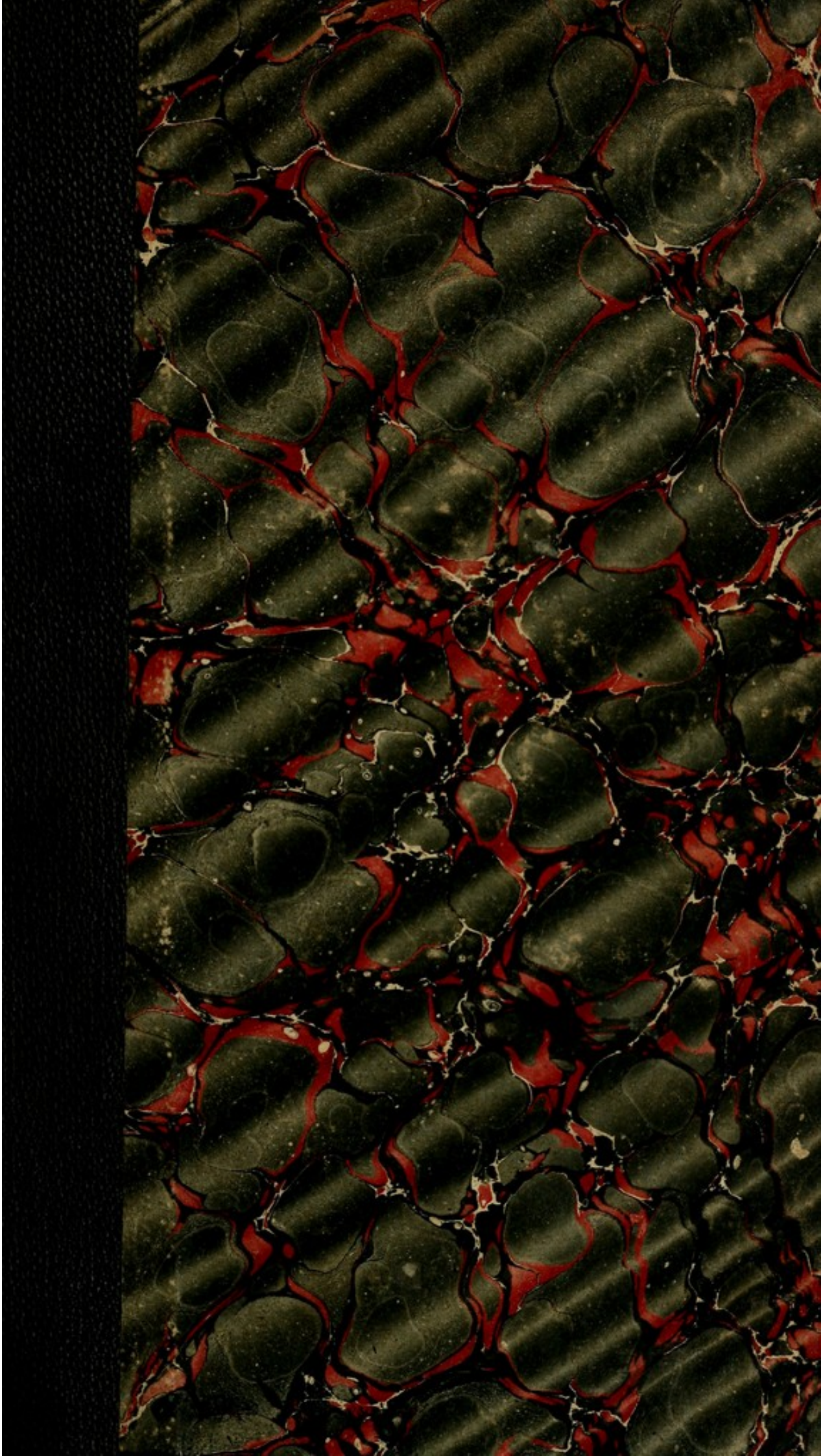

# AN ACCOUNT

OF

# SPINA BIFIDA,

WITH

*REMARKS*

ON A

METHOD OF TREATMENT

*Proposed by Mr. ABERNETHY.*



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## INTRODUCTION.

THE author, not knowing of any book which has professedly treated on Spina bifida, thinks that it might not be altogether an useless employment, to collect the opinions of such authors of character as have written on a disease which has hitherto baffled all the efforts of the chirurgical art. He has been led to consider the nature of this disease more attentively, from having at present under his care a child afflicted with it, and from having perused a case lately published by Mr. Abernethy, in his treatise on lumbar abscess. But lest any one should take the trouble of reading the following pages with the expectation of meeting with some new and successful mode of treating the disease, he begs leave to apprize him beforehand that he will be disappointed, as he has made no such discovery. Still he apprehends that he shall have done a service to the public, (though certainly a less valuable one,)

if he shall succeed in putting his brethren on their guard against any mode of treatment, (however high the authority that recommends it,) the consequences of which must, in his humble opinion, be immediately fatal.

It would no doubt be more agreeable to a medical man to have it in his power to lay before the public some improvement which he may have made in the healing art, but it is also equally his duty to point out the mischiefs of erroneous practice.

The plan which the author proposes to himself in the following short treatise, is—

1st. To give a description of the disease;

2dly. To select a few cases from some of the most eminent writers; and

3dly. To offer some observations on the treatment of the disease, deduced from these cases, and from the analogy which it bears to diseases intimately connected with the coverings of the brain.

## *Description of Spina bifida.*

THE disease which is usually called *Spina bifida*, sometimes *divided spine*, *spinola*, and more properly *Hydrorachitis*, proceeds from a mal-conformation of the spine, and originates with the fœtus in utero. The spinal processes and sometimes the lateral processes of some of the vertebræ are wanting, by which means there is a longitudinal opening of the bony cylindrical channel which contains the medulla spinalis. This deficiency takes place, sometimes in one part of the spine, and sometimes in another; but I believe more commonly in the vertebræ of the loins, or in the os sacrum, than in any other part. It is remarkable that when there is this defect in the formation of the bones, there is generally (though not always) a corresponding defect of the integuments over that part of the vertebræ, for the cutis and membrana adiposa are wanting

for a considerable space, and the opening will be found covered only by a very thin, tender skin, and so transparent, that the contents may be seen through it; and this covering is doubtless a production of the duramatral coat of the medulla spinalis; but this will be noticed when the treatment of the disease comes under consideration. Sometimes, however, the common integuments are perfect, and of their natural thickness and opacity. From the difference in the coverings of the tumour it may be distinguished into two sorts, the *transparent* and *opaque*. The tumour which is formed contains a clear fluid, like the lymph found in the lateral ventricles of the brain, and hence the disease has acquired the name of Hydrorachitis, a name which I am inclined to adopt in preference to Spina bifida, which expresses no more than that mal-conformation of the spine which gives rise to the disease. There is another shape under which this disease appears, and that is when there is no deficiency in the formation of the vertebræ themselves, but where the fluid and the duramatral coat is forced through a small separation of the spinous processes, and produces a tumour of the back with a small base. This has given rise to a proposal for what I consider a dangerous mode of practice; for, from the smallness of the

base of the tumour, practitioners have been induced to suppose that it is easily removeable; experience, however, has proved that this cannot be safely attempted.

The figures from Tulpius and Ruysch, which I have copied, and annexed to this work, with others from my own preparations, may help to illustrate and confirm what I have said above concerning the situation, origin, and nature of this disease.

I shall now proceed to cite some cases from Tulpius, Ruysch, Morgagni, and Abernethy; first from Tulpius, with which will be found a reference to one of the plates.

CASE 1.

Infans in lucem editus, habuit insignem tumorem in lumbis, quo adaperto effluxit ipsi frequens aqua, *sed non minus ipsa vita;* Quâ sublatâ vidimus spinæ vertebras ut laceras, sic laté a se invicem disparatas, et nervos medullæ spinalis tam perplexo errore per tumorem dispersos, ut vix ullibi posuisses scalpellum sine manifesto vitæ periculo. Quam calamitatem reformides Chirurge, *cavesis improvide unquam aperias quam tam facile occidit hominem.*

## CASE 2.

Simillimus tumor sed dissolutus in ipso partu, eventu tamen æque infelici. Cum ob gangrænam consumentem ilico effractas laceri tumoris oras, tum ob denudatos nervos per tumorem passim dispersos, quos circumfluus aër adeo immutaverat, ut non licuerit infanti vitam prorogare ultra diem tertium. Sed notent Chirurgi periculum quod hic animadversum in lumbis; utique evitandum in molli illo tumore, qui insidet nonnunquam dilatatis calvariæ suturis. In quem novacula directa lædit facillime cerebrum illic effusum, et nihil sequius cogitans noces illi, cui veneras auxilio. Quoad ejus itaque, in tantis tenebris fieri poterit, utere acri circumspectione, et confuge potius in tumore tam ancipiti ad emplastra ac fomenta discutientia, quam ad sectionem vitæ humanæ adeo perniciosam.

## CASE 3.

Addam duobus hisce exemplis et tertium sed accurationi bilance ab anatome pensiculatum tumorem videlicet rapiformem ibidem loci, fœtui in vulvâ enatum ob rapam prægnanti matri improvide denegatam. In lumbis enatus sit ipsi insignis tumor quem angustiori pediculo innixum, quo auferret Chirurgus, constrinxit

cum arctissimo filo, deinde satagens emortuum scalpello excidere. Verum antequam res eo devenit jam emoriebatur infans. Cujus defuncti cadaver ubi perscrutata fuit anatome vidimus spinæ medullam plane laceram & nervorum propagines tam varie per tumorem dispersas ut non fuerit in manu medicâ excrescentiam hanc quocunque modo demere, quin demeretur et ægri vita, a quâ sævitiâ propterea *sedulo absterrendi erunt Chirurgi* quoties se offeret simillimus tumor jam sexies nobis visus. Dispescebatur autem vitiosa hæc spina in duas æquales partes ab ultimâ thoracis vertebrâ usque in latera ossis innominati, tegente hiulcum hunc hiatum peritonæo, per cujus membranas dispergebantur copiosissimi nervi extra orbitam delati; quam divisæ spinæ figuram, ut summe deformem curavi tamen exacte æri incidi, *ne tumorem hunc improvide aperiant Chirurgi* sed vitent obnixe ignominiam, infallibiliter inde ipsis eventuare."—*Tulpius.*

The following is a most impressive description of Spina bifida by the accurate Ruysch:—

In lumbis fœtûs dum in utero hospitatur non raro oritur tumor partim mollis præsertim in sui medio et sæpius limpidus quasi *Hydatis* esset; aliquando opacus reperitur. Si rite hunc examinaverimus luce clarius constabit *Hydropem*

esse particulæ medullæ spinalis, eundemque fere esse affectum qui in capite *Hydrocephalus* audit. Nunquam in hoc affectu vertebras ita esse bifurcatas notavi (ut nonnulli voluere) quasi totaliter in duas partes essent divisæ, ut laniones facere assolent, quum animalia in duas partes securi findunt. Dehiscunt tantum vertebræ a parte posteriore circa processus spinosos, potiori parte, puta corpore vertebræ manente. Quod ad curationem hujus affectus; quantumvis vix ac ne vix quidem profligari possit, nemo inter eos quos tractavi hactenus infantes evasit, nec unquam ab aliis curatum percepi, tamen curatio palliativa instituenda adstringentibus & comfortandis remediis in formâ fomenti quo bis singulis diebus adhibito, emplastrum applicandum, quod tumori tenero haud nimis adhæreat, ne aperiatur ejusdem tenacitate. Observavimus enim, *tumore aperto vel rupto mortem accelerari* nullus enim eorum quibus adfui et *suâ sponte aut solâ acu erupit aqua in hoc tumore contenta evasit, sed omnes fere paucis post diebus exspirârunt.*

## *In his next Case,* 35.

Huic affectui valde similem nuper observavi casum—non in lumbis ubi ut plurimum sese offert, ast vero in infimâ ossis sacri parte infantis, ubi partim pellucidus, partim opacus

et admodum mollis (propter ichorosam materiam quâ erat refertus) existebat. Hic præter emplastrum, fotum exsiccantem et cingulum nil instituimus, quippe certi, siquidem aperiretur, mortem acceleratum iri; sæpius miratus sum hunc affectum non esse frequentiorem in dictâ parte ossis sacri: a posticâ parte semper in naturali statu hiat et quasi in duas partes est divisa, quæ fissura naturalis pinguedine solummodo est referta, ut infima pars medullæ spinalis esset tecta. Inter omnes dicto affectu correptos nullum vidi infantem tam diu superstitem quam hunc; vivit enim in hunc usque diem annum jam fere agens—forsan ob affectûs decliviorem situm.

## CASE 36.

Ab affectu in præcedenti observatione memorato, Spinâ nempe bifidâ, non semper multæ vertebræ circa spinosos processus bifurcantur; unam sufficit vertebram esse læsam quemadmodum vidi in filiola cujusdam procuratoris Amstelodamensis in quâ tumor lumbaris pugni magnitudinem æquans, rugisque refertus brevi gangrænam conceperat et quamvis satis leniter tractatus fomentis contra gangrænam, tamen *decimo quinto* post nativitatem mense (raro autem tam diu vivunt) humor contentus erupit et secundo aut tertio die vitam finivit afflicta

puella, unde malum scalpello anatomico perscrutandi nobis nata est occasio. Observavimus autem aperturam in unicâ vertebrâ, eamque tam exiguam, ut vix ciceris granum admitteret. Stilum levi operâ in totam cavitatem spinæ dorsi sursum deorsumque adegi, quo magis certior factus sum, *tumorem nil esse præter expansionem membranarum spinalem medullam investientium, ab humoris replentis copiâ.* In principio nullum percepimus motum in artubus inferioribus, valde macris, tanquam paralysi correptis; postea vero obesiores facti, ad motum redintegrandum vires recepere.

## *Case from Morgagni.*

Epistolam obsignaveram, cum illud non modo speranti sed nec opinanti quidem mirifice accidit quod nunquam antea, ut puer ad me consilii causâ afferretur ob tumorem ad lumbares vertebras extantem. Dum exuunt ut inspiciam; quæro; valeatne artubus inferioribus? et cum id negarent; pellucidusne sit tumor ac si aquam continet? quod continuo affirmant, interrogationes quæ ad rem adeo facerent mirantes. Quod ex responsionibus argueram mox verum esse deprehendi. Tumor erat mollis sic satis, perque ejus parietes, plerisque in locis aqua conclusa manifestissime translucebat. Is ab ortu exiguus, intra decem menses ad magni-

tudinem pugni excreverat; ut eâ non minus quam sede illum omnino referret quem pictum dedit Ruyschius. Erat puer magnus, fortis, egregieque nutritus artubus etiam, quibus duntaxat erat debilis inferioribus; recte etiam conformatus, nisi quod *æquo grandius caput*, cæteroquin sanum, in omnium oculos incurrebat; recte inquam, iis quoque artubus quos modo dicebam, conformatus; ut ex novo hoc exemplo ad plura alia addito, falli intelligerem si qui intortis pedibus nasci omnes qui tumore hujusmodi laborant, propterea existimant quod horum aliquot sic natos esse animadverterunt; quos inter an bene puellam referant a Stalpartio propositam ipse judicabis; ego ut pessime distortis pedibus fuisse præclare video—Sed ad puerum nostrum ut redeam; non ignarus alienæ sæpius nimiæ credulitatis; ex matre tamen quæsivi ætate florente, nec minus sanâ quam maritus, num primogenitum hunc suum in utero gerens in dorsum cecidisset aut percussa esset aut quidquam horruisset, timuissetne aut denique cupidius optâsset; quæ omnia tunc quidem diserte negavit; quamquam postea ut mulierculis solet, in mentem venit ficum concupuisse. Cæterum quod ad consilium attinebat cum præcise negabam eum quidem puerum sanari posse, illud etiam atque etiam inculcavi; *caverent ne quis tumorem incideret, tanto enim citius puerum interiturum;* Hi vero

vix a me digressi, cum in Chirurgum forte incidissent qui se quidem, ut cæteri et Medici et Chirurgi, qui ante me puerum plerique inspexerant, nunquam ejuscemodi tumorem vidisse et qualis esse ignorare, sed tamen quod cæteri ob id ipsum ausi non fuerant, se sanaturum promitteret; in proposito constans suo ferro medio tumore impressit, *exsiliente aquâ pellucidâ* colore nonnihil urinæ simili non paucâ, at prostremo instar ejus quâ caro recens lota est; Aquâ emissâ turundam Chirurgus crassam indidit, quâ eductâ novam quotidie emittebat aquam quoad puer vixit; non vixit autem ad totum tertium ab inciso tumore diem. Ex quo enim hic incisus est nunquam febre et clamore destitit qui antea hilaris esset et ridebundus, et mammam fere aversari cujus semper appetens fuisset. Interea toto corpore sæpius tremere, facies autem prius nitida et bene colorata collabi atque pallescere omnia, ne multis, malum portendere. Unus tamen ille Chirurgus bene sperabat, vel paucis antequam mors ingrueret horulis; quæ cum levi spirandi difficultate sensim advenit.

After the death of the patient he examined the parts, and gives the following very accurate description both of the connection it had with the Medulla Spinalis, and of the imperfect formation of the vertebræ.

Tumoris parietes etsi erant collapsi et rugosi et ob hanc causam crassiores; iis tamen pressis e vulnere exibat aqua non pauca, quæ nonnihil graveolebat urinæ pallidæ similis, quæ similitudo superioribus etiam diebus, ut dixi, animadversa et inter Chirurgos vulgata, quosdam hic quoque permoverat, ut urinariam vesicam cum tumore communicare suspicarentur.

Parietes duabus lineis decussim ductis incisi dum cauti ut indicabam diducerentur, manifesto apparuit spinalis medulla, tenui meninge convestita, per quam distentis vasculis totam rubentem medullæ corpus cum prodeuntibus nervis ad medium ferme illorum parietum secundum longitudinem arctius adhærebat, ut ab his ipse debuerim leviter et suspensâ manu sejungere, evidensque esset cæteras medullæ tunicas in unum cum iisdem parietibus coaluisse. Nec diffluens erat medulla, sed etiam tum satis firma quod ego inter digitos premendo percepi, et mox in transverse incisa substantia circumcirca candida, intima cinerea sic satis solida utraque confirmavit. Amplus autem erat quoquo versus tumoris sinus, osseis lumbarium omnium vertebrarum partibus quæ a tergo esse solent in latera depressis, absumptisque ad earum usque corpora quæ tumoris parietem anteriorem faciebant. Nulla usquam putredo, nigrities nulla. *Morgagni.*

## *Mr. Abernethy.*

Mr. Abernethy, in his treatise on lumbar abscess, has made the following observations:

" I submit it to the reader, whether a mode of treatment similar to that which I have related may not be sometimes adopted in cases of Spina bifida. The reason of the accumulation of fluid in these diseases beneath the Dura mater is not very apparent, nor does the cause producing the secretion appear to be powerful or constant, for the water collects very slowly at first, and in some cases none has ever been effused, and the child has grown up without experiencing any inconvenience. When once the collection has begun, the cause of its continuance and increase is evident; the collected fluid irritates and distends the membrane which secretes it, and thus augments the disease. I do not know that any attempts have been made to remedy these complaints, but I see no reason why we should forego all endeavours. I think it is very probable that a gentle degree of pressure made on the tumour from birth might produce the absorption of any deposited fluid, and thus prevent the distention of the unsupported Dura mater. It has been an opinion too generally adopted and inculcated, that the imperfect formation of a part so essential implies

a deficiency in the constitution. The reasoning appears to me to be fallacious; want of vigour of constitution might cause debility in any part, but could not cause an error of formation. I have seen very healthy infants who have been thus imperfectly formed, and whose health has sustained but little derangement till the tumour has burst, when they have perished from the inflammation which unavoidably ensues.

"Surely some attempt ought to be made to repress this collection of fluid, but even if it should have begun, I would still think it right to endeavour to produce its dispersion by the application of gentle pressure. If this should have no effect, and the accumulation of fluid continue to increase, as the death of the patient would be inevitable, from the spontaneous rupture, I think it would be vindicable to discharge the fluid by a puncture with a finely cutting instrument, and endeavour to heal the wound immediately; and should this be accomplished, to attempt to repress a future collection by bandage, or by those topical applications which appear best adapted to this purpose."

In Mr. Abernethy's second publication on lumbar abscess, is a case where the trocar was made use of, and as every thing from the pen

of so excellent a surgeon must be interesting, I shall take the liberty of quoting the whole of it.

" At the conclusion of my former essay on lumbar abscess, I suggested that this mode of letting out fluids contained in sacs might prove useful in Spina bifida. Only one instance of this disease has occurred to me, and in it the circumstances were such that little could be hoped for by any means.

*CASE.*

" A child about four months old was brought to the hospital for advice. From its screaming violently at times, and being also occasionally afflicted with strabismus, I thought there might be some disease within the head, but yet the child sucked heartily, and its bowels were in a natural state; but the complaint which principally required attention was a Spina bifida; the tumour was as large as an orange, and the dura mater which formed the sac had protruded through a vacancy of the sacrum. The integuments were as thick and inelastic as the upper leather of a shoe, except at the part where the ulceration had lately taken place and formed, through which the fluid contained in the dura mater had just begun to

escape. The thickened state of the integuments arose from a variety of irritating applications being employed to disperse the tumour. As I knew that the child must shortly perish if nothing were done, I punctured the swelling at some distance from the ulcerated part, and let out six ounces of perfectly limpid fluid, I then closed the aperture by means of sticking plaister, dressed the sore with mild salve, and afterwards, laying a compress over the whole, made a slight degree of pressure on the part by applying moderately broad slips of sticking plaister on the compress. Upon removing the dressings the second day after the operation, I found the puncture quite healed, the ulcerated orifice closed, and the sore having a healthy appearance; the sac was now about half filled. In two days the ulcer was much better, and the sac nearly full. I now again discharged, by puncture, about the same quantity of limpid fluid, and afterwards applied the compress in the same manner. The thickened skin fell into wrinkles when the fluid was let out, but shewed no disposition to contract. The puncture was repeated every fourth day for six weeks, during which the child's health continued unaffected, but the great obstacle to recovery still remained, viz. want of contractility in the skin, the dimensions of which did not seem to have varied from what they were at first. The

plaister which covered one of the punctures being now by some accident rubbed off, the fluid continued to ooze out, nor could this orifice afterwards be brought to unite. The discharge gradually changed from a limpid to a puriform appearance, and in a few days the child died, but with much less pain, convulsion, or signs of inflammation, than in any case that I had seen. When the body was examined I discovered more than one error in the formation of the spine and parts connected with it. There was not only a deficiency of bone, which allowed the dura mater to protrude and elevate the integuments in the manner already described, but the medulla spinalis, or a substance of an apparently similar nature, was continued into the sacrum, and then joined to that part of the dura mater which made the front of the bag. The nerves composing the cauda equina went off at their usual place, but there were other nervous filaments which arose from the unnatural prolongation of the medulla spinalis mentioned above, and which, like it, terminated in the dura mater forming the sac.

" In some cases of Spina bifida the skin covering the tumour has not a natural texture, but in this case the diseased state of it was the effect of improper treatment; under such circumstances much benefit cannot be expected

from this mode of treatment, but where the integuments are sound and naturally elastic, and where the mal-conformation consists merely in a defect of a spinous process, I entertain hopes that a gradual contraction may ensue, if it be occasionally emptied and moderately compressed; this unsuccessful case is related, as it shews that when the case is more favourable, the attempt at a cure may at least be made without any hazard." *Abernethy.*

The reader will observe, that in all cases quoted from Tulpius, Ruysch, Morgagni, and Abernethy, the opening of the tumour was very soon succeeded by the death of the patients; and I believe that no instance whatever of recovery from this disease after such an operation can be adduced. The treatment of some of them may be alledged as the cause of fatality, yet still we may be taught by some what treatment is absolutely improper, and from others we may deduce that *no operation* at all ought to be hazarded.

In the case cited from Tulpius, of the tumour which seemed to be attached by a small footstalk, (angustiori pediculo,) the application of a ligature produced death; this would not have happened from *a common cyst;* but the lining of this sac being a production

of the dura mater, an inflammation was communicated along the medulla spinalis to the brain, and this is one of the effects which would most probably take place if violent pressure were made use of.

The fatal effects of the ill-judged insertion of the "Turunda crassa" in Morgagni's case would be reasonably expected by the surgeons of the present day, and though there is no fear of such practice taking place *now*, yet it points out the danger of exciting inflammation in the Hydrorachitic Sac, or of even exposing the medulla spinalis; indeed, they evince very sufficiently the hazard of any operation. "Ne tumorem hunc improvide aperiant chirurgi, sed vitent obnixe ignominiam infallibiliter inde ipsis eventuram" are the words of Tulpius. Morgagni says "illud etiam atque etiam inculcavi, caverent ne quid tumorem incideret, tanto enim citius puerum interiturum;" and Ruysch, who gives the best and most accurate account of this malady, and who says he had seen it ten times, concludes with this remark—"Observavimus enim tumore rupto vel aperto mortem accelerari. Nullus enim eorum, quibus adfui, et suâ sponte aut solâ acu erupit aqua in hoc tumore contenta, evasit, sed omnes fere paucis post diebus expirârunt."

Mr. Abernethy is the only medical author that I know of who has ventured to recommend an opening of the tumour. Such a recommendation, coming from a person standing so high in his profession, is certainly entitled to every respect and attention; but as it is at variance with the opinions of medical men in general, and by no means coincides with my own, I trust I shall be excused offering a few remarks both on the treatment which he recommends, and the case by which he endeavours to illustrate it.

From the success with which the evacuation of the matter in lumbar abscess, by means of the trocar, has been attended, Mr. Abernethy has been induced to recommend a similar process in Hydrorachitis. It is unnecessary, perhaps, to observe, that the principal use of the trocar is to make an opening into the cyst without introducing the external air. This, undoubtedly, is a very material point gained, especially in this disease of the spine, for it may be observed, that the fact is fully established of the certain danger with which any communication of the outward air with the spinal marrow must be attended. But supposing that the practitioner has so far succeeded as to be able to evacuate the fluid with safety, yet no progress whatever is made in removing

the disease, if the membrane, which lines the cavity of the cyst, will not contract; and I submit it to the judgment of medical men, whether the duramatral coat can, under any circumstances, be made to contract. The want of contractility in the duramatral coat is confirmed too, by the case which Mr. Abernethy himself has given us. "Though the puncture was repeated every fourth day for six weeks, during which the child's health continued unaffected, yet the great obstacle to recovery still remained, viz. want of contractility in the skin, the dimensions of which did not seem to have varied from what they were at first." Mr. Abernethy considers the thickened state of the integuments arising from a variety of irritating applications "as an unfavourable circumstance." But such a state of the integuments appears to me more likely to promote contraction than to prevent it. Even if the integuments were in a more favourable state, "*i. e.* sound and naturally elastic," I am still inclined to think that a contraction of the *outward* integuments would not produce any contraction in the duramatral coat which lines the cyst; the latter would, more probably, collapse; and, according as the fluid was re-produced, would be again distended, and, by its constant and increasing pressure, prevent the contraction of the outward

skin. It generally happens, however, that the hydrorachitic tumour has no other covering than the duramatral coat; in one only, out of sixteen cases which have fallen within my practice, has there been any other covering. Now I will venture to say, that if a puncture be made in a tumour covered with *a duramatral coat only*, the opening will never close again.

As to pressure, in order to promote absorption, which Mr. Abernethy recommends, he must be aware that the duramatral coat, (even if he be certain that it is furnished with absorbent vessels,) is so excessively thin and tender, that any pressure which could be made with a chance of being useful, would be attended with great danger of producing inflammation and its consequent ill effects, and in those cases where the hydrorachitic sac had the additional defence of the common integuments, though pressure might not produce inflammation or ulceration, the lower extremities might become paralytic; this paralysis we are led to expect, both by experience and analogy; for Dr. Darwin, in his Zoonomia, says, " a curious circumstance which is affirmed to attend the Spina bifida, is, that in compressing the tumour gently with the hand, the whole brain becomes affected, and the patient falls asleep." This is certainly a curious

circumstance, and if correct, strongly confirms the analogy between Hydrocephalus and Hydrorachitis, and we have reason for supposing, that if coma can be brought on by *gentle* pressure, an inactive state of the nerves of the lower extremities may also be brought on by greater pressure, *i. e.* such a degree of pressure as that mentioned by Mr. Abernethy to promote absorption.

I shall now examine further into the analogy between Hydrocephalus and Hydrorachitis. —Hydrorachitis has generally been considered as a disease analogous to Hydrocephalus; the fluid is precisely the same, and its pellucidness is noticed in all cases of Spina bifida as a characteristic mark, and the dura mater forms the sac both for the one and the other; but whether the fluid be secreted by the duramatral coat which immediately forms the sac, or descends from the head along the spine, or whether both be concerned, has not yet been ascertained. The rapid re-production of the fluid, in the case related by Mr. Abernethy, would lead us to suspect that the secretion took place from a more extended surface than the internal lining of the tumour, and when it is recollected that the dura mater is continued, without interruption, from the inside of the cranium through the foramen

magnum, and down the channel of the vertebræ, serving as a lining for it, and that the whole of it is moistened by lymph, it may very easily be conceived how it happens that this fluid in Hydrorachitis is so quickly re-produced.

That there is a striking analogy between Hydrocephalus and Hydrorachitis must be evident to every one, and the effects of operation in one case will, I doubt not, be equally unsuccessful as in the other; and every author has noticed the analogy, and given cautions on the treatment deduced from that opinion. Tulpius in his case observes, "Sed notent Chirurgi periculum quod hîc animadversum in lumbis, utique evitandum in molli illo tumore qui insidet nonnunquam dilatatis calvariæ suturis, in quem novacula directa lædit facillime cerebrum illic effusum." Ruysch says, "Si rite hunc examinaverimus tumorem luce meridianâ clarius constabit, Hydropem esse particulæ spinalis medullæ, *eundemque fere esse affectum, qui in capite fœtûs Hydrocephalus audit.** Quemadmodum enim in capite fœtûs, imo infantis, (antequam suturarum beneficio capitis ossa

* A daring quack applied a caustic to the unclosed sutures of a child's head, with an intention of curing a very large Hydrocephalus. The lymph was evacuated, and the child died in a few days. This happened at Fenstanton in Huntingdonshire, in 1809.

uniantur) membrana cerebri ut et cutis capitis ob aquæ copiam non raro valde expanduntur, mollemque tumorem excitant; ita etiam in dorso, aut lumbis, rarius in nuchâ (quod semel vidimus, et in musæo nostro adhuc conspicitur) et rarissime in inferiore et exteriore parte ossis sacri, ut referre posthac animus fuit, simile quid occurrit in Hydrocephalis recenter natorum, cerebrum magna ex parte in aquam resolutum esse rarum non est; sic etiam in dicto tumore spinalem medullam deficientem in aquosam substantiam degenerâsse existimo, et quod mirari subit, infra eum tumorem, medullam spinalem sæpe bene constitutam invenio; unde nonnulli aliqualem motum in artubus inferioribus retinent.

Morgagni, lib. 1. epist. 12. art. 9. has noticed the analogy and connexion between the head and the Hydrorachitic tumour. " In hunc autem spinæ tubum congeri aquæ potest, tum quæ a cranii cavo descendat, tum quæ intra illum secernatur, ut modo sit utriusque simul Hydrops, modo alterius, nec secus in fœtibus et pueris, quam in adultis, sed in illis multo magis, ut in quibus haud aliter quam cranii vertebrarum ossa et facile posse et revera cedere compertum est; itaque dehiscentibus alias aliquot, alias omnibus vertebris et aquâ urgenti involucra spinalis medullæ, alias major

in Spinæ posteriore facie tumor existit qui *Hydrocephalo est analogus.** And he constantly speaks of a descent of lymph from the cavity of the cranium, as well as of the secretion of lymph from the involucra of the medulla spinalis, as a method of accounting for the great quantity of lymph in Hydrorachitis. In his first case he notices *the size of the head* of the Hydrorachitic patient, "nisi quod æquo grandius caput."

It may not be improper in this place to notice, that in those cases where the tumour is attached by a small base, some practitioners have been induced to recommend the use of a ligature; but this mode appears to me to be liable to very strong objections; for whoever has examined this disease by dissection will find, that there is great difficulty in determining beforehand the relative state of the tumour and

* Mr. Washbourn, surgeon at Marlborough, has inserted a case in the Medical and Physical Journal for January, 1809, describing Spina bifida as connected with Hydrocephalus; he has favoured me with the additional circumstances, that "when pressure was made on the tumour with the hand, the fontanelle became distended, and when the hand was placed on the anterior fontanelle, there was the same undulation in the tumour on the loins, clearly indicating a free communication between the tumour and the head. The child had a paralysis of the lower limbs. The tumour in this case was similar in shape to that given by Mr. King of Bath, vol. 10. Medical and Physical Journal."

the vertebræ; and if, under this uncertainty, a ligature should be applied when the disease is occasioned by *a deficiency of the Spinous processes*, there can be no chance of the patient's escaping with life. The excessive pain, the long continuance of it, and the great inflammation which must necessarily ensue on tying up such a large portion of integuments, is another objection; and even under the most favourable appearances, *i. e.* when the channel of communication between the tumour and the medulla spinalis is through a separation between the vertebræ, and is a mere tube, there must be great doubt whether it will be closed after the tumour has fallen off. But a still stronger objection I conceive is, that the tying up such a large portion of dura mater is very likely, and almost certain to produce convulsions and death; in support of this opinion, I must refer to the third case of Tulpius, where the tumour is spoken of as being attached "angustiori pediculo," and where a ligature produced death, and in this case, the state of the vertebræ being unfavourable for such an operation was not discovered till after death. My opinion is also fully corroborated by a case in the Medical and Physical Journal for March, 1806, related by Mr. Dunning, of Plymouth; he has there discussed the subject of Spina bifida very

scientifically, and has given a most conclusive case against the application of ligature to hydrorachitic tumours, and a proof of the connexion between them and the brain; in passing the needle through the peduncle, in order to apply the ligature, " I observed, *with much surprise, a single drop of water* to escape. Mr. Little, who was with me, and who perfectly coincided with me in opinion, with respect both to the propriety and mode of removing this præternatural excrescence, remarked it also *with equal surprise.* The day after the application of the ligature, the babe became restless, and a good deal disordered; the tumour readily sphacelated of course; the attending circumstances hourly grew worse, and, having lain a few days under a train of symptoms which usually mark *cerebral affections*, the child died."

It appears clearly from Mr. D.'s statement, that if he or Mr. Little had been aware that the tumour was connected with the medulla spinalis, they would not have thought themselves justified in attempting the cure by ligature; Mr. D. has therefore very candidly given it to the public as a caution to others against operating on *such* tumours. " I did not shrink from applying the ligature because there were no characters either in the appearance

or feel of it that could possibly suggest even the most remote suspicion that it was at all *connected with the vertebræ,* but from the circumstances which arose, *I was afraid then, and am more afraid now, that the peduncle was in a small degree tubular, that it was connected with a small aperture in the cervical vertebræ, that the drop of fluid which escaped was similar to that which was discharged in the preceding* case, and that the fatal event happened in both instances from the same train of causes.*"

From all that has been said, it appears then,

That if an hydrorachitic tumour should ulcerate and slough, so that an opening be made, the patient will inevitably die.

That if the contents be evacuated by a trocar or a lancet, and the opening be left unclosed, the patient will die.

That if a ligature be applied round the base of the tumour, the patient will die.

That if the contents be evacuated by a trocar, and the opening be closed and healed

* An aqueous discharge from an hydrorachitic tumour which had sphacelated.

by the first intention, *the sac will not contract so as to prevent a fresh accumulation of lymph*, but it will be speedily and repeatedly re-produced, and no advantage will be gained by the operation.

To the observations which I have now made, I can only add my concern, that after having, to the best of my abilities, endeavoured to shew what ought *not* to be the practice in the case of this deplorable malady, I have it not in my power to substitute any thing else, or to say what *ought* to be done.

It is but a melancholy comfort merely to *protract* the period of dissolution, without being able at the same time either to check the increase or to alleviate the pangs of disease. But such means, however limited, as may lie within our reach, it is our duty to employ to the best purpose that we can. Upon the present occasion, the name and influence of a very distinguished member of our profession might probably lead to consequences as injurious to society, as distant from his own intention and benevolent disposition. It is upon this ground that that liberal and enlightened gentleman will not, I am well assured, be disposed to attribute to me, as writer of these remarks, any other motives than those which I have now

avowed. His name, were I disposed unbecomingly to assail it, is far beyond the reach of an unpretending pamphlet like mine; his merits are not to be impeached by any accidental view of a subject, to which he may have been directed: but our art, and the sources of information which lead to it, are equally open to us all. It is from the various lights in which experiments are contemplated, and from the conflicting opinions which result therefrom, that truth itself is finally and firmly established; and under this impression, I therefore commit, with some little confidence, these observations to the public. Whatever may be their deficiency in stile or arrangement, the *intention* will, I am convinced, bear me out in the estimation of every good man, to whom even an hour's prolongation of existence of a fellow-creature can never be an object of indifference.

Plate 1.

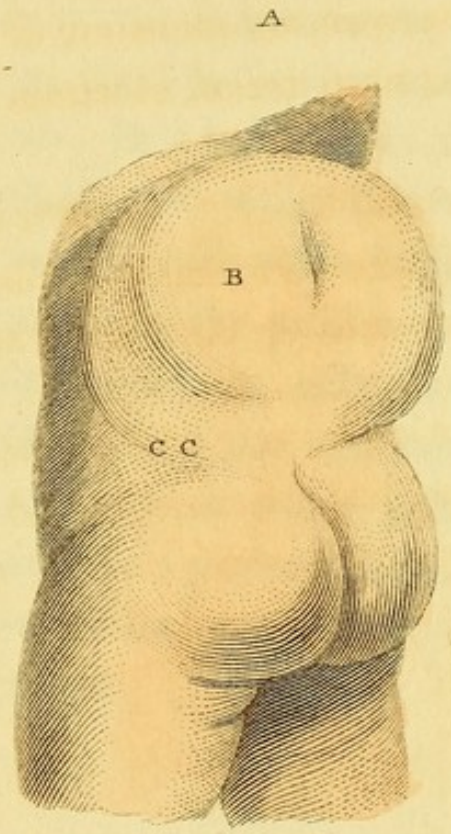



Figura Ruyschiana.

## Explanation of Plate 1.

*Figuræ Ruyschianæ explicatio.*

*A.* Fœtus octo præter propter mensium decimo quarto die post nativitatem mortuus.

*B.* Tumor mollis partim limpidus, propter cutis rarefactionem (quæ membranæ nobis obvenit) partim opacus ob cutis densitatem.

*C. C.* Rugæ cutis cuticulæ ex parte privæ, et quasi gangræna levi obsessæ, quod sæpissime contingere observavi.

## Explanation of Plate 2.

*Figuræ Tulpianæ explicatio.*

*Fig.* 1. *a.* Spina dorsi.
*bbbb.* Spina bifida.
*c.* Cavum tumoris.

*Fig.* 2. *dd.* Spina exempta.
*ee.* Divisio spinæ.
*f.* Cavum tumoris.

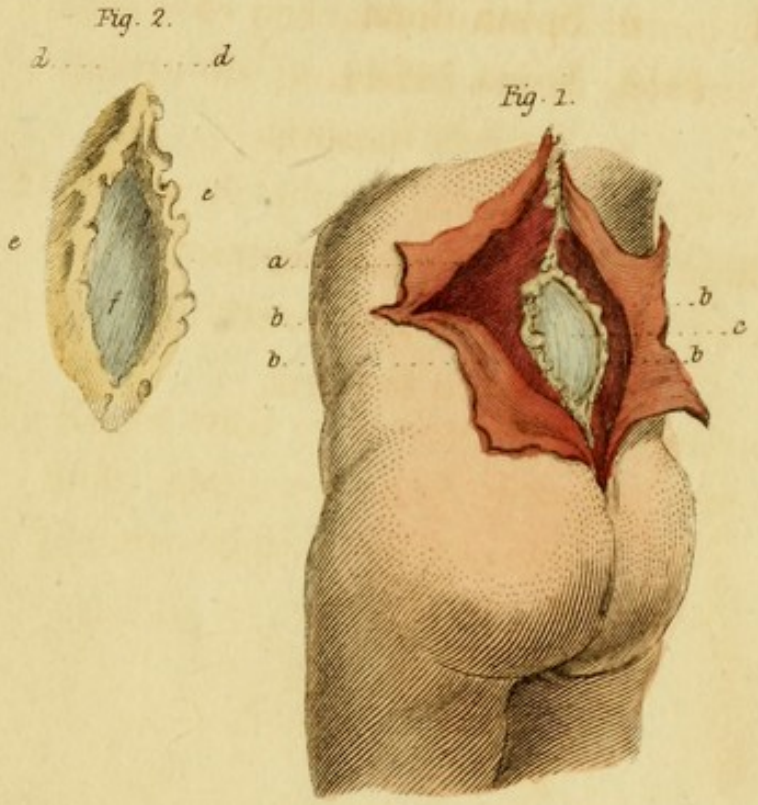
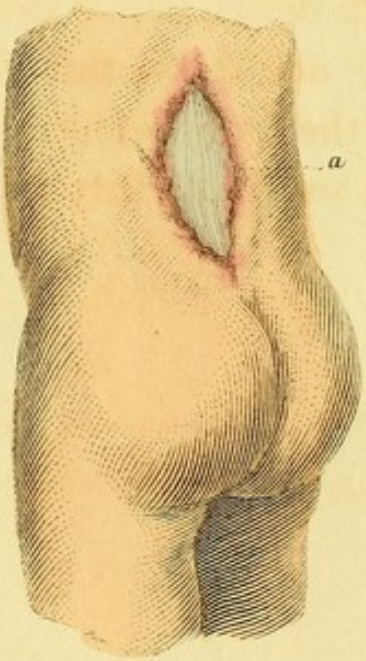



Figura Tulpiana.

Plate 3.

Fig 1.



## Explanation of Plate 3.

*Figure* 1. represents a child born with a Spina bifida, and which died in three hours after its birth; it had an enlargement of the head, and was club-footed.

*a.* points out the deficiency of the *natural* integuments, and shews the duramatral coat covering the hydrorachitic tumour, containing a small quantity of pellucid fluid.

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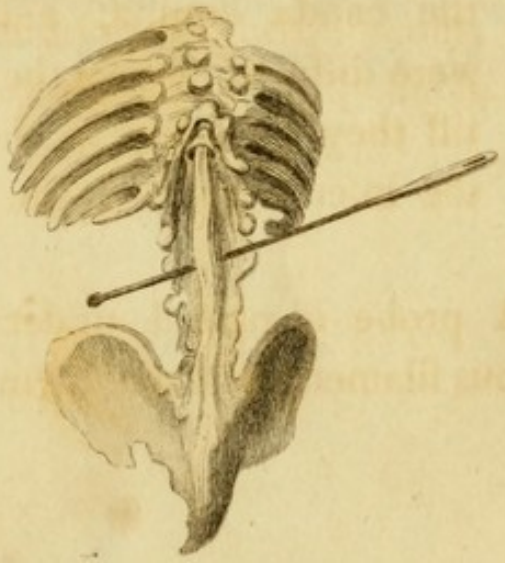
## Explanation of Plate 4.

*Figure* 1. represents the bones of the same fœtus, in which may be seen the opening or mal-conformation of the Spine continued down to the Sacrum. The medulla spinalis at the superior part of the opening spreads itself, and divides into branches of nerves, some of which formed the cauda equina, and the remainder were diffused all over the duramatral coat, till they were lost in the integuments at the inferior part of the loins.

A probe is passed under the bundle of nervous filaments to make them more distinct.

Fig 1.



## *POSTSCRIPT.*

If the reader wishes to consult any more plates, he will find some very accurate delineations of Spina bifida in a publication on White Swelling, &c. by Mr. Crowther, Edit. 1808, and page 234, a case and some observations of the same tendency as in page 30 of this pamphlet.