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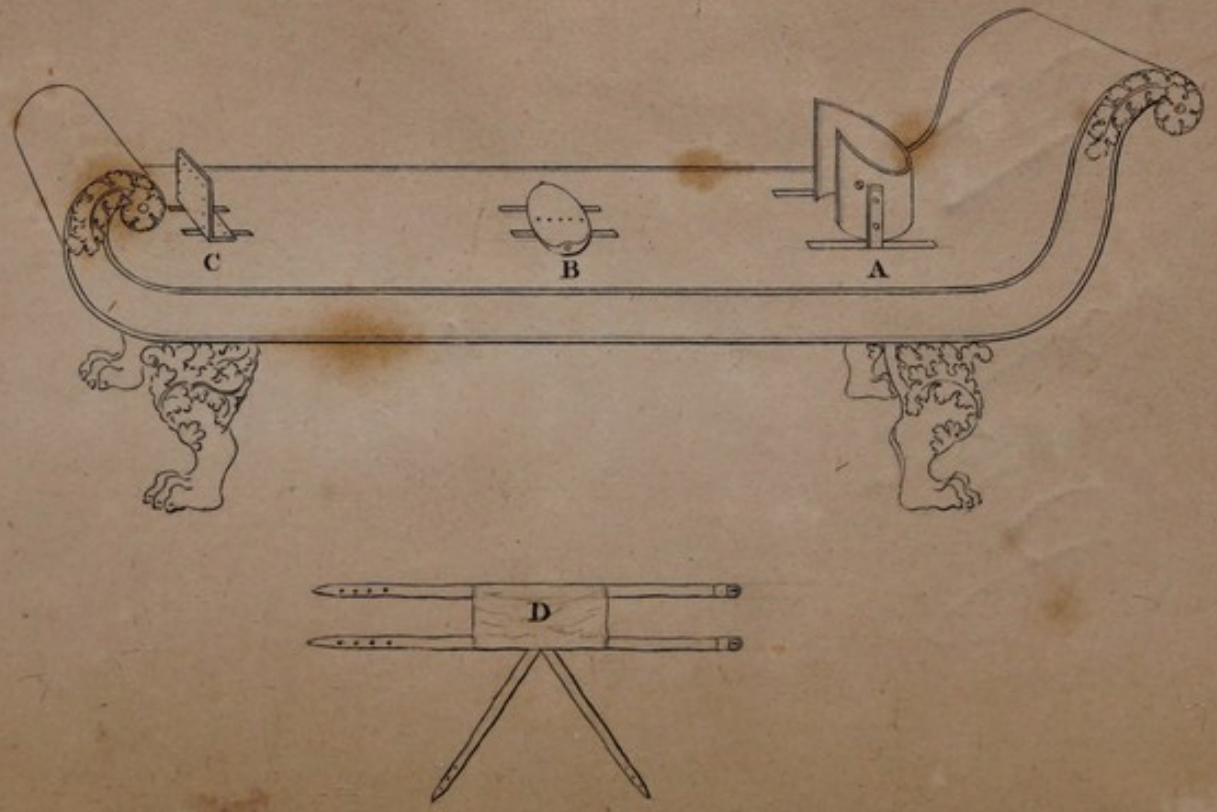
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ROYAL MEDICAL & CHIRURGICAL SOCIETY OF LONDON

A

TREATISE

ON

RICKETS:

WITH A

NEW THEORY OF OSSIFICATION,

AND A

PLATE AND DESCRIPTION

OF AN IMPROVED

RECLINING COUCH FOR THE DISTORTED.

BY

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SECOND EDITION.

"Eum vero recte curaturum, quem primo origo causæ non fefellerit."
CELSUS.

LONDON:

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PREFACE.

In none of the systems of physiology which I have seen is there any theory of ossification: the progress of the process is minutely described; but the manner in which it is accomplished has never yet been attempted to be explained. The main component of bone is the phosphate of lime: this matter is continually being deposited by the secreting arterial capillaries, and again taken up by the absorbents; and yet the wonderful thing is, that the phosphate of lime is not soluble in the fluid from which it is abstracted—phosphate of lime is not soluble in blood. Now, it is one part of the following Treatise to explain this paradox, by demonstrating, from facts and experiments, how this seeming chemical anomaly is performed, avoiding, as unsatisfactory and unprofitable, to enter into the variety of opinions which have, from time to time, been entertained on the subject of conception; and yet this has always been a favourite topic for the speculations of the learned. There seems a natural proclivity in genius to entangle itself in the cobweb which a wild fancy has woven, for the vain gratification of shewing its ingenuity in extricating

itself from the meshes without breaking a thread. Imagination is delighted to wander in the mazes of its own invention—to dive into the ocean of conjecture, and endeavour to explain, as near as human reason can approach, how and why we were created. If we look into the ancient writers on physic, we find this subject occupying a conspicuous portion of their speculations: but with how little success they prosecuted it, is perhaps best evinced by the little regard it obtains among modern physiologists.

In the present edition I have given the original Plates, first published in 1820: one of an improved Reclining Couch for the Distorted, a model of which may be seen in the Gallery of Practical Science in Adelaide Street; the other of Madame Supiot, whose case at that time excited considerable attention.

2 Parliament Street,
5th January, 1835.

A

TREATISE ON RICKETS.

INTRODUCTION.

MAN was well designated by the ancient philosophers, a microcosm. As the most perfect being of sublunary creation, he exemplifies this in centering in himself the three great kingdoms of nature. His bones form the mineral portion of his system, and are the basis upon which the other constituents

rest. They, as the more inert, possess little sensibility in a healthy state; and their vitality, when completely ossified, is languid and obtuse. In very old age they become so fragile as to break by the action of their own muscles, and, reduced almost to the state of a mere mineral concretion, they are with much difficulty, if at all, re-united, so small a portion of animal life at this period pervades their structure. The soft parts constitute more peculiarly the animal portion of man, and specifically distinguish him and other animals from the other organized modifications of matter; and his hair may properly enough be considered as the vegetable and ornamental constituent of his composition, and thus completing the microcosm. Hair, we all know, grows abundantly well after death, even in the grave: thus demonstrating that the life of the body is not necessary for its growth and vitality. Like vegetables, it can grow in the earth; and in their structure also it may be

permitted us to advance that hairs have bulbous roots, and closely resemble the junci or rushes.

Nature, I may remark, in the construction of the material world, adheres a good deal to one model; and, if not too presumptuous in my opinion, there is more simplicity and uniformity in her works than what superficial minds can perceive, or prejudiced minds will allow.

Approximations to a structure similar to what we have described above, as obtaining in the mechanism of animal life, seems to pervade all the works of creation; and whilst they display the same Almighty wisdom and beauty, they at the same moment declare the unity of the design, and the identity of the architect. In the mineral kingdom, we find crystallized organization frequently assuming a beautiful arborescent arrangement, as in the

finer specimens of arragonite ; in those beautiful dendritic appearances imbedded in calcedony, forming the Mocha stones ; and in the wooded landscapes impressed on the Florentine marble. The native metals also furnish us with some fine examples of arborescent crystallized dispositions ; and we may add that the napthous and steatomatous minerals a good deal resemble animal matter. Some may perhaps fastidiously object to the term organization being applied to crystals ; to me there appears no difference in the essence, although there may be in the mode, of the vital principle animating and organizing not only animals and vegetables, but likewise minerals ; and were I required to point out the most diagnostic characteristic distinguishing minerals from other modes of regular, but more complex and energetic, functional structure, it would consist in the inability of crystals to propagate their kind by any process resembling utero-gestation ; the simplicity of

their organization prohibits such: yet even to this function we have a slight analogy in the power which a nucleus has in causing and accelerating the formation of crystallized depositions. Nay, furthermore, the speculative observer of nature's modes of action might even be inclined to ascribe to an inherent *vis medicatrix naturæ*, permeating all matter, the tendency which mineral substances have, of themselves, and under certain circumstances, to throw off their amorphous existence, and to assume a regularly figurative structure.

Again, in the vegetable kingdom, we find an epidermis, a rete mucosum, and a cutis vera: within are circulating fluids, impelled against gravity by a vital principle. The hard and woody parts of trees serve the office of bones, and a medulla is enclosed in their centre. The foliage occupies a double purpose; first, it acts as lungs, by which the tree both respires and perspires; and in another

point of view, the leaves resemble the hair of animals; they are ornamental, and they are deciduous.

It would not be difficult to extend these points of relative analogy, were their prosecution relevant to our present pursuit; but from this I purposely refrain; suffice it, meanwhile, those I have already stated, which I trust the reader will not, too unthinking, consider unfounded, fantastic, or overstrained.*

The consideration of the mineralogical portion of man, is now more particularly to occupy our attention.

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* It might puzzle certain prosing metaphysicians to deny, according to their own definitions of instinct, that chymical elective attraction was not the result of such.

SOME GENERAL

REMARKS ON OSSIFICATION.

Bones are composed of a gelatinous and an earthy matter; the first soluble in water, the latter in acids, consisting of a combination of lime and phosphoric acid. The proportion in which these matters exist, varies at the different periods of life. As a general statement, we may remark that the quantity of the phosphate of lime which is deposited in the cellular tissue of the bones, is in the direct ratio of the age of the individual. In the early months of gestation, the bones of the fœtus are

wholly cartilaginous : in very young embryos, they are composed of a matter possessing the consistence only of ordinary gelatine, but enveloped in a membrane which, in the end, is to form the periosteum. If we examine a fœtus five or six weeks old, we can distinguish neither bones, muscles, nor tendons, but a collection of fibres equally pliant, which are the incipient vestiges of arteries, veins, nerves, and lymphatics. If then it be true, of which there appears to me to be little doubt, that all the parts of the body are designed in embryo, then all the parts of which it is composed, are, at the commencement of organic existence, equally soft. Hence the rudiments of the bones, amongst the rest, are in this unformed state. As life advances, the function of ossification proceeds ; the calcareous secretion is deposited by the proper vessels, and the matrix is more and more occupied by the ossific deposition, till at length the perfect bone is developed. This matrix is the periosteum

which is continuous, like the skin, and passes from one bone to another, leaving still the articulations visible, and envelops them in one common sheath. It is in this membrane that the vessels secrete and deposit the phosphate of lime, which is to impart solidity to the bones. The process by which this is accomplished is neither simultaneous in its progress, nor uniform in its degree: thus we see that the osseous envelop forming the internal ear, is not only ossified before all the other bones of the skeleton, but that it surpasses them also in the greater density of its structure. Not only is there a difference in the precedence in which bones become ossified, but likewise this difference extends to different parts of the same bone. Thus, in the long bones ossification usually commences at certain centres, which are named points of ossification—each long bone has ordinarily three; one towards its middle, which encompasses it in the manner of a ring, and whence

it extends its fibres parallel to its axis ; and another at each extremity, accompanied sometimes by several smaller ones. Ossification thus extends from each point, until the pieces come into contact ; but what is curious they do not cement together, or incorporate for some time afterwards, but are joined by a medium purely gelatinous, which boiling water or maceration can readily dissolve. These extremities bear the name, as every one knows, of epiphyses, in opposition to the piece forming the body of the bone, usually denominated diaphysis. In the flat bones the centres of ossification represent little suns, whose rays are the osseous fibres which diverge into the semi-pellucid cartilage that surrounds them ; and osseous nuclei appear in the centre of the cartilages which occupy the places of the small bones, as those of the carpus and tarsus. In angular bones these centres vary indefinitely, both in their shape and position. The bones of the cranium meet

at their margins, and their indentations intermix and form the sutures. The fontanelles disappear. The urine contains less earthy admixture; and by the time the child is two years old, the bones have acquired such solidity, as to sustain with firmness the erect position in the different motions of the body.

Ossification, as we have said, is completed in different bones at very different periods. In the epiphyses for example, it is not completed for a long time after that of the bodies of the bones to which they belong have been altogether perfected. There are cartilages also, as Cuvier observes, which in certain classes of animals never entirely ossify: such as those of the ribs and larynx; so that, notwithstanding the propensity which all gelatinous organizations have to receive a calcareous deposit, yet there are cartilages which never change into bones.

In a preceding page I observed that the respective proportions of the earthy to the organized portions, varied at the different periods of life; and when a bone has attained its full state of induration, so has it that of its dimensions: hence bones which attain the greatest size, are slowest in their growth.*

These proportions are thus stated by Richerand: at the period of birth, and during the first years, the gelatinous part preponderates; hence the flexibility of the bones in a very young person. In youth, the quantities of the two component parts are nearly equal; in the adult the calcareous part forms nearly two-thirds of the whole bone: at length, in old

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* Whence comes it that, after a fever, young people frequently grow so rapidly? Is it that the disease or its crisis causes the partial re-absorption of the calx, and passes it off by urine or otherwise; and that during the convalescence, nature takes advantage of the thaw, and freely deposits an extended gelatinous matrix?

age, by successive accumulations of earthy deposit, the bones become brittle, they are fractured more frequently, and are cured slowly, and with difficulty. Various diseases may likewise induce this friability; in particular the last stages of Siphilis afford instances of the great friability of the bones, produced by the virus. When fracture happens, in such cases, the cure of the constitutional disease accomplishes that of the fracture. In like manner the scurvy in its advanced stages, produces a fragile state of the bones; and fractures, long since united, are apt to be re-produced in such constitutions. But when this happens as the natural consequence of age, the bones in a manner become dead amidst the living parts that surround them, (for it is the gelatinous structure which is the seat of their vitality); they then partake of the brittleness of other mineral concretions. The consequence of the abundant deposition of the calcareous matter is an obliteration of the

vessels which secrete the cement ; and hence when fracture happens, the plastic hand of nature is disabled, for there is no organized apparatus remaining to repair the effects of the accident. Why the calcareous phosphate should accumulate in the bones in advanced age, appears to me to be owing to the debility which at that period of life pervades the absorbent system. The process of deposition is not so difficult to accomplish, since it is the issue of a series of preceding actions, prolonged and terminated ; but in that of reabsorption, nature, to commence it, has to make a fresh purchase, which her debilitated and worn out energy is gradually, and at length, incapacitated from performing : the exhausted vigour of the lymphatics may nevertheless be able to take up and remove the softer parts of the osseous structure ; but this only adds to the fragility, by causing the earthy component to preponderate the more in proportion.

These, in a manner, prefatory remarks, will the better enable us now to discuss the proper subject of this treatise, wherein a deficiency of the solid ingredient of bone constitutes the proximate cause of the disease.

OF

RICKETS IN GENERAL.

THE HISTORY.

Rickets is *chiefly* a disease of youth; and its effects are to be daily seen in those decrepid and deformed objects which croud the streets of every large town.

This disease was known to Hippocrates,*

* "Et quibus certe adhuc *pueris* ante perfectum cor-
"poris augmentum, spina in gibbum attollitur, iis quidem
"corpus ad spinam augeri non solet; verum crura et
"manus ad perfectionem deveniunt, illæ autem partes
"exiliores evadunt." Hippocrates, de Articulis, Sect. VI.

and others of the ancients, although not properly understood till a much later date; and to England * is certainly due the credit of first calling the attention of the medical world to the study of Rickets.

It has been usual with writers to confine the name Rickets to that which appears in early youth; but from attentively and patiently studying the nature of what is termed Mollitics ossium, a disease sometimes, though rarely attacking adults, we apprehend that equal attention on the part of the reader, in perusing the sequel, will lead him to accord to us his unqualified admission of the proximate sameness of their cause, and the identity of their constituent nature.

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* Whistler was the first English writer on this disease, a copy of whose rare book, De Morbo Puer. Anglorum, printed in 1645, is in the Bodleian library. Glisson published his Tractatus de Rachitide in 1659, and Mayow in 1669.

This history then divides itself into the consideration of the symptoms, first, of infantile, and secondly, of adult Rickets; concerning both of which we will treat in succession.

The first, or infantile Rickets, has been remarked to be a disease of the cold and moist countries of the temperate zone, as England, Holland, and France, and little so of those either more to the northward or southward. The inhabitants of large towns are more liable to it than those of the country; and it more frequently appears among the children of artizans, who dwell in humid situations, have little exercise, who live in an impure atmosphere, are badly fed, and whose parents have led debauched lives.

The usual period of attack is from ths sixth to the eighteenth month of the child's age, although it may appear much later, or otherwise; for even the fœtus in utero is subject

to this disease. Hippocrates relates a case of this kind in Lib. 2. De Morbis Vulgaribus, to this effect: "Antigenis uxor quæ ad Nichomachum habitabat, carnosum puerum peperit, membris quidem et præcipuis corporis partibus distinctum, magnitudinem vero quatuor digitorum qui non excederet, totusque esset *exossis*, tandem etiam crassus et rotundus."* Pinel likewise gives an instance of a ricketty fœtus in Fourcroy's journal.

Rickets is distinctly a disease in the train

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* Ought it not to excite our indignation to perceive how few, since the time of the faithful and adoring Foësius, are inclined to do honour to the great and immortal Hippocrates. Mr. Hunter has had his snivelling panegyrists, whose vapid attempts at fervid enthusiasm put me more in mind of the clumsy efforts a goose makes to fly than any thing else. To *claim* to be the eulogist of any great man (and one among whom was certainly John Hunter) is to insult the apprehension of others; it is in fact as ridiculously offensive as the holding up a rush-light would be to shew the sun in his zenith.

"*Miserum est aliorum incumbere famæ.*" JUV.

of civilized refinement; for nature, when acting unshackled by the trammels of art, and uncorrupted by the devices of luxury, rarely denies to man the regular proportion of his limbs. The savage who, wild and uncontrolled, freely ranges the forest, is noted by all for the regularity of his form, the activity of his body, and the health and vigour of his constitution. It is the pampered progeny of excess, indolence, and debauchery, that are the martyrs of diseased indulgence.

The inconveniences and evils originating from distortion, are perhaps best exemplified by contrast with the perfections and advantages of symmetrical proportion; the beauty this confers, the strength, the agility, and health it imparts, are too obvious to the debilitated, and to the athletic too sensible to require elucidation; whereas the unsightliness and deformity attendant on the loss of this perfection in shape, are amongst the least

of the ills experienced by the distorted. Pain, and an exhausted constitution, render miserable the pitiful object of misfortune ; the one continually tormenting his sickly frame, the other perpetuating and increasing the evils of which he is the melancholy victim.

OF

INFANTILE RICKETS

IN PARTICULAR.

THE first symptoms in children who have learned to walk, pointing out the commencement of this disease, are those of general debility, indicated by a pale, sallow complexion, unusual listlessness, and impaired appetite: the child appears sooner tired by exercise than ordinary; it stumbles and oftener falls in walking; there is a flaccid feel and appearanee of the muscles, and with general meagreness and emaciation of the body, the

skin hangs loose upon, and seems detached from the subjacent parts in consequence of the absorption of the fat from the cellular tissue; it feels dry and loses its clearness; it puts on a dull appearance and becomes indurated,* and wrinkles beset the countenance, falsely giving to the infant the serious aspect of premature old age. Whilst the other parts of the skeleton are wasting, the head attains a greater size than is proportionate to the other parts of the body. This enlargement is confined to the cap of the skull, which becomes much extended in surface, and so attenuated in substance, that the line of separation between the membranous fontanelles, and the ossified parts is no longer distinguishable. The forehead projects. With this increase of capacity of the cavity of the cranium, the encephalon itself enlarges, and the yielding softness of the envelop gives facility to its

* Morgagni, Ep. 13, Art. 17.

aggrandisement; the consequence of which is that the head rolls loosely on the Atlas, and inclines on the chest, or on either shoulder, unsupported by the debilitated muscles which ought to counterpoise its gravity. At the same time that the upper part of the head is augmented in bulk, the face appears proportionably short,* and the neck small. As the disease advances, the limbs become emaciated, and their articular epiphyses swell, which, owing to the atrophy of the soft parts, appears greater than what it really is. A general solution of solidity in the bones ensues; their calcareous component is taken up by the absorbents, and drained off by urine, shewing itself abundantly in the sediment it deposits. Thus deprived of the principle to which they owe their solidity, the bones yield to the

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* This shortness of the face obtains only in youth, for as Rachitics recover, and advance in life, they get a more than ordinary length of visage.

superincumbent weight which they have to sustain, and hence, become curved in various directions.

All the bones of the body do not suffer equally and indiscriminately in all cases. Some are swollen or softened either wholly or in part, and others are occasionally found not at all affected. The spongy bones and the spongy portions of long bones are those, and the parts most usually attacked, as those of the carpus and tarsus, the sternal extremities of the ribs, the bodies of the vertebræ, and the cavernous epiphyses of the long bones. It not unfrequently happens that the first symptoms indicate themselves in an enlargement of the wrists and ancles. The more spongy the texture of the bone affected, the greater is the increase of volume which it is apt to acquire; but the hardest bones are not exempt from the dissolving influence which Rickets exerts upon their natural solidity and configuration.

We have said that the softened state of the bones yields to the pressure of sustained parts; this necessarily is exemplified most frequently in the deviations of the spine from the perpendicular; indeed it is from this circumstance, that Rickets has derived its name, I say necessarily, because the spine has to support the weight and pressure of all the superior part of the body. If we examine the skeleton, we shall perceive that the articulation of the head does not correspond with the central line of gravity; the thoracic and abdominal viscera and the parietes of the cavities which contain them, together with the superior extremities, weigh almost exclusively on the vertebral column; and moreover in children the spine itself rests upon a more oblique base, (for such is the position of the infant pelvis) than what it does in the adult, and is thereby less firmly supported; besides, the action of the strong extensors of the back continually exerting themselves in the erect position of the body to

counteract the bias to which such configuration tends, thus bends the spine in unnatural curves in consequence of the morbid flexibility of the bones which the disease is progressively inducing. The spine in its healthy form describes three curves* ; the lumbar portion forms a convex arch anteriorly; the dorsal, a concave ; and the cervical a convex. These opposite curvitures of the true vertebræ tend strongly to render the different positions of the body firm by enlarging the extent of the space through which the centre of gravity traverses. But the distorted spine, from its assuming various unnatural curves, necessarily becomes shorter. This of itself affects the form of the chest, besides that the ribs yield at the parts least able to resist ; their cartilages project, and hence the ribs become flattened on the sides; this again throws the sternum forwards, forming an irregular ridge. The sternum is

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* Spina igitur etiam in sanis multis modis distorquetur"
Hippocrates, de Artic.

likewise affected by the disease, and becomes unequal and knotty from the irregular manner of its ossification. The clavicles, which form part of the fulcrum upon which the different motions of the arm are executed, not being able to withstand the inclination which it (the arm) has to fall inwards and forwards upon the chest, become more curved than natural, and hence more prominent. The os humeri is distorted outwards, and the ends of the radius and ulna are twisted in the same direction. This inclination of the bones of the arm obtains perhaps from the more frequent action of the flexor muscles; since, in all cases of muscular debility, it is found easier to b nd than to extend the limbs; the habit, in the convalescent Rachitic, of leaning his head upon his hand and his elbow on the table, would likewise assist in giving to these bones the aforesaid distortion; the bones forming the basin of the pelvis fall, in a manner, together, and the os pubis and sacrum approach;

the thigh bones become curved forwards and outwards, and the knees tumble inwards. The spine of the tibia becomes convex and the feet are thrown outwards. Owing to the shortening of the vertebral column, the arms appear longer than their proper proportion; yet notwithstanding this accounting cause perhaps they are really lengthened—the hands, fingers and feet are certainly so. Why the thigh bones and tibiæ should become convex *anteriorly* in a preternaturally softened state of these bones is obviously the consequence of their position; and that the knees should fall inwards and the thigh bones have a curve outwards, is as easily accounted for when we consider the relative situation which the condyles of the os femoris hold with respect to the acetabulum; and finally, the feet are, as a consequence, naturally thrown outwards, in order to counteract the disability occasioned by the approximation of the knees.

Of all the parts of the skeleton none are of more importance than the vertebral column, whether we view it as an ossific pillar tending to support the head and body erect, or as containing that continuation of the brain, usually denominated the spinal marrow. Hence diseases affecting the vertebræ possess peculiar interest from the changes they induce in all the organs that derive their nervous energy from the spine. The consequences which ensue from distortions of this column are many and afflicting: thus, both the natural vertical line of the body and the centre of gravity change place; the muscles lying on the back and attached to the vertebræ lose their proper direction, and consequently when they act they are obliged to contract more violently to produce the same effect, whether in supporting the upright posture of the body, or in assisting in the progression of it.

Other morbid changes are the result of this

alteration of shape. The circulation of the blood in the head and neck is affected. The action of the heart is constrained by the distorted shape of the thorax. The lungs are compressed from the same cause; wheezing* and laborious breathing oppresses the chest; short, dry cough follows, and, finally, confirmed phthisis often puts a period to the struggles which life makes to exist organized.†

The abdominal viscera also suffer derange-

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* Vide Hippocrates, ut supra.

† For it is my opinion that the principle of life can exist unorganized, that is, dormant in amorphous substances. All organized matter, we see, lives upon the debris of dormant existence, and supplies itself with life from what is called nutrition; when its structure can no longer purvey this properly, and in sufficient quantity for its being, it dies, and the life which still pervades it, goes to furnish its principle to some other mode of active vital organization.

In reply, let not the frivolous, superficial mind ask me if organized mechanism lives? it is to natural, and not to artificial structure that I allude.

ment from this affection of the spinal pillar; the liver is often squeezed by the projection of some of the vertebræ; the intestines are forced out of their place, and the stomach, pressed on all sides, frequently descends as low as the umbelicus.

It is needless to add, that nature, labouring under such difficulties, must perform her functions imperfectly. Want of exercise from inability to take it; deficient nutrition from a languid and impeded circulation, and from blood incompletely altered in passing through the lungs, all concur to continue, and hence aggravate the disease.

Yet these, great as they are, do not comprise all the evils occasioned by the deranged form of this important part of the skeleton; jaundice and colic are often accompaniments of this distortion. In the *Ephemerides Naturæ Curiosorum*, we read of a patient who

made water at almost each step she took, from the spine pressing on one of the kidneys. Morgagni proves that those with distorted spine are more subject to Hernias than other people. We may also mention that distortion of the spine impedes labour by the protrusion of one or more of the lumbar vertebræ into the basin of the pelvis, which, with the morbid approximation of the os pubis and sacrum, frequently renders natural parturition utterly impracticable.

In fine, it would be an easy matter to lengthen the enumeration of the evils incident to the distorted, and to shew that the least of the inconveniences felt by the unfortunate decrepid, are the impediments it causes to the free use of his limbs, and the detriment it occasions to his personal appearance.

Deformity though an usual, is not a necessary attendant on Rickets; nay, Rachitics may

even be well-proportioned. This is more apt to occur to those who have been born with the disease upon them, and daily examples are afforded us of seeing such instances in those diminutive beings who are shewn about in caravans as spectacles in the shape of Homuncules and Muliercules, in whom the relative proportion of parts although not perhaps perfectly symmetrical is yet passing well. It is not at all uncommon to see children with a strong tendency to this disease, yea, bearing even some of the tokens of it about them, but whose stamina are just sufficiently healthy to repel its further ingress, and avert its theatened invasion.—but to return.

Along with the symptoms of Rickets we have already detailed, the abdomen becomes unusually tumid, hard, painful and protuberant : some have considered this less a symp- than a cause of this complaint—an idea which we shall revert to in due course ; the digestive

functions are deranged; at first the appetite is much impaired, but in a more advanced stage of the disease, it very often improves; the state of the bowels varies in different cases, and also in the same individual at different times: at one time this is lax, and a debilitating diarrhœa prevails, at another time the bowels are much constipated, and in either case the stools are almost invariably much discoloured and fœtidly offensive. The process of dentition is late in appearing, painful in its execution and slow in it progress, and all the accompanying sympathetic complaints are more than ordinarily severe. When the teeth do exude they soon become dark coloured, and not unfrequently fall out, or very soon decay. Indeed this imperfection in the sound and healthy structure of the teeth is, in my opinion, one of the most invariable symptoms of a ricketty tendency, even in those who evince no other very conspicuous mark of such a predisposition; and the disease very often first

shews itself during the derangement of the system, which so frequently attends, particularly in ricketty constitutions, the developement of the teeth from their alveoli.

This may originate from the strength of the effort required towards their proper formation and solidity. No wonder then that Nature should here first stumble at the difficulty. As the teeth very often are the bones which, in the infant, first indicate Rickets, so we find them the last which yield to its impression when the adult constitution is assailed by this disease, as we shall have occasion hereafter to exemplify ; but again—the pulse is feeble and frequent, and those febrile symptoms are present, the usual concomitants of a debilitated and irritable state of the nervous system. The eyes often are lively and brilliant. The faculties of the mind are prematurely developed ; all the organs of sense are more than ordinarily acute ; speech is sooner acquired,

and the child displays intelligence far beyond its years: though sometimes the reverse happens, and the child is either perfectly stupid or idiotical.

In this aggravated state of the symptoms, the interesting little martyr may continue for years; till at length the constitution rallies, strength returns, the bones indurate,* (retaining their curvature more or less according to the care which has been taken to lessen this,) and the patient survives, the distorted victim frequently of unfeeling ridicule.

When Rickets proves fatal, it is generally in consequence of the supervention of Hydro-

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* In those who recover, we may remark, there seems to take place a præternatural hardness in the bony structure, and we have often observed almost all the sutures in the cranium to be obliterated in the skulls of Rachitics who have died somewhat advanced in life.

cephalus, convulsions, hectic fever and exhaustion, hydrothorax, or phthisis pulmonalis.

Leaving the further prosecution of the above form of the disease for the present, we now proceed to give a brief description of Adult Rickets.

OF

ADULT RICKETS.

This is a much rarer disease than the former, and the cases which have occurred are recorded amongst the curiosities of diseased phenomena. This disease is more commonly known under the name of Mollities ossium. Some writers, and particularly the French, have included, under the designation of adult Rickets, cases of diseased vertebræ from the siphilitic virus, from scurvy, scrophula and cancer; but these being, in our estimation, diseases of quite

a distinct nature, they are not admitted into the view taken of Rickets in this treatise.

Ishmael Albuffeda in his life of Mahomet, tells us that Gatleb, the prophet, was without bones, " Hominis sine ossibus exemplum habemus Illustre," saith Albuffeda, or at least they were so flexible that " complicari poterant instar vestis."

Abraham Bauda in 1650 met with a like case and entitles his narration of it " Microcosmus mirabilis, seu homo in miserrimum compendium redactus," which was as follows: " Pierre Sega, a citizen of Sedan at the age of twenty, began to complain of a pain in his heels. Two months after the pain extended towards his knees; he could not walk without crutches, which was thought to be owing to gout. By and by the pain ascended to the upper part of his thigh, which only tended to confirm the suspicion of its being arthritic,

and it was treated accordingly; a year thereafter he became quite helpless and without power to move himself, with violent pain in all his joints, which obliged him to keep his bed. These pains continued as long as the bones retained either hardness or solidity. At the end of three months all his bones were as soft as wax, so that his body and limbs could be bent in any posture whatever. And I can certify that in the presence of many I have often bent his thighs, legs and arms in various manners without the patient experiencing the least inconvenience or pain. At last the bones became so soft, that the muscles having contracted themselves, this man who was formerly of good stature, was reduced to the height of a child of two or three years old. His head had become round, his thigh was only six inches long, and his chest externally was like that of a fowl. Nevertheless he drank, ate, slept, was awake and performed every function well, saving that of motion; he was in good spirits,

and received the visits of the curious with much good humour. During the last months of his life, the pains returned and tortured him till his death, which happened in the thirty second year of his age.

Given at Sedan the 22nd. of October 1665.

Abraham Bauda,

Surgeon to the King."

A similar instance but of a much earlier date is related in the third volume of the Guèrres de Paris by Abbon, a monk of St. Germain-despres, who lived in the ninth century; " Major habebatur magnis (mirabile factum)" exclaims this historian " is qui nunc minor pueris moriens patet esse."

Like cases are to be found in Zacutus, Oligerus Jacobæus, Forestus, Petrus á Castro, Wormius, Hollerius, Nicholas Massa, Fernel, Schenkius, Bartholin, Ruellius, Gagliardi, Houlier, and in Duverney and Saviard. But

the most remarkable of all is that given in the "Histoire et Mémoires l' Académie des Sciences" for 1753, which as a singular curiosity in pathological anatomy I shall translate, and subjoin.

" TOUCHING

AN EXTRAORDINARY SOFTENING

OF THE BONES.

" The circumstance which has given rise to the observations of which we are about to give an account, is certaiuly one of the most singular which has yet occupied the attention of anatomists. Anne Elizabeth Queriau, the wife of a person named Supiot, about 32 years of age, had already had two children and had miscarried ; but from which she had perfectly recovered; when six weeks after this last accident, a fall she met with occasioned a painful swelling in the leg, but without any derangement in the solid parts: six months had scarcely

elapsed, when a similar affection attacked the other limb. These affections were at that time regarded as Rheumatic, and treated accordingly : her infirm state had even become so supportable, than in 1751 she was for a fourth time delivered under much more auspicious appearances, since it carried off the swelling, but the patient remained without power in her lower extremities.

" After the elapse of six more months, the pains of the limbs increased and the urine appeared charged with a white sediment,* which some took for a milky matter : the patient at this time began to complain of involuntary contractions of the muscles, which by

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* This calcareous phosphate, (for such it undoubtedly was) passed from her in such prodigious quantity, at the commencement of the disease, that the patient used to say that her limbs *walked from under her.* It was thus she expressed the contraction of the muscles by which her extremities were involuntarily bent.

little and little drew her legs and thighs backwards; and in fact the one and the other became curved in such an extraordinary manner that her left foot became a kind of cushion or pillow upon which she supported her head.* The other osseous parts partook of the same degree of softness, and the patient became so deformed that there are few examples of a like disease, carried to such an extreme degree.

"The singularity of this terrible disease gave it a high degree of interest and celebrity; and Mons. Morand, junr. physician of the faculty of Paris, published an account of it during the life-time of the patient.

"In fine, in the month of July 1752, fever, dyspnœa, cough, spitting of blood and suppression of the menses were superadded to distress her already too wretched condition: the miserable patient could hold out no longer,

* Vide Plate in the Frontispiece.

ANNE ELIZABETH QUERIAU.

Vide Pag 46.

and she fell a victim to its influence on the 9th of November of the same year, at the age of about five and thirty.

" The disease of which this woman died, had presented phenomena too singular for her body not to become a tempting object for the curiosity of anatomists: M. Morand was, as we may well conceive, of the number of those who were interested in this affair, and that the more so seeing he had formed the intention of preserving this singular skeleton for the cabinet of the Academy; gratitude for which will not allow us to be silent, as he has in fact since made a present of it, as purposed; but he was scarce able to prevent some of those who were present at the opening of the body from taking away some parts of it, and it became necessary to interpose the authority of M. Le Comte d'Argenson to prevent an object so interesting from being destroyed or becoming the prey of putrifaction.

"Thanks to the care of M. Morand; and to the zeal of the ministerial academician, physicians may as often as they wish, see and examine it in the cabinet of the Academy* where it is deposited; they ought however to be aware that the bones have now assumed a very different consistence from what they possessed at the period of death.

"We will not enter here into the detail of the singularities which this skeleton presented touching which M. Morand has given so minute, particular, and accurate a description in his Memoir; we shall content ourselves with remarking that, excepting the *teeth*, there was scarcely any bone in the body of this woman which was not, if I may be permitted the expression, metamorphosed, and which did not bend, or might not have been cut with

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* This wonderful morbid preparation is now in Cuvier's Museum of Comparative Anatomy, Jardin des Plantes. It was there I saw and examined it. G. H. W.

more or less ease, they having neither stability nor induration. In some parts vestiges of ossification were to be observed, but for the most part these bones had become membranes or cartilages, or some were even of a fleshy nature. In the head, the dura mater was confounded with the cranium: the falx or the membrane which usually divides the brain into two equal parts, was much thicker than in its natural state, and borne so much to the left as to divide the two hemispheres of the brain unequally: the ventricles were full of blood and the choroid plexus varicose. In the thorax M, Morand found the heart and the large vessels studded with polypous concretions, formed of black blood. In fine, all the viscera contained in the abdomen appeared healthy; the two kidneys alone contained a coarse grained sabulous matter."

Thus far the "*Histoire de l'Académie Royal des Sciences,*" in order to complete

which I will add the MORBID ANATOMY of the Bones, as related more fully in the Memoir of M. Morand himself.

I. *OF THE HEAD.*

"The transverse diameter of the head was natural, but the vault of the cranium was much crushed, and the sutures entirely obliterated.

"The two laminæ, or tables of the bones of the cranium were amalgamated together, and formed, with the diploë, a spongy and reddish body merely, capable of bending under the fingers like a piece of prepared buff skin; a portion of which if cut out could be squeezed together in different directions. It would even preserve this consistence, by continuing to handle it thus: Mons Herissent shewed a piece in this state.

"The thickness of the bones of the cranium was in general twice that which is natural, and measured five lines in some places; they could be readily cut, and presented to the edge of the scalpel less consistency than that of cartilage: a fresh incision into a portion of it exposed in its diploic substance, cells of unequal size, which, when compressed, exuded a bloody fluid. I put a part of it into a vice, in order to squeeze the two laminæ together as much as I could, and forcibly to crush the intermediate substance.—The laminæ, glued the one to the other, left only a very thin scale, which, on drying, acquired the hardness and consistence natural to the cranium.

"The small bones of the ear (which we know to be peculiarly solid for their thickness,) were softened, and, the bony passage of the ear excepted, the rest of the internal ear possessed only the consistence of that of the

fœtus: such also were the ethmoid and sphenoid bones.

"The orbitar apophyses of the os frontis were flattened, the outer rim of the orbit was entirely round, and the orbit of the right side less than that on the left.

"The os urguis was membraneous, and its demi-canal less deep than usual.

"Of all the bones of the face, those of the cheek had the greatest consistence: the harmonic sutures of these bones were not distinguishable.

"The lower jaw was much flattened at the symphysis of the chin, and the bone forming it was nearly as much softened as those of the skull.

"The teeth were quite loose from the soft

state of the alveoli, yet their roots stuck fast in these processes, and moreover they had preserved their natural induration.

" The os hyoides in its body was less solid than ordinary; its cornua were of a cartilaginous consistence, and the ossa tritricea were scarcely discernable.

II. *OF THE TRUNK.*

" From the curviture of the inferior extremities towards the upper part of the trunk, the body seemed to end in resembling the figure of a *term*,* and measured from the crown of the head to the symphysis of the pubis only twenty-one inches: the length of the spine was thirteen inches and a half from the first

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* Morand here very flatteringly compares the figure of Madame Supiot to those statues called terminal.

vertebra of the neck to the os sacrum; and in following the curve of the spine, fifteen inches.

"The vertebræ of the neck were very prominent before, and somewhat inclined to the left side; those of the back, from the first to the seventh, were curved from left to right, and from the seventh to the last, from right to left; those of the loins followed the same inclination.

"The five last vertebræ of the back and those of the loins had not their ordinary proportion.

"The vertebræ of the loins were softer than those of the back, and those latter more so than those of the neck; in general, the spinous apophyses were softer than the transverse, and those more so than the oblique.

"The os sacrum was shortened at its ex-

tremity, and measured only twenty-one lines ; its base three inches ; the coccyx was much curved inwards, and its apex turned to the left.

" The first and last rib on both sides preserved their natural form ; all the others formed curves more or less irregular, whether among themselves on the same side, or compared as opposite sides : in general, they were all of them softened yet many remained brittle, and some of the true ribs were bent upon themselves towards their sternal extremities.

" The sternum seemed to have preserved, at least in appearance, a sort of solidity ; nevertheless, it could be cut as easily as the bones of the cranium.

" From the upper edge of one bone of the ileum to the other, the pelvis measured eight inches and a half ; the bones of the ileum were thin, very flat, and, in a manner, cartilaginous ;

the left ischium appeared thrown outwards; the transverse diameter of the tuberosities measured from seven to eight lines; the foramen, in its greatest width, two inches and a half, and the cotyloid cavity seventeen lines at its mouth, and ten in depth.

III. *OF THE EXTREMITIES.*

"Certain differences between the two superior extremities oblige me, in order to be more exact, to give a separate description of them.

"On the left side, the clavicle from the sternal extremity to beyond its middle part was much curved and projected in front; its substance seemed to be cartilaginous, and, when pressed, a glutinous liquid flowed from it.

" The scapula was three inches ten lines long, and from the glenoid cavity to its posterior angle two inches eleven lines in extent. Its superior costa, as well as its spine, formed different folds ; its inferior angle was so twisted from behind forwards, and from below upwards, that it almost touched the head of the humerus.

" The humerus, measuring it in a straight line from its head to its inferior condyles, was five inches long, and by following its different inflexions, eight inches and a half ; the head of this bone, lengthened from behind forwards, had its hemisphere somewhat flattened ; its neck, at its upper part, made an angle with the head ; there the bone seemed to be broken, and from this part to the condyles it formed a semicircle ; its diaphysis measured eight lines and a half in diameter.

" The ulna, from the olecranon to its other

extremity, was six inches and a half long, the radius an inch less, the ulna three lines in diameter at its middle part, the radius six lines, the ulna, towards its middle, had become ligamentous; that of the radius possessed a cartilaginous consistence; the two bones were curved inwards, forming an angle outwards towards their middle a little higher up.

"The bones of the carpus retained their natural figure and situation; they were much less softened than the other bones; those of the metacarpus and phalanges possessed nearly their natural solidity, saving the extremities of the three first bones of the metacarpus.

"On the right side, the clavicle, and that portion of the chest which is parallel to it, were obviously sunk in.

"The humerus and the two bones of the

fore-arm were much more contorted and zig-zag than those on the left side.

" With respect to the bones of the hand, the preceding remarks touching the left, apply *pari passu* to those of the right hand. I wished to try if these bones were susceptible of still greater mollification by macerating them in water for several days, but was not able to remark any additional alteration.

" As to the *inferior extremities*, considering apart those of the right side, the head of the femur, half out of the acitabulum, with a portion of its round ligament, was carried forwards and outwards ; it had become oval ; it yielded to the impression of the finger, and it, as was its cartilage, was plaited in different places ; its neck was very short, slender, and soft. The trochanter major was larger than natural, and throughout soft, excepting in some places wherein were found detached osseous points.

" The anterior part of the femur, down to about its inferior middle portion, presented to the feel some cartilaginous surfaces; but from this part to the condyles it was nothing more than a membranous sheath, containing a bloody, thick, and blackish fluid, into which it appeared that the osseous structure was converted. On the posterior part this bone was almost every where membranous; the condyles were very soft, yet the cartilage which encrusts them possessed nearly their natural hardness.

" The length of the femur, according to a straight line from the head of that bone to the middle of the inferior condyles, measured nine inches, and following its curves, eleven inches and a half.

" The rotula had almost its natural induration on its inner surface: its two cavities were deeper than ordinary, and the cartilages which covered them (which is remarkable,) were

almost entirely destroyed : the whole knee joint was more closed, and its ligaments appeared contracted.

" The length and size of the tibia was as usual : at its superior extremity this bone was irregularly membranous and cartilaginous to its superior middle part ; in this place the whole substance of the bone was changed into an absolutely membranous canal, to the extent of a full inch ; below, there were still some bony parts, but only on its anterior and internal lateral portion ; for posteriorly the tibia was almost wholly membranous, reddish and flesh-like : the internal malleolus had somewhat more consistence.

" The superior extremity of the fibula was much enlarged, and very soft ; small osseous plates might be observed externally, in different places on the length of its body, but it was quite membranous on its external and internal

surfaces; the external malleolus was swollen and much softened.

"The bones of the feet retained their natural configuration, but they were soft; the astragalus was anchylosed with the os naviculare.

"I am unable to give the description of the left inferior extremity, on account of the many curious parts which enveloped it. I suspect that the bones forming it, had undergone changes nearly similar to those of the right; and that the only real difference consisted in the greater degree of distortion they had suffered than those of the other extremity.

"In fact, Madame Supiot, when alive, had her foot situated by the side of the ear, and so placed, that the sole served as a pillow to her head, on which it rested on that side.

ON CERTAIN

OTHER PARTS OF THE SAME.

" The dissection of the muscles of the extremities furnished the following remarks.

" The bones of the inferior extremities having undergone the greatest derangement, that of the muscles necessarily became the most obvious : in fact, the vastus externus, the fascia lata, and the rectus, were shorter, firmer, and thicker than in their natural state ; whereas their antagonists, the biceps, the semi-tendenosus, the semi-membranosus, the gracilis, and the sartorius were very thin, very long, and easily torn . those of the superior extremities were nearly in the same state ; the deltoid, for example, was much shortened, and very firm ; the biceps very soft and relaxed ; all of which is very readily accounted for by the vicious curvitures which the bones had assumed.

"With regard to the viscera, the dura mater was confounded with the cranium: the falx was thicker than in its natural condition, and inclined much to the left, and consequently the right hemisphere of the brain was much larger than the left.—Blood was found effused into the two ventricles, and the plexus chorides was varicose.

"The heart and the large vessels contained polypous concretions, and the blood which formed them was very thick.

"The viscera of the abdomen were quite healthy, and the kidneys contained large sandy particles."

OF THE

MORBID ANATOMY

OF

INFANTILE RICKETS.

THE morbid changes induced in the body by infantile Rickets are the following: first, of the bones.—The appearances of these vary somewhat.—The texture of ricketty bones, as we have before remarked, is loose, soft, and spongy, and their apophyses enlarged. In some, the cellular structure is found filled with a medulloid substance, liquid and reddish; in others, these cellular interstices are full of a compact substance like plaster, while, in a third variety, the bones have been found reduced to their

parenchyma alone. The blood vessels in a softened bone are frequently preternaturally dilated, similar to what is seen in sarcomatous tumours, while the cartilages which are appended to them usually preserve their natural consistence.

The brain is larger in ricketty than in healthy children of the same age, being proportioned to the increased volume of the cranium; its consistence is flaccid, and a serous fluid is often found in its ventricles, and in the canal of the vertebræ. The spinous apophyses of the vertebræ are frequently wanting, especially in the inferior dorsal and lumbar, thus shewing the modified relation of this disease to Spina bifida.

The teeth, as we have said, are often black, irregular, and rotten. In old Rachitics several of the vertebræ are found anchylosed, in consequence of the interruption which the distorted

position of the spine occasions to the little movements they are susceptible of the one upon the other, which, though small, individually considered, is nevertheless well marked in their totality.

In the thorax we find the lungs diseased, bearing the vestiges of previous inflammation. Tubercles, as Hippocrates has remarked, are often found in their substance, and serum is effused into the chest and pericardium.

In the abdomen almost all the viscera are enlarged, and particularly the liver.—-The spleen is often found much greater than natural; the glands of the mesentery are almost invariably tumid and indurated, and the intestines are inordinately inflated through a tympanitic affection; yet it behoves us to remark, that the liver is occasionally the only viscus enlarged.

The blood appears in a dissolved state: the muscles are soft and of a pale colour, sometimes resembling lard; and a want of that rigidity which takes place after death, is the last and closing morbid appearance and remark which we will make.

OF

THE CAUSE OF RICKETS.

MULTIFARIOUS opinions have been entertained on this head, yet all writers concur in the proximate cause consisting in a deficiency of the earthy phosphate in the parenchyma of the bones; whence this proceeds is matter of question; but added to the defalcation of solidity in the bones, it behoves us to remark the deficiency of nutrition generally; and furthermore, that the deposition of osseous matter which does take place, seems to be inordinately determined to the articular apophyses of the long bones. In healthy ossifi-

cation we observe that those bones which attain the greatest size are slowest in their growth; and we may repeat that when a bone has attained its full state of induration, so has it that of its dimensions. If this ossific deposition goes on quickly, and that atan early period of life, it limits the growth of the person; and gigantic people when young indicate, with a lax texture of the bones, a flaccid condition of the carneous fibre.

Among the remote causes of Rickets have been enumerated bad nursing, a watery and acid state of the milk of the nurse, unfermented farinaceous food, a syphilitic taint and hereditary transmission. The French writers in particular, account siphilis as a frequent cause of Rickets, which induced Portal to prescribe chiefly a mercurial preparation; but those cases wherein he relates the efficacy of this remedy, were not, in my opinion, properly ricketty, but examples merely of diseased

siphilic vertebræ. Yet we must allow that parents who have suffered severely from the effects of this disease, and particularly when their bones have been much and principally affected, being thus debilitated themselves, may transmit this weakened osseous organization to their progeny, and in this way found a predisposition for this purpose. But Rickets is not invariably and necessarily an hereditary complaint. It not unfrequently occurs in the offspring of healthy parents, and seems occasionally a sequence of some unkindly repelled cutaneous affection. At the same time there are daily instances before our eyes, which too uncontradictably prove the hereditary transmission of this disease. The connexion of Rickets with a scrophulous taint has been remarked by most writers, and Tabes mesenterica is accounted one of its superinducing causes: indeed, to my observation there appears to be a peculiarity of constitution, and that to consist chiefly in a loose

and flaccid texture of the brain, spinal marrow, and nervous system in general, which may produce indiscriminately, and in a manner of itself, either hydrocephalus, spina bifida, rickets, or scrophula in some of its modes, according to some other peculiarity of structure which directs the diseased determination to a particular part, or order of parts, and thus forms one or other of the above diseases. Thus, more distinctly to define my meaning, that modification of this morbid constitution of the nervous system termed scrophula* is

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* Some may peradventure wonder why I should account scrophula as a disease originating in the nervous system. In my opinion, all diseased phenomena depend, and are occasioned by nervous power.—Reasoning without this admission and you contradict yourself, by tacitly giving independent vital qualities to a part you otherwise acknowledge to be passive and inert; if then the *source of all symptoms* be in the nervous system, ought we not to direct our attention more to produce changes on this *primum mobile* of the animal structure than what we do? Some, for example, are guided in the abstraction of blood by the mechanical idea of quantity alone, and all their reasoning

considered by most authors to have its source in obstruction *somewhere*, and as scrophula is

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on its effects are touching its abstraction.—Let such strictly examine their ideas, and perhaps they will find that they pursue them little beyond the effects produced by those of abstracted quantity, as it *relieves* the vessels, *lessens* the congestion, &c.—granted, but in relieving the mechanical distention of the tubes, which would be of little consequence were they merely, and at most, elasticly inert, it at the same time removes that source of inflammatory *irritation* which such determination and congestion produce on the *sentient* part of the frame, to wit, the brain and its *filaments*. It ought to be recollected that the blood acts upon the nerves as well as the nerves upon the blood—a circumstance which the modern theorists on the powers circulating this fluid seem to have wholly disregarded in their late speculations.*

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* Respecting the latter subject, allow me, though somewhat out of place, to ask the simple question, do muscular fibres any where exist (as living fibres), without exerting their *peculiar* contractile powers?—If any one denies this, then there can be no muscular fibres in the coats of the arteries, as *implied* by the doctrine of the circulation entertained by some of the present day. Let me put it to the

a disease of debility, and as d bility has its origin in the nervous system, this obstruction

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reader, may not the muscular fasciculi, surrounding the arteries, contract *invicem?* And small and hitherto imperceptible as this may be, we all know how much it *prolongs* momentum to give it the least additional assistance. Is it possible to admit, that the contraction of the heart, and the successive *vires à tergo* are alone sufficient to propel the blood forwards, and to overcome the opposition it encounters from the increasing points of resistance it meets with, and these the more numerous as it advances, from the gradually contracting calibre of the arteries ?

Does this theory of a *series* of minute fascicular contractions apply satisfactorily to the venous circulation ? I think it doth. I see no reason, saving the appearance of pulsation, obliging us to admit a *consentaneous* contraction of the arteries with that of the cavities of the heart ; and that this does not take place has been, in my opinion, completely established by the most conclusive experiments, but the inferences such would warrant, have been assuredly carried too far.

I may add, that the example of fasciculi contracting *ex ordine* is not without corresponding precedents in other parts of the muscular system, else whence the peristaltic motion of the intestines ? And who hath observed their fascicular contractions ?—Else whence the series of circumambient contractions which the different fasciculi of muscles make round a joint in performing a perfect rotatory motion?

is its consequence, either direct or indirect; but to determine in what precise order of parts this weakness exists yet remains one of the desiderata of medical pathology.

We mentioned in a preceding page that that form of scrophula denominated by nosologists Tabes Mesenterica, was one of the remote cause of Rickets. There is no doubt but that Rickets is often, though let it be remembered, *not always* accompanied with obstructions in the mesenteric glands; and considering the very early period at which this disease so often appears, it is difficult to say whether it is one amongst other effects of the general diseased habit, or whether it be a cause itself of Rickets. The difference between chyme and chyle proves the change the mesenteric glands effect in fitting the matter of nutrition for its conversion into blood; (and this we know is the pabulum of every constituent part of the body.)—The enlargement

and induration, then, of these glands, may act in two several, or in both the following ways; first, by merely obstructing the just supply of chyle to the blood in the proportion it otherwise would be absorbed by the patulent lacteals did no obstruction exist; or, secondly, as not effecting that proper change in the chyme suiting it for its assimilation and change in the blood-vessels; or, thirdly, and as we believe it happeneth, both of these impediments acting in concert, may have influence simultaneously in producing Rickets.—Be this as it may, the diseased state of these glands must, at all events, aggravate the disease, and unavoidably make it more difficult of cure.

Why Rickets should appear at a particular period of life and not at others, is, we think, sufficiently well explained by Dr. Cullen, viz.: that, before the ninth month of the child's age, the system is chiefly occupied in perfecting the

different viscera and other soft parts. After that the osseous solidity ought to ensue, to enable the infant to walk. If from any cause this process does not take place at the proper period, this must arise from some morbid cause, constituting, in fact, the disease under consideration.—Again, if the child has attained its second year, this process has taken place, and the bones have by this time gained sufficient solidity to enable the child to walk, and thus attain by exercise health to perfect the proper ossific developements. The event, in reality, proves that there has been no hereditary or accidentally-induced predisposition. Yet cases are on record, as we have narrated above, where this disease has supervened at a much later period of life.

In a preceding note we gave a rude sketch of the idea we had of the mutual connexion and dependence of the nervous and sanguineous systems; we may again merely allude to

this in noticing the somewhat similar effects of divided arteries and nerves. If either of these, supplying a limb, for example, be all of them divided, nutriment is cut off equally in either case, and mortification ensues whichever of them be cut asunder. The effects following such an occurrence are not *pari passu* alike, and the circulation, we all know, may continue when the sensation of the part is gone; therefore, we are not to conclude, that in a perfectly paralytic limb this nervous power is wholly annihilated; the logical inference allows us only to say, that the power which remains, though insufficient for the one purpose, is yet competent, although in a lessened degree, for the other. A train of ideas, somewhat similar to the above, induced Mayow * to conclude that Rickets proceeded from an unequal distribution of the nervous

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* De Rachitide.

fluid, whence, while one part of the body augmented inordinately in bulk, another became unduly attenuated; and to the superabundant congestion of nervous energy in the head he attributes the enlargement of the brain, and acute and precocious intellect of the rachitic patient. He was partly right, in our opinion, in some of the *rationes symptomatum*, had he added, that the nervous fluid, whatever this may be, was likewise altered in quality as well as quantity.

From the above, Mayow ingeniously frames an hypothesis, touching the curviture of the bones.—Thus, from the aforesaid inequality of nervous energy in parts, he makes the bones lengthen faster and more in proportion than the muscles; the consequence, according to Mayow, then is, that the muscles, being attached to the extremities of the bones, curve them in like guise as a string doth a bow; and his demonstration of the truth of

this, he jocosely, we presume, styles mathematical. It may be so, but the phenomena of the human frame are not to be solved like a problem of Euclid, notwithstanding the scientific language of some modern surgeons, who tell you of *hollow* tubes, and of the superior and inferior *angles* of a *ring*.*

Glisson, again, had a cuneiform manner of explaining these matters, which it were bootless to wedge in here.

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* Vide books on Hernia. The gross impropriety, nay, ignorance in the use of language which some medical writers are guilty of, is sometimes pleasingly *astounding*. One, for example, in a sapient essay on blood-letting, speaks of "*unimpregnable*"—pregnable and impregnable I can understand; but what unimpregnable means, surpasses my weak comprehension. The author, to be sure, might be experimenting grammatically, as two negatives make an affirmative, according to Lily; or, surgically, on the effect of a *contrecoup*. Again, in one of the late numbers of a medical journal, we are gravely told of the *palateableness of an Enema*. O PROCERES GULÆ!

Notwithstanding the fate of all preceding hypotheses respecting the origin of this disease, the author of the present little treatise is adventurous, perhaps imprudent enough, to advance a

NEW THEORY OF RICKETS.

This the author presumes to found on facts; and it will be his endeavour, in the sequel, to let the inferences from which be as logical and legitimate as may be.

All admit that there are two opposing powers in the system tending to balance each other in the full and perfect man, to wit, deposition and absorption.—-These powers obey the will of nature, and should any casualty derange the just equipoise she intends, it is wonderful in many instances to see the efforts she makes to lessen any undue preponderance.

It is thus that dropsies are *sometimes* spontaneously cured. To suit her own purposes Nature varies the *ratio* at the different periods of life: in young and growing people the absorption is not equal to the deposition, for were it so, there would be no growth of parts.—In middle age these powers equalize each other; and in old age the latter gains the ascendancy; they then both cease in energy of action, but in different degrees:—the function of absorption is more debilitated in proportion, and cannot keep pace with its antagonist; hence, from this debility the calcareous portion of the bones accumulates, whilst the juices are diminished, and hence the brittleness of the bones of very old people.

As these two functions are continually going on, there is consequently a perpetual absorption of old and deposition of new matter forming the body. Any thing impeding this deposition in the osseous structure, at the

same time that absorption is going on in the natural way, must produce that deficiency in the consistence of the bones, constituting the disease called Rickets. Another view will explain equally well the phenomena of this disease, which is by imagining an extra-ordinary energy in the absorbent ratio, while that of the deponent remains natural :—but I am not inclined to favor this opinion, as it is supported by no analogous example.

Now to close with the matter of our Theory. The phosphate of lime is the earthy matter giving solidity to the bones; but the phosphate of lime is nearly or entirely insoluble both in water and in blood; nevertheless, all must grant that it is deposited from this latter fluid; and yet blood is not a solvent, as we have said, of this earthy salt: then, this earth cannot exist in the blood simply in the state of a phosphate. But the super-phosphate of lime is perfectly solu-

ble, both in water and in blood: therefore, our purpose is to shew, that it does exist in the blood in the state of a super-salt. Facts and authorities are not wanting, and those of the highest kind, warranting this assertion, although never, as far as I know, yet inferred from what I am about to state. Thus, then, to our proofs.

Dried human bones contain, according to Berzelius, fifty-one out of an hundred parts of the phosphate of lime: the enamel of the teeth contains still more, that is, $\frac{85}{100}$, or full four-fifths; and in the bones of some animals, as in the ox, the proportion of the phosphate of lime is still greater.

Again—Fourcroy found, in decomposing blood by heat, besides other ingredients, unnecessary here to recapitulate, *phosphoric acid*, and *phosphate of lime*, &c. in the residuum. Here we have the *superabundant* acid driven

off, and the now neutral and insoluble *phosphate* abiding in the CAPUT MORTUUM.

New-drawn blood is perfectly soluble in cold water, and yet we see that it contains phosphate of lime, which, unless it existed as a super-salt, could not possibly be dissolved by, and commix with the water.

Fibrin, exposed to heat, is decomposed, and yields, amongst other components, *Phosphorus*, (that is, the *basis* of the decomposed superabundant acid), *and phosphate of lime.*

Albumen, by analysis, likewise yields this earthy salt; and, according to Scheele and Vanquelin, it is found also in the *serum of milk.* Note that; we can thus account for ossification going on in the infant at the breast.

The super-phosphate of lime has been re-

garded by Fourcroy and Vanquelin * as a distinct salt : it is, as we have said, very soluble in water, and, by the evaporation of its solution, it crystallizes in silky *fibres*, or in brilliant *scales* or *plates*. It cannot be deposited in the cartilaginous matrix of the future bone, between the external and internal periosteum, after this manner, and the super-abundant acid afterwards removed by absorption, and passed off by urine. The fibres would then form the exterior of the long bones and of others, and the scales or plates their cancellous structure.—We know that the enamel of the teeth is deposited in a crystallized form. But without meaning to lay any stress on this hint, or allow our Theory to rest on such disputable ground, I regard the origin of Rickets to consist in an inability in the proper decomposing apparatus to neutralize the fluid super-salt, and thus fix it as a solid.

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* Mémoires de l'Institut National, tom. ii. p. 274.

The *cui bono* of all which is, that such a view of the disease both explains some of the causes, and also points out the proper mode of treatment of Rickets.

The writer is aware that the idea of acidity in the blood as a cause of Rickets is not quite new; he will therefore devote a few more lines, giving an outline of the basis of this former opinion.

Where we first met with the notion of acidity is in some of the French writers, and the following were the authorities for their hypothesis.

M. de Fouchy, by chance, saw an ivory spoon which had been left, forgotten for a long time, in some milk, which, when found, had become as supple as leather. This suggested to Hunauld that it was the acidity of the milk which had effected its mollification, and to

ascertain the truth of his surmise he immersed some bones in vinegar, which softened them ; he then counteracted his experiment, by soaking the same bones in water for some time, and drying them, when they resumed their natural induration ; and, to conclude, he again rendered them soft by a second immersion in vinegar. These facts were deemed sufficient to establish the presence of an acid in the blood of ricketty patients, which, according to these theorists, dissolved the medium which held the earthy component of the bones adherent.—We then find this opinion adopted by Gagliardi, Herissant, Ruysch, Morand, and many others, but on the strength we see an analogical inference, not logical proof.

Leaving our speculative views, we are now prepared, I conceive, if the reader's patience has held out so long, to enter on the

PROGNOSIS OF RICKETS.

With regard to the prognosis of infantile Rickets, it is scarcely possible to improve on that given by Mayow. I shall therefore give it without comment.

"Quoad prognosin morbi hujus," says Mayow, "plerunque ex se lethalis non est: nonnunquam tamen, ingravescentibus symptomatis, in Phthisin, Tabem, Febrem hecticam, Hydropem pulmonum, aut Ascitem degenerat; et ita demum fit patienti exitialis. Prognosis autem facilior ex regulis sequentibus fieri potest.

"1. Affectus hic si ante partum, aut statim a partu invadat, periculossimus est, et plerumque lethalis.

" 2. Quo magis engravescunt morbi symptomata, viz.: si nimia sit partium disproportio, et extenuatio summa ; eo difficilior est curatio.

" 3. Si affectus hic morbos prædictos sibi conjunctos habeat, vix unquam in salutem terminatur.

" 4. Quicunque ante annum quintum non curantur, postea per totum vitæ spatium valetudinarii sunt.

" 5. Scabies aut pruritus morbo huic supervenientes, ad ejusdem curationem multum conferunt.

" 6. Quibus morbi symptomata non augeantur, sed potius minuantur, non est quod de eorum salute dubitetur."

OF THE

CURE OF RICKETS.

"THE unhappy prejudices of the rich," says Portal, "and the deficiency of means (and, he might have added, vices) of the poor, occasion this melancholy fact, that succeeding generations are always deteriorating." This observation of Portal induces us to make the passing remark, that the means Nature has appointed to regenerate man from the accumulated diseases successively inherited from luxury, is the destruction of the fabric civilization has erected for her own gratification—for civilization, like every thing else, has in it

radically the rudiments of its own annihilation, and, like fruit, it is nearest to a state of decay and dissolution when most perfect and ripe. But such is the remedy of the Augean Hercules—it is the province of medicine to effect her purpose by means productive of less momentous and sweeping events.

Our view of the seat of Rickets necessarily guides us in the indications of cure, and as this is placed, in our opinion, in the flaccid state of the nervous system generally, to effect healthy changes in its functions will form the grand indication and plan of treatment.

The medicating efforts of Nature, we may premise, are alone sufficient to accomplish a cure, if the constitution has strength enough to hold out; with such a favouring predisposition, it consequently becomes a speedier matter if she is aided in her healing powers by a judicious application of art, to which

purpose these are our indications: *first*, to bring the digestive organs to discharge *their* functions aright, so as to *prepare* the materials of ingesta for the proper nutrition of all the parts of the body; and, *secondly*, and at the same time, to confirm the strength gained by proper nutriment, by giving tone to the system generally.

In the symptomatology we noticed the disordered state of the bowels, pointed out sometimes by costiveness, sometimes by diarhœa, and always by a fœtid condition of the fæces; therefore, were it merely to remove offensive matter, and prevent its accumulation, we see the necessity of purgatives in this disease. But their good effects, in my opinion, are not limited to that of simply evacuating the bowels; their main efficacy consists in correcting the morbid nature of their secretions, and it is by effecting this, and stimulating the bowels to an healthy action, that digestion

becomes natural, and hence, beneficial.—I commence then with their use, and continue them throughout the cure. Were it asked me which purgative I recommend, Rhubarb, joined with the sub-murias hydrargyri, has my preference. When the patient is convalescent, and able to be removed, a saline mineral spring is advisable, and for this purpose I know none more highly to be prized than that of Leamington in Warwickshire. Bordeu, Farrein, and other of the French physicians, were used to recommend the mineral waters of Bareges in the cure of Rickets.

An occasional emetic is likewise entitled to the same praise, particularly if any acidulous or bilious symptoms are present—but even in the absence of these, I at times administer them with the object of dejecting the sympathy they excite to the bowels, and ejecting it on the surface; indeed, in all cases where digestion is deranged, I know of few

more efficacious modes of cure than that of attending to the state of the skin.

The fact of the deficiency of phosphate of lime being the proximate cause of Rickets, induced some physicians to try the efficacy of this earth administered internally, but in my judgment, from a short-sighted view of the subject, and, in truth, the result proved it so, for the trial was futile. We might cram quartern loaves down the gullet of the Farnese Hercules as abundantly as we pleased; but without an internal apparatus to digest them, our endeavours to aggrandize this Colossus would be vain and unavailing.

Of all the remedies given with a local object I have found none so pre-eminently useful as the alkalis. I was induced to try their effects from reading Brandish's book, and the result has been in several instances most happy. His mode of administering this

medicine was faulty because unscientific, for the preparation never could be precisely of the same uniform strength; to remedy which I usually prescribe so many drops of the *aqua potassæ*, according to the age and strength of the patient, mixed in a stated quantity of *aqua calcis*, and order it to be taken in some bland vehicle or in porter. At other times I order the carbonas sodæ simply, to be taken in similar beverage. Can these remedies act beyond the effect of promoting healthy digestion by correcting acidity in the primæ viæ? I say can they act by neutrallizing the súper-phosphate which we have shewn to exist in the blood, and thus favour its deposition in the bones? But reader, let not this hypothetical idea detract from what I have before advanced, since the author had reason to be persuaded of the efficacy of alkaline remedies long before any speculative notions touching the nature of Rickets, had at all occurred to him.

Among the means tending to fulfil the second indication of cure, *to wit*, that of strengthening the tone of the system generally none are so justly celebrated, or possess more eminent recommendations than cold bathing; as to our ideas of the *modus operandi* of a cold bath, they are as follows: cold externally applied constricts the surface chemically, and the tone it gives to the capillary circulation is similar to that imparted by a tight bandage; but besides this mechanical effect, it distinctly gives an impetus to the nervous energy; the consequence is an increased vivacity of the extreme vascular system, the one indicating itself in the *feeling* of glow which pervades the skin, the other in the *vivid efflorescence* which suffuses the surface. But these effects do not stop here, they are communicated by sympathy to the stomach and intestines; hence the keen appetite it gives, hence the healthy digestion it promotes, and the regular state of the bowels which it eventually induces.

Where the little patient is much debilitated, and in an especial manner when the mesenteric glands are obviously diseased, perhaps a hot bath is preferable; and to venture a second time to obtrude our notions on the *quomodo*, reader, take these.

It were needless to expatiate at length on the effects of the same medicine in different conditions of the system; that a dose of opium, for example, which would induce sleep under certain circumstances, will at another time produce very contrary effects.—The practical physician must almost daily meet with disappointments of this sort, and it indicates his superior acumen to meet with as few as may be: of this kind is cold, which, in a debilitated constitution, if incautiously used, instead of strengthening the tone of digestion, rather impairs it. Hence, to people past the middle period of life, I never prescribe a cold bath. The system, when the spring of life is vigor-

ous, under the impression of a cold bath, resembles a bow :—the more it is bent, the stronger is the consequent reaction when the force which inflects it is removed; but in a weakened system the nervous elasticity is sometimes too far exhausted to resist or repel the imposing power, and, like a rod of lead, it takes and retains unresistingly whatever arc is given to it. The effects of the warm bath again are, that it relaxes the clogged cuticular adstriction; it excites the capillary circulation, and promotes the exhalant perspiration: similar sympathetic effects are produced in the primæ viæ; and the support which weakened life thus gains from the fotus evinces itself in a softened skin, clearer and wholesome complexion, and improved appetite.

As general tonics chalybeates * and chaly-

* Boyle has the credit of introducing chalybeates into the materia medica; but it seems feasible that the medi-

beate waters stand high in estimation, and are therefore useful adjuvants in the cure of Rickets.—Benevoli and Buchner prescribed the preparations of copper with the same intention. The metallic salts are found to coagulate the blood.—Can chalybeates entering the system tend to enrich the blood by condensing its fluidity? Its red colour, we know, is generally ascribed to the iron it contains.

De Haen used the bark as a tonic, and the testacea as a succedaneum; Van Swieten pre-

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cinal qualities of iron were known even to Machaon and Podalirius, the reputed sons of Esculapius, *before the taking of Troy*, that is, about 3000 years ago; for Homer tells us of Telephus, who was healed by the wound given him by Achilles by taking the *rust* of the spear which had inflicted the injury.

The writer is engaged digesting materials for a work which will comprise the consideration of the claims put forth by many of the moderns to what have been delivered to the credulous as new and important discoveries.

scribed hemlock, but these are remedies I do not feel much inclined to confide in. More reliance is to be put in a proper dietetic and auxiliary treatment, consisting of attention to air, exercise, and diet, a few words on each of which will terminate our curative indications of Rickets. It is of consequence to avoid damp, hence an elevated situation where the air is pure and dry is to be prefered as a residence. It is of no less importance that our little patient should have exercise. Children are naturally active, but exercise, in a softened and flexible state of the bones, ought to be of a regulated kind. Thus motion, in a recumbent posture, as that of swinging, stretched horizontally on a reclining couch, afterwards to be described, is what I would advise; there is then no perpendicular weight pressing on the bones, and the body is at the same time preserved in a rectilineal position. Another mode of exercise highly to be recommended, is that of

friction with dry flannel, or a flesh brush, and this particularty along the course of the spine. There can be no objection to the occasional use of a warm stimulating liniment, but perhaps otherwise. And, lastly, the regulation of the diet ought to constitute a main object of the physician's regard. This ought to be nutritive, and if the patient is at the breast, and there is any suspicion that the milk of the nurse is watery and acid, it ought to be immediately changed. Acids have been condemned in this disease, and justly; and whatever food is likely to become sour from fermentation, ought to be shunned. Hence, panada, made of unfermented bread, is objectionable. When facts and theory do not clash, the latter is, at all events, harmless. This persuasion induces me to notice, that those distinguished French chemists, Thenard and La Grange, discovered, by analysis, *free* acetic acid to exist in recent milk, which may be procured by distillation; and there

is no doubt but that this acid is frequently formed in the intestines by the acescent fermentation of unconcocted vegetable aliment. Now, acids *have been found* noxious in this disease, and *acetic acid is capable of dissolving the phosphate of lime.* The rich milk of a country-fed cow, with arrow root or sago, boiled in it, forms a very proper and nutritious food for children away from the breast, and if panada be used for an infant, let it be made of the crust of baker's bread. It is unnecessary to inculcate the propriety of cleanliness, both in health and disease.

It has been a question, whether and when mechanical contrivances ought to be used to remedy the distortions produced by Rickets. When the disease is advancing, their application can be of no utility, but, on the contrary, they must prove injurious, by fettering the limbs unnecessarily; but when the system makes a stand—when it begins to rally, by guiding Nature in disposing of the osseous

deposit in its natural position and arrangement, then it is that instruments prove advantageous. But it behoves us to observe, that if not judiciously applied, they more often do harm than good, and the obloquy attached to their use is more owing to their improper and indiscriminate application, than to their real merits. To do this properly requires more knowledge than what some presuming instrument-makers can pretend to, whose interest it is, as mechanics, *invariably* to recommend them; and yet they even will write you a book on medical subjects connected with distortion—a carped, heterogeneous and abortive digest from some other regular medical works.

But the further remarks on this subject which I have to offer, will be found in a description that is to to follow, on the construction and use of what the writer begs respectfully to submit, as an improved reclining couch.

A FEW REMARKS

ON THE

NURSING OF CHILDREN.

A French writer has well observed, that "les Enfans sont le chef-d'œuvre de la Nature, leur conception manifeste sa puissance; leur développement et leur croissance font admirer l'ordre de ses opérations. Leur naissance est un objet de tendresse et d'amour; elle est le principe des richesse des Nations, de la gloire des Rois, le nerf, et le bon heur des Empires." How incumbent, then, is the duty of paying regard to all those circumstances which may

disable children from afterwards becoming, instead of burthens to society and to themselves, active and useful members of the community. The first moment of pulmonary * life brings with it a train of evils, which beset its existence in order to destroy it. Umbelical life is not less obnoxious to danger; it may be blasted in the germ; it may be too feeble in itself to develop the organs necessary for its own nutrition, in endeavouring to effect which, it may struggle for a time, but die in the effort. Supposing it surmounts these and other difficulties, yet there are a series of entailed diseases, through whose fiery ordeal infantile life must pass before it attains the chance of living even under the rough assaying hand of vicisitudes of temperature,

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* I use the expression pulmonary, in opposition to that of umbelical life, as the word *extra-uterine* might be cavilled at.

hydrometrical variations, changes of diet, and the common casualties of unforeseen events.

Cicero has remarked, that Nature is her own conservatrix and the common mother of mankind. Notwithstanding that the vices of humanity are continually thwarting her efforts, Nature, we see, furnishes all her works with inherent powers and principles tending to oppose any obstable to the completion of her designs, or to the annihilation of her purposes; for human nature, considered as a free agent, is certainly a base compound, false in its principles, deceitful in its purposes, and selfish in its end; and without the bountiful goodness of the first great Cause, man, of his own vile accord would, in a few generations, accomplish his own extinction. It is the object of the following lines to give, in one succinct sketch, a few directions to mothers to lessen, if possible, some of the ills brought about by negligent and improper nursing.

Numerous already are the diseases inherited by mankind, or casually and in a manner unavoidably caught in our passage, as individuals, through organized existence, without our adding to the fell list those which are superinduced improvidently and sometimes even with wilful perverseness. Small pox, measles, chincough, and many other affections, are, as it were, the morbid heir-looms of humanity; hereditary complaints again, as scrophula and its modifications, tubercular consumption, &c., range themselves under the banners of affliction. Females, educated in the lap of indolence, luxury, and ease, bring to the marriage couch a constitution delicate, languid, and enervated, whence their future progeny partake of their own debility; and if the father should add to this stamina shaken and paralyzed by debauchery, the offspring of such is the living vehicle of disease.

Let us see what can be done to avert such

an host of evils from making a prey of the living principle.

First, as to diet. All agree, that the milk of the mother is the natural food of infants; and deviations from this practice, however usual, are not thereby the less reprehensible. In common, then, with all standard writers on nursing, I would recommend the mother to nurse her own child: it is good, both in a moral and physical point of view. But circumstances may exist, rendering even this natural practice improper, as a weak and unhealthy state of the mother, in which case, a nurse's milk is preferable. The choice of a nurse is a matter of serious import: first, that she be perfectly healthy, and secondly, that the lapse of time since delivery should correspond as near as may be, with that of the natural mother. Although it is a disputable point whether the nurse can affect the child she suckles with any peculiarity of con-

stitution not usually accounted, in common language, morbid, nevertheless I am inclined to think it possible; therefore, in the selection of a nurse, her metaphysical qualities, as well as her physical condition, would influence and direct me much in the choice. It is stated, that lambs who are suckled by goats get a coarser and thicker wool than other sheep. Whence comes this, unless through the difference in the nature of the milk? The nurse ought not to be changed unnecessarily, for, as Hippocrates remarks, the food a person has been accustomed to, although of an inferior quality to what might be given, yet it ought not to be discontinued too suddenly, lest danger should ensue from the change.

Secondly. The proper cloathing of children demands attention; as a general direction, it may be said that it ought to be suitable to the season of the year. The unnatural custom of tight swathing has yielded to the eloquent re-

monstrances of Rousseau ; animadversion on this head is therefcre superogative. *

Thirdly, of exercise. Children, by nature, are more helpless than the young of other animals, and hence, remain longer in a state of tutelage.—Before their infant limbs have attained strength sufficient for loco-motion, frequent exercise in and by the arms of the nurse, is therefore a salutary and necessary part of her duty. The perspiration of an infant is much more abundant than in the adult, and exercise promotes this ; hence, also, the benefit and propriety of suitable

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* When I went on a visit of curiosity to the Indian village of Loretto, in Canada, I was surprised to observe some of the *improvements* of civilization adopted by these wild aboriginals. One that struck me in particular, was a sickly babe, lashed to a piece of wood resembling a cricket-bat, only a little broader, and that so tightly, that the only parts the apparently resigned and pensive little innocent could move, were its eyes.

cloathing. Attention to cleanliness, apart from its comforts, likewise assists cuticular transpiration; dry friction is a like healthy and adjuvant practice, the sanative effects of which have been long known in India under the denomination of champooing; and, as a prophylactic, the practice of frequently bathing children in cold water is acknowledged to be most powerful; the Lacedemonians even made it one of their laws. Among the Spartans it was the custom to plunge their children as soon as born into the Eurota. Virgil and Seneca also tell us, that this practice obtained among the ancient Germans, who bathed their children in the Rhine.—Cæsar mentions, that the Scythians and Ancient Britons observed the same custom, and Homer must allude to this when, with the licence of a poet, he acquaints us of the immersion of Achilles in the Styx to render him invulnerable. This feigned river of the infernal regions was in truth but a fountain

in Arcadia, which took its source at the foot of Mount Nocaris, in the Peloponesus. Its waters were *so cold*, that they were regarded as poisonous, and it was said they even corroded iron and copper, and broke in pieces all vessels that were immersed in them. Cold bathing, I may add, has been an immemorial custom amongst all the nations of the East; it makes one of the positive injunctions of Mahomet, and constitutes one of the rites of his religion. The Spaniards, on discovering America, found it an established practice in Peru; and lastly, the constant use of it in Russia is too well known to need more than an allusion. My ideas of its mode of action I have already explained in a preceding part of this work.

The foregoing observations apply as preventives of Rickets; we now come to offer some remarks on the remedying of distortion when this has actually taken place.

One great and prevalent cause of the distortion in the figure and position of the lower limbs of children arises from the idle anxiety of nurses to teach them to walk too soon. No maxim ought to be more inculcated than that children walk of themselves when they have attained competent strength for it. Children are naturally active, and as soon as the bones have gained sufficient solidity, and the muscles sufficient strength, their little mischievous curiosity will quickly prompt them to walk: this inherent bias may be assisted and encouraged, but ought never to be prematurely forced. Indeed, while laziness is at bottom the main reason for the nurse's conduct, she deceitfully flatters the vain and confiding mother by a false representation of the willingness and ability of the really reluctant because incapacitated infant. Nothing can be more correct than the remark of Duverney,* "Tout

* Malad. des os Tom. ii. p. 334.

s'accorde avec l'experience, qui nous apprend que les enfans qui non pas encore marché, ou qui ne marchent peu, ont les parties moins contrefaites." Mothers! then see to this.

Position is another circumstance to be regarded, the neglect of which is, in infants, but particularly in young growing persons at school, one of the most common occasions of a distorted shape.

Respecting children, it imports us to note the impropriety of seating them on soft cushions, &c.; they sink into them, their body bends forwards, and the back consequently becomes curved. The same objection applies to chairs hollowed in the middle; they perhaps sit more secure in them, and with more comfort for the moment, but these considerations ought to be disregarded. The height of the arms of their little chairs is another matter of some importance; they na-

turally lean upon them, and if too high, this elevates their shoulders ; if too low, they lean only upon one, the evil consequences of which are too obvious to require indication : perhaps it were better, were they without elbows at all.

In those more advanced in age, and especially in girls at school, the imprudence of neglecting proper position is often too painfully exemplified. To those in the habit of stooping I would recommend a music chair, the effect of which is to oblige them to sit upright. Dumb-bells are used to throw the shoulders backwards and open the chest, and I do not object to them ; but as a preferable plan, I am in the habit of advising a stick, covered with velvet or cloth, placed across the upper part of the back, its ends coming under the axillæ, and shifted and retained by being embraced by the bend of the fore-arm. In this manner the degree of extention can be

varied and graduated agreeable to the feelings of the patient; and thus pinioned, if I may say so, let the party under discipline, walk about the room or elsewhere three or four times a-day. I may be allowed to observe, that the above plan is often adopted by drill-sergeants to uprectify recruits.

Another mode of rectifying the stooping attitudes of young people, which is mentioned by Portal, deserves mention for its simplicity and propriety. It is as follows: "Let the child take hold of the extremities of a small stick, equally in both hands, attached by its middle to a ribbon or cord, which has passed through a pully fixed to the cieling; and at the other end of the cord let there be appended a small weight; tell the child, after having caused him to put his feet close, and directed him to hold himself erect, to draw downwards the small stick with both his hands, and by repeated exertions, to elevate the weight equally

till he has sufficiently fatigued himself. * I say slightly, in order that he may not be discouraged from repeating it two or three times a-day." And, as the last direction I shall give to mothers, I finish with one given by the same author to counteract any improper curve which the body has acquired on one side or the other. "I have sometimes suspended from the cieling with a pack-thread," says Portal, "a leathern ball, at such an height, that the child cannot reach it with his hand, but in raising himself a tip-toe, and hence inclining his trunk to the side opposite to the elevated hand: for instance, if the body is bent and twisted from left to right, it is with the right hand that we must direct him to reach to the ball; then the muscles of the right side are thrown into action, and not only those of the superior extremity of this

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* *Labor illos citra lassitudinem exerceat."*
Seneca Lib. ii. de Ira.

side, but also those of the trunk, and hence curve it, by repeated experiments, in the opposite direction in which it is morbidly distorted."

As the META of our labours it remains for us to give a plate of the reclining couch alluded to, with some few explanatory and descriptive remarks on its use and construction.

side, but also those of the trunk, and hence curve it, by repeated experiments, in the opposite direction in which it is morbidly distorted.

As the MEDIA of our labours it remains for us to give a plate of the reclining couch alluded to, with some few explanatory and descriptive remarks on its use and construction.

DESCRIPTION, &c.

OF A

NEW RECLINING COUCH.

As the distortion of the spine is one of the most frequent consequences of Rickets, it becomes an object of the first importance to lessen or remove this, or to prevent altogether such an occurrence from taking place.

The reclining Board in common use is constructed on a Tyburn principle, that of suspending the unlucky patient by the neck, and by inclining the Board more or less, to let the weight of the parts inferior to the head *drag* the curved spine into a rectilinear position. It must be granted, that this is an improvement on the plan practised and recommended by Hippocrates, who was wont to hang the

patient by the head between two of the steps of a ladder, and thus suspended, allow the trunk and limbs to dangle straight by their own gravity. To accelerate this object, the patient was *shook* frequently, the effect of which, methinks, was often likely to be similar to a case on record. *

The Couch here represented † is meant to act on a very different principle, and is so capable of graduation that the degree of extention may be regulated with mathematical minuteness. This is effected by the operations of two screws, which work in opposite directions, the superior on the head and neck, the inferior on the pelvis. Now, every one is aware, that nothing can act with more nicety and precision than a screw ; nothing can be made more micrometrical, and, what in the present instance is of infinite importance, no

* Vide Colman's " Night-gown and Slippers.

† Vide Plate.

extention it is caused to make, if too great, can be quicker or more easily counteracted. But to be more particular in the description of its mechanism.—This consists, *first*, of a cap or hood of brass, (A), lined inside with red velvet, which embraces the back part and sides of the head, and a strap, affixed to a stud on each side of the hood, passes under the chin, and thus fixes the head. Two small pillars, fastened to this cap, descend in proper slits through the bottom of the couch, and are riveted to a moveable stage sliding in grooves made in the sides, and at the under part of the couch, which (stage) works upon an adjusting screw with fixed collar, the nut or head of which is placed at the *upper* end of the couch: *secondly*, of a middle part, consisting of two stages, an upper and under, connected by two small pillars, which pass through narrow lengthened slits, similar to those described above. The hips are placed on the upper moveable brass stage (B,) which is hollowed to receive their

convexity, and covered with velvet, upon and to which is fastened a *thinly* stuffed cushion,* with proper straps to buckle round the pelvis, and others coming up over the inner and upper part of the thighs, to be fastened to studs on the outside of the upper moveable stage. The under stage again slides in grooves underneath, and is connected to another adjusting screw with fixed collar, the nut of which works at the *under* end of the couch.

Suppose, then, the patient placed on the couch, with his head in the hood, resting, for the greater comfort, on a small, thin pillow, and his loins, in like manner, fixed in the moveable stage as described above, by turning the nut at the lower end of the couch a gradual extention is made on the spine by its drawing the loins gently downwards, at the same time the head remains a fixed point

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* Letter D in Plate II. represents this cushion.

in the hood above. But in order to make the machine still more corrective, we saw that the hood itself was attached below to a moveable stage, working, for accuracy's sake, in grooves placed in the sides of the couch, and this again regulated by an adjusting screw, whose nut is situated at the *upper* end of the couch; therefore, *after* extension has been made by the one below, it is in the power of the patient to have this made more complete, by having the adjusting screw at the top turned so as to draw the head upwards.

In order that the inferior limbs should be kept straight, a pedestal (C,) is affixed to the same adjusting screw which regulates the motions of the loins, on the like principle as related above, so that inasmuch as the pelvis descends, by so much also does the pedestal. The plain forming the part on which the patient reclines, is covered with red velvet, and two rings are attached at each corner of

the couch, through which, cords are to be passed, when the exercise of swinging, in a recumbent position, is prescribed for the patient.

As it is an object to have the body to lie on a plain as much horizontal as possible, the upper stage on which the hips rest, and to which the loins are fixed, moves so close to the bottom of the couch as merely to clear the velvet underneath. Hence, also, the pillow and cushion mentioned, ought, for the same reason, to be *thinly* stuffed.

I may be permitted to add, as an advantage peculiar to this machine, which, I dare say, the reader has already perceived, that the extending powers can be relaxed in a moment, and at pleasure, by turning the nut of either screw in the opposite direction, and thus, by allowing the head and pelvis to approach each other, to lessen or remove

altogether the extension of the spine. Now as it is desirable in all cases to study the ease and comfort of the patient, which hitherto appears to have formed no part of the construction of preceding instruments for a like purpose, this couch distinctly possesses this superiority. Nothing scarcely can be less complex than its mechanism, or more simple in its manner of adjustment.*

With regard to the application of it as a means of remedying the distortions of the vertebral column, I have, in a preceding page, observed that its use, when the bones are still progressively softening, can be of no avail; but when the system sets about repairing the *dilapidation* of her frame, then it is that, by directing the deposition of the mineral ingredient of bones, it must prove of such

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* A model of it I shall be happy to shew to any of the profession curious to see it.

essential service. As to the degree of extension to be used, and when and how long it ought to be applied, must be left to the peculiar stage and circumstances of the case. As a general remark, it may be said, that if the patient be old enough, the expression of his feelings will serve as a very rational guide to the degree of extension.

To conclude. Had Hippocrates seen this Couch, he could not have expressed himself, in my opinion, more descriptive of its powers than in these words :—

"*Optimum igitur est hujusmodi vim adhibere, quam tum intendendo, tam remittendo pro cujusque arbitrio temperare licet, et quæ vel secundum naturam compulsionem facit.*" De Articulis."

FINIS.

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