Prize dissertations / by M. David ... as adjudged by the Royal Academy of Surgery in Paris ; first, on the effects of motion and rest, and their several modes of application in surgery ; secondly, on the various effects of counter-strokes on the human body, and the methods of relieving them ; translated from the original French, with copious additional annotations, by J.O. Justamond.

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PRIZE DISSERTATIONS

By M. DAVID,

SURGEON AT ROUEN IN NORMANDY,

AS ADJUDGED BY THE ROYAL ACADEMY OF SURGERY IN PARIS.

FIRST,

ON THE EFFECTS OF

MOTION AND REST,

AND THEIR SEVERAL MODES OF APPLICATION IN SURGERY.

SECONDLY,

ON THE VARIOUS EFFECTS OF

COUNTER-STROKES

ON THE HUMAN BODY,

AND THE METHODS OF RELIEVING THEM.

TRANSLATED FROM THE ORIGINAL FRENCH, WITH COPIOUS ADDITIONAL ANNOTATIONS,

By J. O. JUSTAMOND, F. R. S.

SURGEON TO THE WESTMINSTER HOSPITAL.

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M.DCC.XC.

THE SUBJECT PROPOSED FOR THE PRIZE

BY THE

ROYAL ACADEMY OF SURGERY AT PARIS,

FOR THE YEAR 1778.

TO EXPLAIN THE EFFECTS OF MOTION AND REST, AND THE INDICATIONS ACCORDING TO WHICH THE USE OF EITHER SHOULD BE PRESCRIBED IN SURGICAL DISEASES[1].

MOTION and reſt are certainly two methods of cure, the rational employment of which may contribute to enlarge the bounds of ſurgical knowledge, ſince the Academy, ever intent on the improvement of this ſalutary art, propoſes for the ſubject of the prize they mean to diſtribute, to deſcribe their effects, and to ſhew the indications which direct the uſe of them in ſurgical diſeaſes. The diſcuſſion of a queſtion of this nature, which is more intereſting than it may appear at firſt ſight, muſt neceſſarily ſuggeſt intentions of cure, which this celebrated body alone can perceive, and the expoſition of which they may, perhaps, expect in vain

from thoſe who ſhall employ themſelves on a ſubject ſo important. To treat it properly would require the united genius and knowledge of thoſe learned men of which the ſociety is compoſed; how is it poſſible then, that one man alone, left to his own powers, can flatter himſelf, that on ſo intricate a queſtion, he ſhall be able to ſatisfy judges, before whom, moderate talents cannot appear without dread? This humiliating reflection would prevent me from entering the liſts, were I not encouraged by the conſideration of their indulgence, the inſeparable attendants on learning. In granting the prize to the moſt ſkilful, they do not always deſpiſe the labours of thoſe whom an honeſt confidence engages in the competition. Beſides, if I have laboured unſucceſsfully, my excuſe will be in the greatneſs of the taſk, which, as it aſtoniſhes without diſcouraging me, I will proceed to exert my utmoſt efforts to fulfill.

The effects of motion in the animal œconomy are evident, but motion itſelf is an effect produced by its own cauſes. In order therefore to give as much clearneſs to the diſcuſſion of this queſtion as it is capable of, it ſeems to me of ſome utility, to conſider the ſource from whence motion is derived.—This may enable us to explain its effects with ſome preciſion, in conſequence of which the application of them to ſurgical diſeaſes, will become more methodical and certain. Such is the plan I propoſe to follow; the propriety of which will, I hope, appear in the unfolding of it.

It is to motion that the univerſe owes that life with which it is animated. Man, the epitome of the univerſe, diſcovers, in all the faculties which conſtitute and characteriſe him, the produce of an uniform and regular motion, ſubordinate to powers, the admirable mechaniſm of which will ever be unknown to us. But, without endeavouring to form conjectures concerning this mechaniſm, we may reaſonably preſume, that motion is the effect of a general active principle, diſperſed throughout the univerſe, by that Being who created it. This principle is undoubtedly material, and among the ſeveral ſubſtances that conſtitute our globe, and the beings that adorn its ſurface, there ſeems to be but one that poſ-

ſeſſes

ſeſſes in itſelf this property of motion; that is FIRE; all the reſt are in a ſtate of inactivity.

This active principle, united to ſome of our fluids, conveys motion into the machine, and tranſmits it by means of organs appropriated to this effect (1). Theſe organs are the muſcles, of which there are two kinds; ſome which are not ſubject to the controul of the will, and whoſe motion begun at the firſt moment of exiſtence, is uninterruptedly continued to its end; ſuch are the heart, the arteries, the ſtomach, the inteſtines, &c. There are others whoſe motion is ſubject to the will, and which ceaſe to act whenever they are not determined by that principle, either for the wants or pleaſures of the individual; ſuch are the muſcles deſtined for the motion of ſome of the parts of the human body, and employed in conveying us from one place to another.

This diviſion determines two kinds of motion, which are diſtinguiſhed from each other by very palpable lines of ſeparation. — The one is employed in entertaining the vital principle, the other does no more than ſupply its exigencies and its pleaſures; a difference ſo remarkable, that it neceſſarily implies one in the ſource from whence theſe motions are derived.

The nerves are the viſible canals through which the active fluid we attribute theſe two kinds of motion to, is conveyed throughout the whole extent of the animal œconomy. Their origin is well known: they are all derived from the organs contained within the cavity of the ſkull; and amidſt the numerous canals which take their riſe from the medullary ſubſtance of the brain and cerebellum, we may diſtinguiſh thoſe which are diſtributed to thoſe important organs whoſe action, independent of the will, is abſolutely eſſential to life; theſe are particularly the intercoſtal nerve and the eighth pair, which evidently ariſe from the proceſſus annularis, or Pons Varolii (3), formed, as it ſeems, by the union of the pedunclés of the cerebellum, while no part of the medullary ſubſtance of the brain ſeems to enter into its compoſition. The nerves, on the contrary,

which are diſtributed to organs deſtined to leſs important functions; to ſuch, for inſtance, whoſe province it is to direct our loco-motive powers, ſubject to the controul of the will; theſe, I ſay, are all derived from the medullary ſubſtance of the brain, or from the ſpinal marrow which is the continuation of it.

From this obſervation we may be convinced that the fluid ſeparated by the cerebellum is of a ſuperior quality to that furniſhed by the brain, and that the functions of the firſt of theſe organs, are infinitely more important than thoſe which are aſſigned to the latter. This ſuperiority ſeems to be indicated by nature in the precautions ſhe has taken to ſecure the cerebellum from external injuries. The brain, it is true, is likewiſe protected from them; but the anxiety of nature in her precautions to prevent the injuries the brain might be expoſed to, are infinitely leſs remarkable than thoſe ſhe has employed in ſheltering the cerebellum from any hurt that might befall it from without. In fact, the ſituation of the cavities occupied by the cerebellum, the thickneſs of the occipital bone, in thoſe parts where external ſhocks might take place, the quantity of muſcles that ſurround that part of the baſis of the ſkull where the bone is thinneſt, the tentorium which covers the cerebellum, and prevents it from ſuffering compreſſion from the poſterior lobes of the brain; the conſtruction of this tentorium, made with a ſagacity which cannot be ſufficiently admired; the ſpeedy death which is the conſequence of wounds inflicted on the cerebellum, while very material wounds of the brain are ſometimes not mortal [a]; all theſe circumſtances, I ſay, contribute to give the ſtrongeſt degree of evidence to the ſuperiority we have eſtabliſhed.

But the brain and the cerebellum are not the only preparers of animal ſpirits; we find other organs in the cavity of the ſkull, which leave us no room to doubt, that in her preparation of the nervous fluid, nature hath eſtabliſhed a difference relative to the end ſhe means to accompliſh. The corpora ſtriata, for inſtance, placed in the midſt of the brain, are they not particular organs which diſplay the whole apparatus for ſecretion;

tion; to wit, a greyiſh ſubſtance, the ſecretory organ (4), and a white or medullary ſubſtance, the union of which forms the origin of the firſt pair of nerves, deſtined to convey that particular fluid fitted to the purpoſes of ſmelling?

Do not the ſecond pair of nerves, which become the immediate organ of viſion, take their riſe from a particular ſubſtance, diſtinguiſhed by the name of *thalami nervorum opticorum*, and which ſeems to form a kind of ſmaller, in the midſt of the larger brain? The medullary ſubſtance, which their external ſurface preſents, is probably impregnated with a fluid already ſecreted in ſome other part, and which, in its paſſage through the greyiſh ſubſtance of theſe *thalami*, receives a higher degree of elaboration before it reaches the medullary ſubſtance, which is in their center, and which is the origin of the optic nerves, continually replete with a particular fluid, calculated ſolely to receive the impreſſions of light.

The pineal gland compoſed of a greyiſh ſubſtance, and which has two medullary threads produced from it, is it not alſo the ſtrainer of a fluid deſtined to ſupply ſome important functions? The pituitary gland, the uſe of which we are as little acquainted with as with that of the former, may it not likewiſe be the elaboratory of ſome particular fluid abſolutely neceſſary to life? This may, at leaſt, be preſumed, when we conſider all the precautions nature has taken to ſecure it from outward injury, and from being compreſſed by the parts that ſurround it; for nature does nothing without neceſſity or without a motive, and wherever we can follow her ſteps, or diſcover them by conjecture, we find that her choice is always ſupported by reaſons which compel us to admire and be ſilent (5).

The third pair of nerves gives us another proof that nature does not make an indiſcriminate uſe of the two ſources we have indicated. It is from the medullary ſubſtance of the brain that this pair draws the fluid it ſupplies to the muſcles that are governed by it, which are the movers of the eye, an organ endowed with automatic motions, produced by the

fluid of the third pair, and with motions of expreſſion which certainly require fluids derived from other ſources. It is for this reaſon we ſee that the fourth pair, a ſmall nervous filament, goes to receive the fluid it is to convey to the external oblique muſcle of the eye, from the poſterior and inferior part of the tuberculi quadrigemini (5) The ſame thing may be obſerved of the branch of the ſixth pair which goes to the *abductor*, and whoſe origin is at the Pons Varolii.

Had the globe of the eye wanted nothing more than a change of poſition, the third pair ſupplies it with filaments of a ſufficient ſize to have produced this effect for as long a continuance, and as frequently as the functions of this organ might require, or otherwiſe this third pair would have been made more conſiderable at the expence of the large medullary maſs of the brain; but the fluid ſupplied by this pair could not, probably, in many circumſtances, have anſwered all the deſigns of nature for want of ſufficient activity and energy. Love, anger, joy, ſorrow, pride, and contempt, which are ſo ſtrongly expreſſed by the eye, that it is with reaſon conſidered as the mirror of the ſoul, are undoubtedly affections which cannot be expreſſed by the powers of that groſſer fluid which is ſecreted from the great reſervoir.

It is true, that the two laſt branches of the fifth pair of nerves, as well as its ophthalmic branch which contributes to form the intercoſtal nerve, the remainder of the ſixth pair which has not been employed in this foundation, and the ſeventh pair, derive the fluid they are deſtined to convey, from the medullary ſubſtance of the cerebellum, in common with the intercoſtal nerve and the eighth pair. But although the functions of the parts on which they are beſtowed, do not immediately ſeem of ſo great importance as thoſe of the parts to which the intercoſtal nerve and the eighth pair are diſtributed, yet it is no leſs certain that the ceſſation of their action would very ſoon be followed by death.

Were the ſecretion of the ſalivary fluid, were maſtication, or deglutition, interrupted for a certain ſpace of time, in vain would the heart, the lungs,

lungs, the ſtomach, the inteſtines, &c., enjoy the power of fulfilling the offices aſſigned to them; the animal would ſoon ceaſe to live. If the ſmell, the ſight, and the hearing, be not abſolutely eſſential to life, they are, at leaſt, ſenſations which conſtitute the only pleaſures of our exiſtence, and the man, who ſhould be deprived of them, would probably be ranked among the moſt ſtupid animals; it is even to be preſumed that if the deficiency of the ſenſes were not then filled up by ſome particular inſtinct, he would be unable to miniſter to his own wants, even in the midſt of thoſe productions which might be ſufficient for the purpoſe.

From what has been ſaid, we are obliged to allow, that the fluid which makes of man a living and thinking being(c), which renders him capable of all thoſe improvements that embelliſh his nature, is derived either from the medullary ſubſtance of the cerebellum, or from particular and very diſtinct organs of the brain itſelf; and that the loco-motive faculty which completes the animal machine, by adding greatly to the pleaſures of its exiſtence, is derived from the fluid furniſhed by the medullary ſubſtance of the brain. This preſents to us two kinds of motion, as diſtinct from each other as the ſprings from whence they are derived. One kind, which eſſentially conſtitutes life, over which the will exerts no empire, and which is produced by the fluid ſeparated from the cerebellum; another kind, not of ſuch abſolute neceſſity, ſubject to the controul of the will, and effected by the fluid ſeparated from the brain.

Theſe preliminary notions concerning the origin and the diſtinctions of motion being acquired, its effects on the animal œconomy will more eaſily be perceived, and the indications which direct the uſe of it, will be more readily ſuggeſted. Theſe two points of diſcuſſion form a natural diviſion of this eſſay into two parts. The object of the firſt will be to demonſtrate the effects of motion and reſt, and the ſecond will diſcover the indications which preſcribe the uſe of either in ſurgical diſorders.

PART I.

AN EXPLANATION OF THE EFFECTS OF

MOTION AND REST.

THOUGH the motion of the organs eſſential to life, may, of itſelf, maintain the vital principle in man for a conſiderable time, yet this motion is not beſtowed upon an individual deſtined to live by himſelf; for, in man, the loco-motive faculty is almoſt as neceſſary to his exiſtence, as that kind of motion on which life more particularly depends. This is ſo true, that a paralytic perſon left to himſelf would ſoon periſh, although his organs of circulation, reſpiration, digeſtion, and thoſe of the other ſeveral ſecretions, &c., ſhould have preſerved the faculty of performing their reſpective offices. Indeed, what ſort of life is it that the unfortunate claſs of men enjoy who are afflicted with this diſeaſe, even when they are provided with all the helps which perſons who feel for their ſituation can ſupply them? Some few individuals only excepted, they continue to exiſt, and that is all. If, therefore, the action of the external muſcles, or the exertion of the loco-motive faculty,

be not abſolutely neceſſary to life, they do, at leaſt, contribute in a very evident manner, not only to its ſupport, but alſo to its energy.

The effects of the exertion of this loco-motive power cannot, therefore, be indifferent in the cure of ſurgical diſorders; they may facilitate or diſturb this end as they are properly or improperly applied. The academy certainly expects from thoſe who ſhall diſcuſs the queſtion propoſed, an explanation of the caſes and the times when it is neceſſary to forbid or to adviſe the exertion of this power. But to proceed with order in ſo intereſting a ſubject, after having briefly expoſed the effects of the motion of thoſe organs whoſe action conſtitutes life, it will be proper to explain the ſhare which the motion of thoſe on which life does not immediately depend, has in the preſervation, and if we may be allowed to ſay ſo, the perfection, of the vital principle.

The heart is moved and exhibits a ſucceſſion of dilatations and contractions, by means of which the circulation of the blood is carried on. The arteries deſtined to convey this fluid, preſent the ſame phænomena to our view. But theſe actions diminiſh as they proceed, ſo that the contracting power which belongs to the arteries, and which is ſtill ſo viſible in ſmall arterial branches, is, at length, reduced in their laſt ſubdiviſions, in the lymphatic and ſerous veſſels[6] that are continued from them, and in the origin of the veins in which they terminate, into a kind of elaſtic power which conſtitutes the tone or ſpring of all our parts. This laſt is an imperceptible action, ſufficing only to keep up the motion of the fluids, to preſerve them in a fluid ſtate, and to maintain life, which is the conſequence of this fluidity.

The cheſt dilates and contracts itſelf alternately by the action of muſcles, over which the will has but a very limited power of ſuſpenſion or acceleration; ſo that reſpiration is habitually carried on without the concurrence of the will. The ſtomach is poſſeſſed of a power of contraction proper to the fibres that compoſe it; the inteſtines are endowed with a vermicular motion which is particular to them; in theſe viſcera,

as

as in the liver, the ſpleen, the pancreas, the kidneys, the organs of generation, the brain, and moſt of the other glands, there are neceſſary ſecretions carried on, which are as much the product of the motion impreſſed by the heart on the fluids it ſupplies them with, as of that which they receive from the contracting power of theſe viſcera themſelves, which are far from being paſſive. It is indeed by their combined action that life is continued and maintained; but this is upon the ſuppoſition that the ſtomach is conſtantly receiving ſubſtances, proper to furniſh materials, for the repairs required to ſupply the loſſes and decays that are the neceſſary conſequence of excretion and motion. Under this ſuppoſition, each of the organs eſſential to life, will ſeparate from the primary fluid, thoſe liquids that are neceſſary for its ſupport, and for the ſecretion it muſt perform, if it be a ſecretory organ. But in order that the primary fluid may ſupply materials fit for the repairing of the machine, and for the various ſecretions that are to be carried on throughout the animal œconomy, it is neceſſary that the crude materials extracted from the aliments by the juices ſubſervient to digeſtion, and introduced by the lacteal veſſels and the thoracic duct into the general courſe of the circulation[7], ſhould undergo ſome previous elaborations. Theſe are brought about by the agitation of thoſe materials, and by the friction and trituration that are its effects, and which fit them, at length, to aſſociate themſelves with other analogous materials, for the repairing of the machine in which they are deſtined to be employed. But in order that theſe elaborations may be ſuch as are required, and that they may preſerve in the animated machine the principle of life in its full vigour, it is neceſſary that the motion ſhould be regulated at a certain medium indicated by nature[d]. Below this medium, the elaborations produced can only furniſh thick, ill-concocted materials for the purpoſe of repairing; the cauſe of numberleſs obſtructions, which, after they have gradually embarraſſed the motions of the machine, at length deſtroy it. Above this medium, motion gives the reparatory ſubſtances a haſty elaboration, that brings them too ſpeedily to that putrid decompoſition which is their laſt period, and which conſequently does not allow them to be employed for a ſufficient length of time in the ſupport of the machine. From

which it follows, that an exceſs of motion is liable to inconveniences directly oppoſite to thoſe that are the effect of its deficiency; ſuch are the diſorders ariſing from the diſſolution of our fluids, and the diſunion of the globules that compoſe them, together with the various diſeaſes and accidents that may ſpring from this general cauſe.

Nature, ever attentive to the preſervation of that machine, in the conſtruction of which ſhe hath appeared to take ſo much delight, has provided for it in a manner as wiſe as it is admirable. Motion being the only way of preſerving it, ſhe hath at firſt given it a primitive, eſſential kind of motion, diffuſed throughout the whole animal œconomy, over which the will has no power, and which can alone entertain the vital principle in man; but if he were reſtrained to this motion alone, his life, far from being a bleſſing to him, would have been a fatal gift. The loco-motive faculty ſubject to the controul of the will, comes very ſeaſonably to the aſſiſtance of this firſt kind of motion, the effects of which it is to complete, by exalting it to that medium which can only produce the proper elaborations for the ſupport of the animal œconomy (8). As the will is capable of putting this loco-motive faculty into action, it might alſo render it uſeleſs; but nature has provided againſt this, by ſubmitting the animated machine to the imperious voice of want, in giving it paſſions and ſenſations. By theſe it is ſolicited, it is compelled to move, to direct itſelf towards the objects it feels itſelf inclined to, to ſearch for them, and to labour in order to procure to itſelf the enjoyment of them. Thus it is by the ſenſe of want that nature has choſen to furniſh the machine ſhe meant to preſerve, with a ſupply of motion, abſolutely neceſſary to maintain it in its entire ſtate, during as long a continuance as it was deſigned for at its firſt conſtruction.

The law of labour impoſed upon us by the Author of nature, was therefore connected with the plan of our preſervation; and that we might not infringe this law, he has made labour abſolutely neceſſary for us. Unhappy are they who attempt to elude it! The numberleſs diſeaſes they are afflicted with, and which are the characteriſtic of a life reduced

reduced within narrower bounds(c), expoſe them to a very ſevere penalty for the infringement of this ſacred law.

But this ſecondary motion, ſubject to the controul of the will, and which comes ſo ſeaſonably to the aſſiſtance of the firſt in perfecting the functions of the animal œconomy, may deprave them when it is carried to exceſs; it might even deſtroy them very ſpeedily, had it no other reſtraint beſides that of the will. For the imperious will, ſolicited by paſſions it is eager to gratify, and ever intent upon its object, would ſoon carry to exceſs the motion which is ſubordinate to it, and would imperceptibly ſtrike the fatal blow to that machine for the preſervation of which it was inſtituted.

But here again nature, as in every other inſtance, has been watchful to prevent the abuſe; for, after motions too violent, or too long continued, ſhe hath made the powers that execute them, diſobedient to the call of the will. A kind of palſy, the effect of the animal ſpirits being exhauſted, follows the too forcible exertion of the muſcles, and makes reſt neceſſary. Reſt may be compleat or incompleat; compleat, when the loco-motive faculty ſeems to be in a perfect ſtate of annihilation, and that the organs of the ſenſes require to be excited by a ſtimulus more powerful than uſual, from the ſubſtances which ought to affect them; this it is that conſtitutes ſleep: incompleat, when the organs of the ſenſes, reſtored, at the time of waking, to their natural ſenſibility, the loco-motive faculty, without being exerted, may be put into action by the ſlighteſt impulſe of the will. This incompleat kind of reſt is divided into general and partial; general, when this faculty is not exerted on any of the parts of the machine; partial, when it is put into action, to move only ſome of its parts.

Reſt, as we ſee, is ſuſceptible of many degrees, and hath advantages as real and as efficacious as thoſe that reſult from motion. Reſt is, indeed, the regulator of motion, and is intended to keep it in that ſtate of equilibrium which conſtitutes health; or rather it is the loco-motive fa-

culty, which being ſometimes exerted, and ſometimes ſuſpended, becomes the eſſential regulator. What motion has deſtroyed or corrupted, is repaired by reſt, and the diſorders which may be occaſioned by a too long continuance of reſt are relieved by motion. It is during the intervals of inaction, or of ſleep, which neceſſarily ſucceeds to labour, that the vital fluid, exhauſted or corrupted by the effects of motion, is repaired and reſtored after all its loſſes; and that the liquids, too much agitated and attenuated by muſcular action long continued, reſume their former degree of conſiſtence. From motion carried beyond the degree required, there muſt follow a diſſolution, or a premature decompoſition of the humours neceſſary for the ſupport of the animal œconomy; and from exceſs of reſt they muſt become too much thickened. Some reflections and facts will give the higheſt degree of evidence to theſe two aſſertions.

While motion, by the combination of its two kinds above mentioned, is kept in its due medium, the repairing materials conveyed every day into the general courſe of the circulation, are not more agitated and attenuated than they ſhould be to unite themſelves with others ſimilar to them, and to be conveyed with theſe to the parts where they are to be employed. They do not mix or contract adheſions with materials of a different kind, except as far as is neceſſary to accompliſh any views nature may have in bringing about ſuch combinations. Each of theſe materials, which hath not contracted any improper connection, is readily and eaſily admitted into the ſtrainers deſtined to receive it; all the ſecretions are properly carried on, and harmony reigns throughout the machine.

It is in this ſtate of health, or of moderate motion which conſtitutes it, that ſome part of the fat and oily ſubſtances conveyed by the primary fluid, is continually depoſited in particular diviſions of the cellular ſubſtance, to form and keep up what we call a natural plumpneſs (9). It ſhould ſeem indeed, when motion is carried beyond this medium, that the repairing materials, undergoing a more powerful trituration, ought ſooner to acquire that degree of elaboration which makes them fit to be

employed in repairing the machine; but, on the contrary, exceſſive motion deſtroys this uſeful end, by forming between theſe materials that are of a different nature, coheſions and connections which prevent them from being depoſited in a ſufficient proportion for the ſupport of the machine; and ſuch of them as may be depoſited in a ſufficient proportion, will too ſoon have attained that period which requires their being replaced.

In this ſtate of exceſſive motion, which diſcovers, at leaſt, a kind of diſſolution in our juices, the oily part of the blood is either depoſited in a very ſmall quantity in the adipoſe cells, or is perpetually re-abſorbed into the general courſe of the circulation, either to avoid the pernicious effects of too great a friction, or, in mixing, by the means of trituration, with certain depraved humours and materials, to facilitate their expulſion; and that by reaſon of its oily ſmooth particles, which prevent the corrugation and contraction of the ſtrainers through which theſe corrupted juices muſt paſs. Thus we ſee that leanneſs is uſually the attendant of exceſſive labour; the continuance of it would neceſſarily bring on a complete diſſolution of our juices; but nature has put inſurmountable obſtacles to this fatal effect; to wit, laſſitude, and ſleep which ſucceeds to it. During the latter, which is an image of the moſt perfect ſtate of reſt, the maſs of humours, being only affected by that motion which is produced by the action of organs not ſubject to the will, the particles of ſimilar materials, diffuſed throughout this maſs and which have experienced a kind of ſeparation, are endeavouring to reunite themſelves, and to contract a new degree of coherence that may enable them to ſuſtain the efforts of that motion which muſt increaſe at the time of waking. Freſh food, by furniſhing recruits of crude and glutinous materials, contributes to ſtrengthen this ſalutary coheſion, and to weaken the pernicious effects of motion too long continued.

It is ſo true that reſt increaſes the conſiſtence of our juices, that when it is exceſſive, by carrying this conſiſtence too far, it produces evident marks of inſpiſſation in ſome of our humours. It is chiefly among men

who live in a ſtate of inaction and indolence, that we find that exorbitant fatneſs which beſpeaks an habitual depoſit of glutinous and oily juices in the diviſions of the cellular ſubſtance. In ſuch perſons it is not neceſſary that this juice, in many reſpects ſo pernicious, ſhould be taken up into the general maſs to avoid the pernicious effects of friction, which they are far from carrying to exceſs by muſcular action. It is among ſedentary and idle perſons that we uſually obſerve thoſe inſpiſſations of the lymph, which occaſion obſtructions ſo difficult to conquer; and thoſe nervous diſorders ſo common in the preſent age, and which are evidently produced by the thickening of ſome of the juices of the animal œconomy. This may the more reaſonably be preſumed, as theſe affections are mitigated by the continued uſe of diluters, of warm bathing, which ſupplies a greater quantity of fluid to theſe inſpiſſated juices, and of cold bathing, which, while it aſſiſts in this firſt intention, encourages, at the ſame time, their ſeparation, by ſtrengthening the tone of the ſolids that are to act upon them. We may add that theſe diſeaſes are cured by a vigorous and continued exertion of muſcular action, which, after it has reſtored theſe inſpiſſated juices to their natural fluidity, is alone capable of maintaining them in it.

From what has been ſaid, it follows, that motion has the property of attenuating our fluids, and of keeping them in a ſtate of fluidity proportioned to the active cauſe. This fluidity may be either too great from the too violent and too long continued exertion of the agent that produces it; and, in this caſe, it is called diſſolution, and the machine is expoſed to thoſe diſorders which ariſe from this kind of cauſe; or elſe this fluidity may be leſs than the neceſſary degree, which may proceed from the weakneſs or inaction of the agent that ſhould keep it up. In this inſtance, the want of fluidity takes the name of inſpiſſation, and the diſorders manifeſted in the animal œconomy, are ſuch as are produced from this kind of cauſe.

PART

PART II.

EXPLANATION OF THE INDICATIONS WHICH ARE TO LEAD US IN PRESCRIBING THE USE OF MOTION AND REST IN SURGICAL DISORDERS.

FROM the ſhort account we have been giving of the neceſſity of motion, and of its effects, it will not be difficult to diſcover the indications which are to lead us in preſcribing or forbidding the uſe of it in ſurgical diſorders. If it be required to reſiſt or prevent the inſpiſſation of the fluids in the cure of theſe diſorders, it will be neceſſary to call in the aſſiſtance of motion, provided there be no particular circumſtance that may render the uſe of it improper. If, on the contrary, the plan of cure require to give a better conſiſtence to the fluids, and if the effects of motion ſhould counteract this plan, we muſt have recourſe to reſt. We ſhall be in no danger of making an improper application of theſe two curative methods, if we can ſettle our ideas upon the advantages that attend them, by facts and inſtances ſupported with proper reflections; and in order to throw this part of our eſſay into ſome method, we will divide it into two ſections. In the firſt we ſhall expoſe the indications which are to determine the uſe of motion; and in the laſt, thoſe in which reſt is to be preſcribed.

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SECTION I.

EXPLANATION OF THE INDICATIONS WHICH ARE TO LEAD US IN PRESCRIBING MOTION FOR THE CURE OF SURGICAL DISEASES.

AMONG the ſeveral ſurgical diſeaſes in which experience has eſtabliſhed the neceſſity of motion, we find, that they are all produced by the inſpiſſation of ſome of our fluids. The gout, the rheumatiſm, anchyloſes beginning or formed, ſtiffneſſes of the joint, all proceed from this cauſe. The gout indeed, that cruel and common diſorder, which ſcarce ever viſits the cottage of the poor man, but whoſe ordinary reſidence is in the midſt of luxury and opulence, diſcovers, in all inſtances, an evident inſpiſſation of the lymph. The kind of ſerum which circulates, being no longer able to preſerve, in a ſtate of diſſolution, all the earthy particles it conveys through the lymphatic veſſels of the ligaments and aponeuroſes that ſurround the extremities, as the feet and the wriſts, depoſits there ſome of theſe materials. Theſe, loſing that globular form which they had in common with the fluid that ſerved as their menſtruum, become irritating bodies, the action of which, upon aponeurotic parts of extreme ſenſibility, occaſions thoſe acute pains that characterize

characterize this diſeaſe. Nature, it is true, generally ſucceeds in diſſipating its paroxyſms by a proceſs of greater or leſs continuance; but this proceſs is nothing more than an increaſe of motion, which manifeſts itſelf, firſt, in the part affected, by the ſwelling, pain, and inflammation we obſerve in it; then in the whole habit, by the fullneſs of the pulſe, and the evident fever that often accompanies this diſeaſe. It is by means of a ſimilar increaſe of motion, that nature, at length, prevails, in comminuting and attenuating the earthy materials that are depoſited, ſo as to render them fit to be remixed with the fluids accumulated in great abundance about the ſeat of the pain, and thus to facilitate their expulſion through all the natural channels of excretion. Nothing can be more eaſily proved than that theſe diſorders proceed from want of motion, nothing is more evident than that they are relieved by an increaſe of it; and I ſhall now proceed to ſhew that increaſe of motion will alſo prevent them.

The rich, over whom the gout more particularly exerts its dominion, living in the midſt of idleneſs and luxury, ſeem to be affected with a demi-palſy; though they are in poſſeſſion of the loco-motive faculty, they do not put this power into action; the law of labour ſeems not to have been impoſed upon them, at leaſt it is become a habit with them to elude it. Theſe beings are therefore almoſt reduced to that radical kind of motion which is independent of the will; the other kind which is ſubject to its influence, and which ought to compleat the effects of the former, ſo as to give the repairing ſubſtances the neceſſary degree of elaboration to maintain health, is never ſufficiently exerted by them to obtain this effect. The imperious call of want, which urges this ſecond kind of motion, is never heard by them, and deprived of this ſalutary incitement, they live in a ſtate of indolence, the ſweets of which are deſervedly embittered by their effects.

With theſe Sybarites, accuſtomed to high living, motion is, in general, not ſufficiently exerted, to give to the quantity of crude materials conſtantly admitted into the courſe of the circulation, a degree of elabora-

tion perfect enough to form none but proper nutritive juices, and to expel the remains of thoſe that have been ſpoiled by time and friction; from which, it neceſſarily follows, that there muſt be ſome depraved humours remaining. Theſe being depoſited upon certain parts, produce in them diſeaſes more or leſs acute, and more or leſs dangerous, in proportion to the difference of the texture and ſenſibility of thoſe parts. Theſe depoſits uſually taking place in the feet, the wriſts, and the knees, form the gout, which, as we ſee, is the evident conſequence of motion not being ſufficiently exerted to keep up that fluidity of the humours which conſtitutes health. If old people be more tormented with the gout, it is becauſe gluttony and indolence uſually increaſe in an advanced age, and that at a time when the ſuppleneſs of the parts and the diameter of the lymphatic veſſels are diminiſhed, circumſtances which contribute to encourage thoſe depoſits of cretaceous matter that are the evident cauſe of this diſeaſe.

Young men, though rich and voluptuous, are exempt from the gout. For, beſides the natural ſuppleneſs of the fibres in early life, the faculty of motion is excited in them by ſuch a variety of paſſions, that it ſupplies that action which want renders neceſſary in leſs fortunate perſons. The game of tennis, dancing, hunting, fencing, and riding, are exerciſes which prevent the bad effects of the want of motion among perſons of this deſcription; but, at the age of thirty, theſe wholeſome exerciſes no longer make a part of their plan of amuſement. On the contrary, their preſent games ſcarce require that they ſhould ſpeak or move their fingers; and accordingly the gout was never ſo general as at preſent, even at a time of life when it was formerly unknown. It is evident from what has been ſaid, that want of motion is the principal cauſe of this diſeaſe; the work of nature, in relieving its paroxyſms, allows us no room to doubt that the ſalutary criſis which diſſipates them is owing to an increaſe of motion. This muſt therefore certainly be the beſt method of reſiſting or preventing the gout, and the indications which direct the employment of it in the cure of this diſeaſe, are too preciſe to be miſtaken. Beſides, experience has ſo frequently eſtabliſhed

the efficacy of this method, that it would be almoſt uſeleſs to bring facts in ſupport of the truth of this aſſertion; yet as theſe carry with them complete conviction, and as they are the touchſtones of juſt or falſe reaſoning, I ſhall produce ſome inſtances, in which this mode of relief has been employed with a ſucceſs ſo pointed, that it is impoſſible we ſhould not diſtinguiſh the views of nature in the uſe of it[10].

A man who had led a very active life till he was thirty years of age, was, at that period, engaged in a ſedentary employment. A few years after he felt ſome ſlight attacks of the gout which ſeized him every ſix months. Theſe became afterwards ſo ſharp and ſo laſting, that at fifty years of age he was cruelly tormented with it. The fits laſted five or ſix weeks, and returned three or four times in the year; neither had the remedies he had tried at different times procured him any ſenſible relief. The feet, the wriſts, and the knees were the ordinary ſeats of the diſeaſe, which, at fifty five years of age, notwithſtanding he led a very ſober life, had reduced him to a very miſerable ſtate. Being ſtrongly perſuaded that the painful life he had experienced for twenty years paſt, was owing to the little exerciſe his employment admitted of, he purchaſed at that time a garden out of town, fully determined to be his own gardener. As he delighted in flowers, he employed himſelf in the cultivation of them, and laid a plan of hard work for himſelf during ſeveral hours every day. He kept his reſolution, ſo that for a number of years there were few days in which he was not obliged to change his linen ſeveral times in the day, in conſequence of the profuſe ſweats he was thrown into by his ſtrong and continued exerciſe.

The firſt year he felt a change which encouraged him to proceed; and at the ſecond year, ſound and quiet ſleep, a conſtant appetite, and an uncommon agility, the inſeparable attendants on health, ſucceeded to all thoſe infirmities he had before experienced. He arrived to the age of fourſcore without bearing any marks of decrepitude, and ſtill continued to work in his garden, even in winter time. But a ſore leg, in conſequence of a burn, having confined him for a long time to his room in the

the year 1776, he has ſince been attacked with a terrible jaundice, which has terminated in a herpes that may probably be ſtill diſſipated by motion and the labour he is beginning to reſume.

A young man, very fond of tennis, and who frequently indulged in this exerciſe, having quitted it almoſt entirely for ſeveral years, to follow a profeſſion which was rather inconſiſtent with this kind of diſſipation, was ſeized at the age of thirty with pretty ſmart fits of the gout, and which returned at very ſhort intervals. Theſe fits became more and more continued and painful, notwithſtanding he obſerved the moſt regular conduct and the ſtricteſt regimen. I adviſed him to play again at tennis, to the leaving off of which I attributed the appearance of this diſeaſe at an age when one is uſually exempt from it. He contrived his buſineſs ſo as to be able, three or four times a week, to allot two or three hours to this exerciſe. This ſucceeded at firſt in lengthening the intervals of the fits, and diminiſhing their violence, and at laſt made them totally diſappear; for during ſome years paſt he has not felt any return of them. It would be needleſs to alledge any other facts to prove the neceſſity of motion in the cure of the gout; the inſtances which eſtabliſh the advantage of this method are too numerous and too well known to leave us any room to doubt of the propriety of employing it in this caſe (11).

The rheumatiſm differs from the gout merely in the ſeat of the obſtruction, which takes place in the aponeuroſes of the muſcles in their ſheaths, and in the ſtrainers of thoſe membranes that ſurround and connect them. This obſtruction being, as in the gout, the effect of an evident inſpiſſation of the lymph that is conveyed through the channels of theſe parts, motion muſt neceſſarily be alſo the proper agent in this caſe. It muſt therefore be employed to reſtore theſe inſpiſſated humours to the degree of fluidity required for their free circulation. Accordingly we ſee, that if the perſons who are attacked with the rheumatiſm, have reſolution enough to bear the very ſharp pains always occaſioned upon firſt moving the part affected, they ſoon contrive to get rid of them en-

tirely by very powerful and long-continued exerciſe, which putting the part affected in action, produces in it a ſalutary agitation and attenuation of the humours forming the painful obſtruction[12]. Even in thoſe caſes where the pains are too violent, and muſcular action too much benumbed to admit of vigorous motion in the part affected, the beſt curative means are ſtill to be choſen from among thoſe that ſtimulate the ſolids and fluids of the part. Theſe are, either warm or cold bathing, which, beſides facilitating the attenuation of the humours by the introduction of aqueous particles that may poſſibly be conveyed ſo as to mix with them, do alſo excite motion in them; cold baths, by increaſing the tone of the ſolids; warm ones, by the rarefaction they produce in the fluids. Stupes add to theſe effects, already ſo efficacious in themſelves, the power of breaking mechanically the inſpiſſated juices by the ſhocks and ſtrokes they carry along with them. The juices are, as it were, kneaded by this agent, which from its ſoft, mild, and uniform method of acting, is much to be preferred to the other external methods employed to produce this effect; ſuch, for inſtance, as dry frictions upon the part, flagellation with nettles, &c. — If theſe kinds of means are ſometimes attended with ſucceſs, it is evident this muſt happen by their conveying into the painful part a degree of motion fit to attenuate the humours that formed the obſtruction, and induce them to a change of place. This reaſoning may be extended to thoſe large bliſters ſucceſsfully applied to limbs affected with the rheumatiſm; it is as much by the motion they excite in the part, as by the diſcharge of ſerum, and the ſuppuration they occaſion, that they produce thoſe ſalutary effects they are often attended with.

An anchyloſis appears to be nothing more than a gradual inſpiſſation of the ſynovia, by which, bones originally deſigned to move freely upon one another, become conſolidated. The curative indication that preſents itſelf here is to counteract this inſpiſſation while it is forming, and to reſtore the ſynovia to its firſt ſtate of fluidity, when it hath acquired a preternatural conſiſtence which confines and even deſtroys the motions it was deſtined to facilitate: but what are the means by which this indication

cation is to be fulfilled? Which is the kind of remedy that experience hath determined to be the moſt ſucceſsful in theſe caſes? It is the motion of the parts compoſing the joint, which by acting upon the thickened ſynovia, by rubbing and triturating it, reſtores to it that fluidity it had loſt. The indications for the uſe of this method are indeed ſo pointed in this ſort of anchyloſis, that it cannot be ſupplied by any other; but there are other kinds of this diſeaſe in which there are evidently counter-indications that oppoſe themſelves to the application of it; and in others again, there is as much precaution as ſkill neceſſary to direct the employment of it. A haſty review of the chief cauſes of this diſeaſe will be ſufficient to direct the proper application of motion in its cure.

The anchyloſis may be the effect of too long-continued reſt, of too great inaction of the bones deſtined uſually to move on one another, and then it will be ſufficient to reſtore by degrees theſe bones to their ordinary motion, either by the action alone of the muſcles that are inſerted into them, ſupported with a degree of firmneſs neceſſary to overcome the painful ſenſation of the firſt motions, or by increaſing that action by external powers. It ſeldom happens, however, that inaction alone, even though continued for a conſiderable length of time, can produce this diſeaſe. Its moſt uſual cauſes are, the diſeaſed ſtate of the bones, either on their articular ſurfaces, or in the neighbourhood of the articulations, the inflammation and tenſion of the ligaments that ſtrengthen them, and of the muſcular aponeuroſes that cover them. It may be obſerved indeed, that in the diſeaſed ſtate of the articular ſurfaces of the bones, the anchyloſes may frequently be conſidered as the reſource of nature for the preſervation of a limb ſhe is not willing to loſe; and in theſe caſes we ought to be ſo far from reſiſting the progreſs of this diſeaſe, that our art muſt be exerted in encouraging it by every poſſible means[13]. It may here well be preſumed that motion is not to be employed to bring about this ſalutary end, as I ſhall ſhew hereafter, when I ſhall expoſe the indications which direct the uſe of reſt in ſurgical complaints. But ſetting aſide theſe circumſtances in which an anchyloſis may be conſidered as an advantage, motion muſt be the curative medium moſt to be depended upon

upon in theſe caſes, if we employ it with all the precautions required by the difference of circumſtances. We may even have recourſe to it with confidence in thoſe caſes which ſeem more particularly to forbid the uſe of it.

Fractures of the joints, for inſtance, by occaſioning an extravaſation of bony matter into their cavity, ſeem at firſt ſight to make an anchyloſis unavoidable, and yet, in theſe caſes, motion employed with ſkill may frequently prevent it. To be convinced of this from theory, we have only to trace the mechaniſm by which this extravaſation is made in moſt circumſtances. If the bones, fractured at their extremities in the joints, have not experienced any evident change of poſition, or if they have been replaced in their original ſituation by the Surgeon's art, the bony matter exſuding from the ſurfaces of the ſolution of continuity, tends, as in other inſtances, to conſolidate the divided parts, in order to reſtore them to their functions. It is true, indeed, that the bony matter, being extravaſated, exceeds the level of the parts brought into contact, and that as it thickens, it forms a ſolid maſs on the divided part, and that this maſs, on the ſide of the cavity of the joint, muſt be ſo much the more conſiderable, as the bony matter muſt have met with leſs oppoſition in its growth; but it by no means follows that an anchyloſis muſt be the neceſſary conſequence of this. Motion may be employed with advantage to prevent this accident, and the bony projection which threatens the joint with it, indicates, by its very formation, the employment of this method, which can never act more effectually than while the callus is ſtill ſoft. For this reaſon, when we may preſume that the fractured pieces have begun to acquire a certain degree of coherence among themſelves, by means of the bony matter that muſt conſolidate them, it will be neceſſary to give gentle motions to the joint, and to repeat them as often as circumſtances will permit. It is evident that the projection of the callus, which is ſtill yielding, will be reſtrained, and that at length the play of the articulation will be perfectly reſtored. Suppoſing however that the projection had acquired a conſiderable degree of conſiſtence, we muſt not, on that account, abandon the joint to the anchyloſis that may threaten

threaten it. This circumſtance can only render the uſe of motion more painful and more difficult; but by perſevering in the uſe of it, and by combining it with that of diluting and relaxing applications, calculated to diminiſh the force of the preſſure of the articular ſurfaces one againſt another, we ſhall at length ſucceed, if not in levelling entirely the bony projection, at leaſt in rendering it ſo ſmooth and poliſhed that the motion of the joint ſhall no longer be impeded by it.

What is thus dictated to us by reaſon, I have obſerved more than once confirmed in fractures of the olecranon, which is evidently adapted to the articulation of the arm with the fore-arm. If an anchyloſis be frequently the conſequence of this accident, this is leſs to be aſcribed to the nature of the fracture, than to the want of ſkill in thoſe who treat it. It is true, that if, in this caſe, we put the fore-arm in a bent ſituation, and in a ſling, the olecranon being then fixed by the extenſor muſcles that are inſerted into it, while the reſt of the cubitus forms a right angle with the humerus, there will neceſſarily remain a conſiderable interval between the two fractured pieces. In theſe caſes, the exſudation from the fractured ſurfaces being diſcharged into the cavity of the articulation, and afterwards conſolidated there, would, from this reaſon alone, deſtroy the power of its motion; but even if this exſudation, without ſtretching into the cavity of the joint, ſhould only fill up the ſpace between the cubitus and its apophyſis, and that ſimply by moulding itſelf on the correſpondent part of the humerus, the anchyloſis would no leſs be the neceſſary conſequence of an addition that ſhould have lengthened the natural unciform proceſs formed by the olecranon; for the extremity of this proceſs, reſting then upon the bottom of the cavity that is found in the poſterior part of the humerus, we never can hope to make any extenſion of the fore-arm, and it muſt therefore neceſſarily remain in the ſtate of flection in which it hath been placed (f); but if, inſtead of uſing this manœuvre, ſo oppoſite to all the rules of art and of common ſenſe, we keep as much as poſſible the fractured parts in a ſtate of approximation, by a conſtant and moderate extenſion of the fore-arm (g), and by a ſuitable bandage, then the exſudation which proceeds from

the correſponding bony ſurfaces, as it condenſes, does nothing more than unite the olecranon to the body of the ulna from whence it was ſeparated, and that without any viſible increaſe of length. In this caſe, the callus would only form a trifling projection on the ſide of the articulation, which might, however, confine the motion of the joint, if it were not kept under. But if we give the joint a little motion towards the twenty-fifth day (4) after the accident, before the callus be completely hardened, and if we increaſe this motion by degrees, this projection will give way, and in a few months the joint will recover all its motions, as I have been convinced by ſome caſes of this kind in which I have followed the practice here laid down.

It may, however, be obſerved, that after the olecranon has been united by the ſkilful methods required in fractures of that bone, any difficulty of motion that may exiſt, may proceed either from the maſs of the callus on the ſide of the articulation, or from the projection of one of the pieces of the bone itſelf, by reaſon of the difficulty, not to ſay the impoſſibility, of keeping them on a level. But whether it be that theſe cauſes act ſeparately, or in combination, to reſtrain the motion of the joint, we may readily conclude from what has been ſaid, that motion is the only power that can be employed with advantage, in removing theſe inconveniences, and in reſtoring the joint to its original freedom. This is effected, at length, by poliſhing and wearing down, either the hardened callus itſelf, or the bony particles projecting in the cavity of the joint. The only circumſtance to be attended to is, that in the laſt caſe, as the firſt motions muſt neceſſarily be more painful and difficult, it will be proper to be more careful in the employment of them, than in the other inſtance.

If motion be almoſt a certain remedy againſt an anchyloſis threatening the joint in moſt of the fractures incident to it, we are not to expect leſs effect from this remedy, when a rigidity is likely to enſue from a compound fracture, with ſplintering of the bone, in the neighbourhood of an articulation. As the ſtiffneſs of the joint, in this caſe, can only proceed

ceed from an inſpiſſation of the ſynovia, and from a rigidity, the ligaments and aponeuroſes ſurrounding the joint may acquire, motion may be conſidered here too as the means to prevent an anchyloſis. But if we conſider that the ſtate of the parts which leads us to apprehend this inconvenience, is the conſequence of their tenſion, inflammation, and diſpoſition to ſuppuration, as alſo of the long inactivity they muſt be kept in, in order to accompliſh the firſt indication which is the cure of the fracture, we ſhall conclude that the anchyloſis, in this caſe, is but a ſecondary accident which muſt not be attended to, at leaſt, for ſome time. Motion is undoubtedly the proper remedy in this caſe too; but previous to our having recourſe to it, it is neceſſary that the conſolidation of the bony parts ſhould be conſiderably advanced; and that the inflammation and irritation of the ligaments and aponeuroſes ſhould ſo far be overcome, that motion may not produce in them a painful extenſion which might tend to excite the inflammation afreſh, and to form abſceſſes in the part. As ſoon as theſe chief indications are obtained, we muſt call in the aſſiſtance of motion to prevent the anchyloſis with which the joint is menaced. If the articulation be ſtill ſuſceptible of an evident degree of mobility, its own motion alone excited and increaſed by degrees, will, in time, reſtore to the ligaments and aponeuroſes their flexibility; and to the ſynovia its ordinary fluidity. But if the ſynovia have acquired too much conſiſtence, and that the inſpiſſation of the fluids which fill the canals of the ligaments and aponeuroſes, ſhould have made them too rigid to admit of being put in motion without cauſing very great pain, we muſt then avoid perſiſting too obſtinately in the uſe of this method. I have ſeen conſiderable ſwellings and ecchymoſes brought on after an inconſiderate uſe and exertion of motion under ſuch circumſtances; theſe have made it neceſſary to poſtpone for a long time the uſe of this efficacious method, which had failed only from the neglect of precautions proper to have inſured its ſucceſs. In theſe caſes the motion of the joint muſt be prepared and preceded by oily and ſaponaceous embrocations (15), by warm and emollient baths, and eſpecially by ſtupes. Theſe remedies, by tranſmitting a gentle motion among the inſpiſſated juices, and even by beginning their liquefaction through means of the penetrating particles

they may convey to them, are capable of ſupplying the ligaments and aponeuroſes, and are therefore excellent means to be employed previous to that motion which is to reſtore to the joint its free play, and get the better of the anchyloſis.

Stiffneſſes of the joint which continue for a long time after ſprains, luxations, and fractures, even at a diſtance from the articulations, are alſo produced by an inſpiſſation which is the effect either of the compelled ſtagnation of the fluids during the obſtruction of the parts affected, or of the continued reſt to which they have been confined in order to fulfil the moſt urgent indications which theſe diſorders preſent. In theſe caſes too, motion either alone, or combined with other auxiliary methods I have before mentioned, is the effectual remedy to remove theſe rigidities(16). In a word, whatever may be the diſtant cauſe from which theſe accidents may be produced, their apparent cauſe conſiſts always in inſpiſſated juices, which cannot be reſtored to their firſt ſtate of fluidity without the aſſiſtance of motion; either internal motion excited by remedies adapted to the cauſe of the inſpiſſation, or external motion produced by muſcular action.

From the facts already recited, which are well known to all the profeſſion, we are ſufficiently authorized to conclude, that wherever there is any diſeaſed inſpiſſation, we muſt have recourſe to motion to correct it; but other facts will give the higheſt degree of evidence to this aſſertion. Every thing perſuades us that the ſcrophula, for inſtance, one of thoſe diſeaſes in which this inſpiſſation is moſt remarkable, is produced by want of motion in the perſons who are affected with it.

Infancy, which is uſually the ſeaſon of this diſeaſe, is indeed the time when motion is moſt exerted in the machine; but it is not without neceſſity that this principle is carried ſo high at this period. The nature of the food of a new-born infant, the rapid growth he is to experience, the extent of ſurface he preſents, in proportion to his ſize, to the fluid in which he lives; all theſe circumſtances require in him a much

much greater degree of motion than at any other age. The only nouriſhment nature has provided for him, muſt be of an aceſcent quality, ſo that to keep the fibres in a ſtate of ſuppleneſs favourable to their extenſion, a conſiderable degree of motion was required in this living machine, in order to animalize, as it were, this kind of food, and to extract from it the materials proper for the growth of the body. This ſame motion was not leſs neceſſary to ſupply a degree of heat that ſhould enable the child effectually to ſupport the freſhneſs of the air with which he is ſurrounded. For theſe reaſons, the contractions of the heart and arteries in earlieſt infancy are extremely frequent, and muſcular motion very quick. At this period then, as at every other time of life, there exiſts no greater degree of motion than is requiſite for the wants of the animal œconomy; and therefore this principle cannot be interrupted or exerted above its powers without producing an alteration in its effects.

While the child draws from his mother's breaſt the food nature has allotted to him, while he freely enjoys the faculty of moving as much as his muſcular powers will allow, his fluids are neither altered by inſpiſſation nor diſſolution, and he remains in health. But if for this wholeſome food we ſubſtitute one that is made with unfermented flour, and if this aliment, pernicious in itſelf, be alſo given to exceſs, the child will not then enjoy a degree of motion ſufficient to give the nutritive juices, extracted from ſuch glutinous food, the elaborations neceſſary to maintain health. Hence will at length reſult a fault of inſpiſſation, the progreſs of which will be more rapid, as external or muſcular motion ſhall have been more confined by ſwaddling cloaths, and therefore leſs able to ſecond the effects of that motion which is primary and eſſential to life.

Under theſe circumſtances nature ſeems indeed herſelf to have recourſe to motion in order to reſtore the humours to their proper fluidity. Reſtleſſneſs, agitations, pain, and fever, which beſpeak an increaſe of motion, are ſo many means ſhe often employs with ſucceſs in children to reſiſt the aceſcent property of their fluids, and the inſpiſſation produced by it. But theſe means are far from being always effectual; there

are children who periſh ſpeedily after ſuch exertions; others, after having languiſhed a long time under obſtructions of the meſaraic glands, die at laſt of the ſuppurations that are formed in them: others again, are ſeized with obſtructions in the glands of the neck, or other external ſigns which indicate a ſcrophulous habit. This diſeaſe, as terrible from the difficulty of cure as from the accidents that attend it, ſeems, from the ſymptoms that manifeſt it, to be produced by too great a degree of aceſcency in the humours, which not being ſufficiently agitated to correct this diſpoſition, an inſpiſſation of the lymph is produced, which forms the characteriſtic of the ſcrophula. Nature ſeems of herſelf to point out the remedy, by manifeſting an increaſe of motion in all the efforts ſhe makes to counteract this diſeaſe. It is therefore by conſulting this wiſe directreſs, who never deceives us when we underſtand what ſhe intends, that we may preſume, that motion is one of the means, the efficacy of which is moſt to be depended upon in the cure of ſcrophulous complaints. Facts, far from invalidating our ideas upon this head, ſeem to add a freſh degree of probability to them. Do we not indeed obſerve, that all diſſolvents of the lymph (ſuch as *Rotron*'s) compoſed of alkaline, abſorbent, and gently irritating ſubſtances[17]; that repeated purgatives, that mineral and ſaponaceous waters, &c., which ſucceed beſt in the treatment of this diſeaſe; in a word, that all theſe remedies act no otherwiſe than by increaſing the motion in the machine to a higher degree than before their uſe? Some of them too, it is evident, tend to ſubdue the aceſcent quality of the liquids, which is one of the principal cauſes of the inſpiſſation of the lymph, as much by the motion they excite, as by the alkaline and abſorbent particles they contain[18].

The topics alſo applied with ſucceſs upon ſcrophulous tumours, and diſtinguiſhed by the name of diſſolvents, ſuch as the *Emplaſtrum de Vigo*, *Diabotanum*, *&c.*[19], ſeem to act no otherwiſe than by increaſing the power of motion in the obſtructed part. Nature herſelf, when ſhe cannot by her own powers, or with the aſſiſtance of art, diſſipate theſe tumours in an inſenſible manner, doth ſhe not effect the diſſolution of them by calling in the aid of inflammation, and ſuppuration[20], which is the conſe-

quence of it? Theſe two agents which ſhe emplovs to complete her purpoſes, are they any thing more than the produce of an increaſe of motion? But the circumſtance which evidently demonſtrates the efficacy of that principle in the cure of this diſeaſe, is, that the remedies adapted to it are never more ſucceſsful, than when they are combined with ſtrong and continued exertions of muſcular motion. This is ſo true, that with the uſe alone of ſome common diſſolvent, and a few purgatives adminiſtered now and then, joined to that of vigorous exerciſe taken in the country and in the open air, I have ſucceeded in curing ſeveral young perſons affected with ſcrophulous tumours in the neck, feet, or fingers, ſome of which, in the latter inſtances, were attended with fiſtulous ulcers and caries of the bones. But theſe means muſt be continued for a ſufficient length of time, to enable the lymph to be reſtored to its natural ſtate of fluidity, and to be maintained in it; and during the employment of them, we muſt forbid the uſe of milk, and all kinds of acid food.

The venereal virus alſo, which, from every circumſtance, ſeems to be a coagulater of the lymph, and which bears ſome analogy to the ſcrophula, ſince it frequently degenerates into this, appears to require no other remedy than a certain degree of motion excited and kept up for a ſufficient length of time to deſtroy and annihilate the effects of this poiſon. Mercury uſed in frictions, the aquila alba, the panacea, the ſublimate, and all the other preparations of this mineral internally taken, the ſudorific woods, &c., do not exhibit in their effects any thing elſe but an increaſed degree of motion throughout the machine. Nor can the volatile alkalis, propoſed by Mr. PERILHE [21], be uſed upon any other principle in the cure of this complaint. Nature ſeems not to proceed any otherwiſe in her efforts to deſtroy the virus, and to prevent its being communicated to the general maſs, when it hath originally been confined to ſome part. Inflammation, and pain that attends it, and ſuppuration, which is the effect, are the means ſhe oppoſes to the propagation of this terrible diſeaſe.

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I have ſeen gonorrhœas ceaſe of themſelves, and venereal buboes, abandoned totally to nature, perfectly healed after a plentiful ſuppuration, and the perſons affected with theſe complaints have not afterwards experienced the leaſt venereal ſymptom, though they had not made uſe of any mercurial remedy. I have ſeen a man radically cured of the moſt dangerous venereal ſymptoms, for which he was intending to undergo a ſalivation, at the end of a putrid fever that laſted forty days, and the criſis of which was obtained by very copious and long-continued ſweats.

Mercury and its preparations are not then the only antidote to the venereal virus; every thing that can exalt the motion of the machine to a certain pitch, and maintain it there for a ſufficient time, may be uſed with effect in this caſe to reſiſt the inſpiſſation of the lymph, and the cauſe which produces it. Muſcular motion, as it cannot be continual, is ſcarce able to have this effect; but though it may not, of itſelf, have power to deſtroy the virus, it is no leſs certain that it may aſſiſt in preventing the progreſs of it. It is from obſerving its good effects in venereal affections, that I ſcruple not to combine it with the uſe of mercurial medicines, which increaſe internal motion. I therefore always deſire my patients to uſe a great deal of exerciſe, while I treat them with mercurial frictions. Though the weather may be rather cold, I do not confine them to their rooms, and have never had any reaſon to repent of this method. There have been ſome patients even, who though they went out every day, and took a long walk, morning and evening, have never had the mouth heated, notwithſtanding they had uſed as much as eight ounces of ointment in the uſual quantities.

The ſcurvy not being entirely a ſurgical diſorder, ought not, perhaps, to be noticed here; yet let me be permitted to expoſe ſome of the phœnomena this diſeaſe preſents us with in its various ſtages; becauſe they will form, in regard to what has been ſaid concerning motion and its effects, an additional degree of probability by which it would be difficult not to be convinced. In the firſt and ſecond periods of this diſeaſe, every thing indicates too great an inſpiſſation in the fluids of the perſons who

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are attacked with it. Laſſitudes, languor, ſwelling and hardneſs of the lower extremities, are all ſymptoms that characterize ſuch a ſtate of the fluids; and cold and damp weather, inactivity, and the uſe of groſs glutinous food, which are the diſtant cauſes of this diſeaſe, can ſcarce produce any other kind of vice in the habit. Accordingly in ſuch a ſituation, what are the curative intentions, and by what means are they to be fulfilled? They conſiſt evidently in exciting the tone of the ſolids, attenuating the fluids, and reſtoring them to their uſual fluidity. Internal motion, increaſed by certain remedies that have the power of exciting it, and the exertion of external motion, ſeem to be the proper means of obtaining theſe ends.

Now, if we conſult facts, we ſhall find that daily and moderate exerciſe, exerted ſo as to bring on a gentle perſpiration, that the juice of plants which contain a volatile alcali already formed, that the Peruvian and Winter's bark, that wine and antiſcorbutic ſyrups compoſed of theſe plants and of alcaline ſalts, that bliſters, in a word, are all remedies of remarkable efficacy in the firſt and ſecond ſtages of the ſcurvy. It hath even been obſerved that all the ſymptoms that denote this diſeaſe, have not unfrequently diſappeared after a fever continued for a few days. It is evident then that motion is the means employed by nature and by art in oppoſing this diſeaſe; but to that ſtate of inſpiſſation which is the character of the firſt and ſecond degree of the ſcurvy, there frequently ſucceeds a ſtate of evident diſſolution in all the fluids. In this caſe the curative intention and the means of accompliſhing it muſt be adapted to the change the diſeaſe hath undergone. Hot antiſcorbutic medicines, and bliſters, ſo efficacious in the firſt and ſecond ſtages of the ſcurvy, become prejudicial in this more advanced ſtage, in which diſſolution hath ſucceeded to inſpiſſation; and a fever is then the moſt dangerous accident that can happen to the patient; for a diſſolution carried to its utmoſt height, and death which follows it, are the ſpeedy conſequences of ſuch an event.

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The remedies that ſucceed beſt, at this period, are derived from the claſs of ſubſtances which contain a mucilaginous principle, ſuſceptible of a ſlightly acefcent fermentation, calculated to give ſome degree of conſiſtence to the liquids, and to reſtore the ſolids by degrees to their proper tone. Oranges, lemons, freſh vegetables ſlightly acidulated, new bread, ripe fruits, grapes, warm wine, honey, &c., are the remedies which ſeem more particularly to poſſeſs this property. Motion, ſo ſalutary in the firſt ſtages of the ſcurvy, becomes now very dangerous; for it hath been obſerved in the third, and more eſpecially in the fourth, ſtage of this diſeaſe, that ſeveral patients have died of internal hæmorrhages, after having inconſiderately uſed exerciſe which, though moderate in itſelf, was ſtill above their ſtrength; after having made ſome ſudden motion, or after having been only ſtirred with quickneſs, and moved incautiouſly from one place to another.

But this ſtate of extreme diſſolution that the ſcurvy offers at this period, is ſeldom found among perſons who live upon land, except in priſons and dungeons, where inaction, cold, dampneſs, bad food, and affliction, often contribute to carry this diſeaſe to its higheſt period; for among the common people, even among thoſe who live moſt poorly, the ſcurvy ſeldom ſhews us any thing more than a vice of inſpiſſation, againſt which external motion, combined with warm antiſcorbutics, may be employed with ſucceſs. Accordingly in thoſe obſtructions of the legs, which have a purple caſt, with hardneſs, and which are deemed ſcorbutic, ſo far from its being neceſſary to preſcribe reſt, as in other obſtructions of theſe extremities; exerciſe, on the contrary, and walking in dry and warm weather, combined with the remedies ſuitable to the ſcurvy, have always appeared to me the moſt proper means of relief; and I have often obſerved that theſe obſtructions were leſs conſiderable, and leſs ſhining towards the evening, after a good deal of walking, than two or three hours after the patients had got out of bed.

From what has been ſaid, it appears, that the indications which lead us in the application of motion to the cure of ſurgical diſorders are evident.

dent. If we muſt attenuate and divide the fluids, if their too great inſpiſſation ſhould produce a real diſeaſe, or form an obſtacle to the cure of any one; motion becomes one of the moſt certain curative methods, the efficacy of which is eſtabliſhed by experience.

SECTION II.

TO SHEW THE INDICATIONS WHICH ARE TO LEAD US IN PRESCRIBING REST FOR THE CURE OF SURGICAL DISORDERS.

THE effects of reſt and motion being, as we have obſerved in the firſt part of this eſſay, as diametrically oppoſite as their cauſes, and the too great inſpiſſation of our fluids affording us a preciſe indication for the employment of motion, we might immediately conclude from hence, that whenever it becomes neceſſary, in the cure of ſurgical complaints, to increaſe the thickneſs of theſe ſame fluids, or any of them, it will be proper to call in the aſſiſtance of reſt. This is a very natural conſequence which ſhould ſeem to point out both the caſes which require the uſe of this method, and the indications which are to lead us in preſcribing it. But in order that this conſequence may be admitted, it becomes neceſſary to ſupport it by facts, which preſent themſelves in great numbers. In all fractures, for inſtance, where the advantages of reſt are ſo evident, nature ſeems to require nothing but an inſpiſſation of ſome of

our liquids. Is it not by the gradual concretion of a juice originally fluid, that ſhe unites in the moſt ſolid manner, the bony parts that have ſuffered a ſolution of continuity? Is not this deſired effect chiefly brought about by reſt, and doth not motion put the greateſt impediment to it? This circumſtance is univerſally known, and not contradicted by any fact; but there are many other caſes, in which nature appears to have the ſame views as in fractures, and in which the indications for reſt are as preciſe as in theſe accidents. Theſe caſes, though not unfrequent, require a degree of attention and penetration to diſtinguiſh them, and it is by taking a review of them, that we ſhall find reſt to be frequently the moſt certain method that art can furniſh to the ſurgeon who knows how to apply it.

In my firſt anatomical purſuits, I had ſeen ſome ſpines of crooked perſons, that preſented three or four dorſal vertebræ, the bodies of which were ſoldered and confounded together, without having paid any particular attention to this diſeaſe, and without having reflected on the accidents it might have produced during its continuance; but a patient whom I ſaw at the Hoſpital in 1766, fixed my obſervation upon this object. Having been violently beaten, at the age of thirteen, by his father, he felt, a few months after, a weakneſs in the ſpine, attended with pain and a difficulty of keeping an upright poſture. He at firſt walked with great difficulty, and afterwards could not walk without leaning upon a ſtick, with his body bent forwards. Theſe firſt ſymptoms which continued more than ſix months, were followed by a fever accompanied with difficulty of breathing, and pain in the middle of the back, without any very apparent ſwelling externally. Theſe ſymptoms were relieved by bleeding and other remedies, and the patient ſeemed reſtored to his former ſtate; but the difficulty of walking and of ſupporting himſelf increaſed by degrees, and, at length, a tumour was formed towards the lateral and poſterior part of the laſt falſe ribs, the increaſe of which was very ſlow, and made no change in the colour of the ſkin. This tumour extending itſelf gained the region of the loins, and more than ſix months after its appearance, the ſkin became inflamed, grew thin, and

by the aſſiſtance of maturating poultices applied to the tumour, a fiſtulous opening was made in it, from whence there iſſued, according to the patient's account, more than a quart of matter as white as milk. This diſcharge having continued very plentiful for three months without hopes of cure, the parents, tired with the length of the diſeaſe, took the reſolution of ſending this young lad to the Hoſpital. When he came there he had a fiſtulous opening on the right ſide of the lumbar region, which furniſhed an ichorous and plentiful diſcharge; a ſlow ſuppuratory fever accompanied, and every appearance ſeemed to ſhew that death would ſoon terminate this diſorder. A pledgit of ſoft ointment only was put upon the fiſtulous orifice, and the diſeaſe was left to nature.

I frequently ſaw this patient, who being better fed, and more attended to than at home, began to recover a little from the deplorable ſtate to which he had been reduced. He particularly kept very quiet in his bed, and his ſpine was then incurvated with an evident projection outwards, towards the laſt dorſal vertebræ. About two months after he came into the Hoſpital, the matter which oozed from the fiſtulous opening, grew thicker and leſs plentiful, the countenance appeared better, the pulſe leſs frequent, and he began to give ſome hope of recovery. This hope was more confirmed ſix weeks after, for the diſcharge was ſtill leſſened, and the patient began to feel ſome degree of ſtrength in the ſpine. Two months after this laſt period, the fiſtulous orifice was cloſed, and the patient began to walk with a ſtick; but he was crooked, and ſeemed to have loſt much of his former height.

From the accidents this patient had undergone, and the deformity the ſpine had contracted during the courſe of his diſeaſe, I imagined that ſome of the dorſal vertebræ had been affected with caries; that the remains of them after being confounded together, and after having been in a ſtate of granulation, had at length acquired a degree of ſolidity ſufficient in ſome ſort to ſupply the bodies of theſe bones. I could not but conſider reſt as having been the chief promoter of this ſalutary end; and

and ſubſequent facts appear to have completely confirmed my conjectures on this point.

Firſt, the patient who had been the ſubject of the preceding obſervation, and whom I had always kept within my notice, having been ſeized in 1769 with a peripneumony of which he died, I was allowed to inſpect the body, and my firſt care was to take notice of the diſorders the ſpine had experienced three years before. I found, as I ſuſpected, ſeveral vertebræ, the bodies of which were confounded with each other; theſe were the ninth, tenth, and eleventh, of the dorſal vertebræ, which had loſt at leaſt half of their longitudinal dimenſions, while their ſpinal proceſſes which had not ſuffered the leaſt alteration, formed a projection and a remarkable convexity outwards. This firſt part of my conjectures being verified, I have neglected no opportunity of informing myſelf, what ſhare reſt might have had in theſe ſort of cures. Accordingly I have queſtioned all deformed perſons, whenever I could do it with propriety, and deſired them to give me an account of the accidents that had happened to their ſpine previous to its deformity. Thoſe who are become ſo, merely from a lateral projection of this column, without having had any collection of matter during the growth of this projection, or after it was formed, have ſcarce complained of any thing more than a gradual weakneſs of the part affected, and have never been obliged to keep from motion entirely. They have almoſt all been able to riſe out of bed at all times, and even to walk with a ſtick without experiencing any very acute pains. But thoſe in whom marks of former abſceſſes were to be obſerved, who in ſome ſmall part of the ſpine have an evident projection and convexity outwards, have all been obliged to keep their bed for ſeveral months, ſometimes for whole years; and it was never till after a long-continued reſt, that the ſpine began to recover, at the part affected, a ſufficient degree of ſolidity to allow them to ſupport themſelves and to walk.

If reſt, ſuch as it might be, without being ſubjected to any rule, hath produced good effects in theſe caſes, we may readily conceive that it would

would have been attended with much greater advantage, had it been preſcribed and employed with diſcernment; ſtill however this kind of diſeaſe preſents us with preciſe indications to determine the uſe of it. It may even be preſumed, that it would prove one of the moſt certain means that could be employed to prevent deformities of the ſpine[22], for it is not at the time this column diſcovers a tendency to projection, that we ought to leave it oppreſſed by the weight of the ſuperior parts which it ſhould naturally ſuſtain. We ſhould wait, till by reſt and a horizontal poſition, the pieces that compoſe the column ſhall have loſt, by the uſe of proper remedies, that morbid ſtate of ſoftneſs which had diſpoſed them to be thrown out. Theſe two means, of reſt and a horizontal poſture, are equally indicated whether the progreſs of the diſorder be aſſiſted by a weakneſs of the ligaments connecting the vertebræ, or by the action of the muſcles. But theſe unions of the vertebræ, after a greater or leſs deſtruction of their bodies, which we have obſerved to happen in the dorſal vertebræ, may alſo take place in the lumbar vertebræ; and might not reſt contribute to effect this ſalutary purpoſe in caſes of caries with which the vertebræ of the loins are ſo frequently affected? Let us conſult facts, that we may know how far this remedy is to be depended upon in the cure of ſo terrible a diſeaſe.

I have ſeen many of theſe carious vertebræ, and the death of all thoſe who have been attacked with them, ſeems to proclaim that they are an incurable complaint. But before we lay down this dreadful prognoſtic, let us trace the diſeaſe throughout its progreſs, and let us conſider the phœnomena it preſents to us during its long continuance; theſe may ſuggeſt ſome ideas from whence a more comfortable prognoſtic may be deduced, and which future facts may perhaps juſtify. We frequently ſee, after a fall on the buttocks which ſhall have occaſioned a concuſſion in the lumbar vertebræ, after a blow received on theſe parts, after a violent and painful effort made to raiſe too heavy a load &c., after ſuch accidents, I ſay, we frequently ſee that the perſons who have ſuffered them, complain, ſome time after, of a dull pain in the region of the loins, with a difficulty of walking, which increaſing gradually, without ever

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cauſing any very acute pain, ends, at length, in ſo great a weakneſs of the ſpine, that they are no longer able to ſupport themſelves, and are obliged to keep in bed. At this period, which is often nine or ten months after the accident, we generally begin to perceive a tumour which makes its appearance either underneath Poupart's ligament, or on the ſide of the great iſchiatic foramen, and which increaſes ſlowly without being painful to the touch. When the tumour hath acquired a certain ſize, and that the matter which forms it is ſufficiently advanced towards the ſkin, a manifeſt fluctuation is obſerved in it, which ſeems to furniſh a poſitive indication for the opening of it (h).

The Surgeon who makes this opening, and who ſees that he has given iſſue to a great quantity of matter, confined for a long time in ſwellings of this kind, congratulates himſelf upon an event which he thinks cannot but turn out for the good of his patient; but the patient, who for ſome months paſt had experienced no evident degree of fever, who ſuffered but little, who had perhaps preſerved his appetite, who ſlept, and who had complained of no other ſymptom but that he could not keep his back upright, is far from being relieved by this operation, at leaſt if he be, the relief is not of long continuance; for the matter forming the tumour, which at the time of the opening was white as milk and without ſmell, ſoon contracts a conſiderable ſtench, a fever comes on, the pulſe becomes quick and ſmall, and the patients pretty frequently die towards the thirteenth day (i). The body is afterwards opened, when a caries of two or three of the lumbar vertebræ, and often of part of the os ſacrum, preſents itſelf to the view; and after this diſcovery, the Surgeon is far from imputing to his own management the ſpeedy death of the patient.*

It is proper, however, to obſerve, that this patient had lived ſeveral months, without any conſiderable inconvenience, with this caries, and

* Many of theſe and ſubſequent obſervations have been adopted by Mr. JUSTAMOND, in his *eſſay on abſceſſes*, as containing that gentleman's entire ſentiments on the ſubject. E.

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with this tumour though it contained a large collection of matter: his ſtate would not even have been changed ſo ſuddenly, if an opening had not been too precipitately made. We ſhall be convinced of this by attending to what happens when theſe tumours are left to nature; if they burſt, the opening is made much later, and it is only at this period that patients are ſeized with any alarming ſymptoms, and that too in a much leſs degree than after the opening has been made by art(k). The reaſon of this is certainly becauſe nature procures no more than a very ſmall iſſue to the matter. If the patients then die, they periſh much later than in the other inſtance. This difference in the event teaches us at leaſt that we muſt not meddle with theſe tumours, that we muſt apply nothing to them to haſten their opening, ſince nature appears to diſapprove of their burſting, as a termination that is not uſually according to her wiſhes. But here ſome one perhaps may ſay, that a diſeaſe of ſo terrible a kind is beyond the reſources of art and the efforts of nature. Let us beware of deciding this matter ſo lightly; and of aſſigning limits to nature which ſhe hath not preſcribed to herſelf; for ſince we have inſtances of caries of the dorſal vertebræ cured by her aſſiſtance alone, why ſhould not her power be extended to the cure of caries of the lumbar vertebræ, if her operations were not diſturbed by improper meaſures? At leaſt the following is a fact which ſeems to prove, that this diſeaſe is not beyond her power of relief.

A young woman of twenty-two years of age, after having fallen on the bottom of her back, down a ſtaircaſe, felt, for a conſiderable while, a pain, more or leſs acute, in the region of the loins, and was ſeized with a gradual weakneſs in that part, which, in a ſhort time, prevented her from walking, and even from ſupporting herſelf; at which period, ſhe applied to me. Revolving in my mind theſe ſymptoms and the cauſe that had produced them, I imagined her caſe to be a diſeaſe of the lumbar vertebræ, and the beſt means of cure that could be preſcribed were reſt, and lying a bed. I explained to her the imminent danger of her ſituation, and engaged her punctually to follow my advice. This ſhe did very exactly, by going to bed and remaining there conſtantly, taking

care to exert as little motion as poſſible, agreeable to what I had recommended. Notwithſtanding theſe precautions the diſeaſe continued to advance; the weakneſs of the loins, and the pain ſhe felt there upon motion, were accompanied with a tumour that began to make its appearance under Poupart's ligament, which became, in proceſs of time, as large as ones fiſt, and which at length diſcovered an evident fluctuation. Warned by the melancholy end of all thoſe in whom ſuch tumours had been opened, I carefully avoided applying any thing that might haſten the burſting of it, and abſtained ſtill more religiouſly from opening it with a cutting inſtrument. This tumour, with fluctuation, after having acquired its full ſize, remained nearly in the ſame ſtate during four months, and at that period began to be imperceptibly diſſipated, ſo that in four months afterwards, there remained not the leaſt veſtige of it; the patient felt from one week to another, that the ſpine was recovering its former ſtrength; ſhe began to ſit upright in her bed, while her back was ſupported; ſhe then made a ſhift to walk with a ſtick, and was at length capable of walking alone and unſupported with as much firmneſs and confidence as ever; but the happy termination of this diſeaſe was owing to her perſevering for near a twelvemonth in keeping her bed, and in a ſtate of reſt.

This is one of thoſe ſurprizing caſes that ſeem to be an open page preſented to the practitioners of our art, in which nature invites them to meditate her walks, and teaches them to do nothing that may diſturb her intentions. She ſhews us here a large collection of matter, to the evacuation of which, in conformity to the principles received, we ſhould have proceeded as ſoon as the fluctuation had been evident, apprehending leſt a longer confinement of it ſhould produce miſchief. And yet we ſee that this ſame matter, after having been collected for ſeveral months in a diſtinct cavity, has been received again into the courſe of the circulation without occaſioning the leaſt accident; and that the principal diſeaſe produced by it has been cured, without the concurrence of art, otherwiſe than in preſcribing reſt, already ſo loudly called for in this inſtance, by that ſame nature who has directed the cure (1). Inſtead of

ſilently admiring ſuch a phænomenon, it is the province of a man, intent upon the improvement of his art, to endeavour to give ſuch an explanation of it as ſhall not be diſavowed by nature, whoſe interpreter he is to be.

Let us conſider what this diſeaſe exhibits to us in the firſt inſtance. A diſturbance of the organization in the bodies of the lumbar vertebræ, by means of a ſhock conveyed to them, or a violent divulſion of the ligaments that unite them. The ſwelling of the parts being the conſequence of theſe firſt accidents, and a ſlow inflammation coming on, this at length cauſes a ſuppuration and abſceſs, the ſeat of which is in the neighbourhood of the parts affected. The organization of the bodies of the vertebræ being depraved [m], it follows, that ſmall ſeparations or ſcales muſt be thrown off from theſe bones, which is as much effected by the organic action of the inflamed parts, as by the matter they furniſh. This matter itſelf after having been efficaciouſly employed in ſeparating the corrupted from the ſound parts, is alſo the medium to which nature intruſts the care of expelling and carrying them out; but this purpoſe is effected very ſlowly. Theſe bony fragments, of greater or leſs dimenſions, being detached by means of the matter, float in that liquid, to which they preſent a greater extent of ſurface in proportion as they are more divided. The pus itſelf in which they are ſteeped, becomes a menſtruum proper to diſſolve them, and its quantity increaſing in proportion to the continuance and extent of the ſuppuration that ſeparates the looſe pieces of bone, it at length makes a paſſage for itſelf towards the depending parts which afford the leaſt reſiſtance. It is generally underneath Poupart's ligament that theſe tumours manifeſt themſelves; but the matter is ſtill ſheltered from the external air, and undergoing no change, produces no miſchief in the parts that ſurround it. The fragments of bone which float in this quantity of pus, may at length be totally diſſolved in it, ſo as to form a homogeneous maſs, which perhaps may not then in any wiſe differ from our moſt elaborate nutritive juices [n]. This being premiſed, we need not be aſtoniſhed, if, at this period, nature, after having employed the pus as a menſtruum to diſſolve

the bony fragments to the ſeparation of which it hath contributed, ſhould reſume it into the general courſe of the circulation, by taking it up from its cavity, through means of the ſeveral abſorbents that open on the ſurface of that cavity. The return of the matter being then effected as ſlowly as its collection was formed, the parts which compoſe the cavity, muſt return to their proper ſtate as gradually as they were diſturbed from it, without accident and without inconvenience.

With reſpect to the bones that are primarily affected, and which have almoſt adopted the nature of fleſh during the long and important proceſs of exfoliation, no ſooner are they diſengaged from theſe looſe pieces, than they begin to recover their ſolidity; and if ſeveral vertebræ, for inſtance, have partaken of the injury, they form among themſelves a common maſs of oſſification that in ſome meaſure ſupplies their bodies, and terminates this important cure, which, as we may obſerve, can only be the work of nature, time, and reſt (e3).

But however advantageous reſt may be, however pointed may be the indication for it in the inſtances before mentioned, there are ſtill other caſes of caries in which this indication is more preciſe, and leſs liable to be miſtaken, than in thoſe of the dorſal and lumbar vertebræ; theſe are the caries affecting the joints. The ligaments, or the articulating ſurfaces of the bones, often ſuffer injuries in their organization, which cannot be removed by the uſual remedies employed in the beginning, in caſes of concuſſions, wounds, fractures, &c.; or where theſe injuries ariſe from a fault in the habit, they oftentimes will not yield to the remedies proper to reſiſt the action of any acrid irritating principle that may have been fixed upon theſe parts. In theſe inſtances nature, who always tends towards a cure, hath a very great labour to perform, in the proſecution of which we muſt be careful not to diſturb her by any indiſcreet manœuvres; in order that this labour may turn to the advantage of the patient, nothing is required but time and reſt. Here, as in the other caſes, nature avails herſelf of the uſual reſources; ſhe forms pus, by means of which fluid ſhe ſeparates from the whole, the bony, ligamentous, and cartilagi-

nous parts that are vitiated, from whatever cauſe; and ſhe depoſits, in the cavity of the joint, theſe fragments, together with the pus that has ſeparated and conveyed them there. This pus, after having employed more or leſs time in melting down theſe fragments, might poſſibly, as in the inſtance above cited, be re-abſorbed into the general maſs without inconvenience. My practice has not furniſhed me with any inſtance in which nature hath followed this plan in ſuch caſes; but the following is the moſt ordinary way ſhe chuſes, and which ſhe alſo frequently adopts in caries of the dorſal as well as of the lumbar vertebræ.

The pus, which till the time of the complete diſſolution of theſe fragments, ſeemed to exert no ſenſible corroding power upon the texture of the ſkin that confines it, after coming nearer and nearer to this external covering, at length raiſes in it an inflammation of a very ſmall extent, and by means of the ſuppuration ſet forward in it, a fiſtulous opening is made, which gives vent to a large collection of matter that hath often been from ſeven to eight months, and more, in forming. By this contrivance the pus being evacuated by degrees, and the air not having acceſs to its cavity, it doth not acquire that ſtate of decompoſition which makes a deſtructive principle of it. The irritating faculty of the pus ſcarce ſhewing itſelf till all the fragments, as well bony, as ligamentous and cartilaginous, are completely melted down, it may reaſonably be preſumed, that the pus is as it were neutralized by the principles they impart to it, and that they are theſe fragments which maintain it in that mild and unctuous ſtate we obſerve it to be in before this perfect diſſolution. What I have ſaid upon this point becomes ſo much the more probable from the circumſtance of my having rarely found any bony fragments in the matter of thoſe abſceſſes that have opened of themſelves, and that I have always ſeen them in thoſe collections which have been opened before the time intended by nature. It is plain however, that during a work ſo long continued, and ſo prudently directed, nature muſt have been in particular want of reſt in the part where ſhe was carrying on theſe operations, and that motion could only interrupt and trouble them. But if reſt have been hitherto uſeful, it is no leſs neceſſary to conduct

conduct a cure, ſo happily and ſo wiſely begun, to its end; for the bony and cartilaginous ſurfaces being now diſengaged from all the fragments nature hath choſen to ſeparate, preſents us with lively and fleſhy granulations, which are in that ſtate of inflammation proper to contract an adheſion with contiguous granulations of the ſame kind. This adheſion conſolidates itſelf by degrees, and forms at length a compleat union between two bony ſurfaces, deſtined originally to move one over the other. But in order to obtain this ſalutary anchyloſis, nature requires reſt, and reſt continued with the greateſt perſeverance. In this great and admirable operation, ſhe hath loſt nothing but motion; and by this indiſpenſable ſacrifice, ſhe has preſerved a limb with part of its functions, and prevented the mutilation of the machine.

The deſcription I have here given, is not a romantic idea of phyſiology and pathology; it is a truth founded on fact, of which I can myſelf give many inſtances. I have got a preparation by me in which the thigh bone is ſoldered with the os innominatum, and the poliſhed oſſified ſurface of which, together with the ſolidity of its union, leave me no room to doubt that the ſubject it had been taken from, had ſurvived a long time the formation of this anchyloſis. Not having known the perſon, nor been acquainted with the hiſtory of his caſe, I can only form conjectures upon this ſubject. But the neck of the thigh bone being extremely ſhortened, it is to be preſumed, that its anchyloſis with the os innominatum has been produced by a caries, which may have attacked the head of the bone and the cotyloide cavity in which it was lodged; and that this union has been preceded by abſceſſes, and other ſymptoms common to a caries of the joints. The following fact will contribute to ſupport this opinion.

A poor beggar who has an anchyloſis of this nature, and in whom I had frequently noticed ſcars at the upper part of the thigh, as well on the inſide as on the outſide, hath aſſured me, that after a fall upon the great trochanter, he had for a long time ſuffered extreme pains, which had been at length terminated by ſucceſſive abſceſſes, that had kept him

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in hoſpitals for ſeveral years, and had frequently brought him into a very dangerous ſtate. His thigh, which forms almoſt a right angle with the trunk, being evidently much ſhorter than the other, there is no reaſon to doubt that this effect has been produced by the deſtruction of the head of the thigh bone, by a caries which nature muſt have ſucceeded in the cure of, by following the track I have juſt been deſcribing.

But what I have not had an opportunity of obſerving myſelf with reſpect to the articulation of the thigh with the os innominatum (o), I have obſerved in articulations of the thigh with the leg, and of the leg with the foot. I have ſeen in theſe joints, abſceſſes attended with caries, which after having made for themſelves, in a long courſe of time, fiſtulous openings, and after having furniſhed, for years, a diſcharge more or leſs plentiful, have at length ceaſed to ſuppurate; and have left nothing more than a complete union of the articulating ſurfaces that had been deſtroyed. But theſe great cures have all been owing to nature, and art has concurred in them no farther than in preventing every kind of motion, every change of poſture, which might keep up the irritation of the parts affected (p). Dreſſings ſeldom, very ſeldom renewed, and an attention to place the limbs at reſt between junks, as in fractures, have been the only means employed (q).

I might poſſibly have obtained the ſame termination in a caries, with an abſceſs, in the articulation of the os humeri with the ſcapula, had I not yielded to the temptation of giving vent to a large collection of matter that began to ſhew itſelf by an evident fluctuation. But at that time I had not been ſufficiently informed by my own miſtakes. The event was fatal to the patient, who died of a ſuppuratory fever, after having fallen into a maraſmus; and though on examining the part, I found a caries of the head of the os humeri, and of the glenoide cavity of the ſcapula, a diſeaſe hitherto deemed incurable, I have not been the leſs perſuaded ſince, that the operation I had performed, if it had not immediately cauſed, had at leaſt haſtened the death of him whom it had been intended

intended to relieve. Some ſubſequent facts have entirely confirmed me in this opinion.

A man about fifty years of age applied to me in 1770, with the bones of the wriſt ſo carious, that in two or three places one might paſs a probe through them, by following ſome fiſtulous openings that preſented themſelves on the outſide. The wriſt and the hand, which were œdematous, conſiderably ſwelled, and of a dark blue colour, ſeemed to require amputation ſo much the more urgently, as the patient was tormented with a ſlow ſuppuratory fever; it was even the advice of a man very ſkilful in the profeſſion, not to defer having recourſe to this laſt reſource. Notwithſtanding this, I ventured to temporize, and after having applied the uſual dreſſings for two days, I carefully cloſed all the fiſtulous openings with dreſſings that were not irritating, and the hand and wriſt being covered with compreſſes dipt in a balſamic and ſpiritous embrocation, made with the yolk of an egg, oil of roſes, and brandy, I placed them in junks. The parts being thus kept in a perfect and conſtant ſtate of reſt, I made no ſcruple of leaving the firſt dreſſings on for ten days without a renewal, more eſpecially as neither the pain nor the diſcharge required them to be removed ſooner; and at this time, it was curioſity, rather than any abſolute neceſſity, that was the motive of my doing it. As I found the diſcharge leſs in quantity, thicker, and leſs fœtid than when the patient was dreſſed every day. I judged it proper to put off the removal of the ſecond dreſſings for twenty days; and at this period the ſwelling of the hand and wriſt were half reduced, and every thing ſeemed to beſpeak, as much from the patient's countenance and pulſe, as from the nature of the diſcharge, that hopes might already be entertained of a fortunate termination of this dreadful diſeaſe. In about two months and a half after this, theſe hopes were completely realized; for at this time all the fiſtulous orifices were perfectly cicatrized, and the cure was terminated, with no other inconvenience to the patient, except loſs of motion in the wriſt, which has not ſince prevented him from doing his uſual work (r).

But

But what abſolute reſt and unfrequent dreſſings have effected in combination with nature in the inſtances juſt mentioned, they have alſo done under my inſpection, in two caſes of caries of the articulation of the arm with the fore arm. One of the patients in whom this diſeaſe had come on after fracture, with ſplinters and abſceſs in the joint, had even been ſent to me in order that I might amputate the limb; the ſurgeon who had taken care of him for ſeveral months paſt, judging there was no other way of putting a ſtop to the ſymptoms which attended this caries. And indeed, a very conſiderable and œdematous ſwelling of the elbow joint and neighbouring parts, a plentiful and offenſive diſcharge, a total loſs of appetite, a ſlow and ſuppuratory fever, two fiſtulous openings that penetrated into the cavity of the joint, and through which a probe being introduced, diſcovered a very extenſive caries, were all ſymptoms ſufficient to juſtify the operation. Yet in this caſe, dangerous as it was, a few months of total reſt, joined to long intervals between the dreſſings, having aſſiſted the ſalutary formation of an anchyloſis intended by nature, have made all the ſymptoms diſappear, and have effected a perfect cure of this diſeaſe, with no other loſs than that of the motion of the joint.

Here are already a number of facts brought in ſupport of what I have advanced, that whenever the inſpiſſation of any of our fluids is required in the cure of any ſurgical diſeaſe, reſt muſt be called in for this purpoſe; but there are other facts, and of a very different kind from thoſe I have here alledged, which confirm the truth of this aſſertion. Wounds and ulcers, for inſtance, in the cure of which reſt is preſcribed with ſo much efficacy, do they preſent any other indications for the employing of this method, than ſuch as are derived from the neceſſity nature is under of giving the gelatinous liquid that oozes from their ſurface a ſufficient degree of conſiſtence? This conſiſtence is not only neceſſary that it may be enabled to ſupply, in ſome ſort, the place of the ſkin that is deſtroyed, by forming the external ſcar that completes the cure; but alſo, that in the part beneath this artificial covering, it may ſupply the want of the cellular ſubſtance, that natural connecting medium of our

parts, which has been deſtroyed by the ſuppuration. For we are not to imagine that the gelatinous concretion which we obſerve in ſcars, is confined to what we ſee of it outwardly. Motion, far from aſſiſting in this good effect, cannot but prevent it, by deſtroying the adheſions already begun underneath the part where the ſcar is to be made, by putting an impediment to the neceſſary concretion of the gelatinous fluids that are to form it, and even by deſtroying it when it has not acquired its utmoſt degree of ſolidity, as we are taught by experience, particularly in the cure of ulcers of the legs. Here the indication for reſt to the part affected is ſo poſitive, that they never can be firmly healed without the help of this method, and that exceſs of motion alone, without the concurrence of any other circumſtance, often makes them burſt out again after they have been completely healed.

From hence it may be concluded, that we muſt be careful to preſcribe reſt for the part affected, during the cure of wounds and ulcers (*). This attention muſt even be continued beyond the time of the complete formation of the ſcar, in caſes where the muſcular parts underneath it are expoſed to frequent motion; and it muſt be carried ſtill farther when theſe ſame parts have been affected by the diſeaſe, becauſe the gluten, ſupplying the place of the cellular ſubſtance which connected the muſcular fibres, may not have acquired at firſt a ſufficient degree of conſiſtence, to reſiſt the efforts it muſt then be expoſed to by a ſtrong contraction of theſe parts. The following fact will evidently prove how uſeful ſuch a precaution is in this laſt circumſtance.

A Journeyman Taylor, after having had an abſceſs by congeſtion, came to me in 1776 with a fiſtulous opening, which was already of ſome continuance in the upper, external, and rather poſterior part of the thigh, about two inches below the great trochanter. I paſſed a probe into the fiſtula, which furniſhed a large quantity of ſerous, and ſomewhat fœtid, diſcharge, and found that it paſſed under the external and anterior muſcles of the thigh, pretty near the bone, and that it extended about ſix inches beyond its external opening, taking its courſe towards the joint.

joint. At firſt, I apprehended ſome caries of the bone, but having met with bony particles in the way of my probe, I thought it proper to treat this fiſtula by laying it open through its whole extent, by which I might be at liberty to act as circumſtances ſhould require, if, at the time of the operation, I ſhould find that the diſeaſe was complicated with caries. The fiſtula being opened through its whole extent, and appearing confined to the fleſhy parts, I ſhould only have made a ſimple inciſion, had I not been aſſured from experience, that in two or three days, notwithſtanding all my endeavours to the contrary, the bottom of the diſeaſes would have been concealed from me by the diſtention, and even by the re-union of ſome of the ſound divided parts. But foreſeeing this inconvenience, which I had before experienced ſeveral times in ſimilar caſes, I removed ſome portions of the fleſhy parts, and dreſſed the wound to the bottom and rather cloſe. I continued this precaution during the whole of the cure, which went on as uſual in other ſimple wounds. The fiſtula began to fill up, and to conſolidate itſelf gradually, the edges of the divided parts ſunk by degrees, and in two months, formed almoſt a complete cicatrix, which ſeemed to promiſe a certain and ſpeedy cure. But at the time when the ſcar was juſt cloſing, the patient, who had conſtantly kept his bed, having riſen and walked more than he ought to have done, felt, a few days after, ſome pain; a redneſs appeared through the whole length of the ſcar, with a ſmall projecting blueiſh point in the middle, which having burſt with my nail, a ſmall opening preſented itſelf, from whence there iſſued a kind of bloody and ſerous diſcharge. I thought at firſt that this opening was not deep, but having probed it, I had the chagrin to find, that all I had done was in vain, and that there was now a fiſtula almoſt as extenſive as when I firſt undertook the caſe.

This diſcovery ſoon made me ſuppoſe, that the action of the muſcles, at a time when the ſcar was yet recent, might poſſibly have deſtroyed the adheſions formed between the parts that anſwered to the channel of the old fiſtula. I propoſed therefore to confine this action, and even to annihilate it in thoſe parts, till they ſhould have acquired a ſolid coherence

between themſelves. To effect this, I placed on the channel of the fiſtula a thick roll of wetted lint, and applied over it, thick, graduated compreſſes, exactly maintained, and ſtrongly bound on the part by means of a bandage carefully rolled on. This precaution, continued for ſome time, made me hope that I might cure this complaint without having recourſe to a freſh operation; but the patient riſing out of bed, inſtead of uſing a bed pan, and the motion he gave to the part looſening the bandage, I obtained only a partial ſucceſs from it.

The fiſtula indeed cloſed itſelf, but this was frequently only for a few days, and though it was not ſo deep as before, yet ſtill the little ſinus that remained, made me always apprehend a return of the complaint. To get rid of this anxiety, I determined to paſs, for two days, into the ſinus, a piece of lint impregnated with ſome digeſtive ointment animated with precipitate. At the end of two days I omitted this tent, and renewed my bolſtering and compreſſion on the whole extent of the ſinus as before, with the additional precaution of placing the limb in junks and other ſupporters, as I ſhould have done for a fracture of the upper part of the thigh bone, or of its neck. By all theſe attentions, I at length ſucceeded in obtaining a perfect cicatrix; but that I might not be expoſed to a relapſe, I continued them perhaps beyond the time neceſſary to effect my purpoſe, chuſing rather to uſe too much precaution in this caſe then to neglect any.

By judging from this fact, it ſhould ſeem that nothing is required in the cure of ſinuſſes, except the contact of the parts which form the channel, and a perfect ſtate of reſt for as long a time as is neceſſary, that they ſhould contract ſolid adheſions between themſelves. Are there not a variety of cures, effected in theſe complaints by exact and well-maintained compreſſions, which confirm this truth? Even the precautions by which I ſucceeded in the cure of the caſe above mentioned, do they not almoſt argue the inutility of the great operation I had at firſt attempted (1)? At leaſt they tell us very plainly, that we muſt not re-

ſort to ſuch an operation, till compreſſion, employed with all the ſagacity which different caſes may require, has been found inſufficient [u].

Even fiſtulas of the anus preſent ſome preciſe indications for the employment of reſt. The diviſion of the nooze or bridge of fleſh that lies between the two openings forming the fiſtula, does nothing more than protect the parts forming the nooze, from that habitual motion which prevented their re-union. When they are once divided, they enjoy, in compariſon with their former ſtate, a degree of reſt ſufficient to allow the cicatrix to be formed throughout the whole ulcerated extent that formed the ſides of the fiſtula. We may even obſerve, that the healing of the wound is never more ſurely and more ſpeedily effected, than when by means of a ſoft tent, we make our dreſſings preſs a little upon all the diſeaſed part; for they are not the ointments with which theſe tents are covered that perform the cure, ſince I have often effected this without their aſſiſtance. Neither is it the paſſing of the excrements that puts an obſtacle to the cure; ſince I have ſeen perfectly cicatrized in a ſhort time, fiſtulas, in which the wound was conſtantly covered with fœces. But the uſe of the tent is ſo far from being an indifferent matter, that I have often obſerved the fiſtular canal to become ulcerated again, when this compreſſion was left off too ſoon after the formation of the cicatrix.

From theſe obſervations, the propriety of which muſt be evident, it follows, that it might perhaps be poſſible to cure fiſtulas of the anus without either inciſion or ligature. A careful compreſſion, made by means of a pretty firm tent, introduced much beyond the internal orifice of the fiſtula, might be the more likely to ſucceed in the cure of this diſeaſe, if by previous evacuations and a ſtrict diet, the firſt diſcharge of excrement could be delayed till the ſides of the fiſtula ſhould have acquired an adheſion ſufficiently ſtrong and firm, not to be deſtroyed by the contraction of the ſphincter. Theſe are trials to be made, if they have not yet been attempted, and the effect of them I ſhall ſoon have an opportunity to determine.

But

But if reſt of the parts concerned, be indicated in the cure of fiſtulas, of which there is no doubt, it ſeems not leſs ſo in the prevention of them. Abſceſſes which happen in the circumference of the cheſt, and which ſo frequently remain fiſtulous, whether they burſt of themſelves, or whether they be opened by ſmall inciſions, become ſo merely from the continual motion annexed to the parts in the extent of which they are formed. But there are means of reſtraining this motion, and of keeping theſe parts in a ſtate of reſt neceſſary to bring about their coheſion. A free inciſion, carried even acroſs the muſcles that cover theſe abſceſſes, openings extended according to the direction of the ſinuſſes they preſent, compreſſions diſpoſed with ſkill, &c., are the means by which we obtain this deſirable effect, which is almoſt a certain warrant of a radical cure. It is indeed conſtant, that compreſſive dreſſings, ſo efficacious in the cure of moſt wounds and ulcers, are in theſe caſes of ſtill more remarkable advantage than in any other; and that the ſtate of reſt in which they maintain parts naturally moving on each other, by enabling nature to work with effect in uniting them, prevents fiſtulous ulcers, which would often have been the conſequence of not attending to reſtrain the natural motion of the parts.

From what has already been ſaid, it appears how numerous the indications are for the preſcribing of reſt in ſurgical diſorders; though we have only mentioned thoſe in which nature requires an inſpiſſation of ſome of our juices. But the indications which call for the uſe of this principle are not limited here; they are applicable to ſo many ſurgical diſeaſes, that we may conſider it as the moſt extenſive curative medium the art can employ. The caſes we have already gone through will impreſs an idea of the truth of this aſſertion, and thoſe which remain ſtill to be explained, will give it the higheſt degree of evidence. But we ſhall go through them in a ſummary manner, becauſe the indications which moſt of theſe caſes preſent for the application of this method, are too poſitive to be miſtaken; and the employment of it then becomes a precept of the art.

Is

Is it not, in fact, an eſtabliſhed rule, that we muſt have recourſe to reſt in all ſurgical diſorders, where motion may impede any ſalutary coheſions, or may occaſion pains, irritations, or frictions that may bring on diſagreeable conſequences, or may diſplace parts that ſhould be kept in the ſituation they are, or may produce dangerous effuſions of blood, &c.? Therefore, in caſes of recent wounds we wiſh to re-unite, in diſlocations newly reduced, in ruptures attended with bad ſymptoms, and which have been juſt returned by the taxis, in loſſes of blood which come on during geſtation, in caſes of wrenches and forcible extenſions of the ligaments, in ruptures of theſe parts, as of ſome muſcles and tendons, in contuſions of the joints; in all theſe caſes, it being evident that motion indiſcreetly employed is liable to bring on great miſchiefs, theſe miſchiefs themſelves are ſo many abſolute indications which direct the preſcribing of reſt. Beſides, experience has ſo fully proved the neceſſity and advantages of this method in all ſuch caſes, that it would be needleſs to inſiſt any longer upon it.

We ſhall only obſerve, that in caſes of ſhocks in the joints, and of divulſion, and contuſion in the ligaments that ſurround and ſtrengthen them, as motion neceſſarily produces pains which cannot but increaſe the irritation, tenſion, and inflammation which uſually attend theſe accidents from the firſt, reſt preſents itſelf as the moſt efficacious method of cure that nature can furniſh under ſuch circumſtances. We ought then to rely upon it the more, as it cannot be ſupplied by any thing elſe; for all that art ſhould attempt, is only to mitigate the pains, to aſſuage the irritation and tenſion of the parts, and to prevent inflammation and the fatal ſuppurations it may occaſion. Now, amidſt all the methods that art can ſuggeſt to counteract theſe effects, reſt is the moſt powerful; bleeding, diet, and external applications being only acceſſory helps, the efficacy of which is ſo much the more evident as they are combined with this principal agent (w). But ſuppoſing that theſe means ſhould have been neglected in the firſt inſtance, or that notwithſtanding the application of them, abſceſſes ſhould be formed in the cavities of the joints, and that the ſurface of the bones deſigned for their motion ſhould be affected with

with caries; reſt, at this period, and in the ſubſequent treatment of the diſeaſe, as we have before proved, is one of the chief methods of cure correſponding to the views of nature.

We cannot likewiſe but be ſenſible of the efficacy of reſt in inflammatory tumours of the teſticles, and in a falling down of the womb. Is it not alſo evident in caſes of commotion, either of the ſpinal marrow, or of any of the important viſcera that are contained in the abdomen, the thorax, and the cranium? The accidents which follow theſe commotions, being always the effect of a violent degree of motion communicated to theſe parts, do they not preſent us with poſitive indications for the preſcription of reſt (x)? I have ſeen a young lady of nineteen, who, after having by chance jumped ſome few ſteps off a ſtaircaſe, remained ſenſeleſs for ſeveral hours. She afterwards fell into ſwoonings every time ſhe wanted to ſit upright in her bed; and it was only by reſt and a horizontal poſture, perſevered in for ſeveral months, that ſhe was completely cured of this accident.

From what has been already ſaid, therefore, we may be convinced that reſt, as well as motion, is indicated on ſo many occaſions, that we might ſtrictly affirm theſe two means of cure to be univerſal and excluſive; and, what is more, there are infinite numbers of reaſons that preſent themſelves in ſupport of this concluſion. The diſorders which the animal œconomy may experience, are, in fact, nothing more than the produce of an exceſs or deficiency of motion (y); and nature and art cannot really ſucceed in repairing theſe diſorders, but by increaſing the power of motion when it is too weak, and diminiſhing it when it is too ſtrong. Nature, indeed, in all her efforts to cure, clearly ſhews us theſe two points of view, to which all that medicine and ſurgery can preſcribe, in the diſorders belonging to their reſpective province, is obliged to conform itſelf. But amidſt the ſeveral curative means, to be able to chuſe thoſe which can produce either of theſe effects, in the exact proportion required for the recovery of health, would be the utmoſt perfection of our art; to which human ſkill, however, can never expect

to

to attain. In endeavouring, therefore, to ſhew, in this eſſay, the advantages that may be derived from motion and reſt in the cure of ſurgical affections, I have, indeed, only given a ſketch of the ſubject. May the other competitors give complete ſatisfaction to the members of the academy upon this point, and preſent them with performances worthy of themſelves!

NOTES

BY THE AUTHOR.

(a) TO the obſervations contained in MONSIEUR QUESNAY'S *Memoir upon Wounds of the Brain*, (printed in the firſt volume of the Memoirs of the Academy of Surgery,) where this fact is eſtabliſhed, may be added, the obſervation of a rod of iron having paſſed through the brain, without cauſing the death of the patient—*Journal de Medecine*, Auguſt 1777.

(b) The ganglions of the cervical and intercoſtal nerves, and of thoſe which are placed in the cavity of the abdomen, are they not, as Mr. LE CAT has aſſerted, with ſo much probability, in his diſſertation on the nervous fluid, which obtained the premium at Berlin, in 1757; are they not particular organs, in which the fluid undergoes elaborations, and receives qualities relative to the functions of each of the viſcera, to which the nervous filaments proceeding from theſe ganglions are diſtributed?

(c) I mean

(c) I mean the fluid which forms the connection between the material and ſpiritual parts of our being.

(d) This medium comprehends a certain latitude, within the limits of which, health is included.

(e) By theſe bounds we are to underſtand the *quantity* of life, not the *duration* of it. A valetudinarian lives, but he enjoys a leſs degree of life than the man who is in full health.

(f) The following fact will prove, that however inconſiderate ſuch a practice may be, there are ſtill many perſons who follow it.—A country ſurgeon, being called ſome years ago to reduce a fracture of the olecranon, did nothing more than place the fore-arm in a ſtate of extenſion, and maintain it there by a bandage and ſome ſplints. Twenty days after the accident, the parents of the patient called in the aſſiſtance of two ſurgeons from a neighbouring epiſcopal city. They exclaimed openly againſt the practice that had been purſued, and decided, that as an anchyloſis was the unavoidable conſequence of ſuch a fracture, the bent poſture of the fore-arm ſhould be preferred to its extenſion. Accordingly they exerted all their efforts to ſeparate the union already begun, and placed the fore-arm in a ſling. This fact was told me, a few months after, by one of the ſurgeons concerned, who related it as a proof of his own judgment, and of the unſkilfulneſs of the firſt ſurgeon employed, who probably had not been directed in his practice by reflections drawn from the nature of the diſeaſe; otherwiſe he would not have ſuffered practices ſo repugnant to the good principles he would have adopted: for to place the fore-arm in a bent poſture in a fracture of the olecranon, is the ſame thing as bending the leg upon the thigh in a fracture of the patella.

(g) I ſay a moderate extenſion, becauſe a too ſtrong one, eſpecially if the olecranon were fractured near its origin, would puſh the cubitus too much forward, and prevent the fractured ſurfaces from being adapted to each other. This would occaſion, after the union was completed, a bony

bony projection on the ſide of the joint, which might totally impede its motion. If the fracture ſhould have happened nearer to the extremity of the olecranon, the forcible extenſion of the fore arm would make a gap between the fractured pieces on the ſide of the cavity of the joint; the olecranon would conſequently become ſomewhat lengthened, and thrown up, and the effect of this injudicious practice would at leaſt be a difficulty and a decreaſe of motion.

(h) Upon this ſubject may be ſeen the ſecond part of my Eſſay on Counter-ſtrokes in other Parts of the Body beſides the Head, which obtained the prize in 1771, under the the name of John Martin Bazille. *Prix de l'Académie*, Vol. IV.

(i) I have ſeen ſome perſons attacked with this diſeaſe, in whom the ſymptoms, before the opening of theſe abſceſſes, had not been more intenſe than thoſe here mentioned; and who, after the evacuation of the matter, have periſhed at the period I have marked.

(k) I have at preſent under my notice a very ſtriking inſtance of what is here advanced. A young man of four-and-twenty years of age, who has an abſceſs in the loins after a diſeaſe of the ſpine, ſo evident, that it forms a pretty conſiderable projection, had experienced, during the formation of this abſceſs, no other ſymptoms than a debility of the ſpine, attended with a dull kind of pain, without any remarkable fever or loſs of appetite, &c. But this abſceſs having at length burſt itſelf, the patient was ſeized a few days after with a ſtrong fever, and a total loſs of appetite and reſt, which gave reaſon to apprehend that the diſorder would ſoon terminate fatally. But after he had continued a fortnight in this alarming ſtate, he began to grow better; the diſcharge, from being ichorous and offenſive as it was, loſes daily its bad ſmell, and acquires a better conſiſtence; the pulſe becomes more regular, and every thing ſeems to promiſe, that with time and reſt, the patient will eſcape with no other inconvenience than that of being a little deformed.

Such

Such was the ſtate of this patient, when this eſſay was ſent to the Academy; and it had been ſo much mended ſince that time, that the cure appeared certain. The patient had recovered his appetite, digeſted well, the matter which iſſued from the fiſtulous opening was thick, and leſs in quantity, the ſpine gathered ſtrength daily, and the patient began to walk with a ſtick. But the ſpine being more crooked than I at firſt imagined, I thought that by bringing it gradually to a ſtate of extenſion, while the intermediate ſubſtance which was to ſupply the place of the bodies of the vertebræ was ſtill capable of yielding, the deformity might at leaſt be partly corrected, or its farther progreſs prevented. With this view I ordered him to lie on his back, and placed a ſmall bolſter under the part of the ſpine that projected. The deſire the patient had of being cured without deformity, induced him to bear the pain this brought on, without complaining. He no longer ſlept at night, and though I made him change his poſture, and removed the bolſter as ſoon as he had told me of the pain he ſuffered from it; yet I had the mortification of ſeeing, that the ſymptoms which had diſappeared, immediately after this trial, returned. The diſcharge became more and more plentiful; a ſlow fever appeared and continued; a tumour even, but very deep ſeated, manifeſted itſelf on the loins oppoſite to the fiſtulous opening; and there came on at intervals, a loſs of appetite, a diarrhœa, and after ſix months gradual decay, the patient died. Though I found, on opening him, the bodies of the two laſt dorſal vertebræ entirely deſtroyed, and an incompleat union between the bodies of thoſe vertebræ that were in contact, I am not the leſs perſuaded that the patient would have been cured, had it not been for that unſeaſonable extenſion of the ſpine, which brought on the return of the pain, and of the other ſymptoms. When nature, for the preſervation of an individual, makes a ſacrifice of the motion, or of the figure of any part, it is often neceſſary that art ſhould not ſtrive againſt her in attempting to reſtore what ſhe gives up, but ſhould only be the ſpectatreſs of what is going forward. This fact, and ſome others which will be recorded in a collection of obſervations I am preparing to give to the public, will furniſh ſufficient proof of this aſſertion; and in this reſpect I ſhall not

heſitate

heſitate to confeſs my miſtakes. The hiſtory of theſe, oftentimes proves more inſtructive to others, than that of our ſucceſſes.

(l) The impoſſibility of walking, and the neceſſity of keeping in bed, which attend this diſeaſe, are a proof of this.

(m) It is always the depraved organization of the bones that cauſes the caries and the deſquamations; but this depravity may be produced, not only by the action of ſome power on the bones themſelves, but alſo by injuries affecting either the cartilages that line, or unite them; or the ligaments which form and ſtrengthen their union; or, laſtly, the perioſteum which covers them: for the affections of theſe parts which are eſſential to the bones, are often tranſmitted to them, and occaſion the caries.

(n) I might alledge in ſupport of this, the white colour, due conſiſtence, and total inoffenſiveneſs of ſmell, in the matter diſcharged from theſe abſceſſes at the time of their being opened. See the firſt part of my Eſſay on Counter-ſtrokes, &c. already referred to in note *(b)*.

(o) In ſaying this I have ſuppreſſed a fact which might have diſcovered me to be the author of this eſſay. For in the eſſay before referred to, may be found an inſtance of an anchyloſis of the thigh with the os innominatum, after a caries. See page 590 of the fourth volume of the prizes of the Academy of Surgery [25]. I ſhall even obſerve here, that that patient experienced the laſt ſymptoms which brought him to the hoſpital, merely on account of a freſh fall on the part.

(p) I have at preſent under my care, a young man who has the joint of the ancle completely anchyloſed, in conſequence of a caries of the aſtragalus, the os calcis, and the articulating extremity of the tibia. This caſe promiſes a ſpeedy cure, as there are now but a few fiſtulous orifices open, through which ſome few ſmall exfoliations, ſtill to be made, will paſs.

(q) The

(q) The following are facts, ſupplied me by the practice of the hoſpital, ſince I ſent this eſſay to the academy, and come very concluſively in ſupport of the curative means, the efficacy of which I have eſtabliſhed. Peter le Leu having fallen, on the 22d of December 1777, on his right knee, felt a ſharp pain, but ſtill took ſo little notice, that he continued his work the next day. Two days after, the pain increaſed ſo as to make it impoſſible for him to work; a conſiderable ſwelling, attended with much fever, came on, and an abſceſs was at laſt formed in the joint. A fluctuation, at a projecting point on the inſide of the knee, became evident five weeks after the accident; and the pus collecting more and more, at length formed an external and very apparent tumour. The ſurgeon propoſed opening it, but the patient not ſubmitting, he was left to the care of nature alone. Towards the end of March, the matter made two openings for itſelf, from which there iſſued at firſt a matter without ſmell, and in very great quantity. But the pus ſoon changed its nature, becoming in a few days bloody and fœtid, and the patient then found himſelf in a much worſe ſtate than before the vent of the matter, which had been encouraged by all kinds of maturating applications. Nevertheleſs, the patient, left totally to himſelf about this time, confining himſelf conſtantly to his bed, and avoiding all motion of the part to ſave himſelf from the pain that attended it, the diſcharge began to loſe its fœtid ſmell and to become leſs plentiful. The articulating ſurfaces of the thigh bone and the tibia were afterwards gradually ſoldered together, ſo that when the patient came into the hoſpital on the 15th September, 1778, he had nothing more than a ſmall fiſtulous opening at the upper and internal part of the leg, from which only a ſmall quantity of pus was diſcharged, the good condition of which beſpoke the ſpeedy termination of this diſeaſe. It has ended in a complete anchyloſis, with a projection of the tibia backwards, ſuch as would be obſerved in a luxation of the bone towards that part, and which is probably as much owing to the deſtruction of the crucial ligaments at the time of the ſuppuration of the joint, as to the poſition the patient may have kept the part in during his long continuance in bed.

The following fact furniſhes another inſtance in which nature ſeems to be preparing the ſame kind of termination. A ſoldier named Pecquigni, in the regiment of Touraine, having marched ſome days after he had received a wrench, has ſuffered all the accidents that can poſſibly follow ſo imprudent a ſtep. A pain and inflammatory ſwelling came on, the ſuppuration of which being long delayed, it was reſolved to remove him to another place. The tumour having at length ſuppurated and opened itſelf by five or ſix fiſtulous orifices, which, on being probed, evidently diſcovered a very extenſive caries of the bones of the tarſus, and of the joint of the leg with the foot. The patient was ſent back to the hoſpital at Rouen, where he came on the 14th of Auguſt. He had a ſlow ſuppuratory fever, which grew higher every night, and was attended with cough and a hoarſeneſs. The foot and lower part of the leg were extremely ſwelled, and at the circumference of the tarſus and the joint, there were ſeveral fiſtulous openings which furniſhed a great quantity of ichorous, bloody, and very fœtid pus. The ſtate of ſtupidity in which I found the patient the next day and the day after, a colliquative fever, with a diarrhœa, an aſh-coloured and emaciated countenance, made me conſider amputation as a very uncertain method of preſerving his life. This, joined to the averſion I have for theſe mutilations which are ſo often ineffectual, led me to entertain hopes, even in this caſe, critical as it was, of the effects of reſt and infrequent dreſſings, which I had ſo effectually employed for three months in a caries of the wriſt, which I ſhall mention hereafter. Accordingly I covered the fiſtulous openings with pledgits dipt in the commanders balſam (26), and put over them large plaiſters of diachylon, reſolving to dreſs my patient only every five or ſix days, and putting the part between junks. Since five weeks that I have perſiſted in this method, the diarrhœa has ſtopped, the countenance and the pulſe are infinitely mended, the diſcharge is thicker, leſs in quantity, and leſs fœtid; the patient ſleeps, and has recovered ſome appetite, ſo that we may already indulge in the hope of ſeeing this malady terminate by a ſalutary anchyloſis.

(r) To this fact I can add another of the ſame nature, in which the miſchiefs, though carried to a much higher degree than in the fore-mentioned obſervation, are evidently yielding to the method I have been deſcribing.—Michael Davoux came into the hoſpital in May, 1778, with a compleat caries of the whole carpus, accompanied with three fiſtulous openings, communicating with each other on the inſide and outſide of the joint, the parts in the neighbourhood of the caries were œdematous, and ſwelled to ſo conſiderable a bulk, that moſt of the fingers meaſured more than five inches in circumference. If we add to theſe circumſtances a ſlow colliquative fever, with a fœtid and plentiful diſcharge, we ſhall have an idea of the diſeaſe. The amputation of the fore-arm ſeemed indeed the only reſource of the art in this caſe; but before I determined on this operation, I was deſirous at leaſt of giving a trial to the methods that had ſucceeded ſo well to me in ſimilar caſes. Pledgits dipt in the commanders balſam, placed upon the fiſtulous openings, and confined by diachylon plaiſters and compreſſes dipt in a balſamic embrocation, have been the only remedies uſed for this patient, ſince the time of his coming into the hoſpital, to the end of September. Theſe have been aſſiſted by intervals of ten, fifteen, and twenty days between each renewal of the dreſſings, and by maintaining the part in the moſt conſtant ſtate of reſt, by means of falſe junks. Theſe means have brought this terrible diſeaſe into a ſtate that enables us to prognoſticate its cure; for at the time I am writing, all the fiſtulous orifices on the back part of the hand are cloſed; and of theſe, which anſwered to thoſe on the inſide, there now remains but one, which furniſhes nothing but matter of a good conſiſtence, and in ſmall quantity. Theſe circumſtances, added to a very conſiderable diminution in the bulk of the parts affected, ſeem in fact to be the forerunners of an approaching cure.

(ſ) It is ſufficiently known, that a whole limb may be put in motion, while the circumference of a wound or ulcer, upon ſome part of that limb, may be in a perfect ſtate of reſt. It is not therefore this ſort of motion, that we mean to forbid here; it is that kind that ſhould be exerted ſo as to bear upon the injured part itſelf, and ſo as to deſtroy in it, the arrange-

arrangement and adheſion of the nutritive particles nature has brought there for the formation of the ſcar.

(t) It is however to be preſumed, that when fiſtulous openings extend underneath aponeuroſes ſo ſtrong and ſo tenſe, as the faſcia lata, compreſſions can ſcarce ever be made, ſo powerful and ſo exact as to effect the propoſed union throughout the whole extent of the ſinus.

(u) If the fiſtulous opening be produced by a deep-ſeated caries, it will be readily conceived, that any compreſſion which ſhould re-unite the ſinus, before the caries were cured, would prove both uſeleſs and pernicious.

(w) In the memoir referred to above, and which I had not quoted, leſt I ſhould have been diſcovered, it may be ſeen, how much I inſiſt upon reſt, as a mean of cure in moſt diſorders that are the effect of counter-ſtrokes in the joints, extenſion of the ligamentous parts, &c.

(x) The ſame memoir above quoted, in repreſenting theſe different accidents as the natural conſequence of counter-ſtrokes in theſe parts, proves alſo, that reſt is the method of cure chiefly pointed out in theſe caſes. We may even conceive that the preſcription of that, as well as of motion, is as much the province of the phyſician as of the ſurgeon; and that it would be rendering a very important ſervice to the art of healing, to explain the indications which ſhould lead us, either to preſcribe or forbid the uſe of theſe two means, in diſeaſes which are more properly belonging to medicine; for it muſt be acknowledged, they are too indiſcriminately ordered in the cure of internal complaints. I have ſeveral facts by me which prove, that exerciſe, and pretty ſtrong exertions of motion, have been very indiſcreetly recommended in caſes which, had they been properly diſtinguiſhed, ought to have directed the excluſion of this kind of remedy, the effect of which could not but be, as it proved, very prejudicial; and I have other inſtances, in which reſt has been preſcribed from fallacious indications, which, if better underſtood, ſhould have de-

termined the employment of motion. But the conditions of this theſis, not allowing me to make any excurſions foreign to my ſubject, I have only judged it right to mention this, as one of the moſt intereſting queſtions that can be diſcuſſed.

(y) Every thing in nature is motion; it is the univerſal reſtorer and deſtroyer. Abſolute reſt, eſpecially in animated beings, is an imaginary thing; for reſt can only be relative, ſince it implies only a degree of motion reduced below a certain term of compariſon.

NOTES

BY THE TRANSLATOR.

(1) THE author has prefixed an advertiſement to this eſſay, in which he mentions his reaſons for publiſhing it himſelf. Though this detail is here omitted, as being in no wiſe eſſential to the point in queſtion, or intereſting to an Engliſh reader, yet I have judged it moſt proper to keep the performance in the form it was deſigned by the writer to appear.

(2) This ſuppoſes the nervous fluid, (if even there be ſuch a thing exiſting) to be *fire*. I mean not to diſpute this point with my friend. I would only obſerve, that this, as well as the reſt of the introduction to this eſſay, is entirely conjectural. However ingenious it may appear to be, it cannot ſerve as the baſis of thoſe great truths, with which this valuable, though ſmall performance, abounds, and which are founded on experience alone. This introduction therefore, might perhaps have been left out without any detriment to the ſubject. But as I hope it will be found entertaining, and full of new ideas, I ſhould not have done juſtice

to my friend's public appearance in this country, had I altered his dreſs, or pared off any of its embroidery.

(3) The general opinion of anatomiſts is, that the Pons Varolii is formed, by the union of the peduncles of the brain, with thoſe of the cerebellum. Theſe peduncles ſeem evidently to be productions of the medullary ſubſtance of each of theſe parts.

(4) If the grayiſh or cineritious colour of the brain, be the diſtinguiſhing character of a ſecretory organ, it ſhould ſeem, that the whole cortical ſubſtance of the brain ſhould be the glandular part of it, or that part in which the fluid deſtined to be conveyed by the medullary ſubſtance is ſecreted. This, indeed, is generally ſuppoſed to be the caſe. Nature however ſeems to have placed the medullary ſubſtance more out of the reach of external injury, than the cineritious ſubſtance; for the former is deeper ſeated, and the latter, (from whence it is alſo called cortical,) is every where placed on the outſide of the medullary ſubſtance, ſurrounding it on all ſides, and ſeeming to protect it. Accordingly, in wounds of the brain, it is the cineritious ſubſtance which is firſt affected, and more of that is always neceſſarily deſtroyed than of the medullary ſubſtance. This laſt indeed has been conſidered, by all writers, as the moſt important part of the brain, and that chiefly from its more internal poſition. On the contrary, it may be urged in favour of our author's hypotheſis, that the cortical ſubſtance of the brain, being only deſigned to ſecrete thoſe fluids that are to put our loco-motive powers in action, it was not neceſſary that it ſhould be ſo particular an object of nature's care. It ſhould ſeem indeed, in general, that nature is more anxious to place the organ which conveys the ſecreted fluid, out of the way of danger, than that in which the ſecretion is performed. For the ſecretion may ſtill be carried on in one part of that organ, though another part of it ſhould be diſeaſed, or even deſtroyed. The inſtances of this are ſo common, that it is unneceſſary to mention them. But if the channel which conveys the fluid be cut off, and the fluid ſo ſecreted ſhould be neceſſary to life, the communication between the ſecretory or-

gan and the vital principle, would be intercepted. If, for inſtance, one part of the inteſtinal canal, or ſome of the lacteal veſſels, ſhould be incapable of ſecreting and abſorbing the chyle, this proceſs may be carried on by the reſt; but if the thoraic duct be injured, the animal muſt unavoidably periſh, becauſe no more nouriſhment can be conveyed into the machine *. Accordingly, the thoracic duct is placed with ſo much care, that it is almoſt impoſſible it ſhould ever ſuffer from external injury. But this is all, as was before obſerved, the field of conjecture, in which, any man who wanders, muſt unavoidably loſe himſelf.

(5) Theſe tubercles ſeem to be entirely compoſed of the medullary ſubſtance of the brain. This does not appear to agree with our author's ſyſtem.

(6) The lymphatic veſſels, are not continuations of the arteries. They are a diſtinct ſet of veſſels, whoſe origin is throughout the whole ſurface of the body, and from the ſurface of every cavity in it; and the termination of which is in the thoracic duct. They conſtitute the ſyſtem of abſorbents throughout the animal œconomy; and, as it appears from the late diſcoveries made concerning them, by anatomiſts who have been, and ſome of whom are happily ſtill the light of the preſent age, their functions are as important, and as ſurprizing, as thoſe of any other veſſels in the body.

(7) We have a deciſive proof of the poſſibility of nutrition without the aid of the thoracic duct, in the caſe related in Vol. LXX of the Philoſophical Tranſactions, by Dr. CHESTON of GLOCESTER. In this inſtance the duct was rendered impervious by the accumulation of oſſific matter within its cavity, ſo as to render the paſſage of any fluid from thence to the ſubclavian vein, a matter of abſolute impoſſibility.

(8) As theſe two kinds of motion, deſcribed by our author, are very diſtinct, ſo do the effects they each of them produce, ſeem to be.

* In oppoſition to this opinion, ſee the caſe of an oſſified and impervious thoracic duct, related in Vol. LXX of the Philoſophical Tranſactions, by Dr. CHESTON. E.

The

The exceſs of inteſtine motion produces all thoſe general diſeaſes in the habit, which are the effect of any univerſally irritating cauſe whatſoever; ſuch as inflammatory fevers, epileptic fits, univerſal ſpaſm of all kinds, apoplexies, violent and ſudden hæmorrhages, with many other diſorders that fall chiefly under the province of the phyſician, and were therefore out of our author's diſcuſſion. A deficiency of inteſtine motion, on the contrary, produces all thoſe complaints that are the effect of a general relaxation and debility, throughout the animal œconomy. Under this claſs may be ranged all putrid fevers, dropſies, &c. There is another ſurgical diſeaſe which may likewiſe be referred to either or both of the above cauſes combined; I mean true or mixed aneuriſms of the larger arteries, that are not the immediate effect of external injury. Although theſe complaints manifeſt themſelves in ſome particular part, as in the thigh, leg, or arm, and therefore put on the appearance of local diſeaſes, yet the fatal event that almoſt conſtantly follows any operation performed in theſe caſes, ſeems to indicate a general diſeaſe of the whole arterial ſyſtem. This may proceed either from the inteſtine motion of the heart and arteries being too ſtrong for the reſiſtance of the arterial coats, or from a want of inteſtine motion in the arterial coats themſelves, which, preventing them from reacting properly on the fluid thrown into them by the force of the heart, occcaſions them to give way, and to ſwell out into aneuriſmal tumours; or, which is moſt probable, both thoſe cauſes combined may produce this diſeaſe. However this may be, it is no leſs apparent, that this is ſome peculiar diſeaſe of the whole habit; for among the ſeveral inſtances of this kind that I have ſeen, I never ſaw one recover after amputation, which is generally the only operation that can be performed in theſe caſes *. In one of them that was under my care at the Weſtminſter Hoſpital, I had flattered myſelf with ſome hopes of ſucceſs. It was a very large aneuriſm of the femoral artery, for which I was obliged to amputate the thigh, very near the groin, becauſe the diſeaſe ran far up the limb. The wound, from the beginning of the ſuppuration,

* A caſe of popliteal aneuriſm, which was treated by amputation in the Gloceſter Infirmary, proved ſucceſsful. E.

appeared

appeared florid and well; the patient was in good health and ſpirits, and for more than three weeks, every appearance was as favourable as I could wiſh. This was a longer time than I had uſually known patients to live after amputation in theſe caſes; moſt of thoſe I had ſeen, having expired within a fortnight. The ſtump was now nearly healed over, when, all on a ſudden, a total languor came on, and a ſphacelus of the ſtump, which carried off my patient in four-and-twenty hours after its firſt appearance. Muſt theſe deplorable caſes then be left to themſelves? or are the very rare inſtances of ſucceſs, which ſome perſons ſay they have ſeen in them, ſufficient to juſtify us in running the immenſe riſque we do in meddling with them? It muſt be owned, indeed, that theſe patients, if not relieved, will at length of themſelves become victims to the diſeaſe; but, as we know not how long they might live under it with care and quiet, why ſhould we venture to riſque haſtening the death of twenty perſons, let us ſuppoſe, for the bare poſſibility of ſaving one? A dreadful alternative indeed! but let us hope that ſome method may hereafter be found out, to render the aſſiſtance of art leſs precarious in theſe caſes. It may not be improper to add, as a farther proof of this diſeaſe being a general one of the whole habit, that in recent, and, as they uſually are, ſpurious aneuriſms of the arteries in the extremities, from bleeding or other external injury, the operation of tying up the artery as practiſed in theſe caſes, is itſelf ſometimes ſucceſsful; and even when that fails, the ſubſequent amputation of the limb, which then becomes neceſſary, moſt commonly ſaves the life of the patient; but theſe are only local diſorders, in which the reſt of the arterial ſyſtem is not in the leaſt concerned*.

* The improvements ſuggeſted by Mr. Hunter in the treatment of aneuriſms, were ſubſequent to the annotator's obſervations on the ſubject, as here ſet down. They afford proper matter for the reader's conſideration, ſince the trials hitherto made, have, happily, tended to contradict the opinion, that the diſeaſe is a general one of the habit, and therefore not curable by any operation. Some valuable communications on this ſubject are to be found in the London Medical Journal; in the 7th volume of which, is a deſcription of Mr. Hunter's operation, and an account of its ſucceſs. E.

Such is the nature of the diſorders proceeding from the exceſs or deficiency of inteſtine motion, or of that which is independent of the will, and eſſential to life. On the other hand, the exceſs of the loco-motive faculty, produces a great number of local diſeaſes, ſuch as external inflammation, abſceſſes, &c., and is one general cauſe of fractures, luxations, and ſprains in the extremities; while the deficiency of it, occaſions rigidities of all kinds in the limbs and joints, local obſtructions, rheumatiſm, gout, &c. Thus we ſee, that diſorders produced by the exceſs or deficiency of inteſtine motion, are general as their cauſe: thoſe brought on by the ſame errors in the loco-motive faculty, are partial as their principle. I have conſidered fractures and luxations as being produced by exceſs of the loco-motive power, for it has always appeared to me, that moſt bones were broken by the ſtrained action of the muſcles upon them, rather than by the application of external force. In caſes where the limb is quite paſſive at the time of receiving the accident, as where a coach or cart wheel paſſes over it, it is indeed evidently otherwiſe. But when the accident happens by ſome ſlip or ſudden effort, the muſcles, inſerted in the bone, are then excited to their greateſt power of action, in order that we may be kept, if poſſible, from falling. It is at this inſtant, I ſuppoſe, that the bone breaks. In fractures of the patella, this manifeſtly appears to be the caſe. This bone is ſo thick, and its texture ſo firm and compact, that any outward force applied that ſhould be ſufficient to break it, would infallibly ſhatter the joint, and, perhaps the whole limb, to pieces: for external force cannot be confined immediately to the ſpot on which it is exerted, but neceſſarily extends itſelf in proportion to the weight, velocity, and other advantages it may act with. We may conceive then, that fractures of the patella, always happen while the knee is bent, which it generally is, when the foot ſlips in any manner. The ſtrong extenſor muſcles inſerted into the patella, then exert all their power to bring the leg to the ſtraight line, which would prevent the body from falling; but as they cannot overcome the ſudden effort which determines the fall, all their force muſt neceſſarily be ſpent on the patella, which being then preſſed acroſs a fulcrum, formed in the ſtate of genu-flection, by the condyles of the thigh bone being puſhed forward,

forward, muſt the more readily give way; and thus the knee pan is broken before the patient falls to the ground. That the cylindrical bones of the extremities may alſo be broken in this manner, is probable, from the great difference of fractures happening while the limb is in a paſſive, or in an active ſtate. In the former caſe, there is generally a much greater comminution of the bones, the neighbouring parts are more injured, and the fractures for the moſt part are compound. In the latter caſe, or when the limb is broken by ſome ſudden ſlip or effort, the miſchief is frequently nothing more than a ſimple fracture of the bone. Both theſe cauſes, it is true, (to wit, a too ſtrong exertion of muſcular action, and a violent concuſſion from external force,) may concur in producing fractures, diſlocations, and ſprains. Theſe muſt neceſſarily be of the worſt kind; and accordingly we ſee, that in fractures from ſudden leaps, in which the force of the muſcles of the foot is exerted in its higheſt degree, and in which the part muſt alſo receive a very powerful external ſtroke, proportioned to the height and velocity of the fall, and to the nature of the bodies on which the foot may light; in theſe caſes, I ſay, we generally find the ancle joint torn to pieces, and that a mortification, the conſequence of this complicated injury, deſtroys the patient in a very ſhort time, unleſs this fatal event be prevented by immediate amputation*.

Theſe

* The following very remarkable accident happened to a traveller on the box of a ſtage coach. He was thrown on the ground with great violence, by the overturning of the carriage, and was ſoon afterwards taken to a neighbouring houſe, with his ancle in a very deformed ſtate. Two gentlemen of the faculty, who were immediately called, finding a great degree of miſchief done to that joint, and that, from a preternatural fullneſs of the poſterior parts, ſome of the tarſal bones were diſplaced, took no ſmall pains to reſtore to its proper ſituation, what was evidently much out of it. Their endeavours, however, were fruitleſs; ſo that after a conſiderable time ſpent in the attempt, (as well as at the deſire of the patient himſelf,) they were obliged to deſiſt. The joint was then poulticed, with a view to reduce the tenſion, which, by this time, was become very conſiderable. Three days afterwards, it appeared, that an extraneous body had been forced in, between the inferior part of the tibia, and the tendo Achillis. The violent preſſure, which had been made uſe of to return this ſubſtance to its place, produced a mortification of the integuments, and theſe ſloughing off in the courſe of a few days, afforded an opportunity of extracting, what was before ſuſpected to be, a

Theſe reſearches into the mode by which different accidents can be produced, may be thought more curious than uſeful; but it muſt be conſidered, that, in many ſurgical diſorders, great ſtreſs is deſervedly laid on the manner in which an injury happens, on the nature of the inſtrument it was made with, and even on the ſituation of the patient when he received it. In the preſent inſtance, theſe different accidents may ſuggeſt very different indications of cure. But this point cannot be diſcuſſed here, for I would not anticipate my friend in bringing forward obſervations, which are peculiar to him, and which will ſhortly come from himſelf *.

(9) A fat perſon might therefore ſubſiſt longer, with a leſs proportion of nouriſhment, than a lean one; for while there is any fat remaining in the cells of the cellular ſubſtance, it will neceſſarily be abſorbed, for the nutrition of the animal.

(10) Vide Dr. CAVERHILL's treatiſe on the *gout*, relative to the cure of that diſeaſe by motion.

(11) The gentleman who is the ſubject of this remark, is my intimate friend. Juſt after this performance was printed, he had a pretty ſmart attack of the diſeaſe, in his foot. He attributed the return of this complaint, to his having again neglected his uſual amuſement of tennis, for two years paſt. When he was ſeized with this fit, which, from its firſt violence, ſeemed as if it would laſt ſome time, I adviſed him to riſe conſtantly from his ſeat, notwithſtanding it put him to great pain, and by degrees, to move his foot as much as poſſible. I alſo directed ſoft and dry friction, to be uſed frequently in the day. By theſe means, and by

portion of the aſtragalus, ſeparated by the fracture of that bone. The patient, by proper care, afterwards recovered. An inſtance ſimilar to this happened to a poor man's leg, owing to the falling in of a ſtone Quarry; by which accident it had been moſt terribly ſhattered, and a large fragment of the aſtragalus forced into the ſame ſituation with the above. E.

* This alludes to the Memoir on Counter-ſtrokes, annexed to the preſent publication. E.

keeping him in a conſtant copious perſpiration, the fit laſted no longer than three or four days. After it went off, he had a large boil formed on the upper and back part of the thigh, which ſuppurated very plentifully, and confined him for about a week longer.

(12) In ſupport of this opinion, it may be added, that all perſons ſubject to the rheumatiſm, are always more affected with the pain, in the morning, at their firſt riſing, after they have remained for ſeven or eight hours in a compleat ſtate of reſt. The pain is ſcarcely ſupportable at their firſt getting out of bed, but, with the exerciſe of the day, and gently uſing the part to motion, it always grows more tolerable. From this it ſhould appear, that the advantage of warmth, however great it may be in this diſeaſe, cannot be comparable to that of motion; ſince the ſuperior warmth of the bed and of a ſtate of ſleep, cannot compenſate for the want of motion.

(13) Perhaps it is one of the greateſt deſiderata in ſurgery, to be able, either to aſſiſt nature in the formation of an anchyloſis, or to form one artificially when nature does not ſeem to be diſpoſed to it. Let me be permitted to obſerve here, that all the means which the ingenuity of ſurgeons has hitherto contrived, to effect this purpoſe, ſeem totally contrary to the method laid down, in the courſe of this eſſay, for bringing it about, by abſolute reſt and total inaction. It has been thought, indeed, that the exciting of inflammation, would be likely to procure adheſions between theſe ſolid parts. This reaſoning has been founded on analogy, from conſidering the effects which inflammation frequently has on the fleſhy parts. Injections, cauſtics, and ſetons paſſed through the joint, in caſes of diſeaſed articulations, have all been tried upon this principle. I muſt, indeed, confeſs, that I have tried them myſelf, and ſeen them often tried by others, without ſucceſs. If the author's ideas of forming an anchyloſis are juſt, as we may conclude they are from the facts he adduces hereafter in ſupport of them, (ſome of which I have been witneſs to,) it will appear, that all the methods before propoſed for this purpoſe, have rather impeded than forwarded it; ſo difficult is it to know,

know, how to direct the operations of nature. If the method here propoſed ſhould hereafter prove generally ſucceſsful, many limbs will probably be preſerved, as will appear from that part of this eſſay which treats on the effects of reſt in ſurgical diſorders.

(14) The practice of uſing motion in fractures of the patella and olecranon, in order to prevent an anchyloſis of the joint, which was almoſt always the conſequence of the old method of treating theſe complaints, was firſt made uſe of, as I believe, by Mr. WATSON, *Surgeon to the Weſtminſter Hoſpital*, though I know not that he has ever laid any claim to this very great improvement in the art of Surgery. So far I am certain, that I have ſeen him follow this practice above five and twenty years ago. Let me however be permitted to obſerve, that there is no neceſſity for waiting till the twenty fifth day, in order to begin moving the joint. Mr. Watſon's method, in fractures of the patella, which I have always followed ſince I have been in practice, is to bring the fractured extremities as near as poſſible to each other, and to put on ſuch a bandage as ſhall only allow of a very obſcure degree of motion in the joint. But this obſcure motion he permits his patients to exert on the third or fourth day after the accident, by directing them to riſe out of bed, and walk gently about the room, with crutches, a little every day, till the union is ſufficiently firm to allow them to bear on the ground. From following this method, I never ſaw the leaſt inconvenience; but, on the contrary, the motion of the joint became perfectly free, after the conſolidation of the fracture, even though there were a conſiderable interval between the fractured extremities. Let me be allowed to adduce a caſe, in confirmation of the utility of this practice. About two years ago, I attended the ſon of Sir Arch. Ed——, who had accidentally fractured the upper part of the olecranon; a caſe which does not occur near ſo often as the fracture of the patella, and that for obvious reaſons. The fracture was attended with much ſwelling and contuſion, which prevented me from diſcovering it till ſome days after the accident, though I ſuſpected what had happened from the firſt. When the ſwelling and tenſion were removed, the bones, in this young habit, had already begun to ſhoot out

ſome

ſome callus, which prevented me from carrying the arm back to its full degree of extenſion. I brought it however, on the firſt time of applying the bandage, as near to a ſtraight line as I could, and maintained it in that poſition, by ſupporting it cloſe to the ſide of the body. In three days time, I took off the bandage, and found I could extend the arm much ſtraighter than at firſt; I therefore gave the joint a very gentle degree of motion, for the ſpace of a quarter of an hour, and then applied the bandage again. In this manner I proceeded every ſecond or third day, renewing the bandage, and giving, each time, more and more motion to the joint, as the danger of diſplacing the fractured parts diminiſhed. At length I ſucceeded in bringing the arm perfectly to the ſtraight line, and when the young gentleman got well, which was in about ſix weeks after the application of the bandage, he had as free a motion and uſe of the joint as ever. I am apt to think the cure, in theſe caſes, will be much more ſpeedily performed, by adopting this method, than by waiting till the twenty-fifth day, before we begin moving the diſeaſed joint.

(15) Spirituous liniments almoſt ſaturated with ſoap, and united to the active volatile alcaline ſpirit, have always ſucceeded beſt with me, in preventing or curing diſeaſes of the joint. If camphor be united with them, it ſeems to make them infinitely more efficacious; for camphor, beſides the great volatility of its particles, ſeems to poſſeſs a peculiar ſedative quality, which renders it a very proper application in all inflammations, and in all caſes where pain muſt be mitigated.—This method indeed, joined to fumigations, fomentations, and ſtupes, with vinegar, ſeems, as Dr. CHESTON has very well obſerved in his PATHOLOGICAL OBSERVATIONS AND ENQUIRIES, to be the moſt likely way to ſucceed in the cure of thoſe dreadful diſorders the knee joint is ſubject to, and which, when they are incipient, are termed white ſwellings. One circumſtance may perhaps be added, which is, that friction itſelf, *gentle* friction I mean, may be as efficacious in bringing about the deſired end, in theſe caſes, as any of the other methods. This indeed is a circumſtance very neceſſary to be attended to, for which reaſon, I always direct

rect the embrocations made uſe of, to be employed very freely, and the friction exerted with them to be continued for a long time, and very frequently renewed. It ſeems to be as neceſſary, in the practice of Surgery, to know for how long a time, and how frequently we ſhould employ the means we may propoſe for the cure of any ſurgical complaints, under different circumſtances, as it is in phyſic, to aſcertain the proper doſes of medicine, and their repetition, for the relief of internal diſorders, in various conſtitutions. 'Tis much to be lamented, that both medicine and ſurgery are ſtill very imperfect in this particular.

(16) In caſes of rigidity alſo, moſt commonly remaining in the tendinous parts, after violent contuſions or fractures, I cannot too much recommend the uſe of frictions, with oily, volatile, and ſaponaceous applications, and a ſteady perſeverance in the uſe of them. I have frequently ſeen fractures and contuſions about the wriſt, which, after a long time, have left the flexor tendons of the fingers, in particular on the inſide of the fore arm, in a ſtate of conſiderable ſwelling, pain, and ſtiffneſs, inſomuch, that after all the bones were firmly and evenly conſolidated, there has appeared as great a degree of deformity as if a luxation or fracture ſubſiſted ſtill*. The embrocations before mentioned, are uſually

* This deformity of the wriſt does not ſeem to be properly underſtood. It is much more frequently met with, among people advancing in years, (particularly women) after falls, than in the earlier part of life, and ſeems to me to ariſe from a rupture of the ligaments, which, in a natural ſtate, preſerve the ſymmetry of this joint. Hence the radius drops inwards, while the carpal bones ſeem to be thrown outwards. Whoever has ſeen the true diſlocation of this joint, which however is always to be reduced with the greateſt eaſe, will readily diſtinguiſh the two caſes. From repeated experience I have found, that the beſt method to prevent this deformity is, after making a moderate extenſion, and bending the hand inwards, ſo as to relax the palmaris muſcle, &c., to paſs a bandage, pretty tight, round the lower part of the arm and wriſt, and then over the back of the hand, ſo as to put the latter into a declining ſtate; by this means the radius, which cauſes the greateſt part of the deformity, is raiſed to its proper place. If, afterwards, a ſplint of ſome ſtrength be applied on the back of the arm, and extended about two inches over the joint of the wriſt, it will ſerve as a fulcrum, by being incloſed in another roller, to keep the parts in a proper ſituation. It is frequently proper to include a compreſs, in this latter bandage, on the projecting part

uſually ordered, to relieve theſe troubleſome and diſagreeable complaints, but I think, ſufficient ſtreſs is not at the ſame time laid upon the free uſe of theſe liniments, and the long continuance, as well as frequent repetition, of the friction that is to be uſed with them. This I believe to be the reaſon why theſe complaints generally laſt ſo long, and are ſometimes never removed. The patient, wearied out with the inefficacy of means, which ſeem to fail merely from being improperly uſed, grows importunate with the ſurgeon, to try ſomething elſe. The ſurgeon, unwilling to ſee his art baffled, and not perhaps attending to the true reaſon of it, frequently changes his beſt methods for others infinitely leſs likely to ſucceed; but to which, report, and the experience of others, ſeem to have given a ſanction. The officiouſneſs of idle people, who are continually talking of the numberleſs fine cures they have ſeen effected by gooſe greaſe, ſteeping in bullocks' paunches, and other ſuch methods, often induce patients to try them, in preference to a better method, ordered by a ſkilful ſurgeon, which, had they perſevered in, or uſed it properly, would, in all probability, have had the deſired effect. Time alone ſometimes gradually brings about the recovery of the parts.

(17) ROTROU'S SOLVENT—The compoſition of ROTROU'S *ſolvent* is given as follows: "Crude antimony, mixed with three parts of nitre, "and expoſed to the fire in a crucible, loſes all its phlogiſton by the "action of the nitre. The mixture enters into a paſte like fuſion, it is "then poured on a marble, pulveriſed, and kept in a bottle." *Baumé's Manual of Chemiſtry*, p. 206 *.

(18) Burnt

part of the radius, taking care, however, that it ſhall not preſs on the radial artery. The back of the hand, and the arm, above the bandage, in general, ſwell pretty much; but, to prevent inflammation, the bandage ſhould be conſtantly moiſtened with Goulard water or ſome other topic. It ſhould farther have been obſerved, that the radius is frequently fractured in this caſe, but not always in the ſame place. E.

* In the account of ROTROU'S *Medicines* given by ASTRUC, at the end of his fourth book, is the following combination of nitre and antimony, under the name of PULVIS LIQUANS:

(18) Burnt ſponge is one of the remedies that ſeem to act in this manner, in the cure of this diſeaſe. If perſevered in for a long time, and uſed very freely, I am inclined to think it one of the moſt uſeful alcaline and abſorbent medicines againſt this complaint, and alſo againſt the bronchocele, in which latter inſtance, I have ſometimes uſed it with ſucceſs. But to do any good in theſe laſt caſes, it muſt be uſed much more freely than it generally is. I have had patients who have taken more than an ounce of it every day.

(19) I find, in LIEUTAUD's *Synopſis*, and WECKER's *Antidotarium ſpeciale*, the following plaſters of VIGO.

EMPLASTRUM DE RANIS, vel DE VIGO, *cum mercurio*, maxima rerum copia exſurgit. Primo, coquuntur in vino & aceto ranæ & lumbrici, cum radicibus ebuli & enulæ, floribus chamæmeli, lavandulæ, &c. Dein ſeorſim liquantur cera & axungiæ, ſtyrax & terebinthina, cum oleis ranarum, lumbricorum, liliorum, &c. Quibus fuſis adduntur olibanum myrrha, euphorbium & crocus, cum oleo eſſentiali lavandulæ. Tum decocto & liquamini, ſimul mixtis, & ulterius coctis, adjicitur mercurius ope terebinthinæ & ſtyracis extinctus ; ut ex omnibus notiſſimâ arte ſubactis emergat emplaſtrum, quod inter eximia reſolventia & incidentia haud immerito decantatur. Ideo conducit in tumoribus cyſticis & anomalis ; gummata venerea evincit ; glandulis ſcrophuloſis opitulatur, &c. Poſtremo nonnunquam adhibetur amplitudine congruâ, ad movendam ſalivationem, vel oppugnandum virus venereum adhibetur, atque in hunc finem paratur cum duplicato vel quadruplicato mercurio, ut ad hoc opus efficacius evadat. LIEUTAUD, p. 897.

℞ *Reguli antimonii optime preparati et in pulverem triti.*
Nitri purificati et in pulverem ſeorſim redacti ana ℔iſs.

Theſe two powders being mixed, throw a ſpoonful at a time into a red hot crucible, and let the whole calcine for ſix hours. This is afterwards to be pulverized and kept in a glaſs veſſel. To complete the proceſs, we are directed to add to each pound of the powder, warmed over the fire, ſix ounces of ſtrong cinnamon water, drop by drop, ſtirring it continually till the whole is evaporated. E.

DIACHYLON

DIACHYLON CUM GUMMI VIGONIS.—℞ Rad. Althæ. ℔ſs—Semin. Lini Fœnigræci ana ʒj, Violarum—Sem. Malvæ—Sem. Althæ—Sem. Cydoniorum ana, ʒſs—Sem. Pſyllii ʒij—Rad. Ireos ʒij—Olei Chamæmelini —Olei Anethini—Olei Liliorum—Olei Lini—Olei Irini ana ʒiij—Pingued. Gallinæ—Pingued. Anatis—Pingued. Anſeris ana ʒiij—Olei Amygd. dulc.—Oeſypi humidi—Succi Glycerrhizæ ana ʒx—Terebinthinæ ʒiſs—Sevi vituli ℔ſs—Lithargyri auri ʒx—Bulliant omnia ſimul baculo agitando, uſque ad conſumptionem mucilaginis. Deinde cum cera alba, quantum ſufficit, fiat ceratum molle addendo Sagapeni—Opoponaci—Bdellii mollis —Galbani ana ʒiij—Hammoniaci ʒv diſſoluta in aceto, fiat Emplaſtrum.

EMPLASTRUM DE MINIO VIGONIS—℞ Olei roſati adorati ℔iſs—Olei Myrtini—Unguenti Populeonis ana ʒiv—Pinguedinis Gallinæ ʒii—Sevi Caſtrati—Sevi vaccini ana ℔ſs—Pingued. Porcinæ ʒvij—Lithargiri auri—Lythargiri argenti ana ℥iiiſs—Minii ℥iij—Ceruſſæ ℥iv—Terebinthinæ ℥x Ceræ q. ſ. Fiat emplaſtrum ſecundum artem, tendens ad nigredinem. WECKER, *Antid. Spec.* Lib. II.

EMPLASTRUM DIABOTANUM.—Forte plus æquo celebratum, nomen ſortitur ab ingenti plantarum copiâ, quæ ejus compoſitionem ingrediuntur; inter quas notandæ veniunt; cicuta, valeriana, chamæpithis, angelica, raphanus ruſticanus, cucumis, ſchrophularia; chelidonium, gratiola, &c. quorum decoctum, addito nonnullarum ſucco, evaporationi committitur; ut adjiciatur gummi ammoniaci, galbani &c. in aceto ſcillitico ſolutio. Dein admiſcentur lythargyrus; olea lumbricorum, catellorum, &c. in aqua cocta. Quæ omnia mixta poſteà recipiunt ſulphur, ceram, ſtyracem & picem; non ſecùs ac pulverem radicum ireos, cyclaminis, ſerpentariæ, hellebori, ari, ariſtolochiæ, &c. baccarum lauri & nonnullorum ſeminum; varia gummata, camphoram, oleum caryophillorum, &c. Quid emergat e tanta rerum farragine vix definiri poteſt. Huicce tamen emplaſtro inſulæ compoſitionis, tribuuntur vires reſolventes, emollientes & demulcentes; nec refragatur experientia: præcipuè deprædicatur adverſus tumores cyſticos, glandulas induratas, ganglia, &c. LIEUTAUD, p. 810.

(20) In ſcrophulous ulcers attended with caries, I have uſed, with good ſucceſs, a ſmall portion of the magnes arſenicalis, which I have applied to the foul ulcers and carious bones. The idea of uſing this medicine in ſcrophulous ulcers, was ſuggeſted to me, from a ſurgical manuſcript I found at the Britiſh Muſeum, which adviſed it, as a ſpecific in thoſe caſes. But though apparently a very uſeful application, and indeed more ſo than any other topic I have ever tried, yet I cannot take upon me to ſay, that it deſerves this appellation. There were alſo ſome other curious matters I extracted from manuſcripts in that collection, and of which a full account has appeared, in the work which I have publiſhed, on the treatment of cancerous diſeaſes.

(21) I knew not, till I read this pamphlet, that volatile alkalis had been propoſed by Mr. Perilhe in the cure of this diſeaſe; but, for ſome years paſt, it has been my conſtant practice, both in private, and at the Weſtminſter Hoſpital to give ſtrong volatile medicines in the cure of the venereal diſeaſe. The volatile I uſed formerly to preſcribe, was the volatile tincture of guaicum; and this I did with a view to aſſiſt the action of mercury; for I have always held, that in order to render mercury more efficacious in the cure of the venereal diſeaſe, it was neceſſary to excite the powers of it by warm and ſtimulating medicines. By this combination, I have ſucceeded in curing ſeveral venereal complaints, which ſubſiſted after the patients had been ſalivated, and had perſevered in a courſe of mercurial medicines for a very conſiderable length of time, I conſider ſalivation, indeed, merely as an overdoſe of mercury, and cannot think it contributes the leaſt, in itſelf, to the expulſion of the virus. But theſe, and ſeveral other obſervations, which reading and a careful practice has ſupplied me with, on the venereal diſeaſe, would lead me too far here. I ſhall only hint at one particular caſe, of a terrible venereal cancer, that had eaten away the greater part of the penis, and the cure of which ſeemed to prove, that the cancerous ulcer, ſometimes ſucceeding to this diſeaſe, requires a different treatment from the venereal virus itſelf; and that, although the cancer ſhould be cured, the virus ſtill remains in the body. The patient I allude to, had taken

a prodigious quantity of mercury before I ſaw him. He had had many univerſal ſymptoms of the diſeaſe, which had all yielded to this treatment; and there remained only, when he applied to me, this terrible cancerous ulcer before mentioned, which had already eaten away one half of the penis, and was ſpreading very faſt on the prepuce towards the integuments of the abdomen. With great difficulty, I ſucceeded in putting a ſtop to this cancer, without a grain of mercury, by methods which I ſhall give a full account of on another occaſion. To my great ſurprize, however, no ſooner was the cancer healed, than my patient was ſeized with venereal ſymptoms all over the body, viz. ulcers in the throat, univerſal pains, ſwelled legs, and nodes upon the bones. All theſe, however, yielded readily to a prudent adminiſtration of mercury, joined to active volatile ſtimulating medicines and the warm bath; and the patient, at this day, three years from the time of his being under my care, enjoys a perfect ſtate of health.

(22) The beſt inſtrument ever invented for theſe caſes, is that publiſhed in the Memoirs of the Academy of Surgery, under the name of Mr. VACHER, and it ſeems to act entirely upon theſe principles; for, by keeping the ſpine, as much as poſſible, in one continued ſtate of extenſion, it not only prevents the vertebræ from preſſing upon each other, but likewiſe hinders them from moving one upon the other, and conſequently in ſome meaſure maintains them in a ſtate of reſt.

(23) It is needleſs to expatiate upon the novelty and excellence of all theſe obſervations reſpecting abſceſſes proceeding from carious vertebræ of the back or loins, or, in other words, of what we familiarly call *pſoas caſes*, which deſtroy ſo many patients at all periods of life. But theſe call to my remembrance a remarkable caſe, which fell under my care in the *Weſtminſter Hoſpital*, and the event of which I could never ſatisfactorily account for. This caſe is related at large in my *Eſſay on Abſceſſes*, page 128.

(24) From

(24) From this obſervation of the poſſibility of a limb being in motion, while the circumference of an ulcer or ſore in it, may be at reſt, we may account for the utility of bandage, in the cure of ulcers of the legs. Proper bandage anſwers the very purpoſe of keeping the ulcer, and the parts about it, ſteady and at reſt, notwithſtanding the motion that may be given to the limb. But we muſt obſerve, that an upright poſture, by forcing the lower extremities to ſupport the whole weight of the trunk, counteracts the good effects of bandage; ſo that whatever lateral motions of the limb we may allow our patients, in ulcers of the lower extremities, we muſt take great care to confine them to a horizontal poſture. It is evident this cannot extend to ſores in the upper extremities, for the weight of the body not preſſing upon them in an upright poſture, the reſt of the part is only to be attended to in theſe caſes.

(25) The reader will find in the annexed *Memoir on Counter-Strokes*, all the different caſes to which the author alludes.

(26) Balsamum Commendatoris, *Beaume du Chevalier*, vel, a nonnullis, *Beaume univerſel*, eſt tinctura ſpirituoſa radicum angelicæ & florum hyperici; in qua peracta digeruntur primò myrrha & olibanum; dein ſtyrax, benzoinum, balſamum tolutanum, aloe & ambra cineritia. Crebo in uſum venit illud balſamum; ac pro exquiſitiore ſtomachico & carminante habetur; roborantium, & præſertim cephalicorum claſſem ſubit. Idcirco confert in cardialgiâ; dolores a flatulentiâ compeſcit; ſomnolentiam arcet; diureſim movet, &c. Doſis a guttis quatuor, ad viginti, in juſculo, vino, ſyrupo, aliove hauſtu. Inſuper eximium vulnerarium & anteputridum externum cenſetur; nec infimum locum tenet inter reſolventia: ideò fauſtè admovetur vulneribus recentibus, contuſioni & gangrænæ: nec minus auxiliatur partibus paralyticis. Lieutaud, p. 673.

ON THE

EFFECTS

OF

COUNTER-STROKES.

AN ESSAY

ON THE FOLLOWING

PROPOSITION.

TO EXPLAIN THE EFFECTS OF COUNTER-STROKES ON THE SEVERAL PARTS OF THE BODY, EXCLUSIVE OF THE HEAD, AND THE METHODS OF RELIEVING THEM.

A THEME ſo intereſting, could only be propoſed by the ACADEMY OF SURGERY: and it required the ſagacity of that celebrated body, to perceive, in the diſcuſſion of a queſtion, which to ordinary ſurgeons may poſſibly appear barren of matter, a ſeries of facts and practical inferences, well calculated to extend the boundaries of an art, the improvement of which is their ſole object, and the rational exerciſe of which, tends greatly to relieve the ſufferings of mankind. Powerful motives theſe, to excite emulation among competitors for a prize, to be awarded by the hand of Science!

To aſk an explanation of the effects of counter-ſtrokes on the ſeveral parts of the body, excluſive of the head, is to beg the queſtion concerning the exiſtence of theſe counter-ſtrokes, and of the miſchiefs that enſue from them. To demand an expoſition of the means of relieving them, is to require of thoſe who may attempt to ſolve this important queſtion, a methodical and conſiderate application of the means which the art may ſuggeſt to a man of knowledge, who, in the effects of counter-ſtrokes, perceives at once, both the connection between the cauſe and the effect, and the mechaniſm by which the injuries he ſees have been produced.

If it be a matter of ſurprize, that the exiſtence of counter-ſtrokes in the head, ſhould have appeared problematical, even at a time when ſupported by reaſon and experience, it is ſtill infinitely more aſtoniſhing, that the efforts of counter-ſtrokes on other parts ſhould have been in ſome ſort overlooked, and that no writer ſhould refer, at leaſt explicitly, to this kind of cauſe, numbers of accidents which he muſt have ſeen [a]. Although it muſt be acknowledged, that practice is not ſo much affected by this omiſſion, as might be imagined, on account of the number of caſes in which a knowledge of the mechaniſm by which the accident was occaſioned, could have little influence on the mode of cure to be purſued, yet there are caſes in which a knowledge of this mechaniſm can only ſuggeſt, with propriety, the curative means to be employed. This is ſufficient to render a ſolution of the propoſed queſtion very intereſting, although it ſhould not even convey to the mind that degree of ſatisfaction, which we always experience, when we are convinced of having diſcovered the immediate relation of the cauſe to the effect.

Counter-ſtrokes, in the ſeveral parts of the body, excluſive of the head, are ſo frequent, that diſeaſes of the utmoſt importance in ſurgery, may be conſidered as being produced by them. I ſhall endeavour to prove this propoſition by facts, rather than by argument. Beſides thoſe which I have collected from the experience of ſome great maſters in the art, whom I have attended, there are no inconſiderable number which have occurred in my own practice, and which all contribute in the moſt palpable manner

ner to evince the pernicious effects of these counter-strokes. If therefore, I can only give a rational analysis of these facts, accompanied with a mode of cure, adapted to the nature of these accidents and their cause, I flatter myself that I shall answer the two requisites of the proposition; but, sensible as I am of the difficulty of the undertaking, of my own insufficiency, and of the discernment of those who are to decide upon the subject, I am excited to engage in the attempt, rather by a desire of shewing my zeal for the improvement of the art, than by any hope of success in the enterprize.

A counter-stroke, taken in the most extensive sense, is a shock, which, from the part immediately stricken, is transmitted to a greater or less distance, and which produces, in its progression, mischiefs more or less evident; while the part which first received the shock, often remains uninjured.

In a more confined sense, as we generally consider it in the first instance, a counter-stroke is a shock which is conveyed from the part immediately stricken, to other parts, and produces in them the same mischiefs, which the body giving the shock would have occasioned, if these parts had been immediately exposed to its action (b).

When we are once acquainted with the laws, according to which, motion communicates itself and is lost, and with the circumstances necessary to occasion a congeries of solid fibres, to yield more easily in one place than in another, we may form a sufficiently exact theory of the effects of counter-strokes on the hard parts. Several facts will afford me the opportunity of elucidating the mechanism of these counter-strokes; which will be better understood, when it shall only be an explanation of the manner in which such and such mischief may have been produced, in a part distant from that which has received the first shock. Thus, after having pointed out the effects of counter-strokes on the different parts of the body, exclusive of the head, I shall speak of the proper mode of treating them, according to the nature of the mischief

which may have been occaſioned; and that I may proceed with order, this eſſay ſhall be divided into two parts.

In the firſt, I ſhall explain the effects of counter-ſtrokes on the ſeveral external parts ſubject to the action of this cauſe, and ſhall point out a method of cure adapted to the cauſe, to its effects, and to the accidents which are, or may be, the conſequence of it.

In the ſecond part, I ſhall treat of the effects of counter-ſtrokes upon ſeveral of the viſcera contained in the cavities of the human body, beſide that of the cranium; and ſhall indicate the mode of treatment that may be uſed, with the greateſt probability of ſucceſs, againſt the injuries that are occaſioned by them.

PART

PART I.

IT is evident from facts, that the principal pieces which enter into the compoſition of the trunk, and of the extremities of the human body, are ſubject to the effects of counter-ſtrokes. Thoſe eſpecially which conſtitute the lower extremities, are the moſt liable to them, for which reaſon, we are naturally led to begin with examining the miſchiefs that may be produced in them by ſuch a cauſe, and the mode of relieving them. But before we proceed to this part of the queſtion, it may be proper to notice ſome preliminary facts, calculated to explain, almoſt intuitively, the mechaniſm of counter-ſtrokes, and the connection between their effects and the cauſe that produced them. Any part of the machine may ſuſtain a ſhock, whether a body put in motion ſhall ſtrike againſt the part, or whether the part itſelf ſhall ſtrike, with a certain velocity, againſt a body at reſt. This being premiſed, let us obſerve,

1ſt. That the feet, at every ſtep of progreſſive motion, receive ſhocks which are conveyed, without any ſenſible effects, along the inferior extremities, the ſpine, &c.

2dly. That theſe ſmall ſhocks, which are nothing in the inſtance of habit we have been mentioning, are more ſenſibly felt in leaps, and may be

be attended with many miſchiefs in paſſing through the parts to which the ſhock is conveyed.

3dly. That in falls on the feet, it often happens, that the ſhock is ſufficient to produce accidents, which require the aſſiſtance of art; but in this reſpect, the accident is always in proportion to the height of the fall, and to the ſtate of the parts which receive the motion, as we ſhall make it appear in a future diſcuſſion.

Man is deſtined to walk upright, to run, to leap; and is therefore expoſed to all the bad effects that may reſult from the kind of ſhock we have been ſpeaking of. Accordingly, we cannot behold, without admiration, the precautions which nature has employed, in the manner by which the pieces that compoſe the lower extremities and the trunk, are articulated with each other, in order to prevent the invincible reſiſtance which the feet meet with on the ground, from producing (at leaſt in ordinary inſtances) any miſchief in the bony parts conſtituting either theſe extremities or the trunk; and alſo in order that the important viſcus contained in the cavity of the cranium ſhould be preſerved from any ſhock ſufficient to diſturb its organization. A curſory review of theſe objects will enable us the better to underſtand all the contrivances of nature to elude the effects of counter-ſtrokes that may be tranſmitted through this channel.

The bones of the tarſus and metatarſus, are formed and articulated in ſuch a manner, as to leave a hollow of a certain depth in the ſole of the foot; a cavity from which nature derives other advantages beſide that of making a paſſage for tendons, blood-veſſels, and nerves; for this hollow forms a kind of arch, the parts of which being moveable upon each other, may give way a little in yielding to the motion of the upper parts that preſs upon them; the motion, therefore of theſe parts being in ſome meaſure deſtroyed here, they retain the leſs of it.

The

The cartilages with which the articulating ſurfaces of the bones of the foot and leg are covered, deſtroy alſo a part of this motion, ſo that it is much weakened when ſent away from thence, or when we conſider it at the articulation of the leg with the thigh; where the cartilages covering the extremities of theſe bones, and the intermediate ſemilunar cartilages, evidently concur in the ſame effect. Hence it may be concluded, that the motion communicated to the upper parts reſting upon the thigh, hath already loſt much of its force, when we conſider it in the articulation of the thigh with the os innominatum, where we meet with freſh cartilages, which abſorb ſtill more of the motion. But the circumſtance which abſorbs the moſt of it in this place, is the obliquity with which the head of the thigh bone bears upon its neck; for by means of this diſpoſition, the two oſſa innominata, by the quantity of motion ſtill remaining in the upper parts, preſs upon each other forwards at the ſymphiſis of the pubis, and laterally upon the os ſacrum, at the point of their articulation with this bone. Now, we know, that at theſe points of union, there are ſome very thick cartilages; and by tracing the motion along the ſpinal column, we obſerve with what art nature hath articulated and arranged the pieces which compoſe it, to diminiſh the violence of this motion; ſo that we are no longer ſurprized, that the motion of ſo large a maſs as the human body, accelerated even during the time of a fall from a conſiderable height, ſhould be reduced almoſt to nothing, when tranſmitted to the brain, by the reſiſtance which the feet have met with.

We are not to ſuppoſe, however, that the cartilages of the joints, the ligaments that ſurround them, and the motion of the bones over each other, are the only circumſtances that concur in this matter; the muſcles have alſo their ſhare in deſtroying the motion of the upper parts over the lower ones, ſtriking againſt the ground: for notwithſtanding the admirable arrangement of the pieces that compoſe the ſpine, the brain would receive, in the moſt common leaps, a commotion ſufficient to diſturb its organization, if, at the inſtant of the ſhock, the motion were conveyed in ſuch a direction, as that the trunk and extremities ſhould be in a ſtraight line; but fortunately this is a circumſtance which

which cannot often happen. The lower end of the thigh bone, is generally forced to make an angle, more or leſs obtuſe, with the tibia, according to the violence of the fall; which angle would even become ſo far acute, as that the buttocks would come to the ground, unleſs the muſcles, known by the name of extenſors of the leg, exerted themſelves to oppoſe this, or rather, unleſs they gave way only by degrees, and to a certain point(c).

This firſt flexion neceſſarily brings on another, that of the trunk forwards on the thigh; a flexion which is moderated by all the muſcles fixed in the tuberoſity of the iſchium, otherwiſe the head would ſtrike againſt the knees.

It is ſufficiently evident from what has been ſaid, that in all inſtances of leaps or falls upon the feet, the ſpinal column muſt be bent forwards, and that the head then tends to fall downwards and forwards, by deſcribing a curve; but the muſcles which ſerve to extend the head, the back, and the neck, are at this inſtant thrown forcibly into action, and retain the trunk and head in ſuch a manner, that the motion remaining in them can only (except in falls from a very great height) bend the head and trunk forwards to a certain degree; from whence it is evident, that in caſes of leaps or falls upon the feet, moſt of the muſcles of the human body are employed in deſtroying the greateſt part of the motion, by allowing the bones to which they are attached, to yield only by degrees, and ſucceſſively, to the impulſe, or action of the weight.

Notwithſtanding this admirable arrangement, nature is ſtill frequently in default. The direction of the ſhock, though a moderate one, is ſometimes ſuch as to elude the action of moſt of the agents which have been prudently employed to leſſen it; or elſe the motion is too violent to allow theſe agents to abſorb a ſufficient quantity of it to prevent miſchief in ſome of the part through which it is tranſmitted. This fatal truth is

but too well evinced by numbers of facts; but as, in the inſtances above mentioned, the lower extremities are the parts that receive the firſt ſhock, which is conveyed by them to the trunk, we ſhall firſt examine the effects of counter-ſtrokes on the ſeveral pieces which compoſe them. We ſhall then trace the effects of a ſimilar cauſe upon the bones which concur in forming the trunk; and laſtly, we ſhall explain the miſchiefs that may be produced from counter-ſtrokes on the ſeveral parts that conſtitute the upper extremities. In treating each of theſe points ſeparately, we ſhall point out the method of cure adapted to the nature of the miſchief produced by the counter-ſtroke, and to the accidental circumſtances attending it. This mode of proceeding preſents us with a very natural diviſion of the firſt part of our eſſay.

SECTION I.

TO EXPLAIN THE EFFECTS OF COUNTER-STROKES ON THE SEVERAL PIECES CONSTITUTING THE LOWER EXTREMITIES, AND THE MODE OF CURE ADAPTED TO THEM.

FALLS upon the feet, and leaps, being the moſt ordinary cauſes of the violent counter-ſtrokes which the lower extremities ſometimes ſuffer, it is natural that the effects which this cauſe may produce upon the parts moſt contiguous to thoſe which receive the ſhock, ſhould firſt engage our attention; ſuch as thoſe which concur in the formation of the ancle joint.

The manner in which the lower extremities of the bones of the leg are articulated laterally with the aſtragalus, the extent of ſurface which this bone preſents to the articulating cavity which receives its upper part, the motion of the other bones of the tarſus with which it is articulated, the great number of ligaments which unite theſe bones to each other, every circumſtance ſhews us, on the part of nature, a multiplicity of contrivances employed to elude, in the beſt manner, the effects of counter-ſtrokes in the articulation of the leg with the tarſus; inſomuch, that although, in leaps or falls upon the feet, it be the joint neareſt to the

part receiving the ſhock, it ſeldom ſuffers any injury from it, this joint hath ſometimes, however, experienced miſchiefs originating from ſuch a cauſe.

A young man, in leaping from about eight feet high, having reſted much more on the left, than on the right foot, felt, at the inſtant, a pain, which though not violent, was ſucceeded by a numbneſs, and a little difficulty in motion. The vivacity of youth made him pay little attention to theſe ſymptoms which were at firſt ſlight; but the pain, as well as the difficulty of motion afterwards increaſing, and the foot being much ſwelled about the joint, he applied to a ſurgeon, though not till about two months after the accident. Every mode of relief ſuppoſed to be beſt adapted to the caſe was tried in vain for four months; the miſchief increaſed. Several abſceſſes were formed in the vicinity of the joint, which being opened, were found to communicate with the inſide of the articular cavity, into which the probe might be eaſily paſſed. The remedies moſt proper for the patient in his preſent ſtate, having been tried without effect, and the fever increaſing, it was reſolved to amputate his leg. Upon examining the joint, I found the aſtragalus, and the articulating ſurfaces of the bones of the leg, affected with caries.

A few bleedings in the firſt inſtance, above all things reſt, and the application of reſolutive ſpirituous topics to the part, would certainly have prevented thoſe ſymptoms which led to the amputation of the limb; theſe are the means at leaſt, which I have always employed, with the greateſt ſucceſs, in ſimilar caſes. It muſt, however, be acknowledged, that ſpirituous reſolutive topics are not always proper. They ſhould be laid aſide whenever the pain is conſiderable, and cataplaſms made of the pulp of emollient plants ſhould be ſubſtituted for them; and when the pain is aſſuaged, embrocations with the ſaturnine ſoap may be uſed, or compreſſes dipt in water quickened with ſea ſalt, and with ſalt ammoniac, to which a little brandy being added, may be applied to the part. It is very unfrequent in leaps or falls on the feet, attended with bad ſymptoms, that the foot ſhould have borne perpendicularly enough on the ground, to occaſion theſe ſymptoms always to ariſe from the effects of counter-

counter-ſtrokes in the joint: if the foot be twiſted ever ſo little to one ſide, there will be, an extenſion of the ligaments on the oppoſite ſide; there will be, what is called a wrench, and this accident can at moſt only be reckoned an effect of the counter-ſtroke taken in its moſt extenſive ſenſe: the curative indications are, however, the ſame as thoſe which have been juſt mentioned.

I ſhall only obſerve, that whenever, notwithſtanding the uſe of theſe means, there ſhall remain, after the ſhock in the joint with extenſion and bruiſe of the ligaments, a permanent ſtiffneſs and ſwelling of the ſurrounding parts, oily and mucilaginous liniments, ſuch as thoſe of the unguentum althææ, animated however with a ſmall quantity of brandy, may be tried with effect; or liniments made with the marrow of animals, quickened alſo with the addition of ſome ſpirituous topic. The part may likewiſe be bathed in tripe liquor, or in warm animal blood; and if all theſe remedies ſhould prove inſufficient to reſtore the joint to its ſuppleneſs, and to diſſipate the ſwelling of the ligamentous and tendinous parts that ſurround it, no delay muſt be uſed in pumping artificially upon the part with hot water animated with ſea ſalt and ſalt ammoniac; or in ſending the patient to the waters of Aix-la-chappelle, Bourbon, Bourbonne, or any other of the ſame kind. In caſes of relaxation of the ligaments, and habitual pain in the parts about the joint, with a partial anchyloſis, complaints which are alſo often the conſequence of counter-ſtrokes, I have likewiſe uſed the following remedy with much ſucceſs. Let the joint be ſurrounded with a bag full of plaiſter of Paris in powder, to which a fourth part of ſea ſalt and of ſalt ammoniac muſt be added, taking care to heat the bag before its application, which muſt be frequently renewed. I have alſo employed with effect, a cataplaſm made with the pulp of the roots of the conſolida major, mixt up with honey, in equal parts, and ſpread upon tow. What is here preſcribed for the ancle joint, is equally proper for the other parts of the body, whenever the effects of counter-ſtrokes ſhall leave ſymptoms behind them which may require the uſe of ſuch means. I ſhall therefore avoid repeating them, and ſhall only hereafter indicate thoſe remedies that are the beſt calculated to relieve the urgent ſymptoms,

ſymptoms, taking it for granted, that the caſes, in which the application of any of the different topics here propoſed may be of advantage, will not be overlooked.

The counter-ſtroke in the ancle joint, may alſo give riſe to a fracture of the fibula, the lower extremity of which, being forced a little to one ſide in an oblique fall on the feet, reſiſts, while the weaker part of the bone gives way and is fractured, without however occaſioning a luxation of the foot ſideways. I have met with more than one inſtance of ſuch fractures; for which reaſon, in all accidents of a fall upon the feet from any height, or even of a wrench, we muſt always examine whether the injury we perceive about the joint, be not complicated with a fracture of the fibula. It is rather difficult to diſcover this accident, when the lower part of the leg has begun to ſwell; the turning of the ſole of the foot a little inwards, may be the effect of the extenſion of the ligaments, or of a diaſtaſis, and not be an indication of the fracture of the fibula, which we muſt endeavour to find out by ſome more certain ſigns. The beſt way of doing this, is to graſp the lower part of the leg with one hand, while, with the other, we move the tarſus to each ſide; and with a little patience and habit, we ſhall diſtinguiſh the crepitation of the bone, which is the pathognomic ſign of the fracture. The following fact will ſhew how neceſſary it is to make this diſcovery. A maſon, having made a falſe ſtep, felt an acute pain about the external ancle, which he thought to be merely the conſequence of a ſlight ſprain, and paid no great attention to it; he even continued to work, notwithſtanding the ſwelling which came on the part, and the increaſe of the pain, which however became at length ſo violent, that he was forced to give over work on the third day after the accident; but not having recourſe to any chirurgical aſſiſtance, he abſtained only partially from motion, and applied, merely according to his own ideas, different poultices upon the part. At length being obliged to come to the hoſpital, he met with every aſſiſtance which his caſe required; but it was no longer time to think of diſcovering the fracture, the ſwelling was conſiderable, and already announced a ſuppuration formed about the joint, which ſoon manifeſted itſelf on the application of remedies proper

per to forward it. The abſceſs was properly opened, and the ſurgeon, examining with his finger the bottom of it, found that the external ancle was broken off. Notwithſtanding the good conſtitution of the patient, the free openings that were made, and the careful uſe of all the means that were the beſt calculated for his relief, yet he went through a ſeries of accidents, which obliged him, about two months after, to ſubmit to the amputation of his leg, as the only way to ſave his life.

But let us ſuppoſe that we ſhould be called in time, and that the fracture of the fibula ſhould be diſcovered, the treatment proper for ſuch an accident is too well known for me to dwell upon it here. Let me only be allowed to obſerve, that in the firſt inſtance, we muſt carefully avoid applying a circular bandage on the fractured part. It is, indeed, evident that ſuch a mode of proceeding tends only to puſh the fractured parts of the fibula inwards againſt the tibia, which is by no means the intention we ſhould have in view: on the contrary, we muſt endeavour to keep them in appoſition to each other, by preſerving the natural diſtance between the two bones; and in order to effect this, we muſt firſt place, both on the outſide and on the inſide, on the ſpot that anſwers to the interoſſeous ſpace, a ſlip of linen of a certain thickneſs, or a narrow ſplint well covered, in order that the circular bandage to be applied immediately over, may preſs a ſufficient quantity of fleſh between the tibia and fibula, to keep the fractured parts of the latter in exact appoſition, and at a proper diſtance from the tibia. This mode of binding up the limb, anſwers nearly the ſame purpoſe, as if the circular bandage were put round the ſingle bone fractured, which cannot be done. It is from having been witneſs, both to the accidents which have ſometimes ſucceeded the immediate application of the circular rollers in fractures of the fibula [d], and to the good effects of ſplints firſt applied, that I inſiſt upon this precaution, which is alſo indicated in compound fractures of the leg, which are themſelves often the reſult of counter-ſtrokes.

A man carrying a load, upon a ſloping ground, made a haſty ſtep, or rather a kind of ſpring, in which the whole weight of his body bore

almoſt entirely upon the right leg; the motion, loſing itſelf in the ancle-joint, produced no apparent miſchief there; but the tibia, the fibres of which are naturally rather arched forwards, gave way, and was broken juſt below its middle. The upper end of the fractured bone pierced the integuments, and purſuing the oblique direction of its motion, fixed itſelf in the ground.

This was a kind of counter-ſtroke, the mechaniſm of which is very evident, and for which it is eaſy to point out the means of cure; they are the ſame as thoſe that are proper for every compound fracture of the leg, though ariſing from another cauſe. Accordingly, without conſidering the mechaniſm or cauſe of the fracture, I only attended to the circumſtance of reducing it properly; this was done very exactly, after having previouſly ſet the integuments free, which were much upon the ſtretch. After this, the eighteen-tailed bandage was applied according to the rules of art; the patient was blooded, and reſtrained to a proper diet. At the uſual period the ſuppuration came on, which from the fourth to the eleventh day, was plentiful. The portion of the tibia that was bare, had no unfavourable aſpect; the patient's pulſe and countenance were good; notwithſtanding which he began to experience ſome ſhiverings; on the eleventh day he grew delirious; and on the twelfth, he had ſome convulſive motions in the lower jaw; a fever came on; a change took place in the limb; the ſymptoms were all aggravated, and he died on the fourteenth day from his accident (e).

A ſtudent of ſixteen years of age, in leaping a ditch, fractured his leg by the ſame mechaniſm as the man who was the ſubject of the preceding obſervation. The bones had alſo pierced the ſkin, and the youth being carried home to his parents, the fracture was very exactly reduced; he was blooded, and confined to a proper diet. He was attended very aſſiduouſly by one of my brethren in the profeſſion, and myſelf; on the twelfth day, he was again ſeized with convulſive ſpaſms in the lower jaw, accompanied with an obſcure delirium; and on the thirteenth, he died. He is one of the three patients ſpoken of in the preceding note.

The

The tibia, in particular, may experience, from the effects of a counter-ſtroke, another kind of fracture, of which the other bones are certainly but little ſuſceptible. At leaſt it does not appear impoſſible to me, but that, in a violent ſhock on the tibia, the compact ſubſtance of this bone may reſiſt, while there may be a fracture in the tranſverſe bony fibres, which compoſe either the ſpongy or the reticular ſubſtance. May not a rupture of ſome of the fibres of this laſt ſubſtance be occaſioned by a fall on the feet, or by leaping from a certain height, while the body of the bone ſhall remain entire? May not an injury of this kind give riſe to an abſceſs in the cavity of the bone, and to all the miſchiefs which muſt attend ſuch a complaint? The following fact ſeems to ſpeak in favour of what is here advanced.

A young man, of five and twenty years of age, having received a violent blow on the broad ſurface of the left tibia, had nothing more than a contuſion externally without fracture, which ſoon gave way to ſpirituous topics that were applied to it. He ſtill continued, however, to feel an obtuſe kind of pain, which ſeemed to come from the inſide of the bone. He paid little attention to it for four or five months; but the pain, which then became more acute, was accompanied with a ſwelling of the bone, which increaſing gradually, produced an inflammation of the perioſteum and integuments, the matter of which burſting of itſelf, left a fiſtulous opening externally (f). By paſſing a probe into this opening, it was found to penetrate into the cavity of the bone. The patient being properly prepared, the exoſtoſed part of the tibia was laid bare throughout its whole extent; the crown of a trepan was applied over the fiſtulous orifice in the bone, and the parts ſurrounding the exoſtoſis, were removed by the gouge, chiſſel, and mallet. By theſe different proceedings, an opening was made through the bone, (which, though exoſtoſed, was very hard) ſufficiently large, to enable the operator to extract a piece of bone, eighteen lines in length, which being inſulated in the medullary cavity, afforded us an inſtance of a true internal exfoliation (g).

With reſpect to ſimple and compound fractures of the leg, they are moſt commonly the effect of counter-ſtrokes, ſince all thoſe which happen in the inſtance of falls, are ſeldom the reſult of a blow immediately applied to the part of the bone that gives way. But as they require no other treatment than that which is equally applicable to fractures in general, I ſhall proceed immediately to conſider the effects of counter-ſtrokes on the joint of the knee.

Although this joint may ſometimes be expoſed to the effects of counter-ſtrokes, it muſt however be acknowledged, that, in caſes of falls on the feet, the great ſurface by which the os femoris and the tibia are in contact with each other, and the intervening cartilage which is met with in the joint between theſe two bones, are contrivances well calculated to elude the effects of counter-ſtrokes which the joint might ſuffer. The circumſtance which renders theſe effects leſs frequent, and leſs to be apprehended, is, that the ſhock muſt be very violent in order to produce any miſchief; and this could not be in the inſtance of leaps, or falls on the feet, unleſs the whole weight of the trunk bore directly upon the articulating ſurfaces of the tibia; that is to ſay, unleſs the thighs and the trunk, at the inſtant of the ſhock, ſhould maintain that rectilinear poſition which would make the line of gravity of the upper parts bear upon the articulating ſurfaces of that bone. It is evident that ſuch a poſition muſt be very difficult in a part which has ſo many joints and bendings as the trunk, and the inflections of which depend upon ſuch an infinite number of muſcles. But ſuppoſing even this poſition to exiſt, the effects of it would not be felt in the knee joint; they would rather take place in the articulation of the thigh with the os innominatum: the head of the thigh bone might be ſeparated, and its neck fractured, on account of the oblique direction with which the weight of the body bears upon theſe parts; or if the ſhock were not violent enough to produce ſuch effects, it might occaſion a contuſion in this joint. It might even happen, from the poſition above ſuppoſed, that the motion of the head upon the ſpinal column being ſuddenly ſtopped, might occaſion a mortal commotion in the brain, even in thoſe caſes where the ſhock of the

the os femoris upon the tibia would not be ſufficient to produce the leaſt miſchief at the part where theſe bones are connected. Notwithſtanding this, the knee joint is much expoſed to the effects of counter-ſtrokes; but they are chiefly occaſioned by falls upon the knee, or blows upon the patella.

Reaſon admits the poſſibility of counter-ſtrokes with bad conſequences, in this part, and facts confirm it.

A lad, of thirteen or fourteen years of age, having received a blow with a wooden ſhoe on the knee, while the leg was half bent, the contuſion was ſcarce felt externally, notwithſtanding which, he experienced at the inſtant, a ſharp pain, which ſeemed to come from the inſide of the joint. This pain was ſoon relieved; but he ſtill continued to feel it in ſome degree, and a tumour appeared, which increaſed gradually, with a difficulty of walking. A fever came on, and the pain grew more violent about a month after the accident. It was at this period that the patient, who had hitherto received ſcarce any aſſiſtance, came into the Hoſpital, and was under my care. A few days after, the fluctuation being evident in a certain extent of the tumour, it was opened, and a conſiderable quantity of very fluid matter was diſcharged. It was thought at firſt, that it came only from under the integuments; but becoming more and more ſerous afterwards, and the wound not healing, miſchief was ſuſpected within the joint; and in order to determine the point, the bottom of the abſceſs was completely laid open; upon which a ſmall ſinus, leading into the joint, manifeſted itſelf. In vain, after this diſcovery, were all poſſible means tried to cure this young man; deterſive injections, a proper poſition of the limb, dilatation and opening of the capſular ligament, every thing proved unſucceſsful. It being no longer poſſible to preſerve the patient's life without amputating the thigh, which his parents would not conſent to, he died ſome time after. The joint being opened, manifeſted a very advanced caries of the articulating condyles of the leg and thigh, with an almoſt total deſtruction of the crucial ligaments. The internal ſurface of the patella was affected only with a ſu-

perficial caries; and its external ſurface, which had received the ſtroke, had experienced no kind of alteration.

Effects ſimilar, or nearly ſo, of counter-ſtrokes in the knee joint, would undoubtedly occur more frequently, after violent falls on the knees, or ſharp ſtrokes on the patella, if proper means, which readily preſent themſelves to the ſurgeon, were not uſed to prevent theſe conſequences. Reſt is the firſt of the remedies which it is proper to have recourſe to in theſe caſes; and the ſingle precaution of avoiding, for a few days, every kind of motion of the knee joint, aſſiſted with two or three bleedings, and the uſe of ſome emollient and anodine embrocations, ſuch, for inſtance, as the balſamum tranquillum, or the application of ſome reſolutive cataplaſms, would probably have prevented the miſchiefs which I have juſt been giving an account of.

But the following caſe, is one, which more particularly proves, that falls upon the knees, do not always confine their effects to injuries within ſide the joint.

A woman, about fifty years of age, was brought to the Hoſpital after a fall upon the right knee; the patella was not fractured, but the parts ſurrounding it were much ſwelled; and the pain ſhe felt in the motions of flexion and extenſion [b], might have been ſuppoſed to ariſe only from the violent contuſion which the external parts had ſuffered. By careful examination, however, and repeated trials, I diſcovered an evident fracture of the lower part of the thigh bone, or rather a ſeparation of its condyles. Fractures of the thigh very often ariſe from a ſimilar cauſe; the kind of arch formed by the thigh bone, renders it, notwithſtanding its ſtrength, very liable to fracture, when in falling from a certain height, the inferior extremity of this bone is ſuddenly checked, while its upper part is ſtill preſſed upon by the weight of the whole body in motion. The mechaniſm of the fracture which then takes place, is eaſily underſtood; and the method of cure which it requires. It is exactly the ſame as if the fracture had been produced by a blow applied immediately to the

the broken part. The treatment proper for theſe accidents is too well known, to make it neceſſary for me to enter into any details upon the ſubject. There is one obſervation, however, to be made; which is, that in a fracture from a counter-ſtroke, the bone being broken at the inſtant that the force which occaſions the fracture, is ſuperior to the reſiſtance of the bone, the reſt of the motion may be ſpent on other parts; while there are caſes, where the ſhock, being applied immediately to the part where the fracture happens, continues to exert all its action upon the ſpot itſelf, after having produced the principal injury we have been mentioning. This circumſtance may deſerve ſome conſideration reſpecting the cure of theſe accidents.

Although moſt of the fractures happening to the body of the thigh bone may be the effect of counter-ſtrokes, they are not, however, always owing to this cauſe. But the ſame cannot be ſaid of fractures which happen to the neck of this bone, ſince theſe are never the conſequence of a blow received immediately upon the part. The circumſtances under which this fracture uſually occurs, demonſtrate ſufficiently that it muſt always be the effect of a counter-ſtroke. It hath often been produced by a fall upon the great trochanter; and it is ſometimes occaſioned by a fall on the feet, or on the knees. It may be obſerved however, in this reſpect, that the fracture of the neck of the thigh bone will ſcarcely happen, if the two knees, or the two feet, bear at once and equally upon the ground, even ſuppoſing the body to be maintained in that ſtraight line which would make the whole weight of the upper parts preſs upon the heads of the thigh bones; and this, 1ſt, becauſe the effect being divided between the two thigh bones, would be leſſened; and 2dly, becauſe this effort being conveyed obliquely over each of the heads of theſe bones, the oſſa innominata may, in ſome meaſure, glide over them [i]; a circumſtance which will render the fracture of the neck of the thigh-bone more difficult. But when the weight of the body bears only upon one extremity, although the fall be not even from any great height, yet the motion of the upper parts being entirely ſpent upon the neck of the thigh bone, which is in an oblique direction to the line of gravity paſſing through

through the head of that bone; and the os innominatum not being able to glide over that head, becauſe it preſſes upon it perpendicularly, this gives us the reaſon, why the neck of the thigh bone is more readily broken, under this circumſtance than under the former. Suppoſe the quantity of motion to be abſorbed were the ſame in both inſtances, a fall, or a violent blow on the great trochanter, may likewiſe, and in fact often doth produce this fracture. In the accident of falling on the feet or on the knees, the inferior extremity of the thigh bone being ſtopt, while the head of it is greatly preſſed by the upper parts in motion, tends more and more to form the arch, and breaks the bone at its neck, where the arch is already begun. In the inſtance of a fall on the great trochanter, on the contrary, the head of the bone reſiſting in its cavity, while the moſt prominent part is ſtricken externally, the intermediate piece, which is the neck, tends to reſume the ſtraight line, and is fractured by a mechaniſm the reverſe of the former. But ſtill the accident is the ſame in both caſes, and requires the ſame treatment. The proper modes of reducing this kind of fracture, and thoſe which can beſt maintain the reduced pieces in their ſituation, are then to be adopted. Theſe are fully diſcuſſed in Mr. SABATIER's paper in the fourth volume of the Memoirs of the Royal Academy of Surgery, at Paris. I ſhall only add to the wiſe precepts contained in this paper, that beſides the junk placed on the internal part of the thigh, it will be proper to place two other junks on the outſide, which extending from beyond the feet, proceed far above the hips, paſſing one above, the other below the great trochanter. The upper extremity of theſe junks being faſtened by a bandage paſſed round the body and the hips, the motions of the thigh are by this contrivance admirably well confined. By this additional precaution, accompanied with the moſt abſolute reſt, I have ſucceeded in curing, with tolerable eaſe, ſome fractures of the neck of the thigh bone, which have left only a very ſlight degree of lameneſs after them. It will be proper alſo to recollect, that this fracture may be complicated with contuſion in the joint, or on the great trochanter; and that this complication requires attentions which I ſhall have occaſion to ſpeak of hereafter.

It

It muſt not however be ſuppoſed, that a fall, or even a conſiderable ſhock on the great trochanter, are always capable of producing a fracture of the neck of the thigh bone. In order to accompliſh this, it is neceſſary that the direction of the ſhock ſhould coincide with the force of the motion impreſſed upon the part, if this motion be made in the direction of the fibres of the neck of the thigh bone; otherwiſe, the head of this bone would ſooner be cruſhed againſt its cavity, or the cavity itſelf would be broken, rather than the neck of the bone. But if the direction or ſum total of the motion be ſuch, that the fracture cannot be the reſult, then the counter-ſtroke produces another kind of injury, frequently more dangerous than the fracture; that is, the contuſion of the joint, and particularly the ſqueezing or bruiſing of ſome of the parts that are contained in it. The round or inter-articular ligament, which, in progreſſive motion, is never ſqueezed, may become ſo in a fall, or in a ſhock upon the great trochanter, when the direction of the motion tends forcibly to puſh the head of the femur immediately upon the part from whence this ligament proceeds. The ſynovial glands, which form a conſiderable maſs in this joint, may alſo be roughly ſqueezed, between that part of the cavity which they occupy, and the head of the bone driven with force againſt them; hence will ariſe accidents proportioned to the nature of the injury done to the joint.

In the firſt inſtance, pain, ſwelling and inflammation of the parts contained within the joint, always manifeſt themſelves, accompanied with a difficulty of motion in the limb; and the intenſeneſs of the ſymptoms is proportioned to the violence of the ſhock, and to the greater or leſs irritable ſtate of the patient. The pain is often acute in the beginning, and is attended with a total inability to move the limb. At other times, the pain is dull, ſo as, at firſt, ſcarcely to engage the attention of patients: they continue to walk, though with ſome difficulty; yet ſtill they keep upon their feet, and ſometimes perſiſt in hard labour. This difference may ariſe from the nature of the parts bruiſed. I ſhould imagine, that when the ligament is bruiſed, the pain and other ſymptoms are more violent, and that the contrary happens when the ſynovial glands have

have partaken of the injury. The complaint which is the conſequence of this laſt accident, may be ranked in the claſs of chronic diſorders. The glands tumefy, and ſometimes ſecrete a ſynovia, which partaking of the diſtempered ſtate of the organs that ſupply it, is not entirely abſorbed, and may produce a dropſy of the joint, a partial anchyloſis, or a luxation from relaxation (k); or elſe this liquor degenerating, becomes acrimonious, deſtroys the cartilage lining the ſurface of the joint, and the head of the bone; the articular and caſpular ligaments are corroded with caries, and in proceſs of time, an abſceſs is formed externally, the opening of which ſerves only to haſten the death of thoſe who are affected with it.

It may alſo be preſumed, that the contuſion of the cartilages themſelves, and that of the bones, which may very poſſibly be the conſequence of a violent ſhock in the joint, may ſometimes be the cauſe of all the miſchiefs within. Thoſe caſes, undoubtedly, in which the progreſs of the ſymptoms is very ſlow, afford us inſtances of ſimilar contuſions. The following fact ſeems to corroborate the preceding obſervations.

A woman, about eight and twenty years of age, laden with a baſket full of bottles, having jumped down a few ſtairs in going into a cellar, preſerved the center of gravity of the upper parts upon the left thigh and leg ſo well, that ſhe kept herſelf from falling; but ſhe experienced, in the inſide of the joint of the hip, a violent ſhock, which was, however, attended only with a very bearable degree of pain, ſince ſhe was able to continue her ordinary work for more than a fortnight, without complaining. But ſhe ſtill felt, in walking, a pain which gradually increaſed, from the continual exerciſe ſhe was obliged to uſe in her capacity of ſervant: the difficulty of motion increaſed with the pain; and both the one and the other, three months after the accident, were grown ſo much worſe, that the woman was no longer able to ſupport herſelf upon that limb. At this period ſhe came into the hoſpital where I attended; different embrocations were uſed to the upper part of the thigh, but without any effect; reſolutive, anodyne, and maturating cataplaſms were then applied, becauſe a tumour manifeſted itſelf at the upper poſterior, and

external part of the thigh, which ſeemed tending to ſuppuration. A fever came on; and when the abſceſs became evident, all the openings and counter-openings were made, which the ſinuſſes the pus had formed, required; the matter which came out, had no kind of offenſive ſmell: it brought away along with it ſome ſmall bony particles, and an oleaginous fluid floated on the ſurface; the inciſions were lengthened as much as it was thought neceſſary, ſetons were paſſed, and during the courſe of the treatment, vulnerary and deterſive injections were tried, ſuch as were imagined to be beſt ſuited to the ſtate of the parts. At different intervals, ſmall portions of bone came away, ſeparated either from the head of the thigh bone, or from the cavity of the joint, into which ſeveral of the ſinuſſes penetrated. A ſlow fever, and a maraſmus, which is its uſual attendant, deſtroyed the patient, between three and four months after her admiſſion into the hoſpital. Upon examining the ſeat of the diſeaſe, I found the capſular ligament almoſt deſtroyed, the round ligament totally conſumed, the head of the thigh bone carious in all its ſurface, and even to a conſiderable depth in its center; the cavity of the joint was alſo attacked with caries throughout its whole extent; and laſtly, its cartilaginous border was completely deſtroyed. The following is an inſtance of miſchiefs nearly ſimilar, produced by a fall upon the great trochanter.

A man about forty years of age, having ſlipt down upon the great trochanter, felt a ſharp pain which obliged him to ſtay at home for a few days; but the pain being relieved, he choſe to return to his buſineſs, and walk about, which however he could not do without pain, or without ſome kind of difficulty, which he endeavoured to ſtrive againſt for about a fortnight; but the pain encreaſing, he was obliged to take to his bed, and to apply for relief in the country where he was. All the means employed during three months, were ineffectual; the upper, poſterior, lateral, and external part of the thigh was much ſwoln; and every motion attempted to be given to this extremity, was very painful to him. When he was brought into the hoſpital, it was ſoon perceived that there was matter formed in the vicinity of the joint; ſo that the ſurgeon formed a very unfavourable prognoſtic of the caſe. Several inſtances having ſhewn

him, that theſe diſeaſes were incurable, in which ever way they were treated, he had almoſt reſolved to leave this caſe to the efforts of nature alone. The fluctuation of the pus being, however, manifeſt, he determined to give vent to it by a ſuitable opening; the pus which came out at firſt, had no ſort of bad ſmell, as in the preceding obſervation; but that which flowed at the ſubſequent dreſſings, was both great in quantity, and offenſive; ſeveral ſinuſſes led to the head of the thigh bone, and into the inſide of the joint. The patient did not long ſurvive this opening; the fever increaſed, the diſcharge became ſerous and very fœtid, and he died three weeks after the operation. Upon examining the joint, the ſame miſchiefs nearly were found as in the preceding obſervation; only the capſular ligament ſtill exiſted entire, at the internal part of the thigh; but it was much thickened and inflamed there.

In 1762, a man, of forty-five years of age, having fallen upon his right knee, at the time that he was heavy laden, could neither riſe up again, nor ſupport himſelf upon his thigh. Being carried home, ſome means were tried for his relief, notwithſtanding which, the pain, with the inability of walking, ſtill ſubſiſted. After he had kept his bed about a month, he began to walk with crutches; a ſwelling came on in the neighbourhood of the joint, which terminated in an abſceſs that burſt of itſelf, about a year after, and left two fiſtulous openings, which gave vent to a greater or leſs quantity of matter; frequently theſe orifices were even cloſed, and only burſt open again, when there was a certain quantity of the pus collected. Three years having elapſed in this ſtate, without his having been able to make any uſe of his limb, he came to the Hoſpital, having at the upper and back part of the thigh, a very conſiderable collection of matter, which not finding an iſſue through the openings already mentioned, was let out by a ſimple puncture with a lancet, that the patient might, if poſſible, avoid the melancholy fate of thoſe who had been treated in a contrary manner. The matter, which flowed in great quantity, brought away with it, ſeveral fragments of bone; and the new opening added to the former, another fiſtulous orifice, which favoured the habitual diſcharge of the matter. The patient ſurvived

vived the operation ten months; and upon examining the part, the head of the thigh bone was found completely ſoldered with its articular cavity; each of them preſenting alternate aſperities and cavities, which formed reciprocal indentations, as was evident, in ſeparating this connection by force. I ſhall farther obſerve, in this reſpect, that the thigh bone was anchyloſed at a right angle with the trunk; a circumſtance which had undoubtedly proceeded from the ſituation of the patient, whoſe head and trunk had been always much raiſed. I could adduce ſeveral other inſtances of ſimilar diſeaſes of the joint of the thigh with the os innominatum, which had been the conſequence of falls, either on the feet, or on the great trochanter, if theſe inſtances could give us any better information reſpecting the treatment neceſſary to be followed in ſuch caſes: the account of miſchiefs that have been obſerved, is undoubtedly uſeful, inaſmuch as it may ſuggeſt a rational and more certain plan of cure. But there is no need here of a greater number of facts, to determine the curative method to be purſued, in all circumſtances analogous to thoſe which I have juſt ſubmitted to the conſideration of the Academy.

When once we are acquainted with the mechaniſm of the counter-ſtrokes which the inſide of the cotyloide cavity may experience; when we know the direction of the motion which has been impreſſed on the parts by the body producing the ſhock, and can eſtimate nearly the quantity of this motion; and when we are converſant with the nature of the different parts which may be injured, contuſed, and ſqueezed by the ſhock; we are then able to determine, for the caſe that preſents, a method of cure founded on rational principles. Beſides, the accidents which the three patients have ſuffered, of whoſe diſeaſe I have given a ſuccinct account, are fully ſufficient to explain the curative indications to be purſued in all caſes of a ſimilar nature.

All the miſchiefs conſecutive to the counter-ſtroke in the joint, whenever it doth not produce fracture, can only proceed from the contuſion and colliſion of the parts contained in it; but this colliſion and contuſion can only give riſe to a pain more or leſs acute, to a ſwelling and an in-

flammation more or leſs conſiderable. The methods of cure to be employed in ſuch circumſtances, will be every thing that can alleviate the pain, and prevent the ſwelling and inflammation of the injured and bruiſed parts. Bleeding, reſt, and a regimen, are very proper to fulfill this double indication; but the bleeding muſt be repeated ſeveral times, and even at ſhort intervals, if the pain ſhould be violent. Reſt muſt be abſolute, that is to ſay, that all kind of motion of the thigh upon the trunk, or of the trunk upon the thigh, muſt be prohibited till the time for the coming on of the bad ſymptoms be paſt; becauſe however ſlight may be the friction of the contuſed and inflamed parts upon each other, it cannot but be extremely painful. With reſpect to the diet, that muſt be very ſtrictly obſerved.

It is undoubtedly for want of having taken theſe precautions in the firſt period of counter-ſtrokes in the joint of the thigh, that ſeveral patients have experienced that long ſeries of accidents that has brought them to the grave. Nothing is therefore more eſſential than to recommend lying in bed to thoſe who have received, by counter-ſtroke, violent ſhocks in the joint of the hip, and to confine the limb in ſuch a manner, that the head of the bone ſhall not be able to play in its cavity, more eſpecially when motion is extremely painful. This precaution, however, will not prevent us from having recourſe to repeated bleedings, to a diet more or leſs rigid, and to reſolutive topics applied round the joint. Although we can have no great dependence upon theſe topics, on account of the depth of the parts on which they are to act, yet they are not to be neglected. Spirituous, reſolutive applications, for inſtance, may perhaps convey their effects farther than we ſuppoſe. It is by purſuing this kind of treatment, which is that of all well-informed practitioners, that I have ſeen many of theſe ſhocks, though violent, unattended with any ſerious conſequence; while others, which in the firſt inſtance ſeemed to require no attention, have produced the greateſt miſchiefs, for want of having taken the above-mentioned precautions in time. Reſt, above all, is the firſt of remedies; and we cannot be too attentive in fulfilling this curative indication.

Suppoſing

Suppoſing however, that theſe means of cure ſhould not have been employed in time, or that they ſhould have been ineffectual, and that, to the primary accidents of contuſion in the hip joint, there ſhould ſucceed an abſceſs in the cavity, with deſtruction of the ligaments, caries of the articular ſurfaces, &c., how are we to proceed in this caſe? Muſt the patient be left to his deplorable fate, and muſt art remain inactive under ſuch circumſtances? We ſhould be almoſt tempted to anſwer in the affirmative, from what we have ſeen of the inefficacy of its efforts in ſeveral of theſe caſes. Art here conſiſts leſs in doing, than in avoiding to do what may be done; for a cure of this kind can only be the work of nature.

The inſtance we have given of the ſoldering of the thigh-bone with the os innominatum, ſerves at leaſt to ſhew us one of the reſources which nature reſerves to herſelf in deſperate caſes. Suppuration having once taken place in the inſide of the joint, the ſoft and flexible parts which border it and maintain the bones in their ſituation, having been deſtroyed, nature hath no means of preſervation left, but to form, by a complete anchyloſis, one continued bone between the trunk and the thigh; and ſhe tends to this end by the very mechaniſm, by which the deſtruction of the injured parts is effected. In conſequence of inflammations and ſuppurations formed in the joints, the ligamentous parts are inſenſibly conſumed, the bony and cartilaginous parts grow carious, and exfoliate in the ſame manner, and the fragments of them are drenched in the pus which is daily forming in the neighbouring parts attacked with ſuppuration. This pus, while it is not ſuſceptible of ſpontaneous alteration, from the acceſs of the air into the cavities where it is collected, is for the moſt part a mild and beneficial fluid, which, far from re-acting upon the bony and cartilaginous parts, takes charge, on the contrary, of their fragments, and ſerves as a vehicle to carry them out, after having, undoubtedly, contributed to detach them from the maſs that ſupplied them.

Now

Now we know, that when the organic action of the veſſels of the ſound bone hath accompliſhed, either in one piece, or in detached portions, the exfoliation of the bony parts that were diſeaſed, and that this exfoliation has been removed by art, or carried away by the powers of nature alone; we know, I ſay, that the ſound bony texture remaining, endeavours to unite itſelf, either to the neighbouring fleſh, the nature of which it hath almoſt adopted, or to other bony portions which may have undergone the ſame changes. It is therefore no way ſurprizing, according to the preceding obſervation, that the whole ſurface of the head of the thigh bone, and of the cavity which received it, having exfoliated by degrees, and the fragments of this exfoliation having been continually carried away by the diſcharge, theſe ſurfaces ſhould have been ſoldered together, ſo as to make but one common bone. Would it have been more ſurprizing if this great effect had been accompliſhed without the deſtruction of the patient? Can we be certain that the patient, from his conſtitution, was in circumſtances the moſt favourable for the ſucceſs of the event? Can we be certain, in a word, that the operations of nature, as well as thoſe of art, had not been counteracted by imprudent motions, as much during the three years that this man, who was very poor, languiſhed at home, as during the ten months he lived in the Hoſpital?

Diſeaſes of this nature do not therefore ſeem to me entirely beyond the reach of art. The long ſpace of time the patient lived after the evacuation of the pus by the fiſtulous openings, compared to the time thoſe patients lived, in whom large inciſions were made to procure this evacuation, ſeems, in ſome meaſure, to indicate the proper mode of proceeding in ſuch caſes. From this inſtance, and others, which I cannot quote upon this occaſion, becauſe they have no connection with the queſtion of counter-ſtrokes, I ſhould imagine, that when the original accidents have unfortunately failed of effectual relief, and that an abſceſs has been formed in the joint, which ſhall have manifeſted itſelf externally by evident ſigns; I ſhould imagine, I ſay, that we ſhould not be in haſte to give vent to it; and if it ſhould be thought indiſpenſably neceſſary to let out the pus, this ſhould only be done by puncture with a trocar. The pus,

in theſe caſes, ſeems to be a kind of bath for the bone, to which it owes all the advantages we have been deſcribing. So little ſhould we conſider the pus as a noxious fluid, that, in theſe inſtances, I have never found it tainted with the leaſt ſmell, even when I have let it out after the collection had been formed ſeveral months, and in quantities ſo conſiderable as to amount to two or three pints, among which ſeveral fragments of bone have been found floating. But it is neceſſary to repeat, becauſe it is an inſtructive obſervation, that in leſs than three days, when theſe abſceſſes have been largely opened, the matter, which at the time of opening was always of a proper conſiſtence and perfectly devoid of ſmell, has become thin and very fœtid. Perhaps by adopting the method I have propoſed, with reſpect to the time and manner of opening theſe immenſe abſceſſes which are formed in conſequence of violent contuſions in the joint of the hip [1], and by making the patient abſtain from all motion which might impede the operations of nature and thoſe of art, the complete anchyloſis of the articulating ſurfaces might be obtained, which, in the deſperate caſes we are ſpeaking of, is the only reſource we have to look up to. To what has been ſaid upon this ſubject, I ſhall add, that it would be proper to endeavour to put the lower extremity and the trunk in ſuch a poſition with reſpect to each other, that after the formation of the anchyloſis, the latter ſhould preſerve, as much as poſſible, a vertical direction with the limb.

SECTION

SECTION II.

THE EFFECTS OF COUNTER-STROKES ON THE SEVERAL PIECES THAT COMPOSE THE TRUNK, AND THE TREATMENT PROPER FOR THEM.

WHAT has juſt been ſaid of the miſchiefs not unfrequently produced on the lower extremities by counter-ſtrokes, leads us the more naturally to examine what may be the effect of counter-ſtrokes on ſome parts of the trunk, inaſmuch as theſe extremities themſelves are the medium through which the ſhock is tranſmitted to thoſe parts. It may, indeed, happen, that in falling upon the feet, the thigh bone may reſiſt, and yet that ſome of the lower pieces of the trunk may receive a counter-ſtroke capable of being injurious to them. The os innominatum, the os ſacrum, and the laſt of the lumbar vertebræ, are the parts that are moſt liable to this accident. If it be impoſſible that the os innominatum ſhould be fractured over the head of the thigh bone, as it may be preſumed, yet that bone may, at leaſt, ſometimes experience contuſions in its cavity; but

this accident is included in what I have ſaid of the miſchiefs that are done to the hip joint, when there is a violent counter-ſtroke felt in the cotyloide cavity of the os innominatum.

With reſpect to the os ſacrum, though articulated by large lateral ſurfaces with the oſſa innominata; and though firmly attached to theſe bones by intermediate cartilages, and by very ſtrong ligaments, it is nevertheleſs liable to at leaſt partial disjunctions, from the violent counter-ſtrokes it ſometimes ſuffers. We have too many inſtances of this to call the matter in queſtion; beſides that, it is ſufficient to examine what happens in ſome falls on the feet, to be convinced of the poſſibility of a kind of disjunction of the os ſacrum from the os innominatum. Let us ſuppoſe that in one of theſe falls the direction of the motion ſhall be ſuch, as that none of the lower parts can have ſuffered either inflexion or fracture; in that caſe, all the momentum of the upper parts, multiplied by their weight, is ſpent upon the ſuperior part of the os ſacrum, which receives a moſt violent ſhock from above downwards, while the oſſa innominata remain unmoved. The os ſacrum is then driven like a wedge between theſe two bones; but the manner in which their articulating ſurfaces are conſtructed, the cartilage which lines them, the connections which unite theſe bones to the os ſacrum, and the lateral preſſure they then exert upon it, by means of the obliquity of the neck of the thigh-bone, are the reaſon that none but the moſt violent ſhocks can produce the kind of disjunction we are ſpeaking of; which might however be effected by another mechaniſm, if nature had not provided againſt it. In the caſe we have been ſuppoſing, the ſacrum, at the ſame time that it is driven as a wedge between the two oſſa innominata, endeavours to make a ſwing forwards, while it is effectually oppoſed, not only by all the ligaments which connect it at its upper part to the neighbouring bones, but alſo by the ſciatic, and iſchio-ſacro-ſciatic ligaments, which acting upon the ſacrum with a lever much longer than that of the power, on account of their attachment to almoſt all the lower extremity of this bone, are capable of oppoſing with greater force the ſwing forwards, which the ſhock, received at its upper part, tends to make it produce [m]; whence

whence we perceive how difficult it is, in the circumſtance of very rapid motion of the trunk upon the lower extremities, that any miſchiefs ſhould be produced in the parts which concur in the union of the oſſa innominata with the os ſacrum, eſpecially when both the extremities bear together.

But it may happen, that the ſhock ſhall be ſo violent, as to elude all the precautions taken by nature, and to produce, even in the caſe here ſuppoſed, if not a disjunction of the bones, at leaſt a divulſion of the ligaments that connect them, a contuſion of the cartilages, and of the bones themſelves; injuries which almoſt always produce very ſerious complaints; or it may happen, that the motion of the trunk, being ſtopped by one of the extremities only, the force ſhall be ſpent entirely upon the articulating ſurface of the ſacrum on one ſide, and that in the very diſadvantageous circumſtance of that bone being neither preſſed upon laterally, nor ſupported by the oppoſite ſide. Even admitting in this caſe that the velocity of the upper parts, multiplied by their weight, ſhould be reduced to a ſmall matter when it came to be applied to the os ſacrum, yet it would not be ſurprizing, that the parts which ſtrengthen the articulation of this bone, on which the whole effort is ſpent, ſhould ſuffer, at the inſtant of the ſhock, a very dangerous divulſion. All that has been ſaid here, is nothing more than an anticipated explanation of the mechaniſm by which ſhocks, conveyed by a counter-ſtroke to theſe parts, have given riſe to the miſchiefs that have fallen under my notice.

A man of forty years of age, having climbed a tree, fell upon his lower extremities from the height of about fifteen feet, and at the inſtant of his fall, had no other ſenſation than that of a general commotion, accompanied with a ſharp pain at the bottom of the ſpine. Being brought home, he would not ſubmit to be blooded, and only took a few bottles of vulnerary infuſions. The very next day, he went out; the little pain he felt, did not ſeem to him to merit any attention; he walked tolerably well for ſeveral days, and followed his buſineſs as uſual. But about the thirtieth day from his fall, he began to grow lame; ſtill however he felt

nothing more than a dull pain about the region of the os ſacrum, towards the right ſide; the pain increaſed, and on the fifty fifth day the difficulty of walking was ſo conſiderable, that he could not do it without a ſtick; urged by his complaint, which now began to make him uneaſy, he applied for aſſiſtance. Having a ſlight degree of fever, he was blooded; reſt, and the uſe of reſolutive fomentations, were preſcribed to him; and laſtly, embrocations made with the martiatum and oil of nutmegs, animated with ſalt ammoniac; but this was without any ſucceſs, the period of the efficacy of theſe means being paſſed. The complaint continued increaſing for five months, at the expiration of which, the patient could not bear in the leaſt upon the right limb; the motion of bending the thigh upon the trunk was both extremely painful and difficult; and a tumour began to manifeſt itſelf, which came from under Poupart's ligament. Such was the ſtate of the patient when he came to the hoſpital for relief.

The hiſtory of his diſeaſe left us no room to doubt of the nature of it, and unfortunately it afforded but a very melancholy prognoſtic. Suppurating cataplaſms were applied to the incipient tumour, which, during the ſpace of three weeks, increaſed but little. He was then ſeized with vomitings and hiccoughs, as if he had had a ſtrangulated rupture. The tumour being ſomewhat lengthened towards the inſide of the thigh, and there being no doubt of its containing matter, it was opened a few days after; a large quantity of white inodorous pus was evacuated; the patient was then free from fever; he was dreſſed with dry lint, and afterwards with digeſtive. The pus, which had been at firſt white, and devoid of ſmell, having become thin and very offenſive, vulnerary, deterſive and ſpirituous lotions, were injected into the abſceſs; and the dreſſings and injections were more frequently repeated; but all theſe precautions were fruitleſs, the fever increaſed with the putrefaction, and the patient died on the ninth day after the opening.

Upon examining the body, all the upper and lateral portion of the ſacrum on the right ſide was found carious, as well as the correſponding part

part of the os innominatum. There was an evident ſeparation between theſe two bones, and the whole of the ſacro-iliac ſymphyſis was attacked with caries. The laſt of the lumbar vertebræ was alſo carious at its lower part, and the ſuppuration had in great meaſure deſtroyed the pſoas and iliacus internus muſcles. Theſe miſchiefs were probably the reſult of the divulſion, which the parts, deſtined to ſtrengthen the union of the os ſacrum with the os innominatum on the right ſide, had experienced, at the inſtant of the fall (n); and this divulſion muſt undoubtedly have been produced according to the mechaniſm above mentioned. With reſpect to the ſymptoms that ſucceeded, they are the neceſſary conſequences of the dull inflammation of theſe parts, and of the ſubſequent ſuppuration, and they might poſſibly have been prevented, if ſuitable means of relief had been timely adminiſtered.

A woman accidently jumped down a few ſteps, a ſhort time after having been delivered. At the time, ſhe felt nothing more than a trifling pain in the region of the loins, which ſome days after grew worſe, and was accompanied with a difficulty of walking, which increaſed gradually till ſhe could no longer ſupport herſelf upon the left leg. The pain ſhe ſuffered, though not very violent, was continual; and all theſe accidents were attributed to an overflow of the milk, the more readily, as the upper part of the thigh and the hip on that ſide began to increaſe in ſize. This woman, who had not been carefully attended to in the beginning, was brought to the hoſpital, after having kept her bed upwards of three months at home; and at that time, a very large abſceſs appeared to be forming at the back part of the buttock, the matter of which had made numberleſs ſinuſſes, which proceeded from the pelvis by the iſchiatic notch. This abſceſs having been properly opened, furniſhed a large quantity of pus of tolerably good quality, and devoid of ſmell; it ſoon however became thin, of a brown colour, and very fœtid; the fever, which had been more or leſs conſiderable during the diſeaſe, increaſed; a delirium came on, and the patient lived only eight days after the opening had been made. The examination of the body preſented the ſacrum, and the os innominatum on the left ſide, carious throughout the whole

of

of their correſpondent articulating ſurfaces; and in proſecuting our reſearches, we found the upper part of the ſacrum likewiſe attacked with caries, as well as the laſt of the lumbar vertebræ.

The nature of the cauſe, and the circumſtance in which the woman was at the time ſhe received the ſhock, together with the accidents ſhe experienced in the ſequel, every thing announces, that there was a kind of disjunction or divulſion of the ſacro-iliac ſymphyſis (o). The two preceding obſervations would properly come in ſupport of the poſſibility of this disjunction from an external cauſe, if even it had not been evidently demonſtrated by a fact, in the caſe of a man named Binai, of which M. Louis hath given an account, in his hiſtory of the Royal Academy of Surgery (p).

From what has been ſaid, it is apparent, that in the caſe of a fall upon the lower extremities, when the motion is ſuddenly ſtopped, there muſt be many circumſtances united to occaſion ſuch a counter-ſtroke as ſhall be capable of accompliſhing the disjunction of the ſacrum from the oſſa innominata, or only a certain divulſion of the medium that connects them. But without a ſhock ſo violent as is neceſſary to produce ſuch miſchiefs, counter-ſtrokes may occaſion, in the neighbouring parts, injuries entirely as dangerous as thoſe, the unfortunate iſſue of which I have been mentioning. In a fall upon the two feet, which may have happened without fracture of any of the pieces that compoſe the lower extremities, without contuſion of the joints that are found in them, and even without any apparent divulſion of the ſacro-iliac ſymphyſis; it occurs but too frequently, that the whole effort of the counter-ſtroke bears upon the baſis of the os ſacrum, and upon the laſt of the lumbar vertebræ. In the fall upon the feet or upon the buttocks, for inſtance, it is very poſſible, that the motion of the upper parts upon the baſis of the ſacrum, ſhould be ſo rapid, that this baſis, the laſt vertebræ of the loins, and even the ſtrong and almoſt bony cartilage which unites theſe two bones, ſhall experience a degree of preſſure, ſufficient to diſturb their organization, and their internal texture; and conſequently to give riſe to ſubſequent

quent miſchiefs of a very ſerious nature (q). This aſſertion is not made without foundation; for I have found, that many of thoſe diſorders which are called abſceſſes of the pſoas muſcles, might with propriety be aſcribed to the violent preſſure of the laſt of the lumbar vertebræ upon the ſacrum, &c. There is the greater reaſon to imagine this, becauſe, in theſe kinds of abſceſſes, the fourth and fifth of the lumbar vertebræ are ſometimes carious to a conſiderable depth, as well as the anterior and upper part of the ſacrum; this is at leaſt what I have obſerved in the bodies of ſeveral perſons who have died in conſequence of ſuch abſceſſes. The following fact, which I have ſelected from among many others of the ſame nature that I have noticed, ſeems at leaſt to confirm my conjectures upon this point.

A ſtrong and vigorous man, forty two years of age, having leapt, in Auguſt 1765, from about eight feet high, felt at firſt, nothing more than a pain of a very doubtful nature, in the region of the loins. This pain was even diſſipated a little while after; but it ſoon returned, and continued, though in a very moderate degree, upwards of a month. At the end of September, the pain increaſed by very perceptible degrees; and was much more conſiderable, particularly when the patient was coming down ſtairs. The primary cauſe of his complaint having eſcaped his memory, he conceived it to be the rheumatiſm; but time, and the proper means of alleviating his pains, having proved ineffectual, he began to be uneaſy. His diſorder now grew worſe every day; a difficulty, and afterwards an impoſſibility of walking, came on; and in February, 1766, a collection of matter began to ſhew itſelf at the anterior, internal, and upper part of the thigh. This abſceſs was opened in March, and in a ſhort time the patient experienced the ſame fate as the other two perſons, whoſe caſes I have given an account of. The examination of the body, preſented a caries of the upper and fore part of the ſacrum, and of the bodies of the two laſt lumbar vertebræ. Does not the ſlow progreſs of the diſeaſe ſeem to announce, that the ſuppuration and partial deſtruction of the pſoas, were, in this inſtance, only ſecondary effects of the ſuppuration and caries of the neighbouring bony parts? Theſe diſeaſes may be alternately cauſe and

effect; and the caries of the ſacrum, and of the lumbar vertebræ, may give riſe to the pſoas abſceſs, as collections of matter in the pſoas muſcle may occaſion a caries of the ſpongy bones that are near it.

I ſhall alſo obſerve, that a palſy of the lower extremities may ſometimes be one of the effects reſulting from counter-ſtrokes upon the laſt of the lumbar vertebræ; and that the debility which theſe extremities experience, is the reſult of a gradual compreſſion which is then made upon the ſpinal marrow, and which is the conſequence of the miſchiefs going on, either in the cartilages, or in the bony ſubſtance of the vertebræ. Nothing can be more ſimple than this proceſs; the violent ſhock which the parts have ſuffered, cauſing them to ſwell, they muſt neceſſarily diminiſh the diameter of the channel of the vertebræ, and conſequently compreſs, in a greater or leſs degree, the ſpinal marrow. I have ſeen this happen to a young man of two-and-twenty, who, having fallen upon his buttocks, from the top of a ſhed, ſeemed at firſt to experience no remarkable accident, ſince he continued his work for at leaſt three weeks after, at the end of which, he complained of the increaſe of a dull kind of pain that he had always felt at the bottom of the loins, from the inſtant of his fall: he ſtill walked with tolerable eaſe; but this motion became more and more difficult: the lower extremities grew weaker by degrees, and at length totally loſt their power of motion, without the patient having been ſenſible of any great pain. Being brought into the hoſpital, and queſtioned with reſpect to the cauſe of his palſy, it was concluded, that it would ſoon be followed by an abſceſs of the nature of thoſe I have been ſpeaking of. Accordingly, about ſix weeks after, a tumour appeared projecting from under Poupart's ligament; this being opened ſome time after, when it became prominent outwards, the patient ſoon paid the tribute to nature. Upon examining the body, the two laſt of the lumbar vertebræ were found affected with caries; which in one ſpot penetrated even into the channel of the ſpinal marrow, while the pſoas and iliacus muſcles ſeemed likewiſe, in this caſe, to have ſuffered only ſecondarily. Abſceſſes originally formed in theſe muſcles, are not, however, unfrequent; and although they be only indirectly the reſult of a counter-

ſtroke,

ſtroke, it may not, perhaps appear improper to explain, in this place, in what manner a fall or an effort may give riſe to them.

In a falſe ſtep, or a fall upon the feet, if the upper parts do not bear perpendicularly upon the ſacrum, but if, on the contrary, they bear a little behind, the perſon then will fall backwards. To prevent this accident, the pſoas and iliacus internus muſcles, the fixed point of which is then at their attachment to the little trochanter, act, at the inſtant, with power and celerity upon the trunk, to concur in bringing back the line of gravity of the upper parts on the baſis of the ſacrum, upon the bones of the thigh; but the ſudden effort of theſe muſcles is ſometimes ſo great, that many of its fibres may ſuffer a rupture, which may give riſe to an inflammation, and an abſceſs in the ſubſtance of them, and afterwards to a caries of the neighbouring bones; a diſeaſe of ſo terrible a nature, that art hath as yet diſcovered no reſource againſt it. I have had ſo little reaſon to be ſatisfied with the methods I have tried, or ſeen tried, in a number of theſe caſes, that I can venture to affirm, that it is the beſt way to leave thoſe who are afflicted with this diſeaſe to nature, particularly when they are arrived to a certain period. The abſceſſes which come forward, then burſt of themſelves; they leave ſmall fiſtulous openings, and the patients may live, at leaſt for a certain time; whereas they all periſh in a few days, whenever theſe immenſe collections of matter are opened largely. It is for this reaſon I propoſe hereafter to open, only with a trocar, any abſceſſes of this kind that may come under my notice; for notwithſtanding what MAUQUEST DE LA MOTTE hath ſaid upon the ſubject, I have never ſeen one of them, the opening of which could have been reaſonably attempted, by plunging a ſcalpel into the abdomen.

It is not when counter-ſtrokes have given riſe to theſe extreme miſchiefs, of which I have been mentioning inſtances, that we can pretend to oppoſe their effects; the original accidents, are thoſe which we muſt particularly attend to relieve. But in order to do this ſucceſsfully, we muſt make ourſelves well acquainted with the mechaniſm of the counter-

ſtroke, we muſt be able nearly to eſtimate its power, we muſt know the nature and relative ſituation of the parts that have ſuffered; and from theſe preliminaries, we may form a proper judgement of the nature of the injury that has been produced at the inſtant of the ſhock. The method of cure then becomes rational, and leaves us no reaſon to apprehend thoſe errors which are the conſequence of empiriciſm and ignorance. With ſuch principles, the proceedings we are to adopt in counter-ſtrokes, the action of which bears upon the os ſacrum, upon the ſacro-iliac ſymphyſis, and upon the lumbar vertebræ, are already traced out for us. The kind of miſchief which ſuch a cauſe may produce upon theſe parts, requires bleeding, more or leſs repeated, according to the violence of the ſymptoms; reſolutive and ſpirituous embrocations, a proper diet, and laſtly, the moſt abſolute reſt. This cannot be too ſtrongly recommended in disjunctions or divulſions of the ſacro-iliac ſymphyſis; and in this caſe, compreſſes dipt in reſolutive and ſpirituous topics, and ſupported by a circular bandage applied moderately light, and paſſing over the hip bones, are precautions by no means to be neglected. It is alſo neceſſary to have recourſe to them in caſes where the counter-ſtroke hath produced miſchiefs among the lumbar vertebræ; but in this inſtance, the circular turns of the roller muſt be carried above the region of the loins; that part of the ſpine will be kept more ſteady by this precaution, and the bones which compoſe it will be leſs liable to be affected by motion, which is always hurtful in ſuch circumſtances. To theſe precautions we muſt add, that the horizontal poſition is the only proper one in theſe caſes; but we muſt take little account of the number of days the patient is confined to his bed; it is better to carry our precautions too far, than to be deficient in them. So many unfortunate perſons have been the victims of their own neglect in this particular, that the attention of practitioners cannot be too much fixed upon this point.

It is by the very ſimple means I propoſe, that after falls with counter-ſtrokes on the os ſacrum and the lumbar vertebræ, I have ſucceeded in relieving the firſt ſymptoms, which threatened ſubſequent miſchiefs as alarming as thoſe I have been mentioning: among ſeveral

others, I have ſelected the following remarkable inſtance of this. A young man, having fallen from the height of about thirty feet upon his buttocks, felt a very great pain in the region of the os ſacrum and of the loins. The ſecond, third, and fourth lumbar vertebræ, made even an evident projection outwards, and beſides the impoſſibility which the patient experienced of ſupporting himſelf upon his legs, they were attacked with a conſiderable numbneſs, and were deprived of their quickneſs of ſenſation. Repeated bleedings, a ſtrict diet, graduated and very thick compreſſes applied upon the projecting vertebræ, and ſupported by the circular turns of a bandage rolled very tight round the body; the attention of keeping the patient upon his back, with his head low, and a pillow under his loins; were the means by which this accident was perfectly cured, in leſs than ſix weeks. But the patient was more ſtrongly induced to maintain the poſition in which I had placed him, by the diminution of his pain upon being put into it. I obſerved alſo, in the firſt days after the accident, that the tighter the bandage was, the more he was relieved; for which reaſon, I ordered it to be frequently wetted with brandy, to prevent it from getting looſe; and when the effect was not anſwered by this contrivance, I made the whole bandage tighter by applying a freſh roller. The patient, who found himſelf daily growing better, attempted to riſe on the twenty-ſixth day; but his pains in the lumbar region returning, I confined him to his bed for ten or twelve days longer; and when he got up again, I adviſed him not to walk at firſt without the help of a ſtick, and to wear a tight bandage round his body, in order, for ſome time, to give greater firmneſs to the ſpine. A fall of this kind might have occaſioned a diviſion of the ſacro-iliac ſymphyſis, eſpecially if this young man, in falling, had pitched only upon one buttock, and upon the tuberoſity of the iſchium on the ſame ſide.

Although frequent inſtances occur, of the lumbar vertebræ being much expoſed to the effects of counter-ſtrokes, yet they are not the only vertebræ that experience the pernicious effects of a ſimilar cauſe; for it may act alſo upon the dorſal vertebræ, ſo as to produce very great ſubſequent

miſchiefs. Lateral diſtortions of the ſpine, and its exceſſive projection outwards, have been often occaſioned by a counter-ſtroke, the ſhock of which hath fallen upon theſe vertebræ: at leaſt I have ſeen many deformed perſons who had become ſo, only in conſequence of falls they had been expoſed to in their younger days. With reſpect to the method of cure to be purſued, it is almoſt entirely prophylactic; it is ſcarce of any utility, except in the firſt inſtance, and ſhould be little different from that which is adapted to the complaints of which I have been giving the hiſtory. Bleeding, reſt, and a circular bandage round the body, may be ſufficient: it will be proper, however, in children, to add to theſe methods, the remedies calculated for the rickets, whenever there appears a tendency to this diſeaſe, which is itſelf often the only cauſe of theſe deformities. Abſorbents, tonics, bitters, preparations of ſteel, and eſpecially an abſtinence from all aceſcent food, are then the moſt effectual remedies.

After having ſucceſſively examined the effects of counter-ſtrokes on the different bones which compoſe the pelvis, and the greateſt part of the ſpine, it remains only, to complete this ſection, that I ſhould trace theſe effects upon the other bones which concur in the formation of the trunk. Among theſe, the cervical vertebræ do not appear to me ſuſceptible of the bad effects of counter-ſtrokes; but this cannot be ſaid either of the ribs or the ſternum. That the ribs eſpecially, may be fractured in a part diſtant from that which receives the ſhock, is a fact which ſtands in no need of being proved; fractures of the ribs, with projection outwards, are always the effect of a counter-ſtroke, to which their form renders them liable. The rib being ſtopped ſhort, as it were, backwards, at the ſame time that it receives a conſiderable ſhock towards its anterior extremity, is fractured in the middle: this may alſo happen when the ſhock bears upon the cartilaginous part of the rib, or upon the ſternum, provided the body that cauſes it, have ſome extent of ſurface, and ſhall ſtrike with a certain velocity; but the mechaniſm of this fracture, and the treatment of it, are too well known for us to dwell upon. If the ſhock ſhould bear upon the angular or middle part of the rib, even in the inſtance where the oppoſite ſide of the cheſt ſhould lean againſt ſome reſiſting body,

body, no injury can be done to the ſternum, nor to the anterior part of the ribs; and then the fracture, which may happen at the part that receives the blow, is no longer the effect of a counter-ſtroke. It could only be claſſed among the effects of ſuch a cauſe, in thoſe inſtances, where it ſhould happen on the ſide oppoſite to that which received the ſhock; which is not impoſſible in the ſuppoſition of the trunk leaning againſt ſome reſiſting body; and in this caſe likewiſe, the beſt way of directing the cure is ſufficiently known. With reſpect to the ſternum, although from its ſituation and figure it ſhould not be very liable to the effects of counter-ſtrokes, yet it hath ſometimes happened, that a fracture of this bone has been produced by ſuch a cauſe, of which the following fact is an inſtance.

A maſon, eight and twenty years of age, having been brought to the hoſpital, after falling from the height of about fifty feet, it was found, upon examining him, that he had a fracture of the left thigh, and that the ſpinal proceſſes, of the laſt of the dorſal, and firſt of the lumbar vertebræ, were likewiſe broken. The fracture of the thigh being reduced, and the ſurgeon perceiving that the man could not bring his head forwards, examined in order to find out the reaſon of this, and diſcovered it to be a tranſverſe fracture of the ſternum, with a conſiderable interval between the firſt and ſecond piece of that bone. The patient when on the ground, was found lying upon his back, with his left leg under him; and upon the fore-part of the breaſt there was neither ecchymoſis nor excoriation, nor any mark which could induce a ſuſpicion that the fracture of the ſternum had been produced by a blow upon the part. The mechaniſm of this accident, appeared therefore ſo problematical to the ſurgeon, that he found it difficult to account for it; but a workman who was preſent, ſoon enabled him to ſolve this difficulty, by acquainting him, that the patient, at little more than one third of the courſe of his fall, had met with a projecting piece of ſcaffolding, which had given him a blow in the middle of his back. The ſurgeon, as well verſed in the practice as in the theory of his art, immediately concluded, that the fracture of the ſpinal proceſſes of the vertebræ above mentioned, and

that

that of the ſternum, were the conſequence of this firſt ſhock, becauſe, in the inſtant that the body had been ſtopped in its fall by the middle of the back, the lower extremities on one hand, and the upper part of the trunk on the other, had preſerved a ſufficient quantity of motion to force the ſpine to ſuch a degree of extenſion, that the muſcles which go from the ſternum to the head, &c., being violently ſtretched, had effected the ſeparation of the firſt bone of the ſternum from the ſecond. This mechaniſm is too ſimple, not to be readily underſtood. With reſpect to the curative indications that preſented themſelves for this double accident, they were fulfilled by a method as eaſy as it was effectual; ſo true it is, that a man of genius always enriches the art, while he ſeems to ſimplify it. The enlightened practitioner of whom we are ſpeaking, ordered a hollow to be made in the bed, at the part correſponding to the fracture of the vertebræ; he placed thick cuſhions under the nates, with a pillow under the ſhoulders, and employed every precaution neceſſary to keep the ſpine conſtantly bent forwards, and to bring the head in the ſame direction: this he accompliſhed by attending only to the poſition of the patient. The elongation of the ſpine, which is never more conſiderable than in the ſtate of flexion, brought back, into their natural ſituation, the ſpinal proceſſes, which were a little turned to one ſide, and maintained them there by means of the conſtant tenſion of the ligaments and muſcles that are fixed into it. The upper portion of the ſternum was kept, by the ſame contrivance, in exact oppoſition with the inferior extremity; ſo that at the uſual period of the cure of fractures, the patient went out perfectly well, and without having ſuffered any ſymptoms, except ſuch as are uſual, and to remedy which, the proper methods had been employed immediately after the accident. I make no doubt but that many fractures of the ſternum have been produced by the ſame kind of mechaniſm, and which, for want of being known at the time, have given riſe to abſceſſes, and to troubleſome caries of the bones.

SECTION

SECTION III.

TO EXPLAIN THE EFFECTS OF COUNTER-STROKES ON THE UPPER EXTREMITIES, AND THE MEANS OF RELIEVING THEM.

ALTHOUGH the upper extremities, in caſes of leaps or falls on the feet, do not receive the firſt ſhock, yet they partake of it, at leaſt very often, in ſuch a manner as to ſuffer material injuries. If a perſon ſhould fall from any height upon the lower extremities, when theſe come to the ground, they have ſeldom the whole weight of the upper parts to ſupport, becauſe the line of gravity of the latter paſſing, for inſtance, along the fore part of the cotyloide cavity, the trunk and the head continue to fall forwards, and the hands preſent themſelves naturally to the ground, to ward off the violent ſhock which the head might receive, without this precaution of mere inſtinct. It is not neceſſary even, to confirm this obſervation, that the fall ſhould be from any height. If a man, in walking, doth but loſe his balance, he falls; if backwards, he throws his elbows and ſhoulders as far back as poſſible, in order to multiply

tiply his points of contact with the ground; if forwards, he preſents his hands and knees for the ſame purpoſe; and if ſideways, the elbow. Thus it is that we inſtinctively avoid the commotion of the brain or the fracture of the cranium; but nature very frequently can only ward off theſe accidents, at the expence of the parts of leſs conſequence, which ſeem ſo voluntarily to offer themſelves for the preſervation of this important viſcus. Accordingly, we have already ſeen what the lower extremities are expoſed to ſuffer, in many caſes, in taking their ſhare of this preſervative intention (*); and it is in endeavouring to accompliſh the ſame end, that we ſhall find the upper extremities alſo expoſed to injuries which are almoſt always the effect of a counter-ſtroke.

If the palms of the hands ſtrike upon the ground in any fall whatever, theſe parts being ſuddenly ſtopped, the body is ſtopped at the ſame time; and the bones which compoſe them receive the ſhock of the upper extremity, which is itſelf acted upon by part of the trunk in motion. This kind of ſhock, which is a real counter-ſtroke, may, and ſometimes does, produce miſchiefs in the joint, a divulſion of the ligaments which connect the neighbouring bones, or a diſlocation of the wriſt; which laſt accident belongs to the effects of counter-ſtrokes taken in the moſt extenſive ſenſe. It may however be obſerved, that ſome of theſe injuries are leſs frequent than they might be ſuppoſed to be, and that for reaſons which are derived from the mechaniſm of the fall. The direction of the motion being then in a midway between the vertical and the horizontal line, the bones of the carpus are always puſhed directly againſt the bones of the fore arm, and this ſame direction farther eludes the violence of the ſhock, inaſmuch as the hands being able to ſlide on a little forwards, the motion is not ſo ſuddenly ſtopped as it would have been without this circumſtance. But notwithſtanding this, and the looſe attachment of the ſcapula, which renders the application of the weight of the trunk gradual, a fall upon the hands will not unfrequently occaſion, in the joint of the wriſt, the injuries I have been mentioning.

The

The principal ſymptoms that characteriſe theſe injuries, are an acute pain, and a ſwelling, more or leſs conſiderable, with a difficulty of moving the part. If theſe original accidents be not relieved, an abſceſs, a caries, a complete or partial anchyloſis, may ſucceed; at leaſt I have ſeen inſtances of ſome of theſe terminations. The ſymptoms that firſt make their appearance, ſufficiently indicate the kind of remedies to which we muſt have recourſe; repeated bleedings, reſolutive topics, more or leſs ſpirituous; in certain caſes, emollients, and anodines in others; retentive bandages calculated to prevent every motion of the part; are the only means to be employed in the firſt inſtance. But when the primary ſymptoms are relieved, balſamic embrocations may be tried, ſuch as thoſe made with the *balſamum tranquillum*, the *martiatum*, and the oil of nutmegs animated with a little volatile ſpirit of ſalt ammoniac; or we may uſe the ſoap of lead, quickened alſo with the ſpirit above mentioned. I have employed this laſt with ſucceſs, in ſtiffneſſes of the joints, with enlargement. I have ſeen ſome complete and true anchyloſes, and two incomplete or ſpurious ones, in conſequence of counter-ſtrokes received in the joint we are ſpeaking of (1), which have all happened to perſons who had neglected to apply in time for proper relief.

But the effects of theſe counter-ſtrokes are not confined to the wriſt, they moſt commonly produce a fracture of the fore arm; and whether this fracture be ſimple or compound, it requires no other method of treatment than ſuch as is well known. It muſt only be obſerved, that as the bones are at ſome little diſtance from each other, it is neceſſary, before the circular roller be applied, to place two ſlips of linen of tolerable thickneſs, ſo as to anſwer to the inter-oſſeous ſpace, one on the out, the other on the inſide. This precaution is more particularly neceſſary when the fracture is in the middle of the fore arm, and if it be near the elbow joint, care muſt be taken not to put the arm in a ſling; it muſt, on the contrary, be kept extended, for reaſons which are very evident.

If inſtead of falling upon the hand, the perſon falls upon his elbow, and that the olecranon be not fractured, the inſide of the joint may experience a counter-ſtroke accompanied with ſymptoms more or leſs violent, and which may be attended with all thoſe fatal conſequences which I have mentioned in deſcribing the effects of counter-ſtrokes in the joints of the lower extremities.

In November 1768, I opened, in a young man of eighteen years of age, an abſceſs, the origin of which was in the elbow joint, and which had proceeded from a ſimilar cauſe. The patient had felt great pain at the inſtant of his fall; a conſiderable ſwelling had come on; and when I ſaw him, on the 17th day after the accident, he had a conſiderable degree of fever; it was in vain that I bled him twice, and applied anodine and emollient reſolutive topics to the tumour; it terminated in ſuppuration, and the fluctuation becoming evident a few days after, I delayed not the opening of it. The pus being mixed with a glairy fluid, and the introduction of my finger into the opening, aſcertained the ſeat of the diſeaſe. The patient ſeemed relieved for ſome days after the operation; but the bad ſymptoms ſoon returned, the fever increaſed, the diſcharge became fœtid; the edges of the wound were livid and much ſwelled; the patient was delirious; and during the ſpace nearly of three weeks, he ſeemed to be in too deſperate a ſituation for us even to be able to attempt amputation with any proſpect of ſucceſs. After this period, however, he grew better by degrees; the ſymptoms were relieved, and the wound being dreſſed with dry lint, was perfectly healed, without there having been any apparent exfoliation; there were even hopes, when the patient went out of the hoſpital, that the joint would ſtill retain a certain freedom of motion.

It ſeldom happens that miſchiefs are produced in the joints, unleſs in thoſe caſes where the ſhock is not conſiderable enough to occaſion a fracture; but let us ſuppoſe, that in a fall upon the elbow, the ſhock ſhould be ſufficient to produce a ſolution of continuity in the bone; it will either be the olecranon, or the upper part of the fore arm, which will yield to the

the immediate application of the force upon them; or elſe theſe parts will reſiſt, and the os brachii will be fractured by a counter-ſtroke, as it frequently happens. The os brachii will either be broken in its body, and then the curative intentions are too well known to be mentioned here, or elſe this bone may be fractured at its upper extremity, or its neck, and in that caſe we muſt take ſuch precautions as the ſeat of the fracture requires. Though the curative indications be the ſame as in all other fractures, yet the mode of fulfilling them is different. As it is impoſſible to ſurround the fractured part with a circular roller, after having put the bones into a proper ſituation, we muſt apply under the upper part of the arm, two thin compreſſes which muſt croſs each other on the fore part of the ſhoulder, while the axilla and the inſide of the arm muſt be defended with tow or lint, previouſly ſteeped, as well as the above-mentioned compreſſes, in a mixture of oil of roſes, the yolks of eggs, and brandy (*). The arm muſt afterwards be brought cloſe to the trunk, while any hollows there may be between the arm and the trunk, either at the fore or the back part, muſt be filled up with lint or tow, which is alſo to be put round the upper part of the arm and the ſhoulder, and the arm is then to be kept in the ſituation in which it has been placed, by the circular turns of a roller paſſed round the body and including the arm, and by a bandage ſomewhat ſimilar to the capeline for the clavicle, taking care only that the roller ſhould be long enough to make a ſufficient number of turns round the body. The arm being thus immoveably fixt to the trunk, and the fore arm put in a ſling, nothing can prevent the re-union of the fractured pieces. It is by this very ſimple method, which is ſimilar to that of M. Moscate, that I have cured ſeveral fractures of the neck of the os brachii without the leaſt accident. The padding recommended by that able practitioner, is very well calculated to anſwer the ſurgeon's intentions in this caſe: and we may have recourſe to it, if we think proper, in preference to any other mode (w).

But the ſhock tranſmitted from the elbow to the os brachii, may leave that bone entire, and make uſe of it merely as a medium, by which the miſchief is conveyed to a greater diſtance. Thus it is that a fracture of

the proceſſus acromion of the ſcapula, is ſometimes produced: the following is an inſtance of it. In 1769, a man carrying a conſiderable load upon his left ſhoulder, having fallen upon the right elbow, or rather upon the upper part of the fore arm, while bent at right angles with the upper arm; the head of the os brachii was driven with ſo much force againſt the acromion, that the proceſs was fractured, while I perceived only a ſlight contuſion at the part which had received the ſhock. It does not appear to me, that the mechaniſm of ſuch a fracture ought to make any alteration in the method of cure which it requires of itſelf. In whatever manner the cauſe producing the fracture may have acted, the buſineſs is to bring the fractured extremities into exact appoſition, and to maintain them in a ſtate of reſt, which may allow of the inſpiſſation of the intermediate juice that is to unite them.

This double intention may be fulfilled, by keeping the arm exactly fixed to the trunk, and ſupporting it in ſuch a manner, that the head of the os brachii ſhall be conſtantly kept cloſe to the acromion, the motion of which is afterwards to be reſtrained, as well as that of the ſcapula and clavicle, by ſuitable compreſſes, and by the capeline of the ſcapula, which is to be applied, as I have juſt before mentioned, ſo as to include the arm in the circular turns which this bandage makes round the body; the cure will be the more complete in proportion as the motion of all theſe parts ſhall have been more confined. For this reaſon, in order more effectually to anſwer this eſſential indication, we muſt fill up, with lint or cotton dipt in the mixture above mentioned, all the hollows on the fore part of the arm, above and below the clavicle, &c. and this before we apply the roller. Theſe were nearly the modes of proceeding I adopted in the caſe juſt mentioned, and which ſucceeded ſo well, that the patient enjoyed, a few months after, a greater freedom of motion than I expected, conſidering what authors have ſaid of this fracture.

But ſuppoſing that the direction of a violent ſhock ſhould be ſuch, that the os brachii ſhall not ſuffer any fracture either in its body, or at its neck, and that it ſhall not be driven againſt the acromion, the ſhock is

then conveyed almoſt entirely to the inſide of the joint, where it may produce accidents proportioned to its violence. An acute pain, a ſwelling more or leſs conſiderable, with inflammation, ſubſequent abſceſſes, and a caries of the bones, are ſometimes the effect of ſuch a ſhock. In July 1765, a man fell from a horſe, and pitched upon his right ſhoulder; the pain, which was at firſt rather acute, was relieved by two bleedings, and by reſolutive applications; but it was not completely removed; ſome particular motions were always painful, and the pain increaſed upon change of weather; this the patient attributed to the rheumatiſm, to which he had been ſubject for many years, and which he imagined to be fixed upon this part. Eight months having elapſed in this ſituation, he was ſeized in March 1766, with a high fever, for which he was blooded four times. A week afterwards, the fever having ſtill continued with violence, he felt in the right ſhoulder, a pain more conſiderable than uſual, with a difficulty of motion which he had not yet experienced, and a tumour appeared, which was conſidered as the criſis of the diſeaſe. The ſwelling grew larger, and the pain, which increaſed notwithſtanding the application of anodines, did not ſeem to give way, till it might be preſumed that a ſuppuration was formed. The collection of matter not being, however, evident to the touch, anodine and ſuppurating topics were ſtill continued for more than three weeks. The fluctuation being then apparent, an abſceſs was opened on the lateral, outward, and upper part of the arm, which furniſhed a very great quantity of well-conditioned pus. It was thought that the patient was ſaved by this evacuation, becauſe this was ſuppoſed to be only a critical abſceſs; but we were ſoon undeceived; the fever did not give way, the abſceſs ſtill furniſhed a great quantity of matter, and ſome ſmall particles of bone were found at intervals in the diſcharge. This unfortunate diſcovery rendered the nature of the malady no longer doubtful, any more than the imminent danger in which the patient was; notwithſtanding all the care that could be taken of him, he fell into a hectic, which increaſed by degrees, and deſtroyed him in three months after the opening of the abſceſs. Upon examining the ſhoulder joint, I found the head of the os brachii, and that of the ſcapula, affected with a deep caries.

Might

Might I be allowed to hazard ſome conjectures upon this diſeaſe, I ſhould ſay, it is to be preſumed, that the fever which came on, was independent of the effects of the ſhock on the joint, ſeeing that it preceded, ſeveral days, the pain and the ſwelling of the part (*); but it may alſo be imagined, that without the previous miſchiefs in the joint, the fever would not have occaſioned thoſe appearances which I obſerved after the death of the patient. Still it is certain, that in the firſt inſtance, we cannot carry too far the precautions which ought to be taken after violent ſhocks in the joints: it is right to recal to our memory, and to that of others, that in theſe caſes, we are not to ſuffer patients to remain in that ſtate of confident ſecurity, which they derive from being aſſured, that they have neither a diſlocation nor a fracture.

In continuing to trace the effects of counter-ſtrokes upon the bones that compoſe the upper extremities, we find, that the laſt of the pieces that concur in this ſtructure, in aſcending from below upwards, is as much, and even more, expoſed to them than any other; this is ſo certain, that there are very few fractures of the clavicle that are the conſequence of an immediate ſtroke upon this bone; ſometimes it is occaſioned by a fall on the elbow; ſometimes by a fall or a blow on the ſhoulder, or on the ſcapula. I have ſeen ſeveral inſtances of fractures of the clavicle, that have happened in all theſe different ways. The mechaniſm of them is ſo ſimple, that it is unneceſſary to explain it. Neither ſhall I give an account of any of the caſes, becauſe they would contain nothing but trivial obſervations, little calculated to appear before the reſpectable body who are my judges; nor ſhall I mention any thing of the mode of cure, which is ſufficiently known, and requires, beſides, no alteration reſpecting the cauſe producing the fracture: I ſhall only recommend Mr. Brasdor's bandage, as preferable to every other method of keeping the ſhoulders conſtantly back.

We ſhall conclude this ſection by obſerving, that if it be ſufficient, in order to claſs any injury among the effects of counter-ſtrokes, that it ſhould have taken place in a part diſtant from that which received the ſtroke,

ſtroke, the effects of counter-ſtrokes on the external parts will be conſiderably increaſed; for in this general acceptation, diſlocations are always produced by this cauſe. We cannot doubt of this, when we ſee that a diſlocation of the thigh is almoſt always the reſult of a ſhock, of a reſiſtance, or of a power applied towards the lower extremity of that bone; the ſame may be ſaid of a luxation of the wriſt, of the elbow, of the ſhoulder, of the clavicle, of the lower jaw, of the leg, &c. The bone always receives the ſtroke either at the extremity oppoſite to that which is diſlocated, or in its body: there are even few inſtances where the ſhock applied immediately to the joint, could poſſibly produce the kinds of accidents we have been ſpeaking of (g). In making this obſervation, I do not mean to explain the mechaniſm by which diſlocations are produced; this is a point which it was impoſſible ever to miſtake; we only give the name of counter-ſtroke to this mechaniſm, without making any addition to the well-known theory of theſe accidents; nor does this bring any improvement in the mode of treatment required for luxations. It is well known what proceedings are to be adopted in all caſes of this kind, either to accompliſh the reduction of the diſlocation, to maintain the parts reduced in their ſituation, or to relieve the preſent and counteract future miſchiefs. All theſe points of doctrine have been diſcuſſed by the moſt able practitioners; and I cannot ſuppoſe it to be the wiſh of the Academy that we ſhould take a review of all kinds of luxations, becauſe they are effects of counter-ſtrokes, if even we had any intereſting obſervations to offer upon ſome of theſe injuries. What is here ſaid of diſlocations, I alſo ſay of a wrench, and of a diaſtaſis, which are likewiſe the effect of counter-ſtrokes, ſince the miſchief is not done to the part that receives the ſtroke. With reſpect to the treatment of theſe complaints, we have nothing to propoſe which is not already known. Repeated bleedings, reſolutive, emollient, and ſometimes ſpirituous applications, retentive bandages, and above all things, abſolute reſt, are the means to be preferred in all ſuch caſes; and I only mention them here, that I may not be ſuppoſed to have overlooked this part of the effects of counter-ſtrokes.

PART

PART II.

TO EXPLAIN THE EFFECTS OF COUNTER STROKES UPON THE SEVERAL VISCERA CONTAINED IN THE CAVITIES OF THE HUMAN BODY, EXCLUSIVE OF THE CRANIUM; AND TO POINT OUT THE TREATMENT THAT MIGHT BE EMPLOYED MOST SUCCESSFULLY AGAINST THE MISCHIEFS THAT ARE PRODUCED BY THEM.

DAILY experience too evidently proves, that very ſerious accidents are often the effect of a commotion, or violent concuſſion, which the principal viſcera of the human body experience, after a ſhock given to a part which is often at a great diſtance from the cavity containing theſe viſcera. This kind of injury is not confined to that viſcus only which is placed within the cranium. The viſcera that are incloſed within the thorax and the abdomen, are alſo expoſed to it, although moſt of the precautions taken by nature to avoid the too great commotion which the brain might experience in caſes of leaps, or falls, are common to the other viſcera. We ſhall, however, obſerve, and indeed it cannot be

otherwiſe, that in the moſt ordinary counter-ſtrokes, than thoſe which are contained in the pelvis. This is the conſequence, both of the multiplicity of parts, calculated to abſorb motion, which are found between the feet and the cheſt, and of the power which the cheſt has of being extended ſtill farther downwards, when the motion of the pelvis is already ſtopped. In this, as in the firſt part, we find the diviſion ready marked out, and we adopt it the more willingly, as it is very natural, and well calculated completely to illuſtrate the laſt part of the queſtion we have to treat of. We ſhall therefore begin by explaining the effects of counter-ſtrokes upon the viſcera contained in the abdomen, and ſhall conclude this eſſay by examining theſe effects upon the organs incloſed in the cavity of the cheſt.

SECTION

SECTION I.

TO EXPLAIN THE EFFECTS OF COUNTER-STROKES UPON THE SEVERAL VISCERA CONTAINED IN THE CAVITY OF THE ABDOMEN, AND TO POINT OUT THE MODES OF CURE BEST ADAPTED TO RESIST THEIR CONSEQUENCES.

IT is ſufficiently evident, that the ſudden ſtoppage of motion of the pelvis, in inſtances of falls or leaps, muſt give riſe to a ſhock, or commotion in the viſcera of the abdomen, ſo much the more violent, as the ſhock ſhall have been greater, and as the ſeveral bony pieces, by means of which the ſhock is tranſmitted, ſhall have eſcaped being fractured; it is the ſame as in a concuſſion of the brain, which is never more conſiderable after a violent ſhock, than where there is no fracture in the bones of the cranium.

It muſt, however, be acknowledged, that the ſhocks which the viſcera of the abdomen may experience, in caſe of leaps, falls &c. ſcarcely produce any miſchief in them, except when theſe viſcera are in an un-

natural, or at leaſt, not an ordinary ſtate. At any rate, the injuries they may be expoſed to in theſe inſtances themſelves, are always the effect of counter-ſtrokes, taken in the moſt extenſive ſenſe. Thus it is, that abortion and its conſequences may be conſidered as the effect of ſuch a cauſe. The moſt trifling fall, or a falſe ſtep, are ſometimes ſufficient to produce it, becauſe, in theſe circumſtances, the motion of the pelvis being already ſtopped, while the placenta, fixed to the uterus, ſtill tends to move downwards with the velocity acquired by the fall, an effort is made upon that part of the womb to which it is fixed, which would ſeparate it much more frequently than we obſerve this to happen, if it experienced any reſiſtance from the womb, or if the uterus had not nearly the ſame tendency downwards as that ſpongy body has. But this circumſtance, ſo favourable in preventing its ſeparation in ordinary and habitual motions, becomes inſufficient when the pelvis ſuffers ſhocks of any violence: the divulſion of the placenta becomes then almoſt a neceſſary conſequence, notwithſtanding the power which the fundus of the uterus has to follow its motion downwards, and notwithſtanding the preſence of the waters, which take off ſo conſiderably from the weight of the placenta itſelf. We know in what manner the ſeparation of this organ, when begun in one ſpot, extends itſelf by means of the fluid, which iſſuing from the ſmall ruptured fibres, is extravaſated between the placenta and the ſides of the uterus; we know how the flux of the blood is brought on, and laſtly, how the pains which come on, give riſe to premature labour. With reſpect to the proper means of preventing this alarming accident, every ſurgeon is acquainted with them. Bleeding, reſt, and diet, are the remedies beſt adapted to the complaint, and they ſometimes ſucceed; the moſt complete reſt eſpecially, is abſolutely neceſſary. This is at leaſt all that can be done by art, under ſuch circumſtances. It is by the ſame mechaniſm, that a fall, upon the feet, or upon the knees, a leap, &c. may produce a recent hernia, or force down an old one, and thus become the diſtant cauſe of all the miſchiefs that may enſue. It is by the ſame mechaniſm that a ſchirrous teſticle, which is not ſupported by a ſuſpenſory, in the ſhocks which are the conſequence of the fall, may occaſion a dragging down of the cord, and excite a pain in it which may be communicated to the teſ-

ticle itſelf, and occaſion the ſchirrus to degenerate into a cancer. Thus it is too, that a counter-ſtroke, taken in the moſt extenſive ſenſe, may occaſion pain in a womb that is ſwelled and inclined to become ſcirrhous, which may change the nature of this termination into a worſe. Even in inſtances where this viſcus is not in a diſeaſed ſtate, it may give riſe to hæmorrhages very difficult of cure. Are we not alſo to conſider as the reſult of the kind of cauſe, the effects of which we are inveſtigating, to thoſe pains, which, after a fall, were felt in the abdomen of a woman, who, for ſome years paſt, had had a ſchirrhus of one of the ovaries; and muſt we not attribute to the ſame cauſe, the fatal alteration which happened, after a ſimilar event, in a tumour of the ſame ſort in the liver? I have ſeen all theſe fatal accidents be the reſult of imprudent leaps, or of falls upon the lower extremities, or the bones of the pelvis.

It is not, however, always neceſſary, that the effects of counter-ſtrokes ſhould fall on diſeaſed viſcera, in order to give riſe to diſorders which were not previouſly exiſting there. I have ſeen a man who before enjoyed a good ſtate of health, void almoſt pure blood through the urethra for ſeveral days together, and this on account of having fallen aſtride, from almoſt the height of two feet, upon a bar of iron. From that time he has always been ſubject to nephritic colics, and to a frequency of voiding his urine, attended with an habitual diſcharge of ſmall gravel; diſorders to which he was entire ſtranger before his fall. From whence did this blood proceed; from the bladder, or from the kidneys? In what manner has this counter-ſtroke been able to produce a hæmorrhage in the urinary channels, and give riſe to thoſe habitual nephritic colics which torment the patient? Theſe are queſtions, the ſolution of which would be as uſeful as ſatisfactory; but I am far from pretending to ſolve them. It appears to me, however, from the pain which the patient told me he plainly felt at the inſtant of his fall, about the region of the loins, and from the dull pain which he complains of ever ſince in that part, that the kidneys may be conſidered as thoſe of the urinary organs which ſuffered moſt by the commotion. The branches of the renal plexus of nerves being violently

lently affected at the inſtant of the ſhock, may have injured the vaſcular ſyſtem ſo much, as to occaſion a hæmorrhage in the internal ſtructure of the organ; or elſe theſe nerves might, perhaps, leave the ſecretory canals in ſuch a ſtate of atony, that in the firſt inſtant of the accident the blood might paſs into them indiſcriminately with the aqueous fluid that was to be ſecreted in the kidney; and indeed, ſuch a diſturbance in the internal organization of this viſcus was very likely to encourage the formation of thoſe gravelly concretions which the patient voids with his urine ever ſince that period. This is now eight months ago, during which time the patient hath been in the habit of taking a quantity of the decoction of marſh-mallows and linſeed; a drink which may poſſibly have contributed to keep up his tendency to a nephritic colic. The good effects he finds from ſaponaceous and balſamic aſtringent remedies, the uſe of which he has continued for ſome days paſt, would ſeem to confirm my conjectures.

The following caſe affords alſo a very ſtriking inſtance of the effect of counter-ſtrokes, which, though trifling, yet from being often repeated, have given riſe to fatal diſorders. A tradeſman, little accuſtomed to go on horſe-back, having rid ſix and thirty miles at full trot, upon a bad hackney horſe, found himſelf overcome with fatigue. On his return, he vomited, and was ſeized with a pain in the epigaſtric region, which he thought reſt would remove. It continued, however, with a degree of violence for ſome days, during which time, he would not ſubmit to loſe blood, although he had ſome fever, and vomited whenever he took any ſolid food; nor did he even obſerve the abſolute reſt that had been enjoined to him. The pain being ſomewhat abated, and the vomitings returning at intervals only, he took little notice of his complaint for ſome time; but the pain ſtill ſubſiſting, and the vomitings having never left him entirely, he began to grow uneaſy, and had recourſe to remedies which were not well adapted to his caſe; an emetic was adminiſtered to him twice; and he was ordered to take wormwood wine. The complaint, far from diminiſhing, increaſed; the vomitings became more frequent; and after having lived two years, trying a variety of medicines, the patient

was

was reduced to ſuch a ſtate, that his ſtomach would retain nothing but liquids; and theſe he at length became unable to paſs, for they were thrown up again in large quantities, after having remained ſometimes two or three days in the ſtomach. The patient fell at length into a maraſmus, and died in an aſtoniſhing ſtate of emaciation. Upon opening the body, I found the liver very hard, without being much increaſed in ſize; the pancreas was ſchirrhous at that part of it which is next to the duodenum; and this inteſtine, partaking of the diſeaſe of the pancreas, was almoſt entirely obliterated; the ſtomach was exceedingly large, and the inteſtines were ſcarce bigger than thoſe of a chicken.

Beſides all the pernicious effects of counter-ſtrokes upon the principal viſcera of the abdomen, how frequently has not this kind of cauſe given riſe to a mortal commotion in the ſpinal marrow? There are few practitioners who cannot produce ſome inſtance of a palſy in the lower extremities, coming on in conſequence of a fall, without either diſlocation or fracture of the lumbar vertebræ. A girl of ſeven years of age, walking in a waxed room, having fallen backwards, was unable to riſe again. Being lifted up and put to bed, ſhe was examined; and although none of the bones that compoſe the ſpine were found injured or diſplaced, yet the lower extremities had loſt all power of motion. The father having refuſed to ſuffer his child to be blooded in the firſt inſtance, the parts were only rubbed with warm cloths, and fumigated with various aromatics, while vulnerary remedies were internally adminiſtered. Notwithſtanding theſe aſſiſtances, and bleeding, which was afterwards performed, the parts never recovered their power of motion; and the girl lived only between two and three months after the fall. We could not obtain leave to open the body; but it is very certain, that there was no appearance externally, which indicated any kind of injury done to the bones.

With reſpect to the proper mode of treatment in the ſeveral caſes which we have been ſpeaking of, it may be obſerved, that the ſymptoms which are or may be the reſult of counter-ſtrokes, the effects of which

are

are felt either in the principal viſcera of the abdomen, or in the lower part of the ſpinal marrow, ſeem to indicate, that the curative intentions to be purſued, muſt be nearly the ſame, whatever may be the nature of the parts ſuffering the miſchief. Accordingly, in the ſeveral inſtances we have been mentioning, bleeding, reſt, and ſtrict diet, are the chief remedies to be employed.

SECTION

SECTION II.

TO EXPLAIN THE EFFECTS OF COUNTER-STROKES ON THE VISCERA CONTAINED IN THE CAVITY OF THE CHEST, AND THE MODE OF TREATING THEM.

ALTHOUGH, in caſes of leaps, and falls upon the feet, or on the nates, the effects of counter-ſtrokes, for the reaſons before mentioned, can ſeldom be conveyed to the viſcera contained in the cavity of the thorax, ſo as to diſturb the functions of theſe viſcera; it is not however an uncommon thing to find, that the kind of motion communicated to the cheſt in this way, produces evident miſchief in the lungs; but it muſt be acknowledged, that this happens more particularly, when there is ſome diſeaſe in this organ. Accordingly, it may readily be conceived, that if the lungs be affected with tubercles, if they be partly ſchirrous, or have recently contracted adheſions in conſequence of inflammation, the commotion they would experience, in caſe of any fall, might give occaſion to dangerous divulſions, to rupture of veſſels, and to an hœmoptoe. Thus it is that I have ſeen the mere ſhaking of a horſe, haſten the death of per-

ſons whoſe lungs were much affected with tubercles. It muſt not, however, be imagined, that the lungs, though free from the diſeaſed ſtate above-mentioned, ſhould ſtill be entirely ſheltered from the effects of counter-ſtrokes in caſes of leaps or falls upon the lower extremities. I have ſeen perſons, without any tendency to diſorder in the lungs, ſeized with a ſpitting of blood, after ſuch falls, and incur all the dangers of an hœmoptoe. I have known others complain of a painful dragging ſenſation between the two ſhoulders, at the place where the lungs are more particularly attached to the ſpinal column; which was certainly owing to a diviſion of the connections that fix this rather weighty viſcus to that part. I have alſo ſeen inſtances of perſons, who having fallen upon their heels, from the height of about two or three feet only, have been ſeized with fainting fits to an extreme degree. This ſymptom may poſſibly be conſidered as the effect of a violent commotion, which the heart may have experienced at the time of the ſhock. I am, however, more inclined to think, that theſe faintings, among which I have ſeen an inſtance of their returning for three weeks together, every time that the trunk was thrown into a vertical poſition, are the effect of a concuſſion of the brain, a diſeaſe which is not the object of our preſent enquiry; but the viſcera of the thorax may experience injurious concuſſions, by other means beſide that of a fall on the feet, or a leap from a certain height. Every blow received externally upon the parts which form the cavity, may occaſion conſiderable injuries in theſe viſcera, even when the bony compages that ſurrounds them, ſhall remain unhurt. In this caſe, the heart cannot always avoid the effects of ſuch counter-ſtrokes. We know the kinds of miſchief which may happen, by this way, to theſe important viſcera, and the curative means to be employed againſt them; the ſame may be ſaid of the contuſion which the liver may receive from a violent blow on the falſe ribs. Repeated bleedings, a ſtrict diet, diluting liquors, and reſolutive ſpirituous applications, are almoſt the only remedies to be uſed in theſe caſes. I have undoubtedly ſaid enough to prove the danger of very violent ſhocks, even when they fall upon parts of a more compact texture than the brain, and to explain the wiſdom and foreſight which nature has diſplayed, in arranging the contri-

vances

vances deſtined to avoid or to diminiſh the effects of theſe concuſſions. It remains only, to finiſh this eſſay, that I ſhould give a ſummary recapitulation of the effects of counter-ſtrokes, conſidered either in their limited, or their moſt extenſive ſenſe; and to explain the principal curative intentions beſt adapted to the ſeveral kinds of miſchiefs that may reſult from them.

From what has been hitherto ſaid, we ſee how many different diſeaſes may be referred to one ſingle cauſe; and how various and numerous are the effects of counter-ſtrokes. It is not therefore, without foundation, that, at the beginning of this eſſay, I declared, that the moſt ſerious diſorders of ſurgery, and I might have added, of medicine, aroſe from a ſimilar cauſe. All diſlocations, wrenches, every diaſtaſis, all contuſions in the joints of the extremities, disjunctions of the ſacrum, divulſion of the ligaments that connect it, and ſeveral of the injuries that happen to the pieces that conſtitute the ſpine, are they not the effects of counter-ſtrokes? Are not moſt fractures accompliſhed by the ſame mechaniſm, as well as moſt abortions, deſcents of the uterus, and herniæ? Doth not this cauſe frequently make ſchirrous tumours degenerate into cancers, or produce the ſame effect on other ſwellings of a ſimilar tendency? Have not counter-ſtrokes often given riſe to evident miſchiefs in the important organs of the abdomen and thorax, when they were in a diſtempered ſtate, and ſometimes when they were ſound? The moſt ſerious diſorders of the brain, which we have not noticed, on account of the limits preſcribed by the Academy, are they not the reſult of counter-ſtrokes? How many ſubordinate accidents afterwards ſucceed all theſe original diſorders which we have enumerated? From all theſe circumſtances, it cannot be doubted, but that counter-ſtrokes are among the moſt general cauſes of the diſorders to which our frail machine is ſubject.

But notwithſtanding the multiplicity and variety of the original accidents which are derived from this ſingle cauſe, we obſerve, with ſatisfaction, that the intentions of cure to be followed in order to counteract theſe effects, whatever they may be, are always nearly the ſame, when

the injury hath happened in the viſcera contained in the ſeveral cavities, the brain itſelf not excepted. Accordingly, we find, that in all theſe caſes, repeated bleedings, perfect reſt, and ſtrict diet, are the remedies to be preferred (z). External applications in caſes where they can be employed, are only acceſſory remedies, which however are not to be neglected; they muſt only be varied according to circumſtances. Sometimes they are only to be ſuch as to defend the parts, at other times, reſolutive ſpirituous topics are to be applied; ſometimes emollient, relaxing and anodine remedies; ſometimes ſaponaceous, balſamic, aſtringent aromatics, tonics, and artificial pumping upon the part, with natural or artificial medicinal waters, &c. Theſe are all ſubordinate methods, to which we are ſometimes the more obliged to have recourſe, the more we have neglected, in the firſt inſtance, the principal modes of cure which we have treated of.

A ſubject ſo difficult, and ſo extenſive, required more genius to be well underſtood, more talents and knowledge to be treated to the ſatisfaction of the Academy. I have at leaſt exerted my beſt endeavours to fulfill the conditions of the theſis; and can only judge of my efforts, without being anſwerable for the ſucceſs of them; nor ſhall I think my labours uſeleſs, if they can only intitle me to ſome attention from thoſe who are to decide upon them.

NOTES

AUTHOR's NOTES

ON

COUNTER-STROKES.

(a) I DO not mean to ſay, that writers have been entirely ignorant of this kind of cauſe, although they have not mentioned it under the ſpecific term of counter-ſtroke; much leſs do I aſſert, that their practice has never been directed according to the mechaniſm, by which the complaints they obſerved, had been produced. This would be to allow neither reflection nor genius to our predeceſſors. I imagine only, that in many caſes, their attention has been rather engaged in diſcovering the nature of the accident, than in reflecting upon the ſeveral ways in which it might have been produced.

(b) We muſt here make an allowance, for the loſs of the power of motion, by communication.

(c) This is the caſe of the cable that is veered away, for a certain time, in order to ſtop the boat gradually. If the head bore upon an inflexible column, its motion, in falling upon the feet, would be ſtopped, at the very inſtant that the feet came to the ground; while the ſoft viſcus

contained in the cavity of the cranium, would continue to ſtrike againſt the baſis of this cavity, with all the force that would have been imparted to it, by the velocity it would have acquired in the fall. This would produce, in the organization of this important viſcus, a diſturbance of the ſame kind as that which was obſerved in the brain of a criminal, who, running from a few paces back, daſhed his head againſt the wall of his priſon. But the cartilages which line all the joints, thoſe which unite the vertebræ with each other, and eſpecially the various inflexions of the body in falls upon the feet, are the cauſe that the head, coming near the ground when theſe parts are already at reſt, can only loſe its motion in a gradual and imperceptible manner.

(d) I have ſeen patients, cured of a fracture of the fibula, remaining a long time unable to walk without crutches.

(e) This was the third death I had ſeen happen at the ſame period, and with the ſame ſymptoms, after compound fractures of the legs which had been well reduced; this circumſtance led me to reflect. I inquired for the limb, and examined the ſtate of the tibia; the marrow contained in the cylinder of this bone, was ſomewhat in a ſtate of diſſolution towards the fractured extremities, and the ſmell of it was putrid in the higheſt degree. This circumſtance made me imagine, that a portion of the putrid miaſmata produced by the diſſolution of the marrow, having been abſorbed, had occaſioned a true nervous diſeaſe; and in conſequence of this idea, I determined to adopt ſome other mode of proceeding in the firſt caſe of the kind which my practice might furniſh me with. The opportunity ſoon preſented itſelf; when, inſtead of putting the two ends of the tibia in exact appoſition, I placed them in ſuch a manner, that by means of their ſituation, and of a detached piece of bone which I took away, I could conveniently throw into the cavity of the bone any injection I might think proper; ſo that I treated this caſe as every compound fracture is treated, with the additional precaution only, of injecting upwards and downwards into the cavity of the bone, at every dreſſing. By this contrivance, my patient was exempt from any of thoſe ſymptoms which had

ſucceſſively

ſucceſſively deſtroyed three others whom I had attended; and recovered with only a very trifling deformity of the leg. I wait for other opportunities of verifying theſe conjectures, in order to ſend to the Academy an eſſay upon a point of doctrine which ſeems to be new.

(f) Miſchiefs nearly of the kind, may very poſſibly be the reſult of a violent commotion which the marrow of the bone may have ſuffered in a fall, or a ſtroke upon the part; and in that caſe, they would ſtill be the effects of a counter-ſtroke upon a ſoft part.

(g) I have had ſeveral inſtances of ſimilar internal exfoliations; and not long ago, I extracted one of three inches from the inſide of the tibia, but the diſeaſe had not been the reſult of any violence.

(h) Probably the fall on the knees, in this inſtance, had cauſed a fracture of the thigh ſo near the joint, only on account of the woman having an old ſub-luxation of the leg, ſo that there was a deformity in the part, which gave an oblique direction to the ſhock.

(i) The cotyloide cavity preſenting an oval cup, the great diameter of which, is from above downwards, admits, by this contrivance, of this gliding, which contributes to deſtroy the motion by degrees.

(k) See Mr. PETIT's treatiſe on the diſeaſes of the bones.

(l) No man can have a greater veneration for the memory of the celebrated Mr. PETIT than I have; nor can entertain a more profound reſpect for the opinions of this great man: but I have never had reaſon to be ſatisfied with the large inciſions recommended by him, in certain caſes, to empty collections of matter in the joints; perhaps my practice may not yet have been ſufficiently extenſive, or perhaps I may not have employed theſe inciſions in the proper caſes.

(m) If

(m) If we recollect the manner in which the ſpine bears upon the ſacrum, and that this bone is inclined backwards, we ſhall ſee, that as the center of gravity of the upper parts, paſſes only through the baſis of the os ſacrum, the weight of theſe parts muſt neceſſarily tend to puſh this baſis downwards and forwards, and conſequently to raiſe the point of the os coccygis backwards.

(n) Perhaps too theſe accidents were only the conſequence of the contuſion of the cartilages.

(o) It muſt be acknowledged, however, that the unfavourable ſtate of the woman, and the diffuſion of the milky ſecretion were auxiliary cauſes, without which, the external cauſe might poſſibly have produced no miſchief.

(p) Hiſtoire de l' Académie, tom. iv. page 19.

(q) The divulſion and extenſion of the ligaments connecting theſe bones, ſometimes concurs powerfully in producing theſe miſchiefs; but it muſt be acknowledged, that they may be the reſult, of the mere contuſion or ſinking in of the bony ſubſtance of the laſt vertebræ of the loins, or of the os ſacrum, without extenſion or divulſion of the ligaments which ſtrengthen their connection with each other.

(r) It is taken for granted, that in caſes of apparent diſplacing of the bones, all the means, proper to bring about the reduction or natural conformation of the parts, have been tried.

(ſ) A fracture is often the only effectual mode of preſervation, that nature could have adopted under certain circumſtances.

(t) Nothing can be added to what the celebrated Mr. Petit ſays, in his work upon the diſeaſes of the bones, concerning the treatment proper for theſe complaints.

(u) I never

(u) I never ſaw any eryſipelas after the application of this mixture.

(w) See his eſſay upon this ſubject, in the fourth volume, 4to, of the Memoirs of the Royal Academy of Surgery at Paris, page 614.

(x) It might, however, be poſſible, that a carious ſpot in the bone, aſſiſted with a depravation of the fluids, might have given riſe to the fever and other ſymptoms, which appeared to be the conſequence of it.

(y) I deſire it may be remembered, that in the firſt inſtance, I have claſſed among the effects of counter-ſtrokes taken in the moſt confined ſenſe, ſuch injuries only as might be produced by the immediate application of a ſhock upon the part, where the diſorder is ſeated; from whence it follows, that diſlocations not being included in this claſs, it appears to me, that they ſhould only be conſidered as the effects of counter-ſtrokes, taken in the moſt extenſive ſenſe.

(z) It is taken for granted, that in caſes of diſlocation or fracture, the parts have been previouſly reduced.

THE END.

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