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AN  
INAUGURAL ESSAY  
ON  
HYDROCEPHALUS INTERNUS.

SUBMITTED TO  
THE EXAMINATION  
OF THE  
REV. JOHN ANDREWS, D. D. PROVOST, (PRO TEM.)  
THE  
TRUSTEES AND MEDICAL PROFESSORS  
OF THE  
UNIVERSITY OF PENNSYLVANIA,

On the 21st day of April, 1806.

FOR THE  
DEGREE OF DOCTOR OF MEDICINE.

---

By JACOB DAVID WACKER,  
OF SWABIA.

MEMBER OF THE PHILADELPHIA MEDICAL LYCÆUM,  
AND HONORARY MEMBER OF THE PHILADELPHIA  
MEDICAL SOCIETY.

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TO

GEORGE FRENCH, M. D.

OF

FREDERICKSBURGH, VIRGINIA.

THIS ESSAY IS INSCRIBED,

AS

A MARK OF ESTEEM AND GRATITUDE,

BY HIS MUCH OBLIGED

FRIEND AND PUPIL,

THE AUTHOR.



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AN  
INAUGURAL ESSAY  
ON  
HYDROCEPHALUS INTERNUS.

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THERE are two diseases, both called Hydrocephalus; though they are very different in their symptoms and causes.

Hydrocephalus, properly so called, is a disease which may with propriety be considered as a chronic affection, perfectly analogous to other dropsies of the human body. Rickets, or other kinds of constitutional debility, are generally held to be its predisposing cause; its progress is frequently so slow, that patients have been known to labour under it from the period of birth to an advanced age; the heads of children, so affected at birth, are preternaturally large, and continue to encrease for years without any very distressing symptoms attending it; the patients frequently enjoy tolerable health, and those who arrive to an advanced period of life, have commonly sound intellects, until a short time before death, when they are generally affected by convulsions; after death the brain is found so exceedingly distended by water, within the ventricles, as to be reduced to an amazing degree of thinness;

I have seen a case where the brain was reduced to the thickness of half an inch; the ventricles contained at least two quarts of water, though the child was no more than five months old; it was also affected with *Spina Bifida*, which it is said is frequently the case. This disease is never, or but rarely, cured.

The other disease which has been very improperly termed Hydrocephalus, by some writers, Dr. Cullen has called simply by the name of apoplexia hydrocephalica; but Dr. Rush has given it the name of phrenicula, in its first, and chronic apoplexy, in its last stage. This disease attacks persons of all ages, but most generally children.

The brain, in children, is larger in proportion to other parts of the body, than it is in adults; and of course a greater proportion of blood is sent to it, than in the subsequent periods of life. The texture is also less consistent in infants than in adults.

In all febrile diseases there is a preternatural determination of blood to the brain; and this occurs in a more especial manner in children;—hence the reason why they are so apt to be affected by convulsions in fevers.

Dr. Quin, in his excellent treatise on Hydrocephalus, has given a history of its symptoms,

more correct than any of those that wrote before him. I shall therefore take the liberty of introducing it here as he has given it.

“ In general, the patient is at first languid and  
 “ inactive, often drowsy and peevish, but at inter-  
 “ vals cheerful and apparently free from complaint :  
 “ the appetite is weak; a nausea, and in many  
 “ cases a vomiting occurs once or twice in the day,  
 “ and the skin is observed to be hot and dry, to-  
 “ wards the evening ; soon after these symptoms  
 “ have appeared, the patient is affected with a sharp  
 “ head-ache, chiefly in the forehead, or if not there,  
 “ generally in the crown of the head; it is some-  
 “ times however confined to one side of the head,  
 “ and in that case, when the posture of the body  
 “ is erect, the head often inclines to the side affect-  
 “ ed; we frequently find, also, that the head-ache  
 “ alternates with the affection of the stomach; the  
 “ vomiting being less troublesome, when the pain  
 “ is most violent, and vice versa; other parts of  
 “ the body are likewise subject to temporary at-  
 “ tacks of pain, viz. the extremities and the bowels,  
 “ but more constantly the back of the neck, and  
 “ between the scapulæ. In all such cases the head  
 “ is more free from uneasiness.

“ The patient dislikes the light at this period;  
 “ cries much, sleeps little, and when he does sleep,

“ he grinds his teeth, picks his nose, appears to be  
 “ uneasy, and starts often, screaming as if he were  
 “ terrified ; the bowels are, in the majority of cases,  
 “ very much confined, though it sometimes hap-  
 “ pens that they are in the opposite state ;—the  
 “ pulse at this early stage, of the disorder, does  
 “ not usually indicate any material derangement.

“ When the symptoms above mentioned have  
 “ continued for a few days, subject as they always  
 “ are, in this disease, to great fluctuation, the axis  
 “ of one eye is generally found to be turned in, to-  
 “ wards the nose : the pupil of this side is rather  
 “ more dilated than the other ; and when both eyes  
 “ have their axes directed inwards, (which some-  
 “ times happens) both pupils are larger than they  
 “ are observed to be in the eyes of healthy persons:  
 “ the vomiting becomes more constant ; and the  
 “ head-ache more excruciating ; every symptom of  
 “ fever then makes its appearance, the pulse is fre-  
 “ quent, and the breathing quick ; exacerbations of  
 “ the fever take place towards the evenings, and  
 “ the face is occasionally flushed ; usually one cheek  
 “ is much more affected than the other ; temporary  
 “ perspirations likewise occasionally break forth,  
 “ which are not followed by any alleviation of dis-  
 “ tress : a discharge of blood from the nose, which  
 “ sometimes appears, about this period, is equally  
 “ inefficacious.

“ Delirium, and that of the most violent kind,  
 “ particularly if the patient has arrived at the age  
 “ of puberty, now takes place, and with all the pre-  
 “ ceding symptoms of fever, continues for a while  
 “ to encrease, until about fourteen days, often a  
 “ much shorter space of time, shall have elapsed  
 “ since the appearance of the symptoms which were  
 “ first mentioned in the above detail.

“ The disease then undergoes that remarkable  
 “ change which sometimes suddenly points out the  
 “ commencement of what has been called its se-  
 “ cond stage; the pulse becomes slow, but unequal,  
 “ both as to its strength, and the intervals between  
 “ the pulsation; the pain of the head, or of what-  
 “ ever part had previously been affected, seems to  
 “ abate, or at least the patient becomes apparently  
 “ less sensible of it; the interrupted slumbers or  
 “ perpetual restlessness which prevailed during the  
 “ earlier periods of the disorder are now succeeded  
 “ by an almost lethargic torpor, the strabismus and  
 “ dilatation of the pupil increase; the patient lies  
 “ with one or both eyes half closed, which when  
 “ minutely examined, are often found to be com-  
 “ pletely insensible to light; the vomiting ceases;  
 “ whatever food or medicine is offered, is usually  
 “ swallowed with apparent voracity; the bowels at  
 “ this period generally remain obstinately costive.

“ If every effort made by art fails to excite the  
 “ sinking powers of life, the symptoms of what  
 “ has been called the second stage, are soon succeed-  
 “ ed by others, which more certainly announce the  
 “ approach of death. The pulse again becomes  
 “ equal, but so weak and quick, that it is almost  
 “ impossible to count it; a difficulty of breathing  
 “ nearly resembling the Stertor Apoplecticus, is  
 “ often observed; sometimes the eyes are suffused  
 “ with blood; the flushing of the face is more fre-  
 “ quent than before, but of a shorter duration, and  
 “ followed by a deadly paleness; red spots, or  
 “ blotches, sometimes appear on the body and limbs;  
 “ deglutition becomes difficult, and convulsions ge-  
 “ nerally close the scene. In one case I may ob-  
 “ serve, the jaws of a child of four years of age  
 “ were so firmly locked for more than a day before  
 “ death, that it was impossible to introduce either  
 “ food or medicine into his mouth; and in another  
 “ case a hemiplegia, attended with some remarka-  
 “ ble circumstances, occurred during the two days  
 “ previous to dissolution.

“ Having thus given as exact an account of apo-  
 “ plexia hydrocephalica, as I could compile from the  
 “ writings of others, and from my own observations,  
 “ I should think myself guilty of imposition on my  
 “ readers, if I did not caution them, that it must be  
 “ considered as a general outline. The human

“ brain seems to be so capricious, (if the expression  
 “ may be allowed) in the signals it gives to the  
 “ other parts of the system, of the injury it suffers  
 “ throughout the course of this disease, that al-  
 “ though every symptom above mentioned does  
 “ occasionally occur, (and indeed few cases of this  
 “ disease are to be met with, which do not exhibit  
 “ many of them ;) yet it does not appear to me, that  
 “ any one of them is constantly and inseparably con-  
 “ nected with it.”

Although I take this to be the most correct history that ever has been given of this disease, yet there are many deviations from it, and it is indeed, as Doctor Quin has happily expressed it, of a “ truly Protei-form nature.”

Doctor Rush has not found the dilated and insensible pupil, the puking, the delirium, or the strabismus to attend universally in this disease. He saw one case in which the appetite was unimpaired from the first to the last stage of the disease ; he has met with one case in which the disease was attended by blindness, and another by double vision ; he has observed an uncommon acuteness in hearing to attend two cases of this disease : in one of them the noise of the sparks which were discharged from a hickory fire, produced great pain and startings, which threatened convulsions.

He has seen three cases in which the disease terminated in hemiplegia, in two of them it proved fatal in a few days; in the third, it continued for nearly eighteen months.

He has met with one case in which no preternatural slowness or intermission was ever perceived in the pulse.

He obtained a gill of water from the ventricles of the brain of a negro girl of nine years of age, who died of this disease, who complained in no stage of it, of a pain in her head or limbs nor of sick stomach. The disease, in this case, was introduced suddenly, by a pain in the breast, and the usual symptoms of a catarrh.

Doctor Wistar has met with a case in which there was a total absence of pain in the head.

Doctor Carson attended a child in this disease, that discovered, for some days before it died, the symptoms of hydrophobia.

Doctor Currie obtained seven ounces of water from the brain of a child, which died of this disease; in whom no dilatation of the pupil, strabismus, sickness, or loss of appetite had attended; and but very little head ache.

I have seen a case of this disease, in a boy of three years of age, who had a constant desire to put his fingers into the orbit of the eye. In this case the disease succeeded an intermitting fever.

CAUSES.... These act either directly, or indirectly, through the medium of the whole system.

The causes which act directly on the brain, are falls or bruises on the head. Doctor Rush mentions two cases of this disease : one of them was produced by a fall upon the head, and the other by a wound on the forehead, with a brick-bat\*. Certain positions of the body, and childish plays, which bring on congestion and inflammation; afterwards effusion of water in the brain. The doctor has known it brought on, in a child, by falling into a cellar, upon its feet.

The indirect causes are more numerous and more frequent, though less suspected, than those which have been mentioned. The following diseases of the whole system appear to act indirectly, in producing chronic apoplexy.

1st. *Intermitting, remitting, and continual fevers.* I have already mentioned that I have seen a case of this disease produced by an intermitting

\* *Inquiries and observations, vol. 2d, page 211 and 212.*

fever. Doctor Woodhouse saw a case which was evidently the effects of a remitting fever; Doctor Rush supposes that state of continual fever which has been distinguished by the name of *Typhus*, is often the remote cause of this disease.

2d. *Rheumatism*. Doctor Rush has seen two cases, which succeeded rheumatism; and if there be such a thing as misplaced gout, this might with great propriety be called misplaced rheumatism.

3d. *Pulmonary consumption*. Doctor Percival\* has furnished us with the history of a case, which I shall introduce here: “Mr. C——’s daughter, aged  
 “ nine years, after labouring under phthisis pulmo-  
 “ nalis four months, was affected with unusual pains  
 “ in her head. These rapidly increased, so as to  
 “ occasion frequent screaming. The cough which  
 “ had before been extremely violent, and was at-  
 “ tended with stitches in the breast, now abated,  
 “ and in a few days ceased almost entirely. The  
 “ pupils of the eyes dilated, a strabismus ensued,  
 “ and in about a week, death put an end to her  
 “ agonies. Whether this affection of the head  
 “ arose from an effusion of water or of blood, is un-  
 “ certain; but its influence on the state of the lungs

\* *Medical, Philosophical, and experimental Essays, vol. 2d, page*

“ is worthy of notice.” Several other writers have related similar cases.

4th. *Eruptive fevers.* Doctor Odier\* informs us, that he had seen four cases in which it had followed the small pox. Doctor Rush has seen a case in which it was obviously the effects of debility induced upon the system, by the measles.

5th. *Worms.* If they are the cause of this disease, it is by first producing a febrile disease upon the whole system, which has been already mentioned to be one of the causes which produce this disease.

6th. From observations and dissections of several respectable physicians, who have paid particular attention to this disease, it appears to have succeeded all the following diseases, viz. the *cholick, palsy, melancholy, dysentery, dentition,* and *insolation*; also the sudden healing of old sores. Doctor Rush has seen two cases of it from the last cause, and one, in which it was produced by the action of the vernal sun alone, upon the system.

From the symptoms, and causes of this disease, which are so similiar to those of inflammation of

\* *Medical Journal.*

the brain, produced by injuries from external violence, of which the late Mr. Pott has given a correct history, in his excellent treatise on Surgery, where he says, “the symptoms attending an inflamed, “sloughy state of the membranes, in consequence “of external violence, are pain in the head, restlessness, want of sleep, frequent and hard pulse, hot “and dry skin, flushed countenance, inflamed eyes, “nausea, vomiting, rigor, convulsions, and delirium; and these come on so gradually as not to be “observed, until some days have passed after the “accident shall have happened: all the complaints “produced by extravasation, are such as arise from “pressure, viz. stupidity, loss of sense, and voluntary motion, laborious and obstructed pulse, and “respiration; and these usually appear immediately “or very soon after the accident.” It appears that this disease is of a truly inflammatory nature; it only differs from phrenitis, in its being the effect of causes which produce a less degree of morbid action in the brain, and that its second stage is the effect of a less degree of that effusion, which produces serous apoplexy in adults. It bears the same relation to phrenitis when it arises from indirect causes, which pneumonula does to pneumony, and is produced in the same manner as the pulmonary consumption, by debilitating causes, which act primarily on the whole system. In the latter stage, the disease partakes of some of the properties of

apoplexy. It differs from it in its being a slow, instead of a sudden effusion of water or blood; & in its being the effects of a chronic, instead of an acute nature. In persons advanced beyond middle life, who are affected by this disease, it approaches to the nature of common apoplexy, by a speedy termination in life or death. This I believe is owing to their having less tenacity for life than children, who, it is a well known fact, will sustain injuries on the head, which would produce instantaneous death in adults.

Dissections also show that this disease is of an inflammatory nature. Out of six cases, Doctor Rush has found four, which exhibited marks of inflammation.

Mr. Davis discovered signs of inflammation after death, from this disease, to be universal. In eighteen or twenty dissections he found the *pia mater* always distended with blood.\*

Much more might be said in proof of its being of an inflammatory nature; but time and circumstances will not permit me to dwell much longer, I shall therefore proceed to mention the remedies, which have been used of late with the happiest effects, and these are :

\* *Medical Journal*, vol. 8.

1. *Blood-letting*, general and local. This remedy has been used by Doctor Rush with the greatest advantage. Many respectable physicians have followed his example with equal success. Local bleeding, by means of cups, leeches, scarification, and arteriotomy, promise more success, than venesection, and ought always to be preferred to it, especially where the whole system does not sympathise with the disease in the brain. Doctor Wistar, in his lectures, mentioned a case of a man, who was affected with a periodical head-ache, who was always relieved by the application of two or three cups to the temples, and crown of the head, when venesection had not the least effect, though large quantities of blood were taken.

2. *Cathartics*. These have been found very beneficial, especially in what has been called the second stage of the disease; though it ought not to be omitted in the first. The confined state of the bowels indicate their use. Calomel seems to be best adapted for the purpose;—from four to ten grains, or even more, ought to be given every three or four hours, till plentiful and repeated evacuations take place.

3. *Blisters*. have been recommended by all practical writers upon this disease. They are most effectual when applied to the head, neck, or temples,

They ought to be perpetual. I have seen the distressing symptoms increase, as soon as they ceased to discharge.

4. *Cold applications to the forehead*, have been found beneficial in relieving that pain in the head which is generally one of the most distressing symptoms in this disease.

5. *Mercury*, was long considered as the only remedy, which gave the least chance of a recovery from a dropsy of the brain. But experience has shewn that this is not the case, (except when given as a purgative.) Dr. Monroe gave it to twenty two patients who were affected by this disease, but not one of them recovered. Out of all the cases (which I suppose were numerous) in which Dr. Rush gave mercury, as a sialagogue, before the year 1790, he succeeded but in two: and since he has adopted the depleting remedies, which have been mentioned, he has declined to give it altogether, except as a cathartic; for which purpose, as has been already mentioned, it is one of the best articles.

6. *Diuretics*, have been recommended and used, but if the theory which has been taught by Dr. Rush, and which I believe to be a correct one, is true, they promise nothing.

FINIS.



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