Embolical theory [illegible] p 6
No mention of Van der Kolk's theory
" " nutritive changes
in nerve convulsive diathesis [illegible]

Theories & Treatment of Epilepsy.

Chas. M. Rußell. 1862.

Chas. M. Russell—

In the wide field of medical research & observation - though many & various are the diseases which calls for & attract our attention - perhaps none are more important, certainly none more interesting, than that disease which is commonly known among us as the Falling Sickness or Epilepsy.

For to see a man, - it may be, to all appearance in perfect health, - suddenly thrown to the ground senseless & convulsed - his brows knit & features distorted - to watch him gasping & struggling for breath, even to such extent that every successive moment shall seem his last - may well excite the interest of the physiologist & student of medicine, & lead them to put forth their best energies to unravel this subtle disease.

We say subtle disease. For though men of the highest Eminence have devoted their time & talents to solve the mystery of an Epileptic seizure. Still much is wrapped in darkness. much yet remains to be known as to what may be the Essence, as it were, of a malady which is fraught with such dire results to thousands.

For by many - an Epileptic now, as by the ancients of old - is regarded as one to be avoided - Many people, & too often his near relations are afraid of him, & shun him - & he is de-barred alike from the privileges of Society, as from the benefits of most public institutions.

But though we might say much upon the Social condition of the Epileptic - the limits of a Thesis

will not admit of our doing so.
We shall therefore plunge in medias res,
& commence at once with the considera-
-ration of the theories of Epilepsy.
a. Joseph Wenzel
was of opinion that
Epilepsy depended upon a disease of
the Pituitary body of the nature of
Calcareous deposit - or granular
degeneration.
But the time has
passed away when any credence can
be given to this theory - Since it has
been shewn by Romberg - Rokitansky
& others, that the pituitary body
may be altered without the co-exist-
-ence of Epilepsy - & on the other hand
that Epilepsy may exist without any
appreciable alteration taking place in
this little body -

b. Dr. John Simon

endeavours to Shew
that Epilepsy by its symptoms & history
tends to terminate in insanity -
He believes that Epilepsy is due to
a diseased condition of the cortical
substance of the brain -
In favor of this theory is the cir-
cumstance that we may cut healthy
brain without giving rise to convul-
sions - but if the brain be cut
while in a diseased condition - con-
vulsions are produced -
There are other instances also in
favor & elucidation of this theory -
Thus, the Sympathetic nerve is not
sensitive till in a state of inflam-
mation : & the nerves of tendons
seem to be without sensibility -
but when inflammation supervenes

they become exquisitely sensitive.

What objection then is there against Dr. Simon's theory? This. We know that softenings may take place & tumours grow in the brain. & various kinds of brain deseases manifest themselves without the supervention of epilepsy.

But supposing it be argued, that the nature of symptoms are strongly presumptive that an epileptic fit must be the result of some affection of the cerebrum. Thus. one or more of the special senses shall be deranged. patients may have illusions. phantoms shall suddenly rise up before them. Claps of thunder resound in their ears. an overpowering smell of broth irritate their olfactory nerves. & besides these, — praise or

The answer to this is that the loss of consciousness may be explained otherwise than by admitting the brain to be the seat of this affection. & may be due to an action beginning elsewhere than in the brain. And moreover that the disturbed state of the mind & senses after an epileptic attack, may result from various causes taking place during the fit.

C. Dr. Radcliffe refers Epilepsy to the cessation of the flow of the electric current through muscle.
He thinks that the stiffness of muscle is due to the continuous flow of nervous fluid. & contraction of muscle due to the nervous power being temporarily suspended. He exemplifies this by shewing that in cases

of Delirium Tremens - Paralysis Agitans - rigors, subsultus of fevers, & slow mercurial poisoning - the circulation is evidently depressed, as is evidenced by the pale face, failing pulse, & the benefit derived from stimulants; & the nervous system below par.

The strong point in favor of this theory is the occurrence of rigor mortis after death, when one might suppose the nervous influence to be in abeyance. But how is it therefore that a paralysed limb is not always rigid? & why do we not witness convulsions after death, when according to Radcliffe's theory, the muscles wld. have full opportunity to contract owing to the cessation of the electric current?

And since Radcliffe's theory may be

expressed perhaps more clearly thus - The more lifeless the nerves connected to a muscle, the more contraction should there be in a limb - Why do not paralysed limbs always keep jerking about?

2. According to Henle

Epilepsy depends upon changes taking place in the circulation of the blood in the brain proper & in various parts of the Encephalon. He assigns Epilepsy to two causes

1. Plethora of brain
2. Anæmia

He supposes that in the case of Plethora the congestion in the upper part of the brain causes unconsciousness: & that at the base, convulsions, tonic & clonic.

And in the case of Anæmia that there still is congestion at the base of

the encephalon - because the blood vessels of the upper part of the encephalon contract & become empty in proportion as the anæmia increases - & as Abercrombie & Kellie have shewn the impossibility of the cranial cavity containing less fluid - that necessarily there is congestion at the base of the brain producing convulsions - & that now the anæmia at the upper part of the brain is the cause of the unconsciousness - In regard to this last point it seems singular that just the same effect shd. be brought about by an opposite condition : but yet it may be explained by supposing this symptom to be dependent simply on an alteration in the actual amount of the circulatory fluid -

Now assuming that plethora of the brain

causing congestion in the two distinct parts of the Encephalon, the brain proper & base of that organ, - was a sufficient cause of Epilepsy; how is it that we so frequently find a hyperæmic state of the Encephalon which has not been accompanied by nor given rise to convulsive fits - but which nevertheless may have caused delirium - Coma or even paralysis -

And secondly, in anæmic epilepsy, why shd. the blood vessels of the brain proper contract more than those at the base? Are their coats more contractile? or is it because they are further removed from the great propelling organ of the circulation - so that if there be a tendency to congestion the law of gravitation shall come into play?

and in anæmia of brain of low fever,

it is frequently found by Post Mortem examination that there is marked congestion at the base of the brain - while during life this condition was not characterised by convulsive fits.

E. Dr. Todds

is a highly ingenious theory - & perhaps the one most generally received up to the present time - He held that Epilepsy was caused by a poison in the Blood, whether that poison be a product of the primary or secondary assimilation: & that when it had arrived at a certain point, its acme as it were, that it went off in an explosive manner, in the form of a fit.

Dr. Todd illustrated this by the action of Strychnine - For this drug may produce no effect in minute or gradually increasing doses up to a given point - beyond which the smallest increase of the dose will

bring about the fatal toxic effect.
And Dr. Todd further pointed out that just as Strychnine possesses a peculiar affinity for the spinal cord - so does this morbid matter which he believes to be generated in Epilepsy have a special affinity for the brain : & the nature & severity of the fits he explains to be due to the quantity of the morbid material, & the part of the brain it chiefly affects.

Although Dr. Todd has left a name behind him which will never die, & must ever be honored & respected in the annels of medical history - great ashe was both as a scholar, physician & physiologist - yet we must not accept his theory simply on these grounds - for when we come to analyse it, it may not bear the test -

It is quite clear that if there be a poison

in the blood, which is the cause of Epilepsy we must find out what that poison is. & whether accumulated before a fit - & whether diminished after one - but all attempts even to find out the poison have bottle in the hands of Dr. Todd & others hitherto failed.

In favour however of the humoral theory are the cases of Epilepsy occurring in diseases in which the blood is evidently at fault - as in Rheumatism - Rheumatic Fever - Variola - & retained secretions - such as Urea - But that retained secretions should have the power of inducing Epilepsy seems to be negatived by the experiments of Majendie & others, who have shewn that when the cutaneous perspiration is stopped by covering the skin with a layer of varnish, the ani- -mal dies without having epileptiform

convulsions.

If Epilepsy be due to blood poison, we shd. not expect to find the application of a ligature around a limb successful in warding off a fit. And since Epilepsy has ceased after the section of a nerve - the extirpation of a tumor - the drawing of a tooth, or the removal of a stone from the bladder - how can such facts harmonize with the theory that the fits are due to morbid materials in the blood -

Another very strong argument against the humoral theory of Dr. Todd, is the fact of the cessation of Epileptic fits after the expulsion of tape worm & ascarides. In addition to this, it is not unfrequent to find in Epileptics some particular spot of skin which forms the starting point of an Aura Epileptica - &

simply by pressure on this spot or by gal-
-vanising it, a fit may be produced -
How can this be reconciled with the
humoral theory?

I. Dr. Marshall Hall

propounded the doctrine that
all convulsive diseases are dependent on
disease of the spinal marrow. He con-
sidered Epilepsy to be due primarily to
an increase in the excito-motor power of the
spinal cord - but that after many fits, the
patient is in a state of exhaustion, caused
by the loss of this excito-motor power,
which loss is commensurate with the
frequency & violence of the fits: but that
the patient is still in a state of extreme
susceptibility to a perpetuation of fresh
fits. Now if this affection depend
on an increase of reflex power - how
can it persist when that reflex power is

diminished ? We contend that in Epilepsy, it is because the controlling influence of the cerebrum is held in abeyance that the special functions of the spinal marrow are brought into play in so prominent & energetic a manner - & thus subvert Marshall Hall's theory. For in true epilepsy there is an entire loss of consciousness - shewing that the cerebral functions are implicated - ~~& that~~ in cases of epileptic vertigo or petit mal, there is a temporary suspension of consciousness & no convulsion - Marshall Hall also considered that in the first stage of epilepsy there is spasm of the glottis, causing apnea - & that the other phenomena resulted from the circulation of impure blood - At variance however with this, is the fact that some of the worst cases of Epilepsy do not present any

contraction of the laryngeal muscles - neither have laryngotomy & tracheotomy been followed by such favorable results as might be expected to accrue from these operations.

And in fits taking place after these operations, loss of consciousness has been the very first symptom, & certainly not due to the circulation of venous blood in the brain.

Y. Dr. Ramskill advances the theory that Epilepsy is due to an increased nutrition of brain leading to hypertrophy.

He thinks that if there be increased nutrition, there must be an increase of force - Thus if the nutrition of the Medulla Oblongata or Pons Varolii is augmented, convulsions follow. If on the other hand, nutrition is slackened, loss of power or paralysis is the result. And so he thinks the reason

why epileptic convulsions are so frequent in children is because in them the nutritive powers are in the highest state of perfection.

The processes of nutrition when diseased give rise to cancer or tubercle, which are tangible effects: in Epilepsy they give rise to symptoms. At the same time Dr. Ramskill allows that there must be a convulsive tendency in the patient afflicted with Epilepsy. For an irritation which will produce violent convulsions in one man will produce no effect in another. & in this way he explains Epilepsy produced by such causes as Pneumonia. Pericarditis. retained secretions & worms. Again he considers that a convulsive tendency may be developed without any provocative at all. & proves this conclusively to his own mind thus. Supposing the subject of epileptic fits to have a worm. but by the

use of some anthelmintic that the worm is expelled - & the fits still continue - Dr. Ramskill considers this to be positive proof that there is in such a case a convulsive tendency. Once more - Fits are apt to take place after indulgence in an indigest-ible supper - but many people eat indi-gestible suppers without the supervention of any fit - So Dr. Ramskill considers this to be another proof that there is a con-vulsive tendency.

The second part of Dr. Ramskill's theory seems very necessary to substantiate the first. For if we admit this much of his theory, viz: that Epilepsy depends on hypertrophy of brain - then all the healthiest men whose nutritive powers are in a state of high perfection shd. be epileptics - as it wld. be but natural to suppose that their brains shd. be as well nourished as

all the other tissues of their body. And again, as increased use of an organ is allowed to imply increased nutrition, then we shd. especially expect to find epilepsy present in men engaged in deep thought & in literary pursuits. But the second clause in Dr. Ramskill's theory viz: that there must be a convulsive tendency comes very happily to his relief.

h. Dr. Brown-Séquard is of opinion that epilepsy consists essentially in an increased reflex excitability of certain parts of the cerebro-spinal axis, & of the control that in normal conditions the will possesses over the Reflex faculty. He considers that the base of the Encephalon & especially the Medulla Oblongata is the most frequent seat of the increase in the reflex excita-bility, & therefore this part of the nervous

centre is the ordinary seat of epilepsy.
Moreover that the disturbance in the functions of the cerebral lobes during & immediately after a fit, & in the interparoxysmal periods is chiefly due to alterations taking place in the brain during a fit — & that the same cause which produces the first muscular contraction produces a contraction in the blood vessels of the brain proper & loss of consciousness.

Dr Brown-Séquard shews by the following table how he considers the principal phenomena — such as are met with in a complete epileptic seizure — generate each other.

Causes.	Effects.
1. Excitation of certain parts or excito-motory side of nervous centre.	1. Contraction of blood vessels of brain proper. of face — spasms of some of muscles of eye

Causes	Effects.
	& face -
2. Contraction of blood vessels of face & brain proper.	2. Paleness of face - loss of consciousness & accumulation of blood in base of encephalon -
3. Extension of the first excitation partly due to accumulation of blood ~~in~~ at base of brain.	3. Tonic contraction of laryngeal cervical & thoracic expiratory muscles.
4. Contraction of these thoracic muscles.	4. Cry & stoppage of respiration.
5. Further extension of the first excitation of the nervous centre.	5. Tonic contraction, extending to most of the muscles of trunk & limbs.
6. Loss of consciousness & contraction of muscles of limbs & trunk.	6. Falling.

Causes.	Effects.
7. Laryngismus - Trachelismus - Fixed state of Chest.	7. Asphyxia - with obstacles to return of venous blood from head & Spinal cavity.
8. Asphyxia & accumulation of black blood in brain & Spinal cord.	8. Clonic convulsions everywhere - Contraction of bowels - bladder. uterus - priapism - ejaculation - increase of many secretions - efforts at inspiration.
9. Exhaustion of nervous force generally & of reflex faculty especially except for respiration which gradually becomes normal -	9. Cessation of convulsions Coma or heavy sleep - after which extreme fatigue or headache -

This table is self-explanatory, & intended to give what Dr Brown-Séquard

considered to be a type of an epileptic seizure.

Though many writers on Epilepsy consider the fall to be due to convulsions, Dr. Brown-Séquard thinks it is the result of loss of consciousness. Since in Epileptic vertigo it is not uncommon to see a patient fall senseless, but not convulsed.

Sometimes the cause of Epilepsy is inscrutable - but the causes of Epilepsy generally, are to be traced to hereditary predisposition - strumous diatheses - malformation of head - organic lesions in the brain or spinal cord - debaucheries - prolonged constipation - habitual indulgence in intoxicating drinks - & too frequently the vice of masturbation - In addition to these it may be brought about by sudden fright - mental emotion - functional disturbance & nervous irritation. And so from the

nature of causes we may form a division of epilepsies & classify them thus:

1. Idiopathic – In which there is no accounting for the production of fits

2. Sympathetic, Secondary or Eccentric } Worms (Tænia – Ascarides) no lesions of nerves mentioned or tumors &c of cranium

3. Toxic. Due to poisonous agencies whether introduced into the Blood from without or generated from within.

4. Symptomatic. As when there is softening of nerve centres.

5. Bright's epileptic configuration of head.

A few words upon the treatment of Epilepsy – During a fit it is of course essential that the patient have a free access to air – & all violent muscular movements shd. be restrained – since it sometimes happens

that dislocations will occur, - from the intensity of muscular action. { I have had two cases of dislocation downwards into the axilla, both arising from violent muscular action during an epileptic seizure } By pressing the thumbs on both Carotids - the fit may be cut short. This plan ~~xxx~~ will also serve to distinguish true from false Epilepsy, as under ordinary circumstances, a person cannot bear to have the arterial supply to the brain so suddenly checked.

If fits are very irregular both in number & periodicity - taking place say one to day - four or five a day or two hence - & then omitting several days - it is well to give a large dose of Quinine grs. xv with gr. ½ of the Extract of Belladonna: this will probably induce a periodicity of the attacks. We then know when to expect a fit - & may stave it off by Quinine, or by placing a ligature round

or more limbs - so as to keep a large quantity of blood out of the circulation for a time -

If there be perverted action at the base of a nerve, it will be necessary to alter the action at the periphery - Epilepsy produced artificially in guinea pigs has been cured in this way, by applying a solution of nitrate of Silver to the extremity of the nerve which produced the aura - And Brown-Séquard maintains that if a change can be effected at one extremity of a nerve - as this procedure is calculated to do - there cannot fail to be a corresponding change produced in the other extremity of that nerve - It is on this principle that nitrate of Silver is almost sure to do good, in cases of Epilepsy where the laryngeal nerves are obviously affected - in fact wherever there is anything betraying spasm about the larynx.

sensibility of the nervous system.
Belladonna (a) excites the sympathetic system, thus causing dilatation of the pupil by de-pressing the power of the third nerve & allowing the sympathetic which supplies the radiating fibres of the Iris to have sole play - (b) Causes mirthful delirium - {but never Coma, according to Dr. Ramskill} (c) does not check secretions, as Opium does (d) Belladonna purges. In these particulars it is essentially of service in Epilepsy - & possesses great advantages over Opium from its marked contrast in action.
And as Epilepsy may be due to a state of congestion of the Cerebro - spinal vessels resulting from a relaxation of their coats - which again is owing to a want of action in the nerves which supply those vessels - Belladonna acting as a stimulus to those vessels causes their contraction.

Vandekolk has found dilated vessels in the corpora Olivaria in patients who having epilepsy bite their tongues - & in the respiratory tracks of those whose breathing is chiefly affected. And it is a well known fact established by Claude-Bernard, that division of the Sympathetic produces redness of the part which that nerve supplies - shewing that the normal condition of tissues must be in some way dependent on the influence supplied by the Sympathetic nerve - especially as the part is restored to its normal condition by galvanising the cut extremity of the Sympathetic which supplies it - & if nervous force be identical with electricity, the nerve is then restored to its original state. Thus it is that when the vessels are naturally congested, Belladonna acts by stimulating the Sympathetic nerve - or in other words Belladonna

tones the involuntary muscles.

A sixth of a grain of the Extract of Bella-donna is a sufficient dose to commence with for an adult - but children bear Belladonna very well - & require larger doses - If at any time, too ~~much~~ large a dose of Bella-donna shall ~~at any time~~ have been taken - Opium shd. be immediately given - since it is the true antidote to Belladonna - & as good a remedy for it, as Chalk is for Oxalic acid.

The so-called specifics in the treatment of Epilepsy - such as Sulphate of Zinc - Nitrate of Silver - & the juice of the Cotyledon Umbilicus - have been freely & fairly tested, with however such results as to expect but little benefit, if any, from their use - The tendency of Nitrate of Silver to cause permanent discoloration of the skin is sufficient of itself to

preclude its use, even though good effects might be obtained from its administration. Iodide of Potassium of course is an invaluable remedy when Epilepsy can be traced to syphilitic taint, & most good seems to result from its action by giving it in large doses. Bromide of Potassium in some cases certainly seems to be of service.

The use of the tincture of the Muriate of Iron is attended with good results, especially when the history of the case points out that Epilepsy has been brought about by masturbation.

Turpentine is of great efficacy in some cases - especially when the head suffers much - Also the combination of Iodide of Potassium - Ammonia & Belladonna, with tincture of Rhubarb & Bark.

But a combination of a mineral tonic with an antispasmodic & sedative

appears to be of more service than anything else -

The cold shower bath cannot be too strictly enjoined.

If the patient be plethoric, he must abstain from stimulating food & drink - & take plenty of air & exercise. if asthenic, his diet shd. be nourishing, but not stimulating - & good may be derived from tonics & shower bath.

The great point is to prevent the recurrence of a fit. To this end, all causes of irritation such as constipation, intestinal worms, the irritation of teething, shd. if possible be removed. Over fatigue of mind & body must be avoided, & fits of passion, intemperance & dissipation not given way to.

But it does not do to continue any one mode of treatment for a long time - since

epileptics benefit most by a constant change of treatment. In females, epilepsy is certainly influenced by the menstrual period. For in them the fits almost invariably occur either just before, during, or a little while after that period.

But it must be allowed that the treatment of Epilepsy on the whole, is unsatisfactory.

Chas. M. Rufsell.