the three.

3. The lumbar, or those appropriated to the loins, are five in number, which having to sustain the whole weight of the body, are proportionably large and strong ; their processes, except the articulating ones, are not closely united with each other, but stand out wide and free ; these vertebræ perform the principal motions of the trunk.

Commencing from the neck, the vertebræ progressively increase in size, (with the exceptions presently to be mentioned,) though they diminish in density and firmness of texture, until they unite with the sacrum; so that the lower vertebræ, though larger, are proportionably less in weight. By means of this increase of size, they possess additional strength for the support of the trunk and allow greater freedom and security of motion.

In each vertebra may be noticed a body, two laminæ processes, a foramen, and four notches.

The *body* is that thick strong central part situated in the front, and of an irregular oval shape; above and below, the surfaces are horizontal and slightly hollowed to receive the intervertebral substance,—anteriorly and laterally the body is convex transversely; behind it is concave, to form along with the laminæ or arches which spring from the sides of its posterior surface, the large foramen for the spinal marrow: it is the bodies of the vertebræ articulated to each other that form the part of the column which chiefly supports the weight of the head, chest, and upper extremities.

Processes. The processes of the vertebræ are seven in number: the spinous, the two transverse, and the four articulating or oblique. The spinous—which are placed at the posterior part of these bones, and may be distinctly felt down the back, giving the whole the appearance of a ridge, whence, as before stated, it has acquired the appellation of spine. The two transverse—which are situated on each side the spinous processes, and afford attachment to many ligaments, tendons and muscles of the spine, and in the dorsal region are articu-

lated with the ribs. The four oblique or articulating—which are much smaller than the others, two being situated on the upper and two on the lower part, of each bone; it is by their means, chiefly, that the vertebræ are so completely united; throughout the whole of these, the upper processes of each vertebra are connected with the lower one of that immediately above it, and thus form a joint, although possessing but an inconsiderable degree of motion.

Foramina. There is in every vertebra, a large central foramen or opening, corresponding with that of the vertebra, above and below, and so, by their union, forming a bony canal for the lodgment of the spinal cord. There are also four notches on the arches of each vertebra, two on the upper, and two at the lower part; the notches of the inferior meeting with those of the superior bones, form foramina for the passage of the nerves and blood-vessels, which issue from the spine, throughout its whole length.

Intervertebral substance. The upper and lower edges of the body of each vertebra consist of a circle of bone of a firm and compact texture, which forms a superficial depression or cavity for the reception of the inter-vertebral substance: a layer of it is thus placed between the bodies of the vertebræ; but it is not in immediate contact with the surface of the *bone,* being separated from it by a continuation of the periostium which covers the rest of their surface, which is here of a more dense and fibrous texture than elsewhere. The intervertebral substance partakes of qualities both of cartilage and ligament (fibro-cartilage) possessing considerable compressibility. 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. In those sudden shocks to which the body is sometimes liable, it prevents any injurious concussion of one vertebra upon another; at the same time, it readily yields to whichever side the spine is inclined, and being possessed of a high degree of elasticity, instantly returns to its natural situation. Flexibility and security are thus made to result from this peculiar composition, which serves the purposes of uniting the spinal bones to each other, of diminishing and diffusing the impetus of 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. This substance and the adjoining cartilages becoming, in process of time absorbed, accounts, also, for the bending forward of the spine in elderly persons, who are unable to support an erect position, as in their youth.

Ligaments. Besides the intervertebral substance, connecting together the bodies of the vertebræ, there are two strong ligaments, one anteriorly, the other posteriorly, running the whole length of the spine; and also others connecting the various processes to each other, and to the ribs, as well as numerous tendons and muscles, all serving to add to the strength of the column, without impairing its mobility.

The office of the spinal column in the animal economy is very important; it supports and transmits to the ground, the whole weight of the trunk; it forms by the junction of

these twenty-four vertebræ, a continuous canal, for the passage of the spinal marrow; at the same time, by each bone having a slight motion upon its fellow, and by the union of the whole chain, a considerable degree and variety of motion is obtained. A front view of the spine presents these twenty-four bones piled perpendicularly one above another, (with the exception of a very slight convexity to the right in the dorsal region,) and altogether measuring about one-third of the length of the body. It has, in the anterior aspect, a pyramidal figure, the base resting upon the sacrum, the apex supporting the head. Though this is true of the column itself, yet as far as the bodies of the vertebræ are concerned, they are found to diminish from the last lumbar to the fourth dorsal, and then gradually to increase to the first dorsal, again to diminish somewhat up to the second cervical vertebra, so that it might be supposed that the weakest part of the spine would be about the fourth dorsal vertebra. A posterior view also presents a perpendicular column; in the centre, are seen the spines of the vertebræ, and on each side the transverse processes bounding them, and forming between the spinous processes and the angles of the ribs, a deep fossa, which is filled up by masses of muscle, intended to support and raise the body. A lateral view presents this column in a beautiful double flexure, having two convexities forwards, at the neck and loins, and a large central concavity, answering to the thorax, containing some of the most important organs of life. Behind the bodies of the vertebræ are seen the holes through which the spinal nerves pass, these are formed by notches in the arches of bone which constitute a portion of the large foramen: the evident effect of the union of so many pieces of bone into one support, and of their forming the three

curves just alluded to is, that by these means, sudden concussion and consequent injury of the spinal cord is prevented, and the progress of caries, when it takes place, is also probably very materially checked.

BONES OF THE CHEST.

Sternum. The sternum is that bone situated in the centre and anterior part of the chest, to which the clavicles and the ribs are articulated, the latter by means of an extensive cartilaginous union. It is of a more spongy structure than the long bones, not having the force of great muscular contraction to withstand.

Ribs. The ribs on each side, with the sternum anteriorly and the spinal column posteriorly, form a beautiful bony protection for the important organs of respiration, circulation, &c. They are twelve in number; and are distinguished into true and false. The head of each rib divided, with the exception of the first, eleventh and twelfth, which have only one each, into two articulating surfaces, is received into two cavities contiguous to each other, and formed for the most part, in the upper and lower edge of each dorsal vertebra. The anterior extremities of the seven true ribs are articulated through the intervention of cartilage with the sternum, and are called sternal; the remaining five, which are not thus directly articulated with that bone, are termed asternal or false ribs. The false ribs gradually decrease in length to the twelfth or last, which is exceedingly short; the cartilages

of the eighth, ninth and tenth terminate in those immediately above them, before they reach the sternum, but the two lowermost have not any attachment at their anterior ends like the other ribs, but hang loose, and are supported only by the muscles and other soft parts:—hence it will at once be seen how readily 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 no power in these parts to resist even a very slight degree of pressure.*

Clavicles. The clavicle or collar bone, is the long rounded bone, flattened at its outer extremity, triangular towards the sternum, and a little curved, like the Italic *f*. It is situated, almost horizontally, between the sternum and scapula, and is strongly articulated to these bones, although the joints allow considerable motion. The clavicles are essentially useful in preventing contraction of the chest, by supporting and keeping back the scapulæ and upper extremities.

Scapulæ. The scapulæ are loosely attached to the upper and posterior parts of the chest, extending downwards to about the seventh rib, and giving attachment by their heads to the upper extremities. The pressure on the left side, occasioned by tight lacing of stays, is exceedingly injurious, particularly on account of what is called the base of this bone, (the edge of which is of a thin, but firm texture,) being forced against the ribs, which are of a softer consistence, and thereby more readily give way, the former becoming imbedded, as it were, in the latter. This subject,

however, will be further discussed in Chapter IV. when treating on lateral curvature; to which the reader is referred.

From the preceding detail of the anatomy of the spine and chest, it will be seen that the vertebral column does not, on account of the varying forms of the bones of which it is composed, possess an equal degree of motion in every part of it; the bones are firmly bound to each other in such a manner, as to admit of flexion and extension, with some degree of lateral motion and rotation, while by their solidity and firm attachment, and peculiar manner of articulation to each other, great strength is secured. The contrivance is such, as to give considerable pliancy and freedom to that part which belongs to the neck, and to render the dorsal part firm and strong, whilst, in the region which belongs to the loins, the mechanism of the articulating processes admits, in a still greater degree, of all the motions—the whole combining lightness with strength, and elegance with utility, and affording support to the parts adjoining. It gives both firmness and elasticity to the ribs, whilst, by its flexibility and mobility, it readily adapts itself to the diversified positions, which the body is constantly required to assume. With the ribs and sternum, the spinal column supports and gives protection to the important viscera of the thorax. It forms the osseous canal for the reception and protection of the spinal marrow, which is thus secured from external injury, the arch and spinous processes being composed of bone of the firmest texture; these, from their extent and number, also afford ample space for the insertion of the large and powerful muscles necessary for the motions of

the trunk, and by means of which, the body is easily kept in the erect position.

Having given the reader a brief sketch of the anatomy of the spine and its appendages—having shown the skill displayed in its contrivance—the mechanism of its parts and the utility of its design, the next subjects for consideration are the deformities to which it is liable.

CHAPTER III.

ON CURVATURE IN GENERAL.

The subject of spinal disease is justly considered as one of the greatest importance; there are, indeed, few maladies to which the human frame is subject, more deserving the attention of the profession, as well on account of its general prevalence and its distressing effects, as the difficulty of its cure.

The origin, symptoms and effects of the different species of this disease, although agreeing in certain points, yet differ in many and very important particulars. In order, therefore, to place the subject in a lucid point of view, and to explain the peculiarity of its different forms, it is desirable to treat of them separately.

The order in which they may be respectively arranged, according to the frequency of their occurrence and their importance, is the following:—

1. Lateral Curvature.
2. Angular Curvature or Projection.
3. Excurvation.
4. Incurvation.

although, of each of these classes, sub-divisions might be made, according to the causes giving rise to them, and the extent and situation of the deformity.

A more exact idea, however, of the relative frequency of the several forms of curvature will be afforded by giving the per centages of the cases* which have come under the author's care, and of which he has preserved accurate records: of these, the proportion of instances of lateral curvature amounted to 55.0 per cent., those of angular to 29.6 per cent., and of excurvation and incurvation to 7.8 per cent. each, the number of instances of these having been exactly equal; but the real number of cases of lateral curvature existing, probably bears a much greater proportion to those of angular projection, than is above expressed, as an unusually large number of cases of the latter description has fallen under the writer's care.

Various authors have written on the causes of spinal disease, and each has had his favorite theory. Such discussions are useful, inasmuch as they tend to detect error and elicit truth. The causes of curvature are, however, numerous and varied; the intervertebral substance, the ligaments, or muscular contraction, being the cause in some cases, while in others the primary seat of the disease is in the vertebræ, which, from their peculiar structure, become softened, and, by continued pressure, more or less absorbed, or they have their bodies altogether destroyed by caries.

* The author kept journals, chronologically and nosologically arranged, of all the cases of disease which came under his care when in general practice: were the plan generally adopted by the profession, it would be a great source of satisfaction and information to themselves, would form a beautiful series of statistical tables, and tend much to the advancement of the science of medicine.

The author, indeed, believes, and has had his belief the more confirmed the further he has investigated the subject, that the vertebræ themselves are generally at fault, where the sole cause of the curvature is ascribed to muscular debility, and where, in consequence, the efforts of the practitioner are entirely directed towards imparting to the muscles, tone, strength and vigour. This subject will, however, be more fully entered into hereafter.

When, owing to the state of the health or other circumstances, there is a predisposition to spinal disease, the formation of the particular kind of curve may be owing to various, and often, apparently, trifling causes, among which may be mentioned the particular positions in which children are allowed to indulge 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 continual exercise of one side of the body, tight stays, ill-made dresses, and the like. Sometimes the different species of curvature, though distinct in their nature and effects, are found either wholly or partially united in the same case, with which there is frequently considerable deformity of the chest, the sternum projecting and the ribs being flattened and pressed in various directions.

Spinal disease, by far 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. There is, indeed, no time of life in which it may not make its attack, especially when there exists a morbid state of the constitution, and when circum-

stances, such as usually induce the disease, are brought into action. 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 eleven or twelve, 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.

The symptoms varying so widely as they do in the different forms of spinal curvature, an account of them will be more properly given in the chapters referring to the different species than in this one, which treats of curvature in general. But 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, no signs of constitutional debility may be apparent; the appetite may be good, and the bowels regular; the pulse may not be particularly affected, nor the repose greatly disturbed; in fact, the symptoms of spinal disease are often so delusive as to be more frequently mistaken than is the case, perhaps, in any other complaint. 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 unheeded, may baffle the best directed efforts of the practitioner.

The first symptoms then, of the disease may be 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; deterioration of health is not only the general concomitant of spinal disease, but it is, in many cases, its precursor and primary cause, and is again greatly increased by that derangement 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, but the author would particularly urge the fact, that it is by no means to be necessarily concluded that—because no curvature exists, there is, therefore, no disease of the vertebræ. 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 elegance of form, and the efficiency of its functions in the economy of animal life is injured, and, not unfrequently, eventually 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; nay, the body frequently becomes more diminutive; the various changes which are usually unfolded 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 suspended or not established, the natural development of the breasts does not take place, the complexion is sallow and the countenance void of its natural degree of animation.

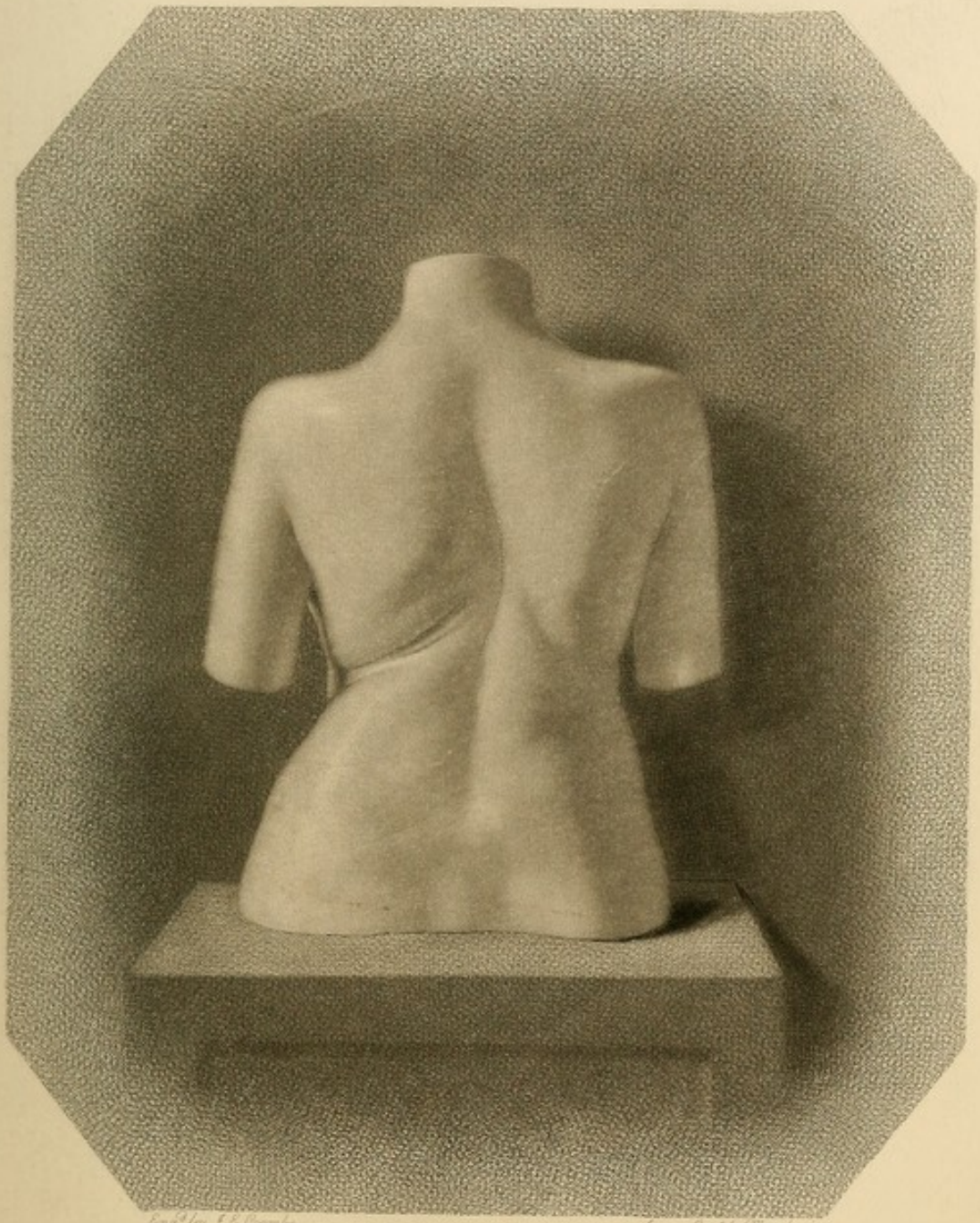
The diseased state of the bones, known by the familiar term, Rickets, though almost exclusively first occurring in childhood, does occasionally make its appearance even after the period of puberty: its tendency is to produce that particular species of curvature to which the body may, from accidental causes, be predisposed; the stated employment and mode of dress of the individual, and more especially any peculiarity of position, adopted in consequence of previous illness, will all concur in producing this effect. Rickets, however, must not be confounded with disease of the spine, as the latter may exist, where there is no indication of the former.

We now proceed to a consideration of the peculiarities presented by each form of spinal disease, and to this subject the following chapters are devoted.

II.

Engd by J. S. Coombs. from a Cast by Mendoni.

II.

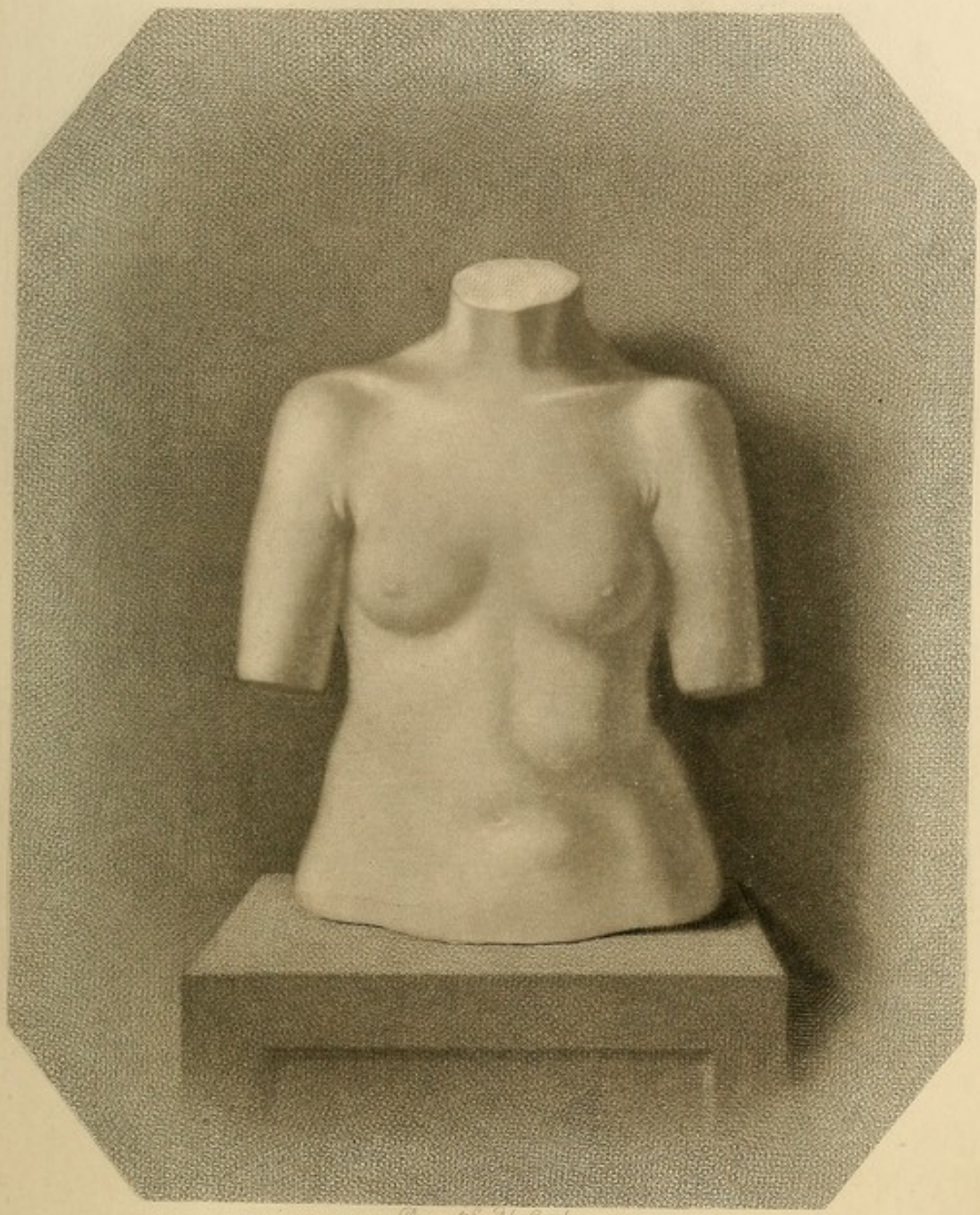


Engd by J. S. Cooke. from a Cast by Mendoni.

III.

Drawn & Engd by Coombs,
from a Cast.

IV.



Drawn & Engd by Cornelius
from a Cast.

CHAPTER IV.

LATERAL CURVATURE.

THAT description of spinal curvature which is usually termed "lateral," is far more common than the other species of the disease. It usually commences its attack during the period that intervenes between childhood and maturity, or between the ages of twelve and eighteen. Its ravages are, almost exclusively, confined to the female sex, amongst whom it is so exceedingly prevalent, that comparatively few in the middle or higher ranks of society are entirely exempt from it. This striking circumstance obviously proceeds from some corresponding cause; what that cause is, it has been attempted, in a preceding chapter, to shew: yet, the subject is so important and interesting 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 it is recollected that the disease is not of frequent occurrence amongst females in the lower walks of life, whose active and often laborious occupations prevent their lacing so tightly, and oblige them to use much muscular exercise; when, therefore,

it is considered that the disease is scarcely known amongst males, and that of females, it is confined to such as make use of improper stays, tightly laced, there can be little doubt as to its origin, in an immense majority of cases.

This cause of lateral curvature cannot be too much insisted upon, since it is one which may so easily be removed. If, as has been asserted, "the knowledge of a disease be half its cure," it is a matter of no inconsiderable importance to have correct opinions as to its origin: nor is the subject less important, when considered in reference to that portion of the community, who are the principal sufferers from its effects in their own persons, many of whom are ignorant of the causes of the bad health and the debility which they endure; and, therefore, to them and their posterity, correct views of the tendency and effect of the extensive and pernicious habit referred to, cannot but be highly interesting, and the author would add the hope that his remarks may have a tendency towards preventing, in some measure, the use of so pernicious a portion of female dress.

The usual mode of progress when arising from this, the most frequent cause of lateral distortion, is as follows: after long-continued pressure upon the chest and abdomen, occasioned by the instrumentality of tight-lacing, a perceptible deterioration of health ensues, the rapidity of which will depend much upon the previous state of the constitution. This derangement of health naturally produces a softening of the bones, accompanied frequently by disordered functions of the lungs, in which the heart and abdominal viscera participate, and unless arrested in its progress, deformity will be established, incapacitating its victims for the perform-

ance of any active exertions, rendering life burdensome, and producing a scene which terminates in severe suffering both of body and mind, and often, through neglect, in premature dissolution.

A very little reflection will show the reader the mode in which lateral curvature of the spine is generally produced. The upper part of the stays are brought close under the arms, and being tightly girt behind, they cause excessive pressure on the scapulæ or shoulder blades; these, in their turn, press upon the ribs and spinal column, and by this pressure, the free use of the arms is obstructed. The various avocations of life unavoidably tend to a much greater use of the right hand and arm than of the left; hence also the right shoulder being more used, the stays would of course become stretched on that side, but being usually made of a material almost altogether unyielding, in order that the right shoulder may have sufficient room, the left one, which is less used, becomes pressed, together with the ribs, towards the right side, pushing before them the dorsal portion of the vertebral column; this is the immediate and constant cause of that elevation of the right, and consequent depression of the left, shoulder, so common amongst females in the middle and higher classes of society. The apparent disproportion in the size of the shoulders, is not occasioned by any enlargement of the right, or diminution in size of the left, scapula, but arises from the former being pushed upwards and outwards by the unnatural convexity which takes place in the ribs on that side, and by the latter being carried downwards, owing to the ribs of the left side being pushed inwards and forwards, and also flattened.

In severe and long-continued cases, some of the vertebræ, generally those of the dorsal region, are so far displaced, as to be driven under the heads of the ribs on the right side, which being bent at an acute angle form a ridge, that, upon a superficial examination, may easily be mistaken for the prominence of the true spine, more or less curved, the convex side being towards the right shoulder. In such instances, the upper dorsal vertebræ give way so completely, as to become almost horizontal; the hips also appear exceedingly disproportioned in size, the left one being much more prominent than the right.

The cause of lateral distortion has been attributed to certain improper habits, such as standing with the weight of the body bearing principally on one leg—to that of lying generally on the right side when in bed—or to the circumstance of continuing long in one position, whilst engaged in the practice of music, writing, and other employments, in the performance of which, the usual posture is of an unfavorable kind. These causes are no doubt agents, to a certain extent, in producing lateral curvature, but by no means so frequently as those previously detailed, and would still more rarely produce that effect, were there not a morbid state of the constitution, and did not the individuals first suffer from injurious pressure. The writer is convinced, that these are far more frequently secondary than primary causes; a view, which will account for lateral curvature being so much more prevalent among females than among males,—the former being, in addition to the secondary causes above stated, subject to the injurious pressure of their dress, from which the latter are exempt. The disease must necessarily be perpetuated by a defective state of health, and as an effect, a diminished deposit of the

earthy portion of the bone; so that, as the disease has a constitutional, as well as a local, origin, whatever mechanical treatment be adopted will avail little, unless the health be also improved.

If, from partial pressure on the lower part of the chest and abdomen, by means of stays or the constriction of other articles of dress; or, if from debility, combined with the above causes, only a slight deviation occur in the spinal line, the intervertebral cartilages must of necessity become of unequal thickness, and the upper part of the spine will unavoidably incline to the thinnest side; which having more than its usual weight to bear, will suffer from the compression, and the proper circulation through it being impeded, absorption will take place. After a time, the vertebræ themselves become cuneiform or wedge-like, causing considerable diminution in the height of the body, and the articulating processes become more and more separated from one another. Such distortions, causing a greater or less displacement of the various organs, are productive of great disturbance in their functions, and thus are explained a number of anomalous symptoms which frequently occur in the progress of spinal disease.

Cases of lateral curvature, even where the spinal column and the ribs are distorted to a considerable degree, do not depend upon caries of the bones, although caries is occasionally, but very rarely, found in anatomical investigations of this disease, to be a cause of the lateral curvature; the disease in such cases, attacking the sides of the bodies of the vertebræ, and not, as in cases of angular projection, their anterior portions.

In all cases, however, of severe lateral curvature, the bodies of the vertebræ are far from being in a healthy state, the cancellous structure being less dense than natural, and their surfaces presenting a large number of forimana, and consequently, a somewhat cribriform appearance; this state being especially observable on the concave side of the curve.

Lateral curvature does, however, sometimes take place in girls who seem to be but little predisposed to spinal disease, being healthy in their appearance, active in their habits, and having the advantage of favourable physical circumstances. In such cases, the mischief is entirely attributable to impropriety of dress; the other causes that have been previously enumerated, together with the unfavourable tendency of sedentary employments, would in cases of this kind, be found insufficient of themselves to produce the deformity; for, without the improper pressure occasioned by this injurious habit, the distressing effects daily witnessed would rarely occur; but when there is a combination of these causes, we need not wonder that distortion is induced. It is a circumstance of comparatively rare occurrence, for the male sex to be affected with lateral curvature, because they are not subject to the chief exciting cause—excessive compression. This shews in a forcible point of view, the injurious effects of such pressure, occasioned by the artificial support to which females have recourse, and which they are, erroneously, supposed to require.

In long-continued cases, the spinal line becomes exceedingly concave on the left, on which side the shoulder

and clavicle are more depressed, and the right side becomes proportionably protuberant, and the shoulder higher. The integuments over the abdomen are folded or wrinkled, the left breast is seldom fully developed, the ribs lose their natural shape, those of the left side becoming much narrower and rounder than they ought to be, and so much straighter that their anterior extremities protruding forwards, can be easily grasped by the hand, while, on the right side, their angles project more backwards, and are considerably longer than natural: at the same time, the ribs themselves are much curved, and often more widely separated from each other than in their normal condition, giving that side a fuller and more rounded appearance than it ought to have. Cases have also fallen under the observation of the writer, where, in consequence of the peculiarity of the distortion, several of the lower ribs have been folded or tucked under those immediately above them. There is generally a very considerable hollowness or cavity on the left side; the right shoulder, although higher than the other, is not so broad, owing to the curvature of the ribs, which form a projection, resembling the spinal column, from which, as already stated, it can sometimes scarcely be distinguished.

It is obvious, that as the disease proceeds, the scapula, by constant pressure, becomes displaced; and the ribs are forced from their natural position and become distorted, producing deformity of the chest; the consequence is, that a morbid state of the lungs is liable to take place, particularly where a predisposition exists; the breathing is rendered laborious, often painful and difficult; the circulation is impeded, and palpitation of the heart ensues. Such disastrous effects need not excite surprise, when we reflect

on the peculiar form and construction of the chest, which was explained in treating of the anatomy of the spine; where it is shewn, that the seven true ribs are joined to the sternum merely by a *cartilaginous* connexion—the eighth, ninth, and tenth, are attached to the cartilages above them, only by a continuation of the same substance—the eleventh and twelfth have not *any* articulation at their sternal ends, whilst their attachment to the spinal column is by means of a joint, which, combined with their natural elasticity, readily gives way to pressure.

Although the lateral is the species of distortion most frequently met with, yet it is by no means uncommon for some of the other kinds to be combined with it; indeed, the disease assumes such diversity of appearance, that no two cases occur which are exactly alike, even in the practice of those who are most extensively engaged in its treatment.

It often happens that the disease is neglected, in consequence of the insidious manner of its approach, until great deformity has taken place, and then recourse is had to steel stays and other artificial means of support, which, so far from being attended with benefit, generally increase the evil, by producing other injurious effects, as much to be dreaded as the original disease, while the primary cause of the mischief is often altogether overlooked; and thus the disease is suffered to gain ground, until an effectual cure is rendered exceedingly difficult, or quite impracticable. So great is the mischief resulting from the practice of using steel stays to support the figure of those who are threatened with, or suffer from, deformity, that it is proper again to allude to

the subject. If deformity be the result of deformity of the muscles, as is so frequently said, or a want of equilibrium in the muscular force; the use of steel stays, by rendering the muscles inactive, absolutely weakens them. Another objection of a very formidable nature remains; 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 those parts, the effect of which must be, a contraction of the apertures of the pelvis, produced either by the pressure acting on the crests of the ilia, or inducing distortion of the pubic bone:—both of these being serious alternatives. A great error also frequently occurs in the hope which parents entertain, that their daughters will "outgrow the complaint," a circumstance altogether impossible, while the causes are continued which produced it. These mistaken notions, on the part of parents, as to the true nature of the malady, and the erroneous practice to which they give rise, produce ultimately, a train of evils, distressing alike to the sufferers and their friends, as such cases are almost certain to get worse, unless they be speedily relieved.

TREATMENT.

In placing before the reader an account of the means necessary to be used for the cure of this disease, the author wishes to enforce the importance of strict attention to the state of the digestive organs, as entered into in the chapter on general health.

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.

The author has already endeavoured to point out the primary and proximate causes of lateral curvature, and if the number of these cases are to be lessened, or their afflictive ravages on the human constitution materially diminished, it will be necessary to effect a total or partial removal of the circumstances which obviously tend to their production and increase.

It will readily be admitted by all who are conversant with anatomical and physiological subjects, that it is much easier to prevent the incursion of disease, than to arrest it in its course of action ;—to keep the enemy without the citadel, than to repel him when he has obtained admission ;—yet, it is gratifying to reflect, that distressing as the symptoms are, by which this malady is characterised, they admit, in almost every instance, of considerable alleviation, and in most, of complete cure.

The treatment must necessarily vary, according to the peculiarity of the curvature which exists, 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 exceedingly diversified, that no two cases are in all respects alike ; and hence, there

are few diseases, to which the human frame is subject, that more urgently require the careful attention and minute investigation of professional men. Notwithstanding, however, their Protean form, they are rarely incurable, as, in the course of a considerable and long-continued practice, cases of almost every possible description have come under the care of the author, and experience has only tended more strongly to confirm him in the opinion, that there are very few which do not admit of remedy. It is true, that in inveterate cases, the cure will of necessity be tedious, and require a considerable degree of patience and perseverance on the part of the patient, as it will generally be found, that the period occupied in reducing the distortion, will bear a proportion to the length of its previous duration.

As, however, the disease is of so insidious a nature, and often makes its attack, and carries on its injurious operations, in an almost imperceptible manner, whilst its effects are not the less certain and destructive, the writer may be allowed to reiterate the injunction, that recourse should be had immediately on its being first suspected to exist, to the opinion of the professional adviser, and, if necessary, to an active plan of treatment, for, as just stated, the difficulty of cure increases, in a direct ratio, with the duration of the disease.

It is on the study of the laws of nature, that all human science is founded, and the treatment of disease, to be successful, must have their careful observance for its basis. The efforts of nature, in counteracting the effects of accident and disease, are truly surprising, but instances frequently occur, where from the interposition of other causes, these efforts are inadequate to meet the peculiarity and emergency of the case—and, on these occasions, she

requires the assistance of medical and surgical skill;—it is thus in reference to diseases of the spine.

Though nature may be said to be ingenious in her resources, yet her operations are carried on in subservience to those great and fundamental laws, by which all created beings are controlled and governed. In the settled economy of these irreversible laws, there is an inseparable, an indissoluble connexion between cause and effect; and over the results of the former, so far at least as direct connexion with the latter is considered, she possesses no immediate control. All effects, of whatever description, are the certain and necessary consequences of their generating causes; which being removed, the effects will inevitably cease.

On examining the human skeleton, it will be seen, as has been shewn in the chapter containing a brief sketch of its anatomy, *(page* 59,*)* that the spine is composed of a series of bones, varying in size, yet, as a whole, to a certain extent uniform in shape, and rising above each other in a pyramidal form; these bones, being united to each other by the intervention of fibro-cartilage, and rendered firm by the addition of strong and powerful ligaments and articulating processes, form a column, combining pliability and strength with lightness and elegance. This important pillar, by its admirable construction, admits of the greatest variety of easy motion, and connects and strengthens the component parts of the frame. Although, from its superior strength and great elasticity, it is almost incapable of dislocation, except by fracture, it is yet highly susceptible of morbid influence, when the natural organization is feeble or the health impaired by disease.

When, therefore, the column becomes from any cause proportionally weak, and is incapacitated from discharging its legitimate office in the vital economy, it deviates from its natural form and position, or, in other words, becomes distorted, and a numerous train of distressing symptoms necessarily follows. If then, by the use of proper means, we are enabled to rectify irregularities of the spine, (and of the practicability of effecting this in the generality of cases no doubt need be entertained,) we may of course expect to remove the symptoms which are occasioned by them.

The vertebral column, when in a healthy state, is fully competent to perform the duty assigned to it by nature ;— but, when it is weakened and distorted by disease or external injury, it becomes incapable of sustaining 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 pristine vigour. This may be illustrated by a very familiar and intelligible simile. 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 intended 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 : recumbency of position therefore becomes a necessary part of the treatment ; it should be resorted to without delay, and continued until the health be restored.

In slight cases, or those which are of very recent occurrence, and to which early attention has been directed, the removal of the causes which have led to their production, will often enable nature herself, almost unaided, to effect a cure; but in instances where the disease has made greater progress, where the distortion has assumed a more decided aspect, other means will be requisite, in order that the vertebræ may be brought into a proper position.

On the subject of mechanical assistance in the treatment of diseases of the spine, the profession has long been divided in opinion; some arguing strongly in its favour, and others being disposed to reject it altogether. Perhaps in most 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. That many mechanical contrivances are, from their construction, more calculated to promote the increase, than the cure, of spinal distortion, the experience of those who are conversant with the subject, affords abundant evidence; although there are some, which are found to be of the greatest utility.

Great caution should be observed in having recourse to mechanical assistance; many contrivances have been invented for the prevention and removal of spinal deformity, such as steel stays, backboards, headswings and others of a similar kind; they are generally, however, productive of much mischief, besides subjecting the wearers to a disagreeable restraint; in their endeavours to relieve themselves from this, they naturally give way to those improper positions, which, though affording temporary relief, are yet cal-

culated to increase the deformity. Many young ladies, 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 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.; indeed, their effects are often truly appalling, as may be seen by reference to the case of Miss Mc K. (*page*, 97.) The patient here referred to, 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 introduced into practice, none are more inconvenient, injurious, and distressing, 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: the stays are so contrived, so as to press upon the shoulders and other parts of the trunk, which may project; this instrument is calculated to produce consequences much more serious, especially with reference to young females, than the deformity it is intended to correct: crutches for the support of the chin, shoulders, &c., are as little to be recommended as the neckswings.

There are several other contrivances, the object of which is to exercise the muscles of the back, &c., and these plans may, in certain cases and stages of the disease, be beneficial; but, for relieving the spinal column from the weight of the head and shoulders, which, in its diseased state, it is unable to sustain; for producing gradual and perfectly easy extension of the spine, which will assist the distorted vertebræ to resume their proper position; for the convenient application of pressure to the projecting or convex parts; for the ease with which it can be changed, applied to the prone or supine positions; and for the comfort and convenience with which it may be used—the author is not acquainted with any means so efficient as the employment of an apparatus, described below, which he has long used with the greatest success; the object being to correct, without suffering, the deformities attendant on this disease; to remove the superincumbent pressure from, and to keep up an easy extension of the spine, during the curative process. This apparatus, the author has employed for many years, endeavouring to base its use 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 on a proper framework. At the upper end are three pulleys, of which the two outer are about four inches, and the middle one six inches in height above the plane, the former ones being about eight inches asunder. Two pulleys are also attached to the lower end of the plane, and

about one-third from its upper end, and six or eight inches from the sides, two openings are made, into which also pulleys are introduced.

A very thin and firm mattress may be placed upon the apparatus, and on this the patient reclines. It is also furnished with weights for extension and with springs, and compresses, according to the circumstances of the case; 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 axillæ of each arm and over the outer pulleys, having weights also 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 pulleys at the lower end of the plane.

The openings in the upper part of the plane are for the purpose of admitting a cord, to one end of which is attached a shoulder strap, and to the other a weight; this is very useful when the shoulder projects, as also in cases of excurvation. 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 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 downwards it must be used on the right; this may be effected by affixing a shoulder strap to the lower side and a smaller one for the wrist on the higher. It is also very useful in cases of considerable projections 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, introduced, 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 gently in the opposite direction, the weights being so equipoised that the body is kept upon the plane, having no tendency to move either upwards or downwards, at the same time, almost imperceptibly drawing the distorted parts 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.

When a protuberance of any part of the spine and ribs has taken place, extension of the column must be accompanied by proper pressure and friction on the projecting part, each application of which should be continued for

a quarter of an hour or more, and should be repeated at regular intervals, at the discretion of the medical attendant. Throughout the progress of the treatment, it is desirable that friction should 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 being made on the convex side of the curve. The salutary effects of friction, when properly followed up, are even yet but imperfectly known; for when recommended, it is seldom done efficiently; it ought, however, to be practised with the most determined perseverance.

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 the 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 properly attended to, bathing is of essential service, and may be practised either by means of the shower bath or immersion.

The objects and advantages to be derived from the adoption of this treatment, may be shortly recapitulated as follows :—

First.—By means of the inclined plane and extension, 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.—There is time and opportunity to adopt a proper course of medicines, the efficacy of which depends upon steady and regular perseverance,—the object being to improve the general health,—to forward the deposition of ossific matter in the bones,—and assist nature in establishing the healthy function of each organ.

Third.—During the period of confinement, a 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.

Fourth.—By frictions and shampooing, or, in some cases, by handswings or other gymnastic exercises, compatible with the first object of treatment, to develope the muscular structure.

But the advantages to be derived from the use of the apparatus are not restricted to confinement alone; all pressure being, by this treatment, removed from the chest, its alternate contraction and dilatation are more easily and perfectly performed, there is less impediment to the free action of the heart and large blood vessels, and a greater

probability of there being less congestion of the digestive organs. These objects 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's re-assuming the erect position, he would probably soon relapse into his former state.

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 tongue, torpid bowels, uncertain appetite, occasional headaches, irregular catamenia, drowsiness, slight emaciation, indisposition to exercise, and an unsteady or lounging gait, indicating a deficiency of vigour 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.

After recovery, a temporary residence in or near a maritime town is very desirable: 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 the contemplation of 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.

CASE.

The engravings, at the commencement of this Chapter, illustrate a case of lateral curvature, which, on account of its long continuance and great deformity, was con-

sidered 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. These are from casts taken at the time she commenced the course of treatment; Nos. II. and IV. exhibit the same case, after the patient had been twelve months under the author's care: they will probably be examined with considerable interest, as showing the decided advantage resulting from the treatment recommended, even in an extreme case of distortion.

The following is the account which the author received 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, so very severe and long continued, as to reduce her to a skeleton; the danger was imminent for six weeks, and for more than two months, her mother had scarcely a single night's sleep; 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 investigation, 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 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 alarm 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,

* But from the accounts 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.

now resident in Glasgow, wrote to the author, giving an outline of the case, and requesting his opinion. In reply to this communication, he said that though he considered the case a very unfavourable one, he 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 sufferings as would be quite satisfactory.

When first seen by the author, the deformity had assumed the serious and alarming form represented in plates No. 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 so entirely disappeared, that, strange as it may appear, they were not perceptible on a most attentive examination; the ribs, on the right side, formed an angular and nearly perpendicular ridge, which it required no small degree of care 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, forming, owing to the curve in the loins, a duplicature, or double fold, which extended from below the left scapula, round the hip, and across the umbilical region, towards the right side. She had suffered exceedingly from the pain in her back, which of late had greatly increased, and had become so weak, as to be quite exhausted, if she took but half, or even a quarter of an hour's walk. 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 formed

the upper part of the flexure, the largest curve being formed by the dorsal vertebræ to the right, while a slight one existed in the lumbar region, to the left. 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.

October 1st, 1836. Commenced the use of the apparatus; the recumbent position was enjoined, the weights gradually increased and pressure was applied, by means of compresses, to the protuberant parts. Her health was in a very unfavourable state, she was exceedingly weak, could bear no fatigue, 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 have not yet appeared. Pulse, eighty-six; tongue, white and furred.

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 is 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; in fine, all the symptoms are such as to encourage a hope that she will, ultimately, attain the great object in view—the re-establishment of her health The distressing anxiety which her friends have, for a great length of time, suffered on her account, and the melancholy forebodings which previously existed, as the issue of the disease, are now happily relieved and her own spirits are, in consequence, much more cheerful and buoyant. The sensibility of the spine is greatly mitigated; catamenia have commenced, and she is now, decidedly, in a state of convalescence.

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 experiences an augmentation in weight, and becomes 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 opportu-"nity of satisfying himself, by occular 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 the French call "en bon point." She is now allowed to leave the inclined plane, and 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 symptoms, was necessarily more protracted than usual, 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 also exhibits to what an alarming extent lateral curvature may proceed, when not timely checked in its progress, and 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.

As a proof of the permanency of the cure in the case of Miss Mc. K., it may be stated that Mr. Cumming, in the house of Messrs. Morrison, Dillon and Co., of the City, called upon the author in September last, to say that he

had seen this lady a week or two before in Scotland, and that she was in very good health—that she moved about with activity, and that an individual might be in company with her without perceiving that she had ever laboured under any kind of spinal disease.

The author has now under his care, a young lady, aged twenty-two years, residing in the City, whose case is as nearly similar as possible to that of Miss Mc K., only perhaps, still more extreme. When consulted, December 5, 1843, the contraction of the ribs on the left side was so great, as to leave a space of full three inches between the arm and the side—the distortion of the hips and other parts bearing the same proportion: the complaint existed when she was fourteen, and has gradually increased to the present time.

March 5, 1844. This patient has been under treatment only three months, and the improvement which has taken place, has been such as greatly to exceed the expectations of herself and friends. So much was her chest contracted when first seen, that on taking a deep inspiration she was able to expire only sixty-two cubic inches of air, while at the present time, such has been the increase in the capacity of the chest, that she is able to expire rather more than one hundred; this is ascertained by what may by called a pulmometer—that is a glass vessel, marked with cubic inches, from ten to two hundred; this is filled with water and inverted in a pneumatic trough; the patient then fills his or her chest, and breathes through a glass tube into the meter —the additional quantity of water displaced, shewing of course, the increased capacity of the lungs.

The following case also tends to shew the increase which

takes place in the capacity of the chest, during the treatment adopted for the cure of spinal disease; a circumstance which, it is obvious, must have considerable effect in increasing the decarbonization of the blood; and, consequently, of promoting the health and vigour of the system generally; and it is probable, from this increased capacity, that the effects of predisposition to pulmonary disease, may in some measure, be warded off. The case, likewise, affords an excellent example of the fact mentioned, when treating on curvature in general, that it is by no means to be concluded, that because no curvature exists, there is, therefore, no disease of the vertebræ.

On the thirteenth of November last, the author was consulted respecting a young lady, aged twenty-four, who had been labouring under lumbar abscess, which had continued open upwards of seven years. On examination, it was obvious, that her health, which by her friends was considered good, was not by any means so;—the digestive organs being impaired, and the bowels in a morbid state; although she possessed a more than ordinarily fine figure, yet there was evidently greater contraction of her chest, than in a state of health; to ascertain this, she used the pulmometer and displaced a hundred and thirty-one cubic inches of water. The abscess had formed on the right side of the fourth lumbar vertebræ—the external opening was but small, and discharged a thin sanious matter, but on passing a probe, the cavity appeared extensive, and was, at least, one inch and a half in depth; the bone was denuded of its periosteum, which, with the bad state of health, no doubt, kept up the irritation. She was ordered a course of alterative and tonic medicines—her diet was parti-

cularly attended to—the recumbent position was enjoined, and a spirituous lotion, with Sulph. Zinci, applied to the back, and, subsequently, tents of gentian root made hollow were kept in the opening, which was syringed daily with an astringent injection.

February 13, 1844. The patient has persevered in her remedies with great regularity, and her health is much improved: she has used the meter this day, and has displaced a hundred and fifty-one cubic inches of water, being an increase of twenty inches in the three months. It may be added that the abscess is decided better, there being less roughness on using the probe, while the cavity is more contracted and healthy.

This case, though certainly an exceedingly interesting one, is here introduced chiefly to shew the increase which, while the patient is under treatment, may take place in the size and capacity of the chest.

CHAPTER V.

ANGULAR CURVATURE, OR PROJECTION OF THE SPINE.

ARRANGING the species of curvature, as was proposed, in the order of their relative prevalence and importance, the next in succession is that usually termed "angular." This form of the disease commonly takes place in early life, and is generally the result of a severe attack of some acute disease, as measles, scarlatina, &c., or any other circumstance bringing into action a scrofulous diathesis; it may also arise from local injury to the vertebræ, as from falls, contusions, &c. In a great majority of cases where males are the subjects of spinal deformity, it is the angular curve with which they are affected; to this particular species of the disease, females are equally liable, though, in comparison with lateral curvature, it is, with them, of very rare occurrence. Its seat is generally towards the lower part of the dorsal vertebræ, and it assumes the angular from, owing to a caries of one or more of these bones, and the consequent destruction of the connecting cartilages, and ligaments; the

weight of the head and shoulders concentrating their pressure on the already softened bodies of the vertebræ, they become in time absorbed, and this particular projection necessarily takes place; indeed, without their destruction or absorption, it would be impossible for it to occur. The origin of the disease is certainly, in very far the greater number of instances, in the bodies of the vertebræ, and not in the intervertebral cartilages, as has been supposed: this view of the progress of the complaint accounts for every symptom which subsequently takes 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 be of a more chronic nature, and 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; they are incapable of active exercise, 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.

In the progress 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 very first symptoms of the affection; this difference depending upon accidental circumstances in the progress of the case.

Paralysis 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 indeed, almost always the proximate cause of the paralysis—*paraplegia*—that occurs in these cases. Exostosis into the canal, also sometimes gives rise to the same result —pressure on the spinal cord—of which it is, in truth, 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; beside which, paralysis of the bladder or rectum, or both, may supervene. It is then the duty of parents to guard against the approach of so dangerous a disease, and, should it, notwithstanding their vigilance, make its appearance, to pay the closest attention to its earliest symptoms.

PSOAS ABSCESS.

When caries takes place in the bodies of the ver-

tebræ, 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; 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 orginated: 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 pelvis—the abdominal parietes or the loins,—the abscess in the latter being termed, lumbar.

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, it is generally very rapid, which will readily be conceived, on taking into consideration the cellular structure of the bodies of the vertebræ; these, together with

the intervertebral substance and the surrounding ligaments, soon, in consequence of the existing inflammation, assume a morbid state and become absorbed. Owing to the formation of the angular projection, and consequent pressure on the nerves, a variety of unfavorable symptoms ensue, varying according to the situation of the malady; great weakness exists in the region of the disease, accompanied with more or less atrophy of the muscular system, and an increase of diseased action in the digestive organs as regards the quantity and morbid quality of the secretions.

The bodies of individuals labouring under angular curvature present appearances, varying considerably according to circumstances; they are generally emaciated, the muscular system is consequently 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 thorax appears enlarged and the cartilages of the ribs expanded, probably in many cases, by the enlargement and pressure of the abdominal viscera, —a circumstance of almost constant 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 the shoulders, in some cases, 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 effects. On any of the preceding symptoms, or other irregularity of

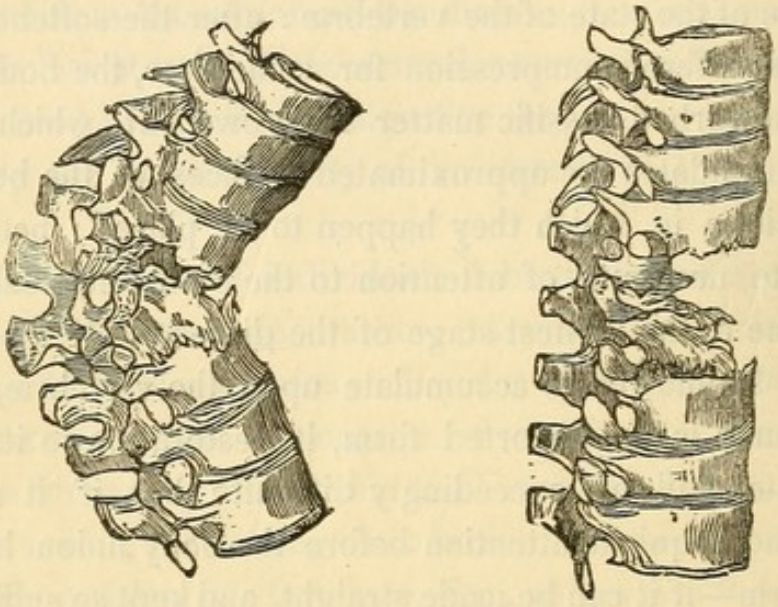
shape or awkwardness of gait becoming observable, they should be examined without delay, and appropriate remedies immediately applied.

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 the softened portion has suffered compression for some time, the bodies become absorbed, ossific matter is thrown out, which unites and consolidates the approximated surfaces of the bones in the position in which they happen to be placed; hence, the absolute necessity of attention to the state and position of the spine in the earliest stage of the disease. If the ossific matter be allowed to accumulate upon the vertebræ, while the column is in a distorted form, its restoration to its natural state, will be exceedingly difficult; but if it receive early and requisite attention before the bony union has become firm—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 the author has in view, and to which he wishes 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 woodcuts; the first represents an instance of caries in the bodies of two vertebræ, producing angular curvature; the other

shews the same vertebræ, in a straight position, leaving a vacant space, which nature will fill up, provided the health of the patient be improved and the spine be kept in its corrected state.

No. 1. *No.* 2.



CARIES.

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 curvature, 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, the author has examined the specimens of this disease, contained in a large number of the Metropolitan and Provincial Anatomical Museums, to which he has been kindly permitted access. Out of sixty-nine cases of this species of disease, in which there was more or less caries of the vertebræ, it existed twice in the cervical re-gion, 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 surfaces of the bones, or where the disease had made but slight progress; the second line 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 curvature.	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 cases of *angular* curvature were not so likely to occur.) 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

curvature arising as a consequence of caries of the spine. 1st, The caries may attack the surface of the bodies of the vertebræ only, 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, they seem to be perfectly healthy. Caries, however, attacking this part of the vertebræ only, is rare; the author having met with but one example of the kind, out of the large number he has 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, and 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 the 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 has already been described as existing 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, comparatively speaking, is 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 cavity for the cord was actually larger at the most acute part of the

angle than elsewhere, as if to protect the cord from the possiblity 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 colour 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 a 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 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, à 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 vetrebræ *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.

After a time, however, where the cases take a favorable turn, and when the general health becomes improved, the progress of the caries will be arrested and ossific matter thrown out, producing anchylosis of the part—a result which is never to be despaired of, as it has 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 greatest 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, and 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. as 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 curvature.

In angular curvature, 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, their 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.

TREATMENT.

The importance of prompt and decisive attention to the first symptoms of so serious a malady, need scarcely

be insisted on; and, that no time ought to be lost in the application of suitable remedies will be apparent, when it is considered, that every irregularity of the spine must, to a greater or less extent, interfere with the functions of the most important organs of vitality. The greater the delay, the greater, too, will be the risk, that the individuals affected will become *permanently* deformed, and that they may thus be rendered, for the residue of life, subject to the painful feeling of inferiority, in regard to personal appearance, through the unfortunate neglect of those, whose more immediate duty it was to have prevented, by early attention, so mortifying a calamity.

If the treatment of the disease be commenced in its incipient stage, it generally admits of cure, or of efficient relief; the complaint ought not, therefore, as a general rule, to be considered incurable, except in extreme or long-continued cases, where timely recourse has not been had to professional assistance, and where the constitution is in an extremely morbid condition.

A disposition to regard the disease as incurable, must necessarily be attended with consequences unfavourable to the improvement of medical science as respects its treatment, and therefore injurious to those who have the misfortune to be suffering under its effects. If the medical attendant entertain this opinion, he can scarely be expected to be very zealous in his exertions to effect a cure, which he regards as next to impossible; in like manner, also, the prevalence of such an opinion must have a very distressing and injurious effect upon the minds of the relatives and friends; on the contrary, how great the comfort, if it be true, and facts

prove it to be so, that it is not by any means necessary to consider it an incurable disease.

The peculiar nature of this malady renders it imperative to adopt the recumbent position, and this so far from being in the least objectionable, is, with the general treatment, always attended with the greatest benefit; for if the directions detailed, be regularly and perseveringly observed, the patient will experience a decided improvement in general health, not only on account of the correction of the deformity, but also in consequence of freedom from fatigue and from pressure on the vertebræ. The ease with which the plan is adopted—the regular superintendence of the medical adviser, and other favourable circumstances under which the patient is placed,—all conspire to promote the recovery: even in cases of children, it is surprising with what facility they are managed, and how much they are improved by recumbency. The author has had numerous cases in this class of patients of incipient angular curvature, completely recovered by a few months' treatment, during which the recumbent position was also used,—where there could be no doubt that a permanent deformity would otherwise have been established.

Where there exists 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 these may

be succeeded by the application of a blister, which ought to be repeated, as occasion may require, or be kept open by savine cerate.

In cases where the caries has advanced so far that considerable absorption of the vertebræ has ensued, the treatment will have to be continued sometime after the spine has become straight, in order to improve the constitution, and forward the deposition of ossific matter. The spine must, therefore, in the first place, be brought as near as possible to its proper rectilinear position: but this must be effected in the most easy and gradual manner, and without using the least degree of force, which can never be productive of good, but must be the cause of great, and may even produce irreparable mischief. In this position, the spine must be maintained, which can only be done accurately by keeping the patient in the recumbent position, for, with whatever skill and ingenuity spinal stays or supports be made, they fall short of the great object which is to be kept in view in the cure of caries—the keeping of the diseased parts in accurate juxta-position with one another, which being effected perfectly by the recumbent position, the diseased part or space will, if the health be at the same time improved, become filled up with ossific matter, as already explained, *page* 111. So convinced is the author of the necessity of this plan of treatment, that he feels compelled to state that recumbency properly persevered in is absolutely necessary to effect the whole amount of improvement of which cases of angular curvature are capable.

Much has been said by different authors on the relative

advantages of the prone and supine positions; the former having been strongly advocated by the late Dr. Verral. The writer has used both these methods, as the apparatus which he employs can easily be modified, so as to suit either the one plan or the other. On the whole, however, he decidedly prefers the latter, except where there exists psoas abscess, when there is this advantage from the former, that the pus gravitates towards that part at which the abscess has a tendency to point or discharge, while the same consideration renders the supine position preferable in lumbar abscess. In cases where there exists that deformity of the chest, in which the ribs and sternum project forwards to a very considerable extent, the prone position has also been recommended; the author does not at all object to this; on the contrary, has long adopted it, for the sake of change of position; yet, he believes it to be, as regards its efficiency in correcting the deformity, decidedly inferior to the plan which he more generally adopts.

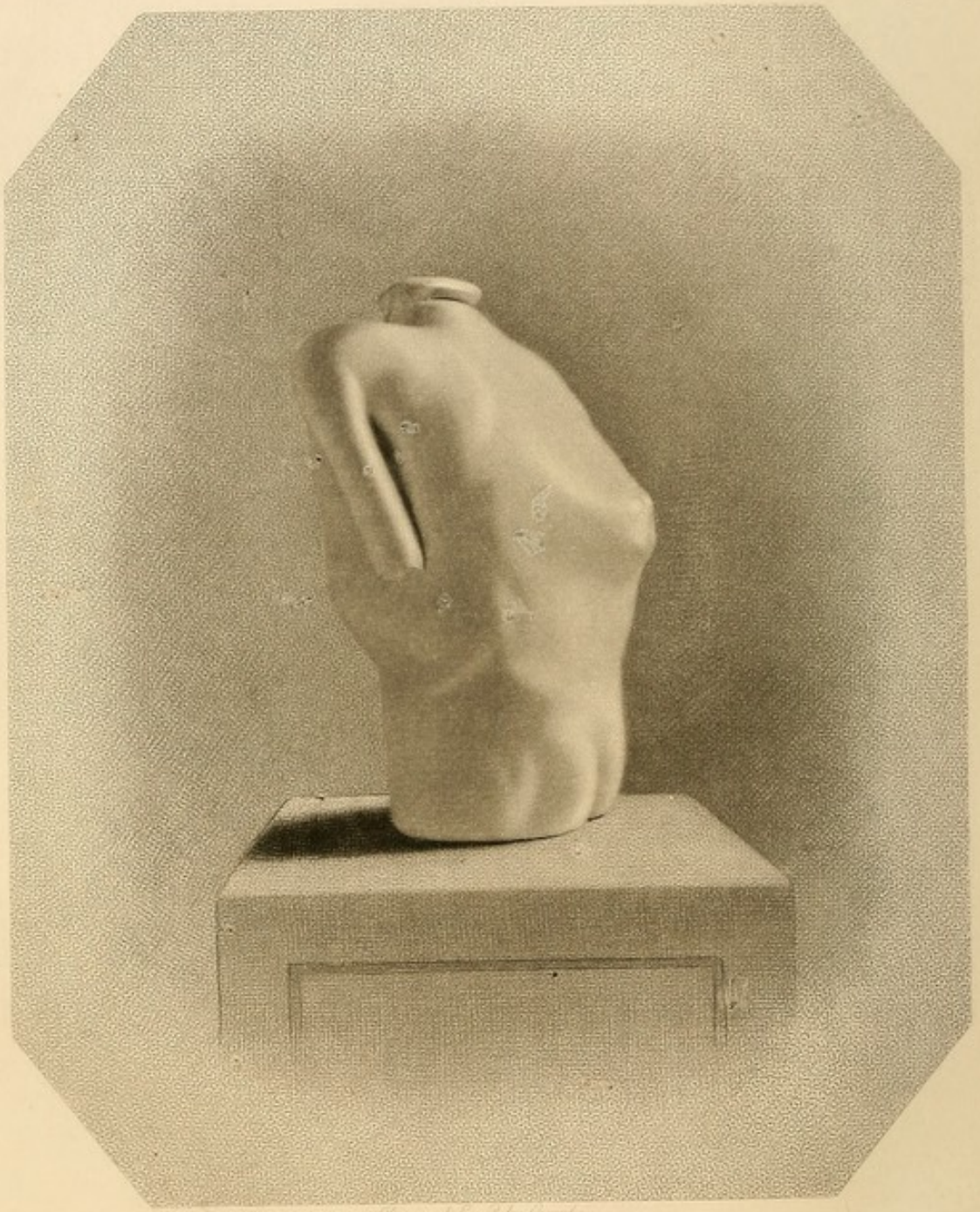
Allusion has already been made to the general treatment necessary in cases of angular curvature, and which should consist in such measures, as will tend to restore the secretions to their healthy state, while tonics are administered so as to maintain and improve the patients' strength; for these purposes 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 now be advantageously administered, and after these, the iodide of potassium, with preparations of iron, of which, for strumous subjects, the

sesquioxide is exceedingly valuable; the iodide is also useful, and other preparations of this metal, as the citrate, may be advantageously employed. The compound iodide ointment has, in some instances, appeared to be an useful application to the neighbourhood of the abscess.

Paralysis, when present will often disappear, as the curvature, on which it depends, becomes relieved, while the diminution of the chronic inflammation and the absorption of pus may be promoted by the application of blisters to the affected part. 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 do so spontaneously, and this 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.

Although the author has strongly insisted upon the importance and necessity of the disease being attended to in its incipient stages, yet it is certain that great and satisfactory benefit may be obtained, even in cases of many years' duration, and which, perhaps, to those unacquainted practically with the disease and its treatment, would seem to be of a hopeless character. The author is in possession of numerous casts, exhibiting astonishing improvements, which nothing but a steady perseverance, both on the part of the patient and the practitioner, prompted by a thorough con-

V.



Drawn & Engd by Corbaux
from a Cast.

VI.

Drawn & Engd by Combe
from a Cast

viction of the efficacy of the plan recommended, could have produced.

Setons, issues, &c., have been so long recommended by practitioners of the first respectability, that nothing but extensive practice, and close attention to the subject, can justify the writer in stating, that their use may be dispensed with: after mature deliberation and careful investigation of their respective effects in different cases, he is quite satisfied that blisters are, generally, far more efficacious, and decidedly the best counter irritants; in place, therefore, of the seton or similar remedies, he recommends 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; the parts also, frequently remaining extremely sensitive even after they are healed. The foregoing remarks are well worthy of consideration, especially as cases of the worst description have been cured without the more severe remedies being resorted to. This is the author's general opinion, which he feels it his duty to express, leaving his professional brethren to adopt that plan, which, to them, may seem best.

CASE.

1829. September 1st. The daughter of Mr. J. W., aged eleven years, commenced the use of the apparatus this day. She had been very delicate from infancy:

four years ago, 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.—February 10th. This patient derives much benefit from the exercise of swinging, morning and evening by means of a rope suspended from the ceiling of the room; to such an extent has she practiced this, that it is not difficult for her to continue it for a quarter of an hour or twenty minutes, without touching the floor.

April 6th. A cast has this day been taken from the patient, and it is not too much to assert that nothing but an inspection of the busts,* or the engravings taken from them, 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 entirely gone, her breathing and the functions of the stomach and intestines are regular and natural; when standing, she

* When the young lady, whose case is detailed in the preceding chapter, was brought to the author, he deemed it desirable to send for this patient, now 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 he thought it advisable to obtain another cast, 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.

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 curvature, 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.

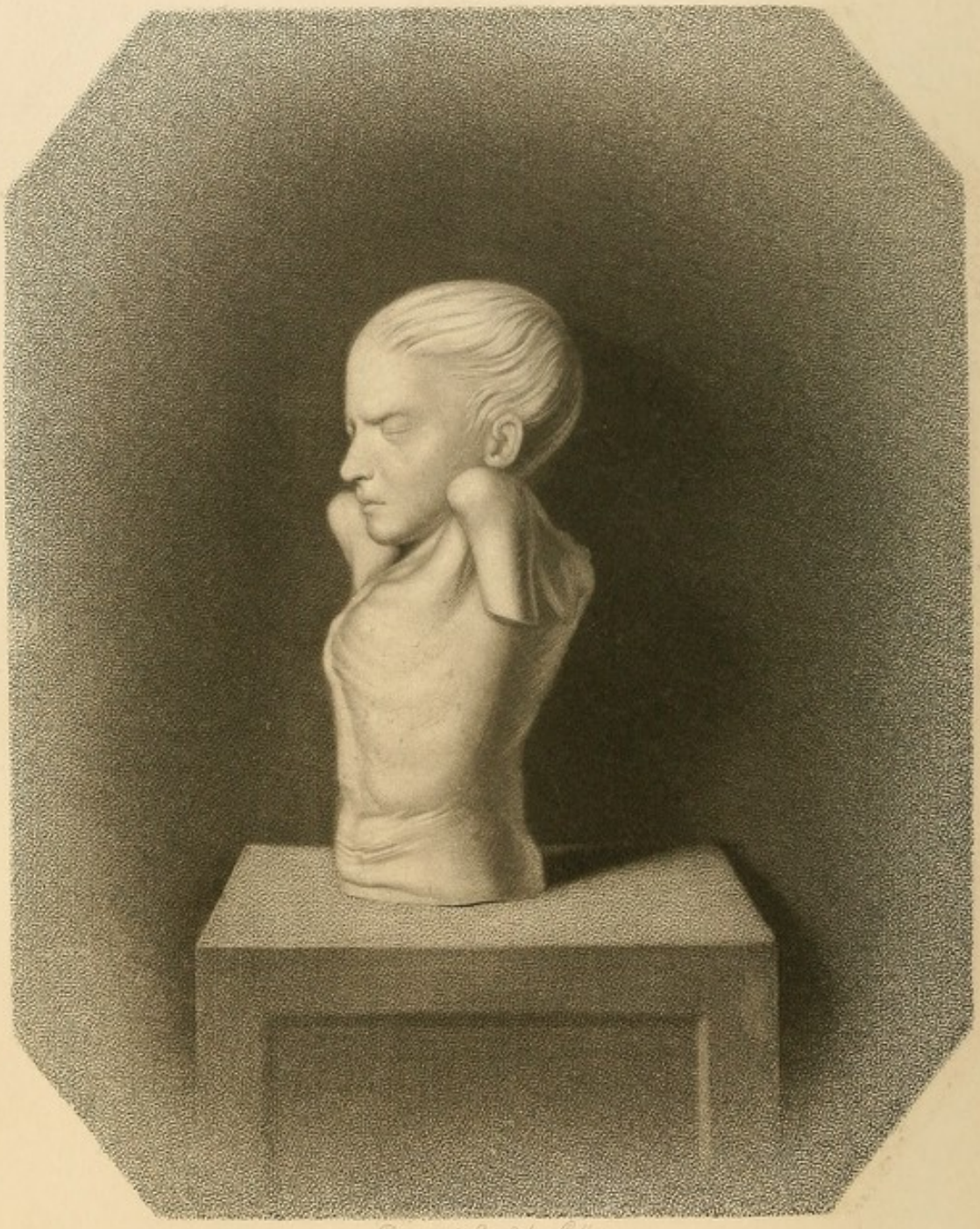
The engravings illustrative of this case, are V. and VI.: the former was taken when the patient was first seen, the latter* seven years afterwards; they clearly indicate the efficiency of the treatment and the permanency of the cure, both as regard the spinal curvature and the excellent state of her health.

CASE.

A case may be introduced here, being one of the most extreme deformity which has at any time come under the notice of the writer, as, when first seen, the patient walked upon his crutches, with his chin resting upon his chest, 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

* Vide Note, last page

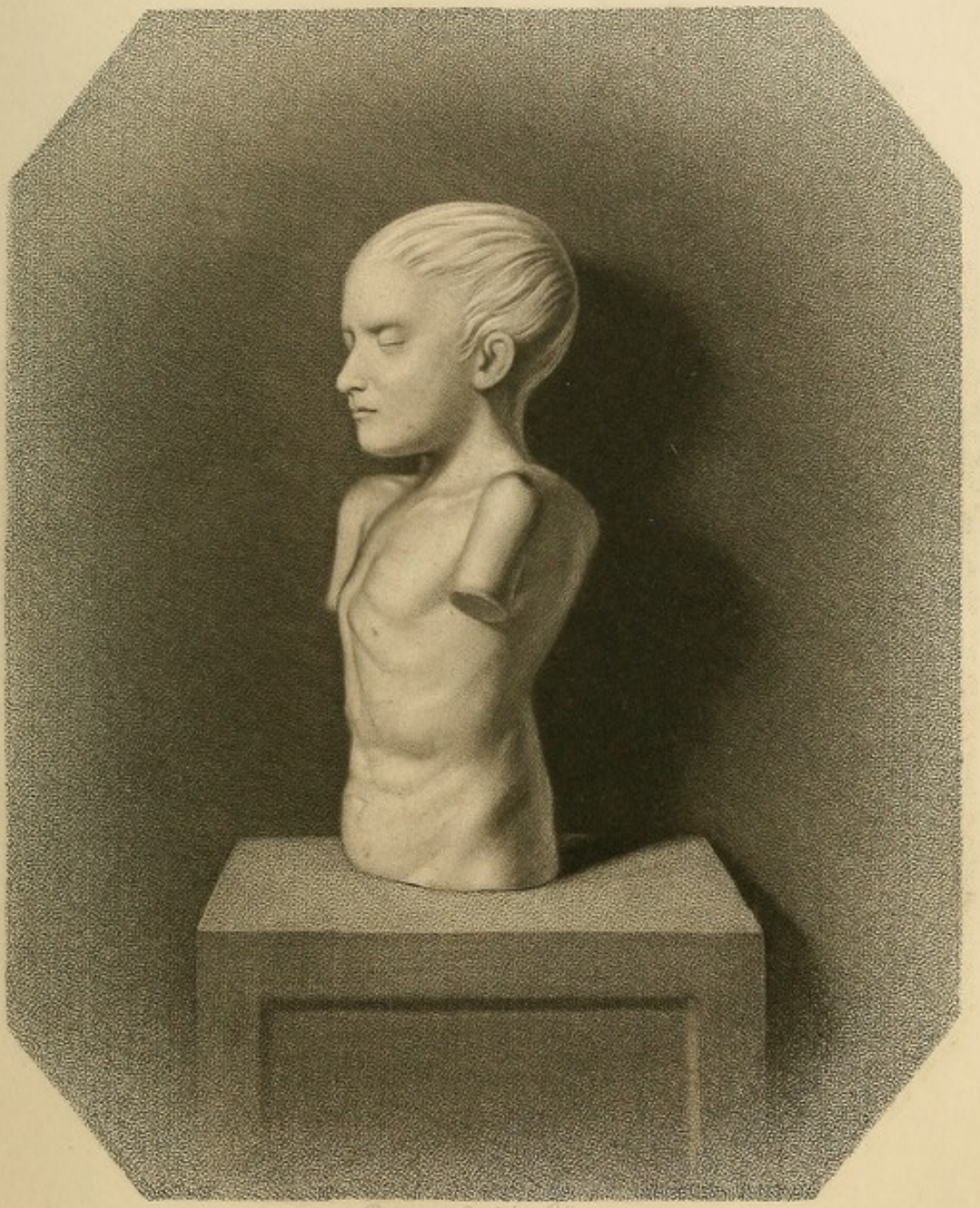
V. A.



Drawn & Engd by Feller

From a Cast.

VII. A.



Drawn & Engd. by Sidler.

from a Cast.

accompanying engraving. His mother gives the following particulars of the case:—

1843. June 27. W. F. aged ten years, when an infant, although not stout, was yet a fine child and his flesh was firm; he had the hooping cough while at the breast, and subsequently was exceedingly ill from enlargement and hardness of the abdomen. When two years of age, his nurse slipped and let him fall, in consequence of which he suffered so much that it was thought he could not recover; he did, however, so far improve, that it was hoped no further ill effects would follow. At the age of three years he had the measles: in the spring of the following year, a projection of some of the upper 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 backward and having his shoulders much raised. Medical assistance was immediately procured, but the disease progressed rapidly, the spine and the sternum becoming more and more prominent, which they have continued to do to this time. In the course of the summer he lost the use of the lower extremities, and for ten months had not any feeling in them, even when they were pinched, intentionally: the spasmodic contractions in them, during the nights were most severe, his limbs being forcibly drawn to his body. As the disease advanced, his head, which was at first thrown backwards, fell upon his chest, not being able to support the weight of it without some assistance; his strength entirely left him, and his emaciation was, and has been since, extreme. The whole trunk was exceedingly deformed, being much diminished in length, his chest was greatly contracted in its transverse diameter, and his lower ribs

fell considerably into the pelvis. His cough was very troublesome and his breathing most distressing, especially when asleep, so that his mother was often obliged to awake him, to render him more comfortable. He had the greatest difficulty in turning himself in bed; if he did so, he was ten minutes or more before he could be composed; his complexion, at these times, was quite livid.

From this period 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 distressing to see him dragging his limbs after him, and his difficulty in breathing prevented him walking more than a few paces: but no symptoms caused him more suffering than his difficulty in micturition, being often twenty minutes or more in the most distressing pain without being able to relieve himself in that respect: the secretion from the kidneys was dark in colour and exceedingly strong in odour.

Such was and had been his condition, when first seen by the author.

Sept. 27th. The little boy has now been three months under treatment, and it is certainly gratifying to see the improvement which has taken place. His symptoms are all very greatly ameliorated; his breathing is much less difficult, and his sleep more composed; his shoulders, which were as high as his ears, are now 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.

Dec. 27th.—A cast has this day been taken of the patient, and, as stated respecting another case, "it is not "too much to assert, that nothing but an inspection "of the busts or the engravings taken from them, can "convey an adequate idea of the improvement which has "taken place." His general health is much improved; his breathing, which, to use his mother's expression, was "awful," is now comparatively comfortable; he has nearly lost his cough, and is much less subject to colds; he sleeps well all night, is quite composed, and his spirits are excellent. It may be added that his mother, who used, in consequence of the attention necessary to be paid to him, to pass almost sleepless nights, can now rest as well as her son.

Feb. 29th, 1844.—All his symptoms continue favourable; his strength has increased so much that he can walk across the room with perfect ease, and he is quite erect; notwithstanding the development of his body generally, his chest has diminished one inch and three-eighths in its antero-posterior diameter, having increased proportionably in the transverse diameter; while he has grown since September last, nearly two inches.

The regularity and perseverance of both the patient and his mother may be said to be beyond all praise, every direction having been most scrupulously observed.

CHAPTER VI.

EXCURVATION OF THE SPINE.

THE species of spinal curvature which next presents itself is that, which, from its peculiarity of form, is called EXCURVATION. It depends in different instances upon various exciting as well as proximate causes. Thus, this form of curvature arises sometimes as a consequence of long continued illness, accompanied with great debility of the muscular system, but under these circumstances may disappear as the strength improves and the health becomes reestablished. Again, the anterior edges of the fibro-cartilages may become much diminished in thickness and thus give rise to a bending-forward of the body—in other words, to excurvation of the spine. But a far more common cause is disease in the bones themselves, and this may be of two kinds, consisting either in rickets, as will be stated more fully in the chapter on that subject, or in a peculiar softened state of the bones; while suffering under this diseased action, they are unable properly to support the weight of the upper

part of the body. In these cases, the spinal column is bent forward, especially in the regions of the cervical and dorsal vertebræ; the ribs and scapulæ are bent in the same direction, giving the back a rounded appearance, but there is very little dissimilarity in the size and appearance of the shoulders. When the bones are thus affected, they become more porous than natural, the number of foramina for the transmission of vessels being apparently increased; 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 considerably diminished in thickness, so 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: sometimes this exostosis takes place, to a very considerable extent, covering one side, the anterior part, or the whole of several or many vertebræ; if the curvature be lateral, the ossific deposit 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 at the side of the vertebræ, being 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 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 the 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 mean, 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 impossible, and any deformity in it which may exist, for ever permanent. When still more extensive exostosis takes place, anchylosis of the ribs with the vertebræ ensues, 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.

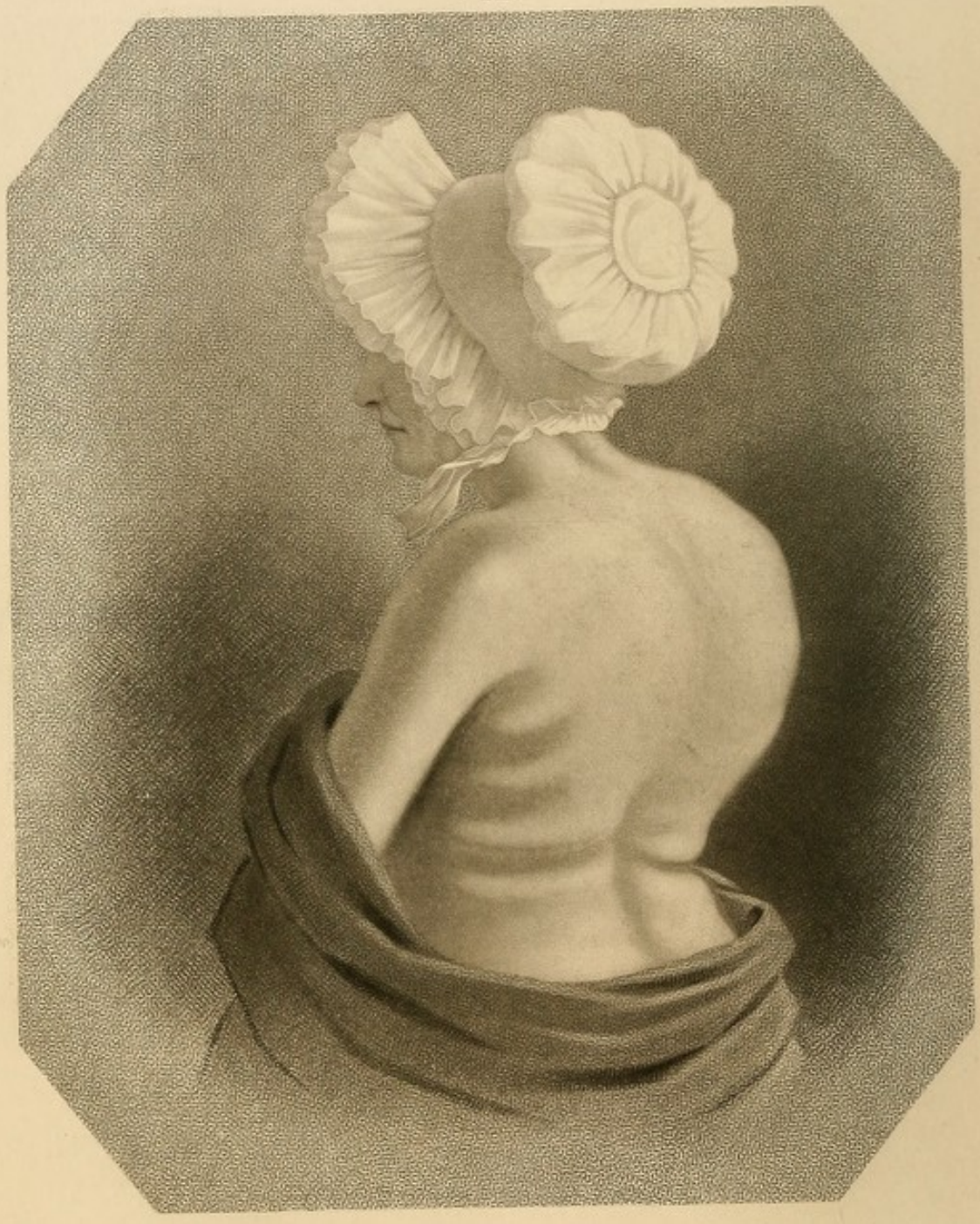
This disease approaches in an insidious and almost imperceptible manner, but, though its commencement be scarcely discernible, its progress is not the less certain, nor its results less painful and distressing. The peculiar feel-

ings to which it gives rise are not generally those of acute pain, but rather consist in a sensation of constant uneasiness, accompanied with languor and disinclination to active exercise; the sufferer usually complains of cold, particularly in the extremities, and a peculiar and distressing sense of numbness throughout the whole frame.

Excurvation often exists for years without exciting particular attention, being supposed to be merely the effect of rheumatism in the back; and thus it is allowed to progress, until the patient experiences considerable impediment in rising from his chair, and walking is found irksome and painful. In elderly persons, who have long laboured under this species of the disease an anchylosis, or union of the vertebræ to each other almost always occurs; hence arise the rigidity of their spines, the consequent stiffness of gait, and difficulty of locomotion. As this state is generally attended with impaired health, a gradual emaciation and still greater difficulty of locomotion succeed; and it is too often under these formidable circumstances that the medical adviser is consulted.

A deformity of this kind is taking place among the young females of the present day, who, in addition to their having lateral curvature, are generally becoming round shouldered, owing to their dress not resting, as it ought to do, *upon* those parts, but pressing *against* their arms, a little below the acromion; the obvious tendency of which is to bring the scapulæ forwards, to obstruct the free use of the arms, and cause an unsightly protuberance of the shoulders and upper part of the back.

VII.



VIII.

TREATMENT.

Cases of this species of curvature, like the foregoing, must be kept in the horizontal position, and are exceedingly benefitted by frictions and compression on the convex part of the curve. A great advantage is derived in these instances by the application of shoulder straps, to which a slight weight is attached and passed through an opening in the plane ;—these will, with pains-taking by the patient, in the course of a few weeks produce an astonishing effect upon the rounded curve, and, with the adoption of constitutional treatment, soon relieve symptoms of a most alarming nature ; at the same time the health must be strictly attended to, and such remedies employed, as are indicated by the general symptoms which are observed; the alvine evacuations are usually deranged, and the urine very frequently contains a great excess of the phosphates, under which circumstance, the liquor potassæ will be found very useful, rendering the secretion more clear, and improving the state of the constitution generally; afterwards, tonics may be administered on the same plan recommended under the head of Lateral Curvature, but in these cases trusting especially to the preparations of iron. After sufficient improvement has taken place, benefit will be derived from a change of air, and those spas are more particularly to be selected, the waters of which possess chalybeate qualities.

CASE.

The case of a married lady, Mrs. P——, may very properly be here introduced, as tending in a particular and forcible manner to illustrate the nature and effects of excurvation of the spine.

This patient was, at the time she came under the author's care, (September, 1829,) about forty-one years of age, and had been the mother of eleven children. Her last accouchment, 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 this disease upwards of eight years; her attention being first particularly directed to the spine, 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; the action of her lungs was so much impaired, that her respiration, instead of being easy and natural, was obstructed and painful, and was rather of that character which is usually expressed by the term, "gasping." 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; the cervical vertebræ were so much affected, that she could not sustain the head erect, and her chin, in consequence, sank upon her chest. She complained of general weakness and considerable pain, particularly in her right shoulder and between the scapulæ; and the spasmodic contractions in the lower extremities, when night approached, and particularly when in bed, were truly distressing.

For the last three years she had been confined entirely to the house, and, through 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.

October 3rd. 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, this unpleasant feeling was 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 had settled, upon admeasurement, 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; she also possesses similar power in the use of her upper and lower extremities, being able to use them with great facility.

July 1st. Has used 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; indeed she is satisfied, that she can move about with as much freedom as her daughter of nineteen.

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.

Feb. 1844. The author has great pleasure in being

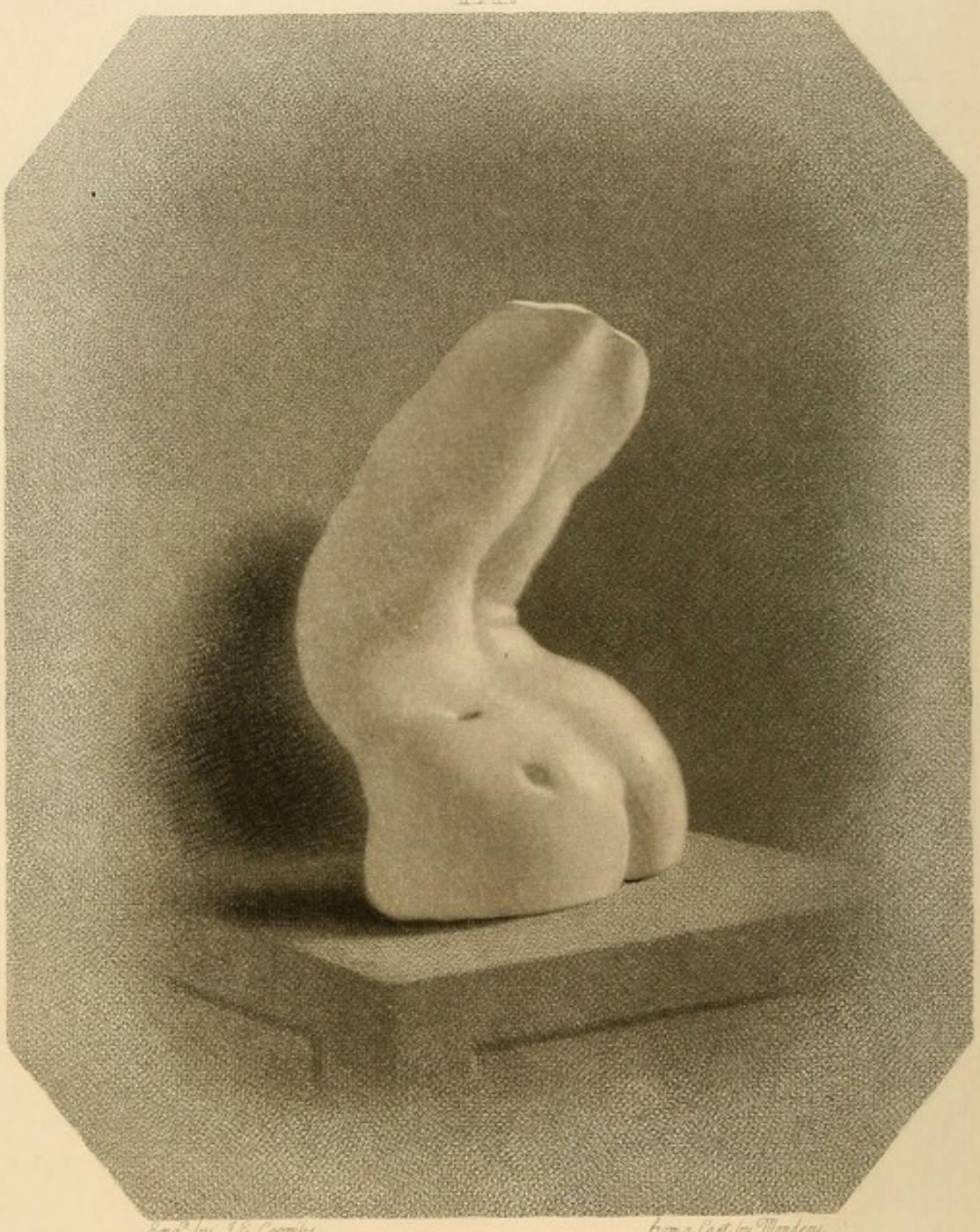
able to state, that he has lately heard from the lady, now resident in Bristol, whose case he has just detailed, and was happy to learn that she continued in the enjoyment of an excellent state of health, that she had been exempt from any return of her former complaints, and that she was quite competent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

CHAPTER VII.

INCURVATION OF THE SPINE.

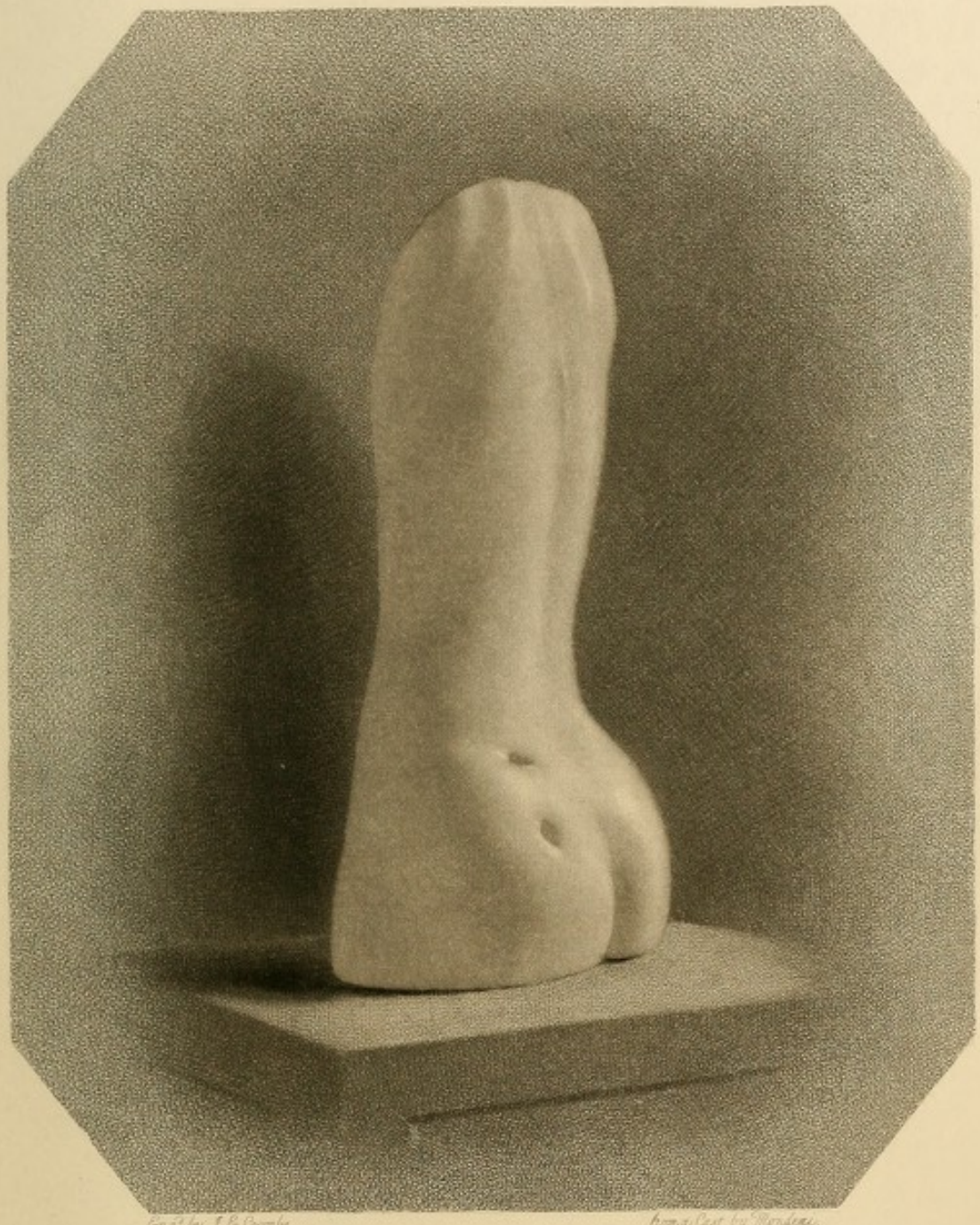
Like most of the other species of distortion already treated of, the incurvation or inward curvature of the spine, has a constitutional as well as a mechanical origin, or both combined; when it proceeds from constitutional causes, it not unfrequently shows itself in the lower cervical and upper dorsal vertebræ, and is often complicated with that peculiar distortion of the column, denominated the rotated or serpentine state of the spine,—a form which seems to combine somewhat of all the varieties of distortion, except the angular. This is frequently attended with very distressing effects upon the functions of the lungs and heart, these being prevented from freely performing their respective offices, producing, apparently from trifling causes, very great disturbance in the system. The lumbar incurvation, the consequence of a shortening in one of the lower extremities, occasioned by long ex-

IX.



Engd by J. S. Coombs. from a Cast by Mendeni.

X.



Engd. by J. B. Crombe. from a Cast by Mondeau.

isting disease in the hip joint, is productive of extreme deformity, and great difficulty in walking; it is also caused by a softening of the bones, as in rickets; because, all being equally diseased, there is the weight of the trunk superadded to that of the head and shoulders pressing upon the vertebræ of this part of the column. In this case, the deformity is general, the incurvation rarely occurring alone. In persons suffering from this species of the disease, there is always a stiff and formal carriage, accompanied with extreme rotundity and lameness about the hip: in this, as in the other forms, inflammation and its consequences may take place, according as there exists a scrofulous diathesis or otherwise.

This species of curvature, perhaps of all others, is the most serious, and in females requires the greatest attention, on account of the deformity of the brim of the pelvis, the lower part of the lumbar vertebræ and the sacrum being pushed forward, and consequently diminishing the diameter of the superior aperture, thus rendering parturition in all such cases, proportionally difficult and hazardous, and sometimes even impracticable, —without surgical assistance. This is strongly evinced in reference to a case of distortion, the details of which are highly interesting. (*Vide, Page* 145.)

CASE I.

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

The following is the account given by her mother, of the state of her health, before she came under the care of the author.

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 from 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 this 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 IX. 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. Commenced the use of the apparatus, a firm compress being used to bring the spine down to the plane.

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 X. represents a cast of this case at the conclusion of the treatment.

CASE II.

In the month of November, 1827, the author was first engaged to attend Mrs. M——, on the occasion of her approaching accouchement. He 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 the nature of her peculiar case would admit, but was left extremely weak, having very little power over her 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, he 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 anticipated; a considerable curvature existed to the right, and the dorsal vertebræ were affected by lateral curvature, 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, of the extent of which he had not before had any intimation, being thus made manifest,* a proper course of treatment was commenced without further delay, which terminated in her restoration

* 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 touchingly described in her expressive and well-written letter.

to a state of health, such as she had not enjoyed since her first accouchment.

The author, on discontinuing his attendance on Mrs. M———, in September 1828, 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, 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.

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 alteration 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.

1821, 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 during the whole period.

1828, January. Fourth child born. This was indeed a most distressing labour, 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 machine. 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.

M. A. M——.

Leeds, Sept. 30th, 1828.

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 for-

cible manner, the propriety and efficiency of the plan of treatment so successfully pursued.

The author has great pleasure in adding, that the writer of the preceding letter is not only still living, but has since enjoyed, comparatively, an uninterrupted state of good health,—not having had any return of disease in her spine, from the date of her communication to the present time.

CHAPTER VIII.

RICKETS.

As spinal deformity is seldom met with amongst barbarous nations, so is rickets another disease which follows in the train of civilization, and is very frequently met with in this country. It occurs almost entirely amongst children, and most generally manifests itself between the ages of six months, and two or three years. Sometimes, however, 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, when the health of the parents is bad, and especially when 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 necessarily follow that the constitution of the parent is 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, i.e. 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 have children affected with this disease, or one child in a family may be ricketty, 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.

Fertile causes of this disease, in those not predisposed to it, are a supply of improper food during infancy—being fed by the spoon rather than at the breast—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.

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; yet, in some cases, they are relaxed, and the stools are excessively offensive and unnatural. 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 is more frequently 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 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, while 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 out of all 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 the author's experience, their frequency is nearly equal. 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 disease, 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 dense portions alone remain, while the cancellated parts are almost altogether destroyed, so that the bones may be said to be mere shells. It will thus easily be conceived how, from pressure, under these circumstances, the vertebræ, as well as other bones in the body give way, and assuming a wedge-shaped appearance, produce some one or other form of spinal curvature.

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 re-established, the bones assume more of their natural hardness, become more dense, and ossific matter is 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 134, 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 excurvation, 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.

TREATMENT.

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 may 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 the 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 Pil. Hydrarg. proportioned to the age of the child, and combined with Pulv. Jalapæ or Rhubarb, 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 this, or some similar plan, 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 dark or black 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 Carb. Potassæ, or the Liq. Potassæ in Decoct. or Syr. Sarzæ; or for these, the Iodide of Iron may be occasionally substituted.

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 they would probably be injurious. Pressure may also be applied, if done carefully, 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; this plan being especially calculated for those cases, which, from their combination with curvature, require for their cure the adoption of the recumbent position.

CASE.

1843, Aug. 26th. The author 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 born apparently, a fine child, but before he was six months old, he was observed to be very weak, sitting still on his mother's lap, and not having any disposition for activity, as is the case with children of the same 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 separated 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, his abdomen being large and tumid, his evacuations exceedingly crude, of a dark colour and excessively offensive. He is extremely emaciated, and his skin is of a very sallow colour, 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 now 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, February 25th. There is considerable improvement throughout his system,—his head is much reduced in size, and the angles of his ribs are less prominent, and he is

altogether stronger and more active; the state of his health is astonishingly better; he sleeps well, has lost the shortness in his breathing, and is less susceptible of colds; his body has settled to 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 IX.

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.

This being the case in reference to its normal state, greatly, it may well be conceived, will the difficulty be 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, however, the intention of the author to enter ully into the consideration of those numerous diseases of the

spine which are unconnected with curvature ; these would of themselves occupy a larger volume than the present one,—yet, as most cases of curvature of the spine are complicated more or less with symptoms of spinal irritation, it may not be misplaced to offer—the work could not, indeed, be considered complete without,—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 the cure of some of the most severe and painful of these cases, which totally incapacitated the individual labouring under them for any exertion, and required a constantly, or almost constantly, maintained recumbent position, has, in the author's practice, been materially aided by a modification of that plan of treatment, which he has found so eminently 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 the author recommends 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, he has found great benefit from the employment of it in some of the very worst instances of this disease which have been placed under his care.

All the reasons which have been urged for an early attention to the symptoms which precede curvature, will hold in full force as respects irritation of the spine, for, if merely symptomatic, 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, mollities ossium, 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, we believe, 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 will be described.

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 the author has 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 disease, 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 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; the author has known instances where the spinal tenderness rapidly changed from one side to the other of the column, and where the pains in the chest and abdomen shifted exactly *pari passu*. The consideration of this point leads us, in the next place, to speak of the symptoms of this disease.

These 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, every part of the animal frame. Chronic inflammation, irritation, &c., of that portion of the cord whence the nerves arise, or in other words, 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 nerves of the vertebral column.

Of all the symptoms of this affection, as occuring 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 water 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 two successive days, 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 the symptoms 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 minut 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 constitutio nbeing 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 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 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 the author more frequently employs it in the following, or some similar combination :—

R. Ung. Ant. pot. tart.
Adipis..... aa ʒ ij.
Olei Tiglii ..... m xv.
Misce intime, et fiat Unguentum.

of which a small portion should be rubbed over 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, the author has not found 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 his care, where, owing to errors in diagnosis, the cases 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, the author has found considerable advantage by inducing the patient to lie, during the day, on the 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 dissertation.

CASE.

Miss G——, aged twenty, resident in a neighbouring county, 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, which 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 has 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 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 first seen by the author, the patient was in a very helpless and distressing condition; her respiration was short, impeded and difficult, with constant inclination 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 constant pain about the sternum and scrob. cordis, and experienced 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 made to the author; she was recommended to adopt an occasional recumbent position, and was shortly afterwards placed under his care; she manifested great readiness to make trial of every suggestion, which had reference to her cure; and the following extracts from his journal will shew the effects produced by perseverance in the plan.

She commenced the treatment on the twenty-second of December, 1837. 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.

1838. January, 22nd. She feels considerably relieved, but the nervous uneasiness or irritability is still troublesome, particularly towards evening.

March, 15th. 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. Her head and eyes are more comfortable than she ever recollects them to have been; she is, indeed, wonderfully improved in this respect, and is not now obliged to have recourse to food in order to relieve the sensation complained of, as she can do without it for many hours together, a circumstance which for some years has been unusual with her.

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.

GEORGE ODELL, PRINTER, PRINCES STREET, CAVENDISH SQUARE.