On the Various

Modes of Fatal Termination of Diseases.

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On the Various Modes of

Fatal Termination.

We propose, in the following pages, to treat shortly of the various ways in which Diseases, when they have put on a fatal aspect, cut short the life of the patient.

The ways in which this termination is brought about, the Symptoms and Anatomical Characters according to the Organ concerned, in some few cases the fault being directly referable to some one Organ, the Brain, the Lungs, or the Heart, failing in the discharge of its functions, will be considered also.

The arrangement adopted is taking the three great general divisions, going by the names of Conicussion, Apophasia, and Coma, according as the Heart, the Lungs, or the Brain is the seat of the primary lesion.
In following out this order, the individual cases, as Death by Feeding; Death by Burning, &c. will be brought under the several heads to which they more immediately belong.

It would impossible to follow out the details of each case as no two, tho' arising from the same circumstances, agree in the symptoms they produce. For in the words of Dr. Warton, "in one instance the thread of existence is steadily snapped; the passage from life and apparent health perhaps to the condition of a corpse, is made in a moment; in another the process of dissolution is slow and tedious, and we scarcely know the precise instant in which the solemn change is completed. One man retains possession of his intellect, 'till up to his latest breath; another dies insensible, and insensible to all outward impressions for hours, or days before the struggle is over."

Before beginning to enquire into the several modes of Fatal Termination, we shall shortly endeavor to define what is meant by the term "Fatal Termination" or "Death", and then it will be more clearly perceptible how the various Causes act.
Death, in the common acceptation of the word, expresses the fact that a change has taken place in the body of an individual, whereby he is separated from all the events and circumstances which affect the life of an animate being.

When a person no longer feels and wills, when his senses are no longer in obedience, when his respiration is entirely gone, and his heart has ceased to beat, when his body is cold, and rigid and his muscles have lost their elasticity, then he is said to be "dead."

Now, what is the 'Change' which affects all this? It is the absence of "Life." What is Life? "La vie est l'ensemble des fonctions qui résistent "à la mort." Biichat.

Death is the opposite, not of Life, but of Birth. An individual is born, lives and dies. He lives, not because he is made up of certain parts which are each endowed with a separate function, all contributing to his maintenance, but because the principle of Life is an active operation guiding its subordinate organs and their functions and defending all from those changes to which
they are prone if left unprotected.

Let this principle, however, be checked, then all those changes will be brought about; the organs will cease to perform their functions, their substance will become disorganized and the individual himself a lifeless corpse.

"Car ici la cause de la mort n'est que l'absence"
"de celle de la vie". — Bichat.

"The death of the body as distinguished from"
"the organic death of the tissues; Conduits to it"
"the dissolution of the Intellectual principle from"
"the Corporeal Organization". — Haye.

This applies as far to man, not however to the lower Animals. The "Intellectual Principle" is distinct from the "Vital Principle" which exists in all lower Animals, and perhaps in Vegetables, where the "Intellectual" is absent. If the Vital principle be destroyed, no Man the "Intellectual" but the "Intellectual principle" (unless it is meant to comprehend the Soul), need not lead to the death of an Individual. If it comprehend the Soul, then the Moment it takes its departure, that Moment the person 'dies'.


In a physiological point of view, death is the last of a series of phenomena symptomatic of the picture of an organized being. In the human body there are animal functions, those by which we perceive, and organic functions, by which we are maintained.

Death, properly so called, consists in the loss of the first of these, "the organic death of the tissues" following from gradual loss of stimulus.

The purest form of death, or that from the natural and gradual loss of the animal functions, is often called in death from old age, which is rarely seen, some one organ, at least, being the seat of decay and the cause of the total termination.

This form closely resembles sleep, the patient dying with no symptoms save the exhaustion of nature.

During sleep, all consciousness is lost, sensation is diminished so much only being left as will suffice to keep up the organic functions. Heart's action is slower, and the animal heat is
lowered. The cause of sleep is diminished excitability of the sensitive portion of the brain and spinal marrows, brought on in consequence of the exhausting influence of the day's pursuits and occupations.

So in this form of death, both sets of functions are gradually worn out by the pursuits of a lifetime and the person dies as if he were sleeping after the fatigues of the day.

Death is organization at rest in contrast to the explanation of life, "organization in motion." This expression is symptomatic only of the existence of a vital principle. Life can not exist without the "due performance of all the subordinate parts," still there must be a vital principle regulating the action of these "subordinate parts." It is the result of the due performance of the functions of the various organs through the medium of organization acted on by the vital principle.

"Organization appears to be the effect, not the "
"cause of vital action." Pliow.
If the human body be considered as consisting of an innumerable number of cells all aiding in the maintenance of individual, if any number of these die or be destroyed, then we have partial or Molecular Death.

The two attributes of the life of a cell are Nutrition and Contraction. If secreted and exerted when these are injured, we will have more or less injury done both to cell itself and the surrounding parts. Accumulation of Effete Matter from the exerting power being gone or the Matter not being absorbed at all the absorbing power being gone. The cell being thus injured, whether from prevention of the fluid or lesion of the Cell itself, the Nucleus will cease to exert any power; the fibres will cease to Con-tract and the Nervous Filaments will be para-lyzed.

This is what takes place in Mortification or Partial Death, where from injuring either a part or to the Nerves supplying the part the Nutrition is altered and an unhealthy fluid takes the place of the finely healthy nutrient blood.
When death is general, systemic or somatic, the whole body suffers. It divides itself into death or the loss of the sensorial functions, death absolute or loss of all the functions, the sensorial functions being those by which we perceive and act. If these be taken away the individual will be dead; the death of the various organs and tissues may survive for a certain time. It however involves sooner or later molecular death.

Death may therefore be said to be with regard to the animal structure, the absence of the protective agency of life and with regard to the moral nature of man, the separation of the soul from the body.

The symptoms of actual death may be said to be, for practical purposes, the entire cessation of the organic functions, the loss of irritability in the muscles, loss of the animal heat, rigidity within twenty-four hours after death, before and after which there is softness and flexibilité, and lastly the presence of the process of post mortem which is a putrefaction.
In attempting to describe the various Modes of Fetal Termination, three leading forms, as formerly stated, are recognizable. The first is where the Heart suffers and is first brought to a stand; the second is where the Lungs are first injured and prevented from doing their duty; and the third where the Brain is suspended in its functions. This was Bichat's theory: "Toute espèce de Mort subite commence en effet par l'interruption de la Circulation, de la Réanimation, de l'action du Cerveau."

Strictly speaking however there are only two, Suffocation and Apoplectic or Coma induced Apoplectic and ends by it.

In some cases of Sudden Death, where Heart's action is suppressed by Constriction the Nervous System is probably the first to suffer and to bring on this form. "There is reason to believe that a regular series of impressions and action maintained between the Nervous and Muscular Systems is indispensable to Animal Existence, and that an interruption, derangement, or sus"
"Punishment of these is occasionally the result of a sudden and violent shock, mental, or corporeal, or both combined, which is fatal or recoverable from, according to the greater or less intensity of shock." Travers.

"When the blood no longer circulates, life is presently extinct; and our investigation of the different modes of dying resolves itself into an investigation of the different ways in which the circulation of the blood may be brought to a momentary standstill." Mathew.

In every case the blood, either from its not circulating at all or from its circulating poisoned with various substances, is the direct cause of the death of the tissues.

We shall commence with the failure on the part of the Heart or Syncope, then we shall take up Phrenia, and lastly Coma.

I. Syncope. { 1. Atherosia. in the Heart.
II. Phrenia. in the Blood.
III. Coma. { 2. Coma. in the Lungs.
     3. Coma. at the Brain.
I. Death by Syncope.

This form of death begins at the Heart. It results from the direct suspension or depression of the action of organs concerned in the circulation of the blood.

If the Heart be so injured as to affect its power of contraction, whatever be the cause, the Blood will more or less suddenly stop flowing, and death will result.

To see why this should be, we have only to remember how immediately every organ in the Human body depends on the presence of the Blood for the due performance of its functions.

Again, this means of the Nervous System a very great intimacy is kept up between the Heart and the various viscera. This is easily seen in any mental or physical excitement of any one organ or part of the body—as in the Brain—Inflammation of Skin of alveolus &c.

Though the Heart be not directly affected by any effort of the will, yet it is very evident it is easily acted on by any circumstance which principally involves the Nervous System.
In order that the heart's action may go on in health, two circumstances are requisite:

1. A certain power of contraction in its fibres;
2. A sufficiency of blood to act as a stimulus.

Unless the fibres are capable of contracting and unless there be a sufficiency of fluid to be moved on, and to act as a stimulus, there can be no circulation; and therefore it is that death at the heart arises either from

1. Want of contraction of walls of heart, or from
2. Want of stimulus, blood.

Abstraction of one or both of these may arise from external or internal injury.

In the one the heart receives its usual quantity of blood but can not contract on it; in the other it has the power of contraction but wants the stimulus to contract upon.

The first or want of contraction is called Death by Ataxia; while the second or deficiency of stimulus, Death by Anaemia.

Both these are included under the general name of Apoplexy, which merely signifies Death at region of the Heart, from whatever cause.
a. Death by Asphyxia.

In this form of Death, the Heart suffers first, and it dies so from losing its fibrillæ deprived of their Contractility.

This loss again may be caused, either by sudden violence, or by the more gradual effect of disease of the tissue itself.

We shall now consider the first of these or that in which up to the moment of death or to the moment when the body receives the injury which brings on this form of death, the tissue of the heart is perfectly healthy.

The majority of such cases are cases of sudden death, the person being previously either in good health or laboring under some disease which had severely taxed his strength.

When the heart is rendered incapable of contracting, there will necessarily result an instant stagnation throughout the body, with a deprivation of blood from the higher parts of the body, especially if the person lie in the erect posture, which might of itself prove fatal, independent
Of the effects of the injury producing it. Let us now enquire into the

I. Causes of Ailments.
The Causes of this form of Death are very numerous and various; the Heart being so
susceptible to many effects and impressions which the body may receive physically or
mentally.

There are some causes which act by the way of "Concussion" or "Shock"; other act
from debility of heart's walls brought on by previously existing disease.

Among those which act by way of Concussion may be mentioned. Efferal injuries, as
blows on the Head, on the Epigastrium or if severe enough on any other part of
the body. Severe Surgical Operations, Efferent lacerated wounds, Compound
Fractures. Very intense heat applied to any part of body as a severe burn, or more
generally a 'Coup de Soleil'. Lightning or Electricity; intense Cold may be fatal in this
manner. Some Poisons and Poisonous
Gases, and Gases which tho' not points on themselves, contain no Oxygen. Under the head of External Injuries may be classed the sudden diminution of the pressure of fluid on the Brain as in the drawing off of the fluid of Asites when the proper means for maintaining artificial pressure be neglected, or of sudden withdrawal of any substance which has been pressing on the Brain as a piece of depressed bone, a Coagulum of blood, or the Contents of an Abscess within the Cranium; or the withdrawal of fluid from Brain altogether as in profuse Hemorrhage and according to some the effect of a large body passing near the head of the Individual with great velocity as a Cannon ball.

There are some Causes which may not be so classed as Profuse Evacuations from the Intestinal Canal. Inflammation of the Brain or Gaugliionic Centres. Severe pain whether caused by External or Internal Injuries passing from Agony to Comparative ease, which however will so far have left with Mental Emotions.
Another class of causes which act by way of concussion or the effect of mental emotion as intense joy, pleasure, transitions from crises - painful disgusting sights, effluvia &c. Mental shocks; fatigue mental or bodily.

There are other causes which can hardly be comprehended under either of these classes, such as injection of air into the veins, premature assumption of the erect posture while in a state of convalescence from fever or in a state of great debility from other causes; drinking cold water while in a heated state; in a plethoric state of constitution inducing a temporary oppression of heart and large vessels seen in certain forms of hysteria, in certain cases of pregnancy collection of fluid in the pericardium.

These last may be considered as more properly coming under the denomination of those which act from debility of heart brought by previous disease yet they require a certain amount of force to bring about pethemia as in assuming erect posture during convalescence from fever whereas in the next class they act without any necessary exciting cause.
The other class of causes which act this induced, cability of the walls of heart are mostly if not all, the result of some chronic or it may be acute diseases.

Any disease which so far weakens the powers of the system as to cause extreme prostration, may terminate by Athesisia. Any decrease of vital energy of the body or of the assimilating processes so as to bring about an impoverished state of the blood and a consequent deterioration as well as diminution of the nutritive principles will lead to this form of death.

Any disease which affects the nutrition of the heart as obstruction to full supply of blood to its walls, or morbid degeneration of the walls themselves may also so end.

In short, any disease which weakens the system generally or the heart alone will lead to death by Athesisia.

Of the particular diseases we shall speak hereafter.

Having thus imperfectly enumerated the chief causes, we shall proceed to the
Various Symptoms of Death by Asphyxia.

In that form caused by concussion the result takes place so suddenly that no time occurs for symptoms: as the body in receiving the shock is affected so generally that in many cases every function of the various systems is completely destroyed.

But in those cases where great delicacy is induced by disease we may safely conjecture that death may occur in this form if we find the heart acting very feebly, pulse imperceptible or almost so, and every function irretrievably, and beyond the influence of stimulants, losing energy.

The senses may, and do in many cases, remain entire, in some cases even to all appearance more vigorous than formerly.

The breathing may be little affected: there may be no complaint of pain or backwards but yet the heart is evidently, fact being its contractile powers, and at last death takes place slowly and quietly, it may be several seconds before the last inspiratory or expiratory effort is made.
These perhaps are more properly the
signs of Approaching Death, constituting
the act of Dying, looking upon Death
as distinct from the act of Dying—

In all cases the Death will be sudden
that is Consciousness will depart with the
last beat of the Heart that is concerned in
the propulsion of the Blood; this last beat
being Equivalent to the Shock which Hills in
Cases of Violent Injuries or Constrictions—

In all cases of Resisting Diseases the
body shortly before will be Cold; the Extremi
ties quite so. Cold Sweats will break out
the features will be Pale and Collapsed.

These Symptoms occurring in Chronic
Waiting Sickness are also dependant to
a certain Effect on Anaemia, of which we shall
hereafter speak. That is on loss of Nutrition
but still the Stroke which closes the Scene
is almost entirely an act of Anaemia.

On Examination after Death certain
appearances present themselves; and
by which we know that Death has taken
place in this Manner.
3. Anatomical Characteristics.

On dissection the following morbid appearances present themselves.

In the majority of cases the heart is found full of blood, scarlet in the left and purple in the right as in the natural state showing the inability to contract the latter be material to contract upon.

In some cases the heart is said to have been found empty, so also the Vena Cavae.

In some resulting from great debility the blood sometimes is found either coagulated forming polypous Concretions, or with a tendency thereto.

In some cases the irritability not only of the heart but of the Ventilatory Muscles is gone, in most the heart itself is completely insensible to any stimulus. The blood was thought by many close its coagulability in cases of sudden death but several cases (and some from lightning) have been observed where this was not the case.

Having seen the various Causes, Symptoms and Anatomical Characters of Athetia, we shall now consider how it is that Death is brought about, how it is that the Heart is made to fail in Action to lead to a fatal termination.

And first, of Athetia induced by Concussion.

The body in sustaining a shock or Concussion is in all probability affected generally and that this the Nervous System which we know now, is the first to suffer.

The Nervous System being affected either by bodily injuries or Mental Emotions affects all parts of the frame and the various viscera thru' Sympathy. Thus one victim or limb severely injured will to a greater or less extent depress vital actions not only of the parts in the immediate neighborhood but also of those more remotely situated.

The whole body being supplied in all parts with Nerves it matters little where the injury be inflicted, the only requisite being sufficient Strength to affect to such a degree
In cases of concussion, the Nervous System at the first Suffer, and the Heart, tho' perhaps incapable of being artificially or voluntarily excited to contraction, Suffer along with the rest of the body.

The Heart is connected thro' the Cardiac pleurises with the Brain and sympathetic system and so intimately connected with all the viscera of the body as well as with the general Nervous distribution.

Any injury of the head implicating, or not, the Brain will have its affect on the Heart; so with the viscera of the Abdomen.

Concussion will implicate all the parts supplied with nerves, more or less, not necessarily the heart alone, so that in the most sudden cases the death will be general from every system being involved; if the injury was less severe recovery might take place if the heart could contract, which it can not and so death strictly occurs in form of Atetania.

Death by concussion or a part of the general Term Atetania begins in the Nervous System.
An in-depth study of what power which makes the company or individual
unique. Exploration and analysis of the different factors that contribute to
this uniqueness.
That concussion does act first on the Nervous System as shown by experiments of Legallois, who found that injury of any part of brain or Spinal Marrow would cause death so, if extensive enough. But how does concussion affect the Heart so as to cause its loss of contractility? It does so by acting on the Fibrillea of the Muscular texture of the Heart; for, according to Dr. Carpenter, "sudden and severe injuries" of the Nervous Centres have power to impair "directly and instantaneously or even to destroy" the Contractility of the Whole Muscular System so that death immediately results, and no "irritability subsequently remains."

Hence results the immediate death of the Heart and along with it in the sudden cases the death of the Whole Muscular or Contractile Textures, causing not only stagnation of blood in the Heart but in all the vessels, whether that arise from Contractility of Capillaries being injured or from sudden suspension of the attractive and repulsive acts which take
place in Nutrition, and which must have some control over the flow of the blood, if they do not positively urge its Circulation.

Now the Heart is so connected with all parts of the body as to be quite and easily susceptible of all impressions which are produced on it.

Again the Fibrillae are richly supplied with Nervous filaments so that they also are directly under the influence of the Nervous System.

That the Heart is cognizant of the feelings of the viscera is well seen in Palpitation, so brought on by arraignment of Process of Suggestion and various other conditions of the body, that it is under the influence of the Mental Emotions is also well known.

The great Salter thought that the Heart was not affected by any injury done to the Brain, but Sir William Phillip has shown that Stimuli have a decided effect on it in Experiment 39. Spirits of Wine were applied to the surface of the Brain of an Animal which caused the Heart to Action to be
Immediately increased. Several cuts were made into the brain and spirits of wine were dropped into them, when the heart action was increased "in a much greater degree". Sedatives had the precisely opposite effect.

He found further that the heart could be isolated, after any effect could be produced by them in the muscles of voluntary motion. If the brain and spinal marrow be removed slowly and gradually, the heart performs its functions for several hours and is little if at all affected beyond what might accrue from the operation itself.

A different result is obtained however when the brain is injured suddenly as by a blow. Then the heart is found to have lost its contractility and either to have stopped altogether or to do within a minute after receiving the injury.

In Mr. Millon Philips's experiments after the lapse of half a minute or a quarter of an hour the heart slowly resumed its contractility and slowly beat so as to support the
Circulation for an hour or two, when it entirely ceased,

F. Willow Philips, in experimenting on the relations between the circulation in the capillaries and the nervous system found that on crushing the brain with a hammer, and bringing the web of the frog's foot under the microscope, the circulation instantly ceased, "an effect," in his own words, "which can not arise, we have seen, from the ceasing of the action of the heart."

Now, exactly the same occurs in the human body from a concussion, which however as far as has been observed, completely destroys the action of the heart. We have the authority of Dr. Carpenter for supposing that the contractility is destroyed, and even if irritability did remain as the experiments above mentioned would show, it might be the result of the injury affecting the nervous system alone whereas in cases of general shock every texture and function suffer independently of the shock communicated to them by
the Nervous System. The shock might
have such an effect on the processes go-
ing on in the extremities of the circulation
that stoppage might be the result, tho
in Nervous System.

However it is certain that concussion
affects the heart, thru' the medium of the
nerves, and probably also the effect
is conveyed to the Capillaries, that from
this results the ceasing of the circulation
and death of the individual.

Concussion may be caused by any
violent blow as has been seen in the causes.
A blow on the head with or without being
of the brain can cause Asthenia thru' the
medium of concussion. So with Blows on
the Epigastrium, especially if the stomach
be full, probably owing the greater surface
presented, there is the empty state of
the organ. Here may be mentioned the driv-
king of cold water when heated, the result
being the same in both cases. In these
cases the Sympathetic might form the
first recipients of the impressions and
to cause loss of action in the heart, but in the former, the 
brane would seem to suffer as soon as any other tissue 
as the slightest blow on that region the 
nerve would be knotted to a difficulty of moving the brachybranes in the attempt 
to take a full inspiration, and in the latter the 
nerve may serve to convey the necessary impression. 
Again Dr. H. Philip has shown that the 
semilunar ganglion may be cut and 
irritated and yet no impression on the 
heart is discernible. The sympathetics 
have doubtless a share in propagating and 
receiving impressions but the Chief agent 
would seem to be the branches of the cerebro- 
spinal system. A slight blow is some-
times quite sufficient to destroy life, as in 
Two Cases related by Sir Astley Cooper 
where in the one, a man recovering from 
Fever was struck on the Epigastriac 
region by a horned, and instantly fell 
down dead, in the other a man was 
killed by what would appear to have been
a mere push given by a fellow laborer.

Extensive lacerated wounds and severe
surgical operations act also by way of Con-
cussions. Mr. Hunter tells us of a man who
bied the moment one stitch was yticipated
and many cases of such have occurred.

This form of death is identical with
the "Nervous Apoplexy" of Dr. W. Philip,
the "Death without Reaction" of Sir A. Cooper
and the "Pneumatisation without Reaction" of
Mr. Draper. The term "Nervous Apoplexy"
implies paralysis of Muscular fibre this
affection of the Nerves.

The various other Causes as mentioned a-
bore causing sudden death act in same
Manner.

In the Case of Poisons the effect is pre-

icely the Same that is among those affecting
the body by way of Conclusions such as
Prussic Acid which causes death in the course
of 8, 5 or even 3 Seconds. From the great ce-
derity with which this and some other Potious
act, some have thought that they act primarily
on the Nervous System, that the Effect produced
on the part to which they are applied is propagated along the nerves to the brain and to give rise to the various phenomena.

In cases of sudden death taking place by way of concussion this must be the Case, as we have seen concussion is consequent on an affection of the nervous humour produced.

"It is quite possible, that the agency of poison," "circulating in the blood, on muscular organs," "and especially on the circulation, may be in " "part consequent on the impression which they," "make on the brain and nerves."

This effect is produced in some cases by Hydro-
Cyanic Acid, Acidi Acid and Strychnine.

For a long time the doctrine of action by sympathy was generally adopted, the supporters thinking that many acted too suddenly to be accounted for in any other way. They thought that the organ affected was so that the transmission of the impression from the surface primarily in contact with the poison, in some cases fatal syncope would be induced by the impression being transmitted to the heart from the injured surface.
This view is also countenanced by the fact that poisons act more energetically when placed in a wound, more slowly when placed in contact with mucous surfaces.
Others, again, consider poisons to act through absorption, requiring to be absorbed and brought into contact; in some instances, with the organs affected. This opinion is inferred from the rapidity with which fluids injected into shut cavities are absorbed; from the fact that poisons will act as well as when the nerves of the part are cut, the only connection being the vessels; as when the nerves are entire, and from the poison not reaching the circulation is arrested, all other communications being entire.

That this is probably the more correct view, is countenanced by the fact now known of the very great celerity with which the circulation performs its rounds. D'Herings of Stuttgartt showed that ferroxyd and of potashum injected into the jugular vein of a horse, might be discovered throu'out the venous system in the space of 20 or 30 seconds. However, there are some poisons which act so instantaneously that they seem to act much in the way of concussion. Whether, this is general or merely confined to the one organ the Heart is not very certain, as Majendie asserts that the irritability of the Heart and voluntary muscles
That rapid poisons in 1887 may act by way of the heart as advanced by Dr. Symonds, in "Facts," Cyclopaedia of Anatomy and Physiology. He distinguishes it from H. physica, in the one the pulmonary arteries only, in the other "both these and the pulmonary veins are the seats of congestion." The cause is mechanical and is "prevented by the current in the trunks" of the pulmonary veins by the turn of the heart. Symonds.
is so exhausted, as to be insensible to the stimuli of Galvanism. While Schubarth says that the heart is not contractible while the intestines and voluntary muscles are so. The heart and great vessels are found after death, distended with blood, and it is probable that these poisons do act by concussion, that is, considering concussion as a necessary accompaniment and cause of sudden death.

The poisons alluded to above are the @ites, Antiser, Tobacco, Hydrocyanic Acid, Salicylic Acid, Arsenic, and several others, all of which were the subjects of experiments performed by Sir H. Brooke, MacPhedie Christian, and others. Digitalis acts by depression of heart's action.

Some poisons may act directly on the inner surface of the heart, paralyzing its movements, and Morphine is known to do when injected into the heart of a rabbit. This action would be subsequent to the act of absorption.

Air injected into the veins causes death by the arrestment of heart's action, and according to Aristic, Asote which is a poisonous gas has the same effect.
Hydrogen Sulfate Acid Gas would seem also to act by way of congestion. Nine quarts injected into the lungs of a horse killed it in a minute. This was the experience of Chancellor who found that it acted as energetically either inhaled or injected into the stomach. With regard to the action of this on the heart, may it not act on the brain in some way as incoercibly and produce hemorrhage and cause death by congestion?
Among the other Causes acting by way of Concussion some have thought a sudden and violent Hemorrhage may be chased, acting in the same way as sudden diminutions of long continued pressure on Brain from Ascites, then tapped, opening Abscesses which press on the Brain to the impression "reacting on the Heart after the Manner of a Concussion." Alison.

So much for Causes acting by way of Concussion, at least as far as we yet know.

Among Causes enumerated above as acting on the Heart and so causing death without any preceding Concussion Inflammations of the Peritoneum or Peritonitis are mentioned as to a very few seconds before death a patient suffering from Peritonitis retains all his faculties and death ensues in consequence of the heart gradually giving way. There may be a general Concussion of the system here "but it is more probable that one organ only is thus, at least in the first instance, acted on sympathetically," namely the Heart: Christiansen.

Evacuations from the Intestinal Canal were in Malignant Cholera then prostate and sudden act
in a similar way on the Heart where also the
individual may retain his faculties.

The Mental Emotions as Joy, Grief, Anger, &
Cause Sudden Death by way of Constriction
so with all those Causes Connected with the
Mental Functions Mentioned above.

Again in Cases of Death by Apoplexy
brought on during, after, or by previous
disease, which is distinguished at the Com-
 mencement from Death occurring in apparently
healthy individuals, the Heart may be weakened
by the general debility of Muscular Tissue Ca-
used by the Disease as in Pneumonia. It may be
made to perform its functions from fatty degener-
ation of its Walls, or it may be influenced
so as to Cause Death by some exertions made
during the Continuance of, or during the Con-
 valescence from, Disease as in Patients Dying
from rapidly assuming the erect position when
Convalescent from Fever: here the Brain be-
ing deprived suddenly of its supply of blood
acts on the Heart & Causes Apoplexy. The
same may be said of Death occurring during late
Stages of Disease of the Heart or Enlargement, &c.
5. Diseases in which Asthenia occurs.

In this list we leave those injuries which cause this form of death suddenly, as Lightning. In general terms it may be said that affections of the abdominal viscera prove fatal thus. It is frequent in Peritonitis, in Dysentery, in inflammation of the uterus, in Malignant Cholera, in extensive Mortification of other parts, in inflammation of the larger joints.

It is seen in Phthisis, Diabetes, in chronic diseases of the Heart, in effusion into the Pericardium and several other mixed up with Senescence, the general wasting of all the tissues acting alike on the heart and the blood. In Cases of Hypertrphy it may occur if strength of the patient be straitened during the disease by depletion, bad nourishment or violence. Here it is mixed up with Apoplectic, as from the nature of the Complaint the breathing may be affected from a very early date.

In Fever, especially during Convalescence or any other exhausting disease where the strength is exerted too soon and too suddenly. In profuse Diarrhoea, in softening of tissues of the heart.
(I.) b. Death by Anaemia.

Having considered death by Asthenic we will now go on to the other subdivision of Synastheia entitled Anaemic or failure of heart's action from want of stimulus or the due quantity of blood.

This fruit is the very opposite of the former in having the proper action of heart ready, but unable to act, to as to sustain from want of blood which the former, we have seen, possessed.


Any circumstance which will deprive the body of a large amount of blood whether artificially or by accident will cause Anaemia.

Profuse Haemorrhage, as in flooding in women after childbirth, or from severe wounds which are not attended to, or occur in the field of battle or depending on ulcerate internally opening some vessel which can not be reached by the Surgeon as Aneurism of the Aorta or its branches, Ulcerations in the Coats of Vessels, or the more gradual draining from Hemorrhoids if not stopped in time, or long continued Hemorrhagi
will be sufficient to cause death by Anemia. The false evacuations from the Intestinal Canal will also lead to this form of death, from the watery part of the blood being to a greater or less extent drained off. In diseases also which exhaust the system gradually, from prevention of the proper assimilation of food and consequent diminution in the supply of blood. These are generally, however, more or less mixed up with Anemia where the action of the Heart is weakened along with the deterioration of the blood.

2. Symptoms of Anemia

In this case, the Countenance and lips of the individual become pale. Cold sweats break out over his body, his eyes become dim, his Pupils dilate. He complains of Vertigo, his Pulse becomes slow, weak, and irregular, and his Sensibility and Consciousness quickly vanish. Nausea and vomiting sometimes are present, also Restlessness, Tidling of the limbs, sometimes Transient Delirium. The breathing which at irregular, may become light, and at last, gasping. The Qushing in the ears in-
- create, and more or less Spasms and Convulsions may occur shortly before Death.

3. Anatomical Character.

The only Character which will be noticed in most Cases is the empty, but Contracted state of the Heart, especially if the Heart has not been influenced by any disease which may affect the Solids as well as the Fluids. In the latter case the Heart may not be contracted so greatly as the heart in degenerating as well as the blood where the attraction of blood has been very gradual. Little blood may be found throughout the Body. All the parts will be more or less pale in color and destitute of blood.


This is very simple. The blood being drained from the System, by Hemorrhage from whatever Cause will necessarily cause both the Vital Functions and the Heart to become to a stand still. Here Death begins in the Blood and the Heart ceases to act from deficient supply of Material.
and not from want of Contractile Power.
In very sudden Hemorrhages as we have seen
Concussion is probably induced, but here there
is none. The creature being deprived of its
proper supply may affect the
Heart more or less. It is this deficiency of
supply of blood to Brain that causes the Inc-
sensibility and the various other "head symptoms."
In gradually exhausting diseases the Heart
will itself suffer more or less, but still in
some cases Death will be purely by Anaemia,
the Heart will not perhaps show any Con-
traction or Contractility afterwards.

5. Diseases in which Anaemia occurs.
Anaemia as the direct cause of Death may be
looked for in all disorders of the Assimilating
Procedures from disease or improper food. In
all diseases which interfere with the Blood as in
Phthisics, Chlorosis, Hemorrhages. Specially when
Cheiric and gradual. Stoolings after delivery
from Puerperides, Purific Evacuation from whatever
Channel, and of course in all cases where food cannot
be taken and if taken not digested.
Having considered the two modes of fatal termination beginning at the heart, the first which demands our attention is that which begins at the lungs and which is termed

II. Death by Asphyxia.

In this form death results from the non-arterialization of the blood.

The lungs are the organs in which the blood, coming from all parts of the body laden with certain effete matter which are to be expelled in the form of Carbonic Acid, aqueous vapor, is arterialized and so rendered fit for the sustenance of the various tissues and organs to which it is sent in the course of circulation.

To this end Respiration is necessary and that this latter function may go on certain conditions are requisite, namely:

a. A certain quantity of circumfused air;
b. Means to allow and enable this air to enter;
c. A sound state of the Nervous System more especially of that part connected with the act of Respiration.

If any injury occur to any of these three conditions
preventing either the presence of respirable air, the entrance of the same, or the due performance of the action of the nerves engaged in the process the arterialization of the blood will be materially hindered.

1. Causes of Asphyxia.

In treating of these, we shall first take up those circumstances which delay or prevent the presence of respirable air.

Air that is may be respirable requires the presence of a certain amount of oxygen; hence this there be a sufficient amount of air or gas around the individual. If it contain no oxygen, death will speedily ensue by asphyxia. Thus it is that confinement in a gas which is not itself poisonous is a cause of asphyxia. Confinement in poisonous gases will cause similar results. The their action may be more or less complicated by the action of the poison itself.

Total deprivation of air, as in drowning and perhaps some kinds of suffocating as between two mattresses, which prevent the presence of air, they also perhaps the latter especially may be ranked among the causes preventing
the access of air. In Submersion of body or if it may be the head or even the face, the air is prevented from entering still & a certain it may be said the presence of air is prevented as if there were any air in the water or liquid which could be breathed, it would be so and death would not be the inevitable consequence.

So also in Smothering if there were insufficient quantity of air there would be no difficulty in breathing as no obstruction to free ingress of the air existing.

q. Causes acting by prevention is free ingress of the air, when present, thus the Eternal passage.

These may be from Eternal Violence or by disease. Among the Eternal Injuries may be mentioned, the various Methods of Suffocation or obstructing the Eternal passages, by solid substances, or of Submersion when passages are obstructed by liquids or of strangulation as in hanging. In these Cases the Eternal passages are acted upon.

Air may be prevented from entering by obstructions in the eternal passages, as in choking.

Good remaining in the Pharynx or Cæsophagus.
by Injuries lodged either in the Larynx or Pharynx or Oesophagus, by Ulcer of the Larynx as Odema Glottidis, thickening of the lining Membrane lining the Larynx or Trachea, or Spasmotic Closure of those parts, by the Accumulation of Secretions, or the presence of a Formative Membrane Asia Croup.

By pressure on Trachea of Aneurism or Tumors, the Presence of Fluid in the passages as in bursting of an Aneurism into the Trachea.

Again obstructions may arise from Spasmotic Closure of the Bronchial Tubes as in Asthma; or by the Accumulation of Serous Effusions; by a congested state of the Vessels, or if the bronchial Membrane itself, or both together. Obclusion of the Air Cells themselves will give a similar result.

b. Air may be prevented from entering the Lungs, the passages being open, by Arrangement of Action of the Muscles of Respiration. This may be accomplished by Mechanical pressure on the Walls of the Thorax or Abdomen so that free Expansion is prevented.

The pressure may be accidental as in the Cases of persons buried all save the Head by
Luman also, as a poison, acts by paralyzing the muscles of inspiration. In Christians' lectures, it causes asphyxia by spasm of the thoracic muscles and diaphragm.
falling in of the walls of chest or by "suffocation" it may be artificial as in cases of murder done to as to leave no trace of violence.

Sceases of the Abdomen and Thorax as inflammation of the investing Membranes, acute, tumors, may cause death in a like manner. In all these cases compression or incapability of expansion of chest arises from the walls not being allowed to act or from the ascent and descent of the dia-

phragm being interfered with.

Let it be, Rheumatism of the Muscles of the chest or abdomen, and Stryphea will in their more grave forms now and then be sufficient to cause Asphyxia.

C. Derangement of Continuity of Walls of Thorax and of Normal Size of Cavity.

Wounds of Walls so as not to admit air will impede the full expansion of the Lung and tend to Asphyxia, more especially if air be admitted from wounds or both sides and the greater the amount admitted the more speedily will be the Asphyxia

Effusion into the pleural Cavity, from
openings between them and the air passages, as in pleuritic effusions and Empyema Pericardial effusion if extensive enough may end so likewise.

2. Disarrangement of the Nervous System especially that part connected with Respiration. This will be caused by any injury which affects the Nervous Cible. The Diaphragm is supplied by the Phrenic and the Sympathetic; the Lungs by the Pneumogastric and Sympathetic, if this direct communication be injured Asphyxia will ensue. Section of these nerves, especially the Nerves connected directly with the Cerebro-Spinal System, the Vagus, the Phrenic or Intercostals, when performed singly will take a longer time to act, but if performed all at once will cause instant Asphyxia. The Intercostals will act for a time after the Phrenic is divided and 'vice versa.' Respiration will also go on for a short time after division of the Vagus, but in an impaired state. So with any Tumor, or other diseased structures which by their Compression will prevent action of the Nerves.
Injury of the Spinal Cord between the roots of the various branches or above them and below origin of the Vagus or supple the Medulla Oblongata whether produced artificially; by accident as in fracture or dislocation of the upper cervical vertebrae or by disease as in clots deposited above the origin of Vagia and Intercostals, or in the Mass of Brain connected with origin of Vagus will cause death by Asphyxia.

Narcotic Poisons and various lesions of the Brain as Causes of Asphyxia will be spoken under the head of Coma.

2. After the Air has gained entrance to the Lungs Asphyxia may occur from the Chemical Changes being interfered with from some Morbid State of the Tissue of the Lung.

1. From Inhalation of gases poisonous or containing no Oxygen.

Inhalation of Chlorine, Nitric oxide gas and Nitric Acid Fumes. Phosphate and Sulphuric Acid.
2. Phenomena of Asphyxia.

In a purely marked case of Asphyxia, the symptoms may be resolved into three stages.

1. The first commences with an increased desire to take a full inspiration, in consequence of the increasing urgency of the "besoin de respirer". Strong voluntary and involuntary efforts are made, not only by the muscles employed in ordinary respiration but by the other muscles of the upper part of the body, as is seen in Cases of severe asthmatic paroxysms. This stage, which amounts to Agony does not last long, but gives rise to Vertigo, Lividity, and loss of Consciousness, which forms the commencement of Stage 2. In which the Convulsive efforts are redoubled in energy, become irregular and in which the whole frame partakes. The lividity of first stage attacks the lips which soon become deep purple, the veins become turgid, the eyes look as if starting from their sockets, the pulse becomes almost imperceptible, the Heart
Contracts languidly.

3. Soon the Animal Functions all give way; the Sphincters relax, and the body becomes powerless. Heart soon gives up beating, patches of a purplish color appear over the body with a general lividity. The temperature and the "Rigor Mortis" are slow in leaving. These phenomena follow each other more or less rapidly according to the gradual or sudden death of the individual. In gradually occurring cases from disease, there may be great irregularity; the lividity may thus arise before the consciousness is lost, this last phenomenon being ushered in with convulsions auricular, flushings of light, &c. the lividity may be less in the face while the discoloration is more general over the body; the heart ceases shortly after the Respiration has ceased.

The Genital organs are said in some cases of Sudden Asphyxia as in Strangulation to undergo a state of Erection, which may be followed by an emission Seminis. Rarely an evacuation of the feces occur.
3. **Anatomical Characters.**

These shall be treated off generally, without entering into the different characters seen in the various modes of Causing Death.

**External Characters.**

There will be general lividity, not confined to the dependent parts, sometimes ecchymosed like spots will be observed scattered over, especially on the Neck and Shoulders of Strangulated individual, along with the mark of the Rope which last will of course be absent in all other modes; said also to be (the general ecchymosis) absent in drowned persons. The features will express great distress, the Eyes will be prominent with dilated pupils.

There are other marks which are interesting to a Medical-legal point of view, but which shall not be spoken of as they would be too extensive for the present purpose. These already mentioned will be modified according to circumstances. The face will be floated after strangulation, with protruding
Tongue which need not be expected in the more gradual cases of disease, with which we have more immediately to do.

Internal Characters.

All these proceed from venosity of the blood. All the large will be found more or less congested with venous blood, the Liver, Spleen, the Intestinal Membrane and the Stomach in strangulated persons. Congested state of the Nervous System of the vessels of the Brain &. The right side of the Heart will be found full of blood, along with the Systeric Veins, and the pulmonary Artery. While the left side will be found quite empty, along with the Systeric Arteries and Pulmonary Veins. In long standing lung disease where death takes place by asphyxia, the right Ventricle will be found more or less enlarged.

In the more sudden cases the blood will be fluid and imperfectly coagulable, which need not be in the more gradual cases.

In the sudden cases again there will of congestion not only of the vessels of the Brain
but of the vessels at the root of the tongue causing the papillæ to enlarge, which may extend to the membranes lining the passages, and Epiglottis, this may be covered with a frothy Mucus or serous Effusion.

The Lungs if previously healthy will be found dark, increased in bulk, and greatly injected, the blood oozing out when the substance of the lung is cut into, large drops coming out on the slightest Pressure.

This may also be noticed when the lung has been previously injured as from Pulmonary Apoplexy &c. which served as the exciting Causes of the Apoplexy.

Having seen what are the Causes, Symptoms and Anatomical Character of Apoplexy we shall now proceed to enquire into the Manner in which Stoppage of the Circulation in the lungs causes Death. We shall also enquire into the reason why the Circulation receives this check how it is produced in the lung itself, what are the Changes necessarily gone thro'.
1. Mode of Action.

In investigating the mode of action of asphyxia, we shall first inquire where it is that the circulation is first arrested.

From finding, on examining the body of an asphyxiated individual, the lungs greatly congested, from the great quantity of blood found in the right cavities, with the small quantity in the left cavities of the heart, and from knowing that the blood should traverse the lungs in the passage from the right ventricle to the left auricle of the heart, we conclude that the blood is arrested in the lungs. Having ascertained this point the next question is at what particular part of the lung does this occur?

About this question there has been much dispute, and it is only lately that anything satisfactory has been ascertained.

Valer thought that the stagnation took place in the capillaries of the lung, where it formed a mechanical impediment to the further advance of the blood. This stagnation he attributed to the imperfect
action of the Lung. The lungs not being able to expand properly from whatever cause would doubtless offer a resistance to the flow of blood from the more condensed state of the tissue. This might cause an accumulation in the right cavities, and little or no blood in the left, and such was the doctrine for a time until it was refuted by Dr. Goodwyn, who, in his "Essay on the Connection of Life with Respiration", pointed out, that the venous blood did pass along the vessels, and that the air-cells did not return to the state which they present in the New-born Child, and which was evidently suspected by Galen, even after the fullest inspiration. That this state of condensation is not requisite to produce asphyxia is seen in cases arising from inha-
lation of gases producing this form of death. Dr. Goodwyn further thought that the venous blood found its way to the left side of the heart, but no further, there causing non-contraction of the ventricle, from its not being the proper stimulus to the healthy contraction of the organ, which he thought
would contract only from contact of arterial blood. He thus went a step further than \textit{Mallor\textsuperscript{a}}, who thought that the obstacle lay in the Capillaries of the Lung, while \textit{Gorjus} fancied that the blood was not obstructed but in its turn prevented proper action of the Heart.

This doctrine was however found faulty and another step was taken by \textit{Bichat}, who contended that the blood not only was not obstructed in the lungs, but was sent to the Heart and from thence conveyed throughout the Whole System in which it acted as a poison, more especially on the Heart's substance by entering the Coronary Arteries and stopping the Muscular action of the organ by destroying the sensibility.

This last Physiologist observed that the Heart, for several minutes after the apparent extinction of Animal life, continued to beat; he accordingly found, on tying the Trachea of the Animal, and opening the Carotid Arteries immediately, that the blood was propelled forward in a full stream, the Arterial
the gradually disappearing, and the venous
becoming more general and deep, convulsions
and insensibility marking its contact with the
Brain. Not seeing the circulation thus continue-
ning, thought that it might continue for a
short space of time, provided other effects
were present, "au moins d'une Memoire tres-belle."
Seeing that the internal Surface of the Heart
was not the direct Means of causing the Stagn-
ation as Goodwin, (and which should give
a filled left ventricle on dissection) imagined
seeing also that there was a sufficient time for
the action of a poison thro' out the body, Richat
concluded that the venous blood acted on the
fleshy fibres at the extremities of the vessels
by way of paralyzing them. amongst other
those of the Heart. He says that the same
result might be gained by injecting venous
blood into the coronary Arteries, if it were
possible, during the healthy Circulation of
arterial blood.
"Il suit de la que les différents organes ne cessent
pas d'agir dans l'atrophie, parce que le coeur n'y envoie"
"plus de sang, mais parce qu'il y foule un sang qui"
"Theleur est point habituel". Bichat.

He further says that Asphyxia may result from the general effect produced on the Brain by Venous blood causing insensibility to the feelings produced in the Lungs.

Legallois thought that the irritability of the Heart was lost by the action of the Venous blood on the Spinal Cord.

Lastly, Dr. Hage, from an extensive series of experiments performed in order to discover the real facts of the Case, has disproved the most of the theories which were formerly prevalent and has shown what is, in every probability, the true Pathology of Asphyxia.

He has shown that Venous blood does not destroy the irritability of Muscles, that it even restores it when sent to a part previously unsupplied with, the not so such an effect as Arterial blood will do, as it is the more Natural Stimulus. This disproved Bichat's view of the blood acting as a poison to the walls of the Heart.

Dr. Hage tied the Trachea of a Rabbit, he then opened the Chest and Abdomen; at
the end of the second minute, dark blood flowed from a wound of the external iliac artery and at the end of the 3rd minute it had nearly ceased. In the course of five minutes, all blood had ceased to flow, but the left heart contracted for a very considerably longer period. This disproves the theory that venous blood is stopped at the heart by its incapacity of exerting a proper stimulus, as proposed by Goodwin. It also weakens Richard's theory of the venous blood acting as a poison to the walls of the heart. It proves that the circulation of venous blood may go on for a certain length of time acting as an inferior stimulant. That there is no mechanical impediment in the lungs as supposed by Haller, dependent on the undue expansion of the arrest of the expansion, as seen from the fact that the air cells never contract wholly on any inspiration, as also in Cases of Apoplexy from the inhalation of gases which produce death, and where the full dilatation of the cells may go on. Again, deprivation of air in an adult is followed by a sudden arrest of the
Circulation, when however air is again admitted, the blood flows onward thru' the Lungs the Heart acting under its influence, thus showing that the Heart has not lost its Contractility.

Mayer on considering these facts was led to the Conclusion that the arrestment of the blood must take place in the Lungs as Haller conceived, and he further thought that this can not be in the Lung itself, but in the Blood.

Now to see how the Blood can, of itself when deprived of Oxygen, cause Afferoia, we must recur to what changes the blood under-goes in the Lungs during the Pulmonary Circulation.

The Right Ventricle of the Heart sends Venous Blood thro' the Pulmonary Artery to the Capillaries of the Lungs, there to undergo those Changes which turn it from Venous into Arterial. The force exerted by the Ventricle will suffice to carry the Blood so far on its way thro' the Artery. This may be and probably is sufficient to carry it the length of the Capillaries, independent of any "Vis a Frons" from the motion of the Chest, which may
If the Nervous System started any influence over these Capillaries we would not have the readump.

Time of function brought on in treatment stills seven cases, before any change had taken place in the vessels of the Brain.
Although there may be a mechanical effect to the filling of the capillaries in the lung, and it is further probable that the "capillary power" which is supposed by some to vitiate these capillaries may only act in regulating, not forcing, the flow of blood, "we should altogether dismiss from our minds the idea of any mechanical assistance afforded by the action of the capillaries to the motion of the blood." Carpenter.

Seeing then, that the capillaries if they act in the lung will only regulate the flow of blood, knowing that in capillaries, oscillations take place as the circulation is being suspended as observed by Waller, knowing also, that the velocity of the blood "is sometimes greater in a part of one of them than in other parts of the same, and often greater in one than in the other, or in the trunk whence several arise," which we can not understand, in vessels the "joint area of which increases as they subdivide," if the only cause of motion be an impulse "a large impulse," Alice, there must exist some other cause or set of causes acting independently in the
Pulmonary circulation.

What are these aiding circumstances?

In reasoning on the probable causes of the motion of the blood in the capillaries of the systemic circulation, various physiologists have been led to the conclusion that there existed as an essential of the motion of the blood "a mutual vital attraction or affinity between the blood and the tissues of the body."

This view, we think, is confirmed by the fact that in inflammations, when from any irritation the nutrition of the part is increased, that is when the solids of the body attempt to abstract more from the nutrient fluid, the blood is increased in quantity, the flow is greater and more frequent and all in consequence of the greater demand made by the solids. "ibi stimulatur sanguis fluere."

It is also confirmed by what is seen in the case of placental arteries, which grow to a certain size, in which the circulation is carried on so long as they are supplied with blood from the placenta, and when in absence of the heart, the only constant pulse-flow of blood in the fetus must be from some
attraction on the part of the solids of the tract.
In cases of Spontaneous Purgation it is said
that the Capillaries are porous; "So that cell-
utation of the flow of blood could not be attrib-
uted to any impediment save that arising
from cessation of some power which existed in
the Capillaries and which is necessary for the
maintenance of the current thro' them." Carpentier.
May not the impediment arise from the
cessation of some power in the solids whereby
the same quantity of blood is not called for
and therefore not sent?.
Now to carry this principle of attraction
and repulsion to the changes undergone in
the Lung, by the blood in its transition from
Venous to Arterial.
Venous blood comes to the Lungs laden
with Carbonic Acid; not Carbon as was formerly
supposed, this Carbon being a secretion from
the Lungs, for Edwards found that the
volume of Oxygen which disappears is greater
than that of Carbonic Acid which appears
in the respired Air showing that Oxygen is
absorbed.
"The oxygen of the inspired air, pervading the air-pariters of the pulmonary vessels, displaced by virtue of its superior affinity, an equal bulk of carbonic acid gas, and thus converts venous into arterial blood." - Dr. H. Williams.

Sir J. Reid showed that blood imperfectly arterialised is retarded in the systemic capillaries, causing increased pressures on the walls of the arteries, in consequence of stoppage of absorption which would take place in either when an improper fluid is presented to them.

Hence the first effect of the non-arterialization of the blood is retardation of its flow thru the capillaries. This will take place in the lungs, when the effete matter the carbonic acid gas not being thrown out is accumulated there, and when oxygen which not only carries off the effete matter or acid in its effusion, but which is itself an ingredient in the nourishing fluids necessary for the maintenance of their motion and vitifying power. (Histone) is excluded.

Hence the change not being allowed to go on in the lungs is insufficient to cause Alphysi.
This error showed. In Haller’s view he was right in the place but not in the cause.
In Godfrey’s view we should find on dissecting the heart full and unable to contract which is not the case as we find in true asphyxiated individuals the heart empty and contracted. So with Legalle’s theory—
Biichat again was faulty from the circumstance that the heart is re-pectable and may be made to contract by blowing into the lungs favoring arterialization of the blood a short time after asphyxia has commenced.

Sir Kaye was led to this conclusion by observing the great distinction of all the vessels containing venous blood and the opposite condition of those with arterial together with the various reasons mentioned above.

In trying the color of the blood during the process of asphyxia it will be seen to become darker according on the "residual air" in the lungs as consumed for its oxygen—
The affection of the brain noticed will be caused by the improper stimulus of venous
In decapitation, the immediate effect is Paralysis of the Respiratory Process. Legallems has found that an Animal will survive the loss of influence of Central Nervous and of Hemorrhage for a longer time than in extirpation of the Respiratory Process.
blood and by the diminished quantity sent thither.

To take up now the Causes, as mentioned above, individually, the first the complete absence of Air fit for Respiration will be sufficient to cause the Stagnation of the blood even if Air be received which contains Poisonous Airs.

The following Causes preventing entrance of Air by injury or disease of passages will act similarly. The bursting of Membranes will cause Air physiologically be prevented to enter from the passages being blocked up by the fluid which may descend to the finer branches.

The Muscles of Respiration being prevented from acting by Coughs, by Coniace, by Tumours, or by Strangulation or by External pressure or in the case of the Diaphragm by Inflammation of Peritoneum or some abdominal organ will by imperfect Expansion of chest greatly caused promote Tendency to Edema. So with the imperfect Expansion of Liver itself by fluid within the Thoracic Panicles and External to the Lung.

Arrangement of the Recessus Circle will cause Death by stopping either the action of the different
During inspiration the Glottis is opened, and
partially closed during expiration, and completely
so at the end. If therefore the muscles
be paralyzed by lesion of Nerves supplying
them we have arrangement of this action, either
inability to open or to shut the Glottis.
branches or there being entire, destroying the action of the different ones both together whether from injury at alveoli, pressure on their course or from Chills as destroying the sensibility to the warmth felt in the Lungs as in Concre. Which hereafter.

With regard to the Inhalation of died arteries. Some are irritants, causing more or less inflammation congestion after dealt in the Lungs and air passages. There may have a distinct effect independent of the denial of the Oxygen but those mentioned among the Cancer. Chlorine, Ammonia, Sulfurous gas to act more by purelie physis.

The Oxygen and Nitrogen possess the best forms of pure asphyxiating gases. Some think Carbonic Acid is so also but I christiennes thinks it is an energetic poison. If an individual inhale pure Carbonic Acid gas, he will be aware of suffocation from the distressing closure of the Grottie but when diluted its action seems like Apoplexy. It is in this diluted state that it gradually kills as Examinations from burning Charcoal.
5. Diseases in which Asphyxia occurs.

It will occur in all diseases of the Lungs where growth in the substance prevents the free circulation of the blood, as Pneumonia; in diseases preventing free expansion of the Lungs, as Pleuritic Effusions; in diseases preventing action of the thoracic walls as Tetanus; Pneumonia, Paralysis of the Respiratory Muscles; the latter may be produced by poison as Cunia, or Spasmodic affection of the same Muscles as by Strychnia. It may be caused by the presence of false Membranes or Effusion into the Air Passage as in Croup. Bronchitis, by obstruction as in Bed-ridden, Effusion, or by Strangulated Matter either in the Air Passage or the Cæsophagus. It occurs in Paralysis, and other diseases having the Cærotic tendency, by supervening or arising from that tendency, and also from the Matter not being expectorated from the weakened condition of the Patient. It sometimes occurs in the influence of old Persons. In some diseases of the Heart it may occur.
III. Death by Coma.

This form is of frequent occurrence.
Here Respiration goes on to the last, though imperfectly, the Heart and the Animal Heat continue up to the moment of dissolution, sometimes even surviving it for a few minutes.
The Nervous System is precociously involved.
The Brain no longer performs its proper function necessarily involves the Respiration and this again the Circulation and so Death is brought about. It may be sudden or gradual.

Symptoms of Coma.

In the sudden cases the individual suddenly loses his senses, he becomes insensible to every thing around him, stoppers, develops itself, his Respiration becomes irregular, slow, and stertorous. His face may be flushed and turgid. He looks as if he were in a very deep Sleep from which nothing can remove him. The pulse beats with unnatural force not above or below the natural standard.

In more gradual cases the pulse will be more distinctive, the Countenance may be pale or alternately flushed and pale. Pupil dilated.
perhaps Strabismus, Collapse of Countenance. Atrocity from cold, and in some cases, swelles close to the Seizure.

The great characteristic is the Sopor.

2. Causes of Conium.

These will principally affect the nervous system. The most frequent are the "Shocks" seen in Apoplexies and hemorrhages, which cause effusion or clots. Gradual and constant pressure on the central muscles softening of the same ulcers implicating the region of the Nerves of Respiration.

In cases of poisoning, it may be from use of narcotics or from these being induced by disease as the accumulation of Carbonic Acid in blood, Urine or Bile from ulcers of these organs respectively.

The use of Opium, Tobacco, or the taking Medicinally or accidentally of Acute or Alcohol, Hyoscyamus, Camphor, Cinchona, in too large doses.

Poisonous gases, and also may be mentioned some forms of Haemorrhage.
3. Anatomical Characters.

The same as in Apoplexy. The Respiration not allowing of the proper action of the Heart will produce the characters already described; the Nervous system being in some cases indistinguishable, while in others there will be found the various lesions which occasioned the disease which ends in this way. In these last cases the Brain or Medulla Oblongata will be found more or less altered or destroyed.

In some cases there will be Extravasation of Blood or Effusion of Serum or Liquefied in the Ventricles or beneath the Arachnoid. The clots of extravasated blood may be fresh or enveloped in leucocytes, may be in any part of the Cerebral Mass or in the Ventricles.

In other cases and those of more gradual development, the Brain may be found softened; or since injuries be inflicted that it will retard the action of Respiration will be easily recognised.

In Cases from gradual absorption of Poison into the Blood as in Area from Obstructed Kidney, the Blood may be more or less discoloured and perhaps
Several tissues may be at fault.
In disease of the Liver bringing on this force from the bile being mixed with the blood; there may be a dark color of that fluid, not perceptible however, to any extent, from the venous hae given by the imperfect agituation during the Comatose state.

In Cases of Coma, however, leaving out of sight all the lesions of stomach or organs which induced it, there will be nothing visible beyond the lesion of the brain itself, which will be absent moreover in Cases caused by deterioration of the blood, and the various conditions described under the head of asphyxia.


Coma resolves itself into that force of asphyxia or Stupor caused by Nervous lesion.
The Cerebral Mass, being injured so as to impair its function of sensibility, will, among other consequences, by destroying the sense of feeling lead from the lungs required for
the exercise of Respiration, in a great or less completely cause Apoplexy.

The Nerves of Respiration serve the purpose of Carrying to the Brain and Medulla Oblonga the impressions felt at their distant extremities, and of Carrying from the Brain the impulses requisite for the action of these Muscles by which the Chest is expanded, the Diaphragm depressed, and the Expansion of the Lungs jarred. Now if by any lesion of the Brain, the origin of these Nerves be injured so that the impressions be received but not responded to, Apoplexy will be the result.

If the Par Vagum be destroyed by disease so as to impair its functions, independently of the Gloso-Pharyngeal and Spinal Accessory, death would result from the loss of sensibility to the Respiratory impressions. It would be Apoplexy without any necessary degree of Coma, unless the disease implicated the Cerebrum to a great extent.

When an individual becomes Comatose from the action of some poison in the Blood or Air, every function of the Brain is lost, and
gradually becomes so intense and universal that the Respiratory Impressions are no longer needed. In the Poison of Venous blood in Asphyxia, loss of Sensibility or Coma is induced. It is also induced imperfectly in some Cases from severe Hemorrhage, as in Post-partum Hemorrhage, in which Case it is induced by Venous blood returning from a partial Asphyxia caused by too little supply of Air. The Patient cries for Air, there is plenty of Air & Why does the Cry for it, if it were not from an inability to inhale a sufficiency? Again does or may not this partial Asphyxia be induced by a deficient supply of blood to the Brain caused by the Supererogory Anaemia? or does the inability to inhale arise directly from the Anaemia, and the Coma directly from the same? Convulsions arise from Anaemia, why not Coma?

Among the Narcotic Poisons, Opium is the most frequently the Cause of Death, among the Drugs properly so called at least. This Poison acts, according to M. Charret, by Conducing Congestion and Consequent Depor, by Causing Convulsions thro' irritation of the general Nervous Centres, and by a sedative action on the Muscles.
The opinion is probably carried in Substance to the Brain where it acts by direct influence. If in large enough doses, and injected into an artery, it might act more or less directly by destroying the Heart's action. For Dr. W. Philip found that when applied to the internal surface of the Heart, it caused a cessation of the movement.

Hydrosyphonius has much the same effect. So with Hydroxyphoric Acid, in smaller doses than are sufficient to cause Convulsion.

Belladonna and sometimes Tobacco act in a similar way.

Among the Poisonous Gases may be mentioned Hydro Sulphuric Acid Gas, Carburetted Hydrogen, Carbonic Acid Gas, Cyanogen Gas and Oxygen. This last probably acts by "Hyper arterialization of the Blood." Christian.

5. Diseases in which Coma occurs.

These are easily enumerated. As all disorders of the Brain whether caused by disease therein, or in the Gossypie and Paralysis, or by Poison as in Safety, Paralysis of the Kidney a.s. end by Coma which induces Sehpfia.
We have Corone produced in the Course of
Bleeds of the Kidney as "Bright's" from the ab-

sorption of the urine into the blood, we have it
also where the bile is accumulated therein both
acting as a poison on the Nervous System.
We have it in Cerebral Stupor in its cases generally
we may have it in the advanced stage of Tuberc

oulous, sometimes in the Enzyme, Small-pox,
om more generally in the Eruptive Tylphus.
We will have it in Cases where the Brain is
injured by Clots or Pressure, as in Aplasia,
Paralysis, Epilepsy, Abscesses within the Cere-
num. In Inflammation of the Brain,
in Softening in Delirium Tremens; in Hygro-

phobia we have it in Delirium Tremens,
Complications, with Ablution of the Mental
Faculties toward the end.
Again we may have Coma induced by the use
of Drugs of the Narcotic Class, as Tobacco,
Opium, Hyoscyamus, Belladonna, Prussic Acid
Hydron, &c, either in abundance or in per

ons, each affected this Idiocymeracy, in Cases of
Exposure to intense Cold we observe Coma and Stupor
which is insufficient if left if unattended to.
Having thus imperfectly sketched the various modes in which death may be brought about, it only remains to be added that these are so often complicated and mingled up together with the other that they are seldom seen distinctly.

Thus in "death from starvation" or "fasting," asthma and anemia both occur; and anemia may be superadded by the slightest exciting causes. So is it in phthisis and all of harassing disease. In anemia, septic, syncope may occur in one of the pulmonary, yet if death occur in an advanced condition of the disease, all the organs in the chest will be affected.

In general terms, all forms of syncope may be induced by disease of the abdominal organs, by disease of the lungs and chest, and conce by disease of the brain.