"Hystero-epilepsy"

with special reference to

"Metalloscop"y"

by

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Preparatory Remarks

The subject of a thesis is not infrequently somewhat difficult to decide upon; but having had the opportunities of attending the Cliniques and practice of M. Charcot at the Salpêtrière Hospital in Paris for two winters and seeing so much of hysteria-shyplasy in all its forms, I thought would not do better than take this affection as the subject of my paper.

The whole subject, as will be found, has been specially treated of clinically, with some remarks on the important subject of metallopathy and metallotherapy.

Some not unimportant observations, concerning which I am in correspondence with M. Charcot, are not mentioned in this paper, but I hope in the course of a short time to mature them and bring them forward for scientific scrutiny.

R. L. Shaw
In commencing this Thesis it is not my intention to expose the complete history of Hysteric, for it has been known to, and described in medicine from the most remote period. If one were to enumerate the earlier writings on the subject, almost the whole of early medical literature would have to be cited. Indeed, it would be difficult to add anything to the profound researches with which Briquet has enriched science; further, it would be a study of little practical importance - suffice it to say that all that has been written on Hysteric corresponds to Hysteric epilepsy, which is as Dubois, of Amiens, puts it "que de l'hysteric ayant un degré de plus dans les symptômes."

The study of Hysteric has been pursued by men of mark of all times, and within the number of works and the exceptional merit of some of them, especially the dissertation of Sydenham, have been able to upset the Galenic-Hippocratic theory that there exists a necessary correlation between the development of Hysteric and a morbid state of the uterus, or, at least, of some of the generative organs, particularly the Ovaries."

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(i) Dubois - Histoire périnale de l'hysteric et de l'hysteric - Paris 1852
(ii) Bernoltz - Article Hysteric - Dictionnaire de Jaccoud.
In the oldest theories the uterus exclusively acted as a 'primum movens' of the disease. The ancient Greek physicians thought that it wandered through the body and produced by pressure on different organs symptoms of disease. In the latter, Galen saw the impossibility of such migrations and promulgated the theory of retention of fluids or blood in the uterus exerting a pernicious influence on the whole organism. After Galen followed the humoristic physicians based upon most absurd hypotheses, such as, the ferment, aciety of humors, rushing out of spirits, black and yellow bile for. In 1620 Charles Estiais did justice to these exaggerations, but went to the opposite extreme, and denied any influence whatever of the uterus in hysteria. Robert Le said to prove that the uterine unrest state directly produced the convulsions; whereas, Schultze-Overberg, Lenberg & stated that it was produced reflexly through the Medulla Oblongata. Sylvainism considered an atony of the brain to be its cause. Lenberg, as a reflex neurosis caused by mental irritation. Prouvre thought it was caused by a hardening (raccroissement) of the nerves.

In the Gazette des Hôpitaux for Feb, 1874, is an article by Bernard proving that acute affections of the genital organs, hematocele, periuteritis de rarely give rise to hysterical complications; and in a large number of affections of perfectly hysterical women the genital organs were perfectly healthy. Grisolle, in the same journal, Nov 18, 1853, and Castanet (1873) have even seen in two undoubted cases of hysteria a congenital absence of both uterus and vagina. Further, hysteria and hystero-myolopy even exist in men.
Brizet relates 7 such cases, and Rosenthal 2 cases. Therefore it seems impossible to admit that the cause of hysteric exists in the uterus or ovaries.

Although opinions concerning the essence of the disease have been truly diverse, yet all contain a particle of truth, as they are founded upon a knowledge of particular and frequently operative causes of hysteric. The view that the disease has its root in the Nervous System, has, since the time of Sydenham, gained more and more adherents, and may at present be said to be that which is almost universally entertained.

Brizet, in his masterly work, (Traité clinique de l’hystérie, Paris, 1859) stated that hysteric was a central nervous, and may be combined with Epilepsy, constituting what we now term Hystero-epilepsy (Epilepsia uterina of Bonnet). He states that this combination takes place in three ways:—sometimes the Epilepsy is the primary affection with hysteric grafted on in due time, sometimes it is hysterical, and at other times the two affections are developed simultaneously and are coeval, but varying in proportion in different cases. Upon the first two forms, 'Hystero-epilepsy with distinct crises', all writers are of one opinion; but it is upon the third or last form, 'Hystero-epilepsy with combined crises', that opinions are divided. Some writers think that it is a distinct or hybrid affection; whilst others, including Longar-Villermay, Trousset, Dubois of Monier, Trousset, Brizet and Charente, believe it to be merely a grave form of hysteria. Epilepsy will only be present in an external form of manifestation; it will act at the root. The epileptic form of convulsion will appear there, as it appears
in many other forms of nervous affections, as an accessory element, without changing the primitive nature of the disease. In other words, hysteria is solely and always present taking on it the semblance of epilepsy (Harey).

It is this form or variety that the following pages are intended to be descriptive of. It has received various synonyms; thus — hysterie epileptiforme (Longu. Villermay and Liest), hysterie a attaqués violents (Briquet), and hysterie major or grand hysterie (Charcot).

Hystero-epilepsy is a rare affection, for Peace only found 32 cases of it out of 276 cases of hysteria, and as 20 of these had distinct attacks or crises, there were in reality only 12 of true hystero-epilepsy. Moreau de Joncour only found 61 cases of hystero-epilepsy out of 671 cases of hysteria. Durant, in his excellent thesis, states that of 235 epileptics at Salpêtrière only 54 were hystero-epileptic, and 23 of these merely had some hysterical complications.
Description of a regular Hystero-epileptic attack

Prodromata

The hystero-epileptic attack does not commence unexpectedly, but is always preceded by phenomena, termed Prodromata, which nearly always give the patient sufficient time to take precautions or seek a place of refuge when the fit is coming on. These prodromata may appear some days even before the fit. They are numerous and varied in character, so that in order to consider them carefully it will be best to do so in a systematic manner by dividing them under the following headings:

(1) Psychic disorders
(2) Organic functional disorders
(3) Movement disturbances
(4) Sensation disorders

(1) Psychic disorders — These are the first to appear. Sometimes for a week before the attack the patient states that she does not feel herself. She is incapable of applying herself to her usual occupation, whatever it may be, and any little vexation or disappointment, however trifling, greatly affects her and is apt to assume an exaggerated importance. Sometimes she becomes profoundly melancholic, often refusing to speak, or may display violent fits of anger. Again her usual neat mode of dress and propriety of cleanliness become neglected. Also her changeable expression of physiognomy, whilst her attention is fixed on some point (in space), betokens the presence of some form of hallucination, which will be treated of directly.

The melancholic periods often alternate with those of gaiety without any assignable cause. They become restless, suspicious, jealous and very irritable. Also at times they are obstinately silent, so much so that nothing will induce them to speak.
Not infrequently they become very active, moving every limb, and destroy anything that comes in their way. When this agitation is accompanied by cries it not infrequently has a dreadful appearance, but is never so dangerous as the delirium of epilepsy, for there is no impulse to destruction of self or others, and therefore probably is merely a safety-valve action in letting off surplus activity (Vol de l'opium Médical, Jan. 11, 1879).

With regard to hallucinations, those of sight and hearing are the most frequent, although every sense may at one time or another be affected. The most common hallucinations of sight consist in visions of animals, such as black cats, colored rats, spiders, and fabulous animals. Chas. has established discovered a law which establishes a constant relation between the senses affected with hallucination and the seat of the hemianesthesia - thus, the cats &c. run from left to right, or vice versa, according as the seat of the hemianesthesia is left or right - the hemianesthetic side being the one from which the hallucination departs. But very often these visionary objects run by the patient's side from behind and vanish in front - and that always from the unaffected side.

We will cite a few cases at the Salpêtrière, which are very fully treated of in L'Illustration photographique par Mornexville at Regnard.

Marie B. saw black cats and rats climbing up the right side of the head of her bed. She had right-sided hemianesthesia, and when she was very sleepy saw soldiers in red uniforms passing to and fro at the foot of her bed. (Icon. Phot. Vol. II p. 167 and 189)

Alphonsine B. saw no animals, but in place of them were soldiers, who stopped at the foot of her bed and stared at her with great fright. (Icon. Phot. Vol. II p. 187)


Lir. saw a great number of coloured butterflies, also the devil in the trees. (Icon. Phot. Vol. I p. 14)

Many others might be cited, but the above will be sufficient for our purpose.
The hallucinations of hearing are certainly less common than those of sight, and are found principally to affect the hemianesthetic side.

Gl... whilst walking hears a voice calling her but on turning round sees no one, and whilst at work, familiar voices speak in her ear. She hears them principally on the right side, having right sided hemianesthesia. Also she sometimes imagines that someone is hiding her and always holds the right cheek (L'Espe. Photographique).

Nearly all her hallucinations in the ears which are more intense on the hemianesthetic side. They also bear little to strike or voices of any kind.

Occasionally she imagines that someone is about to take liberties with them during the night. At other times the hallucination takes a form of theAura and indicates the commencement of a fit - this was always the case with Alphonse B..... (The Lancet, Vol III, 1872-3, 49)

(a) Organic functional disorders —

(b) Digestion — Digestive and the psychic disorders just described. The digestive disturbances are amongst the earliest to appear, coming on generally some days before an attack. They are pretty constant. Thus there is loss of or depressed appetite. Vomiting is pretty frequent, and sometimes, owing to spasmotic contraction of stomach, Acidosis or Diaphoresis, nausea is produced which may be very obstinate.

According to Briquet (Haste de l'hystérie) the stert of speech in the 'hysterical suffocation' may be in the Pharynx, Esophagus, Larynx or upper part of Trachea. He found that out of 4,000 cases of hysteria there were only 30 that had never been so affected. This stert of the throat may be observed in the intervals as well as during an ordinary hysterical attack; and further, constitutes one of the prodromata.
of kystio-epilepsy, forming generally a part of the principal symptoms of the kystio-epileptic aura.

Also convulsions and symptoms may be complained of. At times, \( \ldots \) was obliged to cover her face after meals - this abdominal distention, affecting principally the large intestine, comes on usually suddenly and vanishes equally quickly. These occur also during the attack itself as we shall describe further on.

6. Respiration - Generally there is a constant oppression, varying in intensity, which causes a sensation of want of air. Niccough and Carpal spasm take place in the convulsions phenomena which often precede an attack. Also loss of voice, yawning or cut to be observed.

7. Secretion - Varying amounts of phlegm are noticed in the commencement of the attacks. Mathieu (\textit{Etudes Cliniques sur les Maladies des Femmes}, p. 450) mentions a case of this in which the abundance of phlegm acted as a warning of the approach of an attack.

The urine is abundant, clear, and colourless.

8. Circulation - Palpitation of the heart forms an important part of the prodromes. All suffer alike from it - coming on by fits and starts under the slightest cause or even without any appreciable cause. This palpitation always accompanies the painful phenomena of the aura, and is very intense being felt all over the chest and even in the neck.

Motor changes are by no means rare. Garcia not infrequently had twitchings before her attacks. On the other hand, Rosenthal, in his \textit{Etudes Cliniques des Maladies du Systeme Nerveux}, p. 497, mentions a case in which there was a sensation of cold and a blanching of the finger ends. Charest has observed the same in several of his cases.
Movement disturbances — Anaesthesia is a constant symptom of hysterical epilepsy, accompanying the anaesthesia, and appearing or disappearing with it. At the approach of an attack, the muscular weakness on the affected side becomes more marked; and often the patient is unable to use the anaesthetized arm. The dynamometer shows pretty diminished power. The walk becomes uncertain, especially on the anaesthetized side, with trembling, and the limbs even suddenly give way at times. Frequently there are cramps and startings — these startings are similar to those seen in true epilepsy, and consist of a sudden tetanization of a muscular group, ceasing as quickly as produced, and causing a rigid movement of the levers to which the muscles are attached. They may be partial, affecting only one side, and then generally the anaesthetized one, or only the face, a limb or; at other times they are general and prior to a movement of the whole body. These startings seem to take place principally at night towards bed-time. Sometimes for some seconds before an attack they increase in rapidity and finally seem to merge into the epilepsy from tetanus of the attack.

Contractions is also frequently a forewarning symptom. It is generally partial, coming on suddenly, and passes from one limb to the other, ceases and re-occurs, and gradually becomes general in the four limbs only a few moments before the attack.

Sensation disorders — Anaesthesia or hemianesthesia, although a symptom of hysterical epilepsy, exists apart from the attacks. And sometimes the anaesthesia is accompanied by analgesia. Not infrequently hypoaesthetic zones are observed. Also there may be loss of taste and smell, dysaesthesia, achromatopsy, dyschromatopsy, hemiopia or
amblyopia on the affected side which became more marked before an attack.

Besides these general phenomena there are certain peculiar phenomena which constitute the true **Aura Hystérica**.

These hysterical females have always, a more or less intense, fixed pain in the abdomen, which Schönfelder, Piercy, Hébert and Charcot, contrary however to Briquet, assign to the ovaries. They consider it to be a hypochondritis of the ovary (Ovarie). Briquet, however, states that it is merely an hysterical hypochondrias of the pyramidalis, rectus abdominis and lower part of the Abdominal Muscles.

As it has been worked out so carefully by Charcot, I think it best to give his remarks in extenso from his work.

"I. Thus he states, sometimes it is an acute, raw, a very acute pain; the patient cannot tolerate the slightest touch, nor suffer the weight of the bed clothes, &c.; they shrink suddenly, and as if instinctively, from the fingers of the investigator. Add to this a certain degree of transfixation of the abdomen, and you have the clinical appearance of false peritonitis — the chronic peritonitis of British authors. It is manifest that the muscles and the skin itself share in the suffering here.

"II. In other cases, the pain does not spontaneously show itself; it requires pressure to discover it; and, under such circumstances, we note the following phenomena: a, there is general anaesthesia of the skin; b, the muscles, if relaxed, may be pencilled and scored without causing pain; c, this preliminary exploration proves that the root of the pain is rooted in the skin nor in the muscles. It is consequently necessary to push the investigation further, and by penetrating, as it were, into the abdominal cavity by pressure of the fingers we reach the real focus of the pain.

"This question allows us to make certain that the root of the pain in question is usually fixed; that it is always near the skin, and indeed, it is not uncommon to find that patients point it out with perfect unanimity. From a line uniting the anterior borders of the skin, let fall the perpendicular lines which form the
lateral limits of the trigastrium, and at the intersection of these vertical and horizontal lines will be found the focus of pain, as indicated by the patient, and which becomes further manifest on pressure being applied by the finger.

"Deep exploration of this region allows us readily to recognize part of the superior rict which describes an inwardly concave curve; this is our guiding point. Towards the middle of this rigid crest, the hand will usually meet with an oval body, elongated transversely, which, when pressed against the bony wall, slips under the finger. When this body is swollen, as often happens, it may attain the size of an olive, or a small egg, but with a little experience its presence can easily be ascertained, even when it is of much smaller dimensions.

"It is at this, the period of exploration, that the pain is chiefly revealed; it then manifests itself with characters which may be called specific. This is the common pain we have to do with, but a complete sensation which is accompanied by all, or some, of the phenomena of the acute hysteria; such as they spontaneously show themselves before an attack. When the sensation is thus determined, the patient recognizes it as familiar, as having felt it scores of times.

"In short, gentlemen, we have succeeded in circumstanciating the virtual force of the area, and, by the same act, we have provoked irradiations in the direction of the trigastrium (the first node of the area to use Mr. Perry's terminology) sometimes complicated with nausea and vomiting; then, if the pressure be continued, then soon supernumerary palpitations of the heart, with extreme frequency of the pulse, and finally, the sensation of the phlegm hysteria is developed at the throat (second node).

"At this point terminates the description, given by authors, of the ascending irradiations which constitute the acute hysteria. But, judging from my own observations, the enumeration of symptoms, if thus limited, would be incomplete; for an attentive analysis allows us to ascertain the presence, in most cases, of certain cephalic disorders which are evidently the continuation of the same series of phenomena. Such are, for instance (in case of compression of the left artery), the intense sonorous sounds in the left ear, which the patients compare to the stertorous noise produced by the whistle of a railway engine — a sensation as of blows from a hammer falling on the left temporal region — and, lastly, a marked diminution of sight in the left eye.
"The same phenomena show themselves in the corresponding parts of the right side, when pressure is applied in exploration of the right ovary.

The analysis cannot be carried further, for when death has arrived at this point, consciousness becomes profoundly affected, and, in their confusion, the patient no longer retain the faculty of describing what they feel. Besides, the convulsion fit soon enforces, if the experiment be presented with."

Before an attack, the ovarian pain becomes much more acute, and is immediately followed by the phenomena of the aura hysteria described above from Charcot’s work. Generally it starts from the left ovary, but it may start from any part of the body where there is a fixed pain; as, head, neck etc.

In many, probably in all, hysterics, there are certain hyperesthetic spots or zones which, if touched, provoke convulsive attacks. In one patient at the Salpêtrière (Gen.) this spot was an hyperesthetic zone between the two scapula — this is a frequent area. Once a sceptical student touched this zone and immediately there followed an attack. Singularly, however, after a severe attack touching gave negative results as though the excitability was exhausted. In another patient (Gen) if she were touched on both sides simultaneously at a spot situated below and outside the mammae hysteria-epileptic convulsions were immediately provoked. In others, it was situated at the top of the head, over the ovaries or even over the epigastrium according to Schultzeberger.

These spots are termed the hysterogenic zones or points.
First Period

Epileptiform Period

The attack once inaugurated commences by epileptiform symptoms similar to true epilepsy, but differing entirely from this by the presence of the fact that at any moment of the epileptiform period the convulsions can be immediately arrested, and the patient restored to consciousness by firm pressure over the eye or else by the shock of an electric current. These at once establish the diagnose—that the epilepsy is present only in an epileptiform form and is not at the root—for in true epilepsy these means would not even ameliorate the convulsions much less stop them.

And like true epilepsy this epileptiform period has been divided into three phases:—

I. Tonic
II. Clonic
III. Resolution

When the hystero-epileptic attack arises spontaneously the tonic phase is ushered in by irregular respiration, awkwardness of speech, amounting to embarrassment, of which the following example, which occurred in one of the patients at the Salpêtrière (With kind permission I) may be cited—"Je...ai...d'en...respiration...différente...le...ne...suis...pas...malade...apres...de...pas...avoir...le...volut...d'angle". The words were enunciated in the way they are written. Some tumultuous heaving of the abdomen then follows, the eye-lids palpitate rapidly, the loins becomes fixed, the pupils dilated, the gaze is fixed upon some object above and then suddenly
occur the three phenomena which mark the onset of the epileptiform period, viz.: loss of consciousness, arrest of respiration, and muscular tetanisation. But if the attack be provoked by some strong emotion or by pressing on the hypothecic zones, the patient falls immediately, and there are no preliminary convulsive movements. Dr. Pasteur published a case in Les Archives pédiatriques de Médicin, Feb. 1860, in which the sight of a letter at once caused an attack.

During this epileptiform period the loss of consciousness is absolute; however, the patient may be awakened at any moment by pressure on the ovary and introverted, but her answer is invariably the same: she knows nothing, remembers nothing and has been nothing — thus entirely differing from the other periods of the hystero-epileptic attack in which they, as we shall find, perfectly relate the subject of hallucination when awakened.

The initial cry of the epileptic is wanting according to Chasséot, if I mistake not, although Landouzy and Brière affirm that there is a plaintive half-broken cry which may possibly be caused by the existing respiratory spasm. The real hystero-epileptic cry takes place in the second period.

**Tonic phase** — Muscular tetanisation does not arrive at its maximum instantaneously; before tetanic immobility is reached there are certain extensive movements made by the limbs of circumduction, pronation, flexion and extension, the former being the most general, which are exemplified by the following sketches (Figs. 122). These movements are performed slowly for 3 or 4 times, being always the same in that patient. And whilst this is going on the trunk bends or extends or even turns on one side.
The head bends gradually backwards generally, and the face
which at first is very pale soon becomes suffused with blood.
The forehead wrinkles, the jaws set, the eyes roll and the
pupils, which are usually dilated (at times contracted), are
turned upwards behind the upper eye-lids. The mouth may
be closed or open; sometimes the lips are firmly pressed together.
The tongue may protrude, and frequently there is frothing
at the mouth. The facial aspect is greatly distorted and
then respiration suddenly ceases, the pulse being felt with
difficulty. The neck swells enormously, much more so than
is met with in true epilepsy, exhibiting the veins as to many
greatly distended cords.

After these extensive movements follows a condition of
titanic immobility in which the attitudes assumed are various,
but that of complete extension and dorsal decubitus is the
most general, with the arms extended, adducted and rotated
outwards, the wrist being flexed and fist closed. Sometimes
the two arms touch by their posterior surfaces over the middle of
the body, as seen in the following figure 3, copied from Seors' Photo.
The inferior extremities are also stretched out with the knees pressed closely against one another, and the foot in the position of Equino-varus or-valgus. The trunk is rigid and rests on the side or back, not infrequently Olistotasis being present.

Although this is the most common attitude, it is by no means the invariable one, for the body may be in the pose of an arc of a circle, with the head and heels alone resting on the bed, the back being sometimes raised quite 15 feet above the bed at the highest part of the arc — or, sometimes the arms are stretched out as is seen in the state of Crucifixion, and, at other times, the positions are very bizarre and unexpected. However, very shortly follows the

**Clonic phase** — this phase commences by a few quick and slight movements of the tetanic kind. The movements become rapidly generalised and the whole body and face are convulsively agitated, as seen in the sketch (Fig. 4).

Frequently the movements seem to predominate on one side; then they become less and respiration (at this time suspended) recommences painfully. The respiratory movements of the chest do not correspond with those of the abdomen, owing, no doubt, to the contracted and tetanic state of the abdominal walls. By this time there is much foaming at the mouth — and not unfrequently a snoring noise is heard. The size of the neck diminishes at each inspiratory then gradually the convulsive movements become less frequent and the patient passes into the next stage of complete muscular resolution.
Resolution phase—The patient lies on her back with her head turned to one side, perfectly quiet, with her muscles lax and flaccid. However, the face is still somewhat flushed; the eyes are closed; and respiration is more regular but still stertorous. Saliva is secreted more abundantly and is frothed by the expired air. Although this is generally the case, yet, at times, some contraction remains and the body then retains an unusual position.

Duration of epileptiform period

Generally, the epileptiform period occupies from two to five minutes, very rarely more, most frequently one to three minutes. Although the duration of the whole period varies, yet the tonic and Clonic stages show a great regularity, being generally 60 seconds for the two. It is very difficult to decide on the duration of the Resolution stage, for it may be short or even at times absent altogether.

Variations of epileptiform period

Although the foregoing is the description of a complete and regular epileptiform period, yet there may be great variation. Thus, the tonic (extensive) convulsions may be omitted, and tetric immobility established at once; or, again, it is the tetric immobility that is wanting. The Clonic convulsions may occupy the greater part of the epileptiform period, or may be limited even to a few rapid movements. And, lastly, the resolution stage may be incomplete or altogether wanting.
Second period

Contortions - Extensive movements

After a more or less lengthened period of repose the patient passes into the second period, that of Contortions and Extensive movements, to which Charcot has given the picturesque name of the period of Clownism, or rather, Harlequinism.

This period is divided into 2 phases:

(1) Contortions
(2) Extensive movements

Contortions - Here the body and limbs are contorted into almost any position that is unnatural; the muscles being perfectly rigid so that the patient may be moved like an iron bar. The two most common positions are those of Crucifixion and Act of a Circle - in the latter the inflated abdomen forms the summit of the arc, the heels and Occiput only touch the bed, see Fig. 5.

Piguet relates a case in which the body was so curved that the head and heels touched one another. Again, the body may be similarly bent with the abdomen alone resting on the bed. At other times the body is acutely flexed forwards.

Sometimes the facial muscles take part in the general
contraction producing most horrible grimaces.

The respiration although irregular is never suspended as in the Epileptic form period and therefore there is no facial turgescence. Nor is there any foaming at the mouth. These strange attitudes may be retained without change for some minutes.

She then, without any transition, passes into the next phase:—

**Extensive movements** — not infrequently this phase is opened by a prolonged shrill cry, not unlike the screeching of a railway engine; and it is often repeated two or three times. The muscular system becomes relaxed. The movements performed are very various — the most frequent one is that in which the patient sits up in bed and violently and rapidly throws her head back on the pillow performing a sort of bowing or salutation movement, as represented in the following sketch.

![Fig 6](image)

At other times the legs perform a similar movement in addition to that of the upper part of the trunk.

Again, thus, as exemplified by Dr. ... at the Salpêtrière, raise the body into the position of a Criele and then let it fall on to the bed — thus:—

![Fig 7](image)
Or the legs may be thrown with such violence into the air that the whole body is raised from the bed.

These movements are repeated 15 to 20 times in succession without any appearance of fatigue. They require such agility and quickness with such an enormous muscular power that in the Middle Ages they were considered to be beyond the resources of human nature, and the idea of a supernatural intervention was called in to account for them.

Singularly, the same contortions and movements are nearly always performed by the same patient.

Sometimes, however, in place of the above described rhythmic movements a sort of struggle or fury ensues when the patient strikes her chest with great violence with her closed fist; tries to tear her hair and scratch her face, howling like some wild animal; tears her clothes to pieces and tries to bite her attendants, and at the same time her head and body are agitated by rapid and violent movements.

The two phases of contortions and extensive movements may not be distinctly observable at times, but in their place a mixed and disordered series of movements without any regularity.

During this period there is not absolute loss of consciousness as is seen during the epileptiform period, but the patient is more or less under the influence of some horrid hallucination as is revealed on waking her by means of pressure on the eye when she expresses great relief at being saved from some great dominating moral or immoral terror.

There appears to be no relationship whatever between the hallucination and the attitudes assumed—these differing entirely in this respect from the next stage of the attack as we shall find.

The mean duration of this period is 1 to 3 minutes, like the epileptiform period.
Third period

Emotional attitudes

Without any intermission, the patient now passes into the third period, that of emotional attitudes; for it is very rare that there is any period of repose, sometimes even the delirium appears to commence during the movements of the 2nd period.

This is the most interesting phase of the disorder. Hallucinations of the most vivid and dramatic character transport the patient into the world of imagination— and by her striking attitudes of miming and spoken words one can easily follow every step of the drama in which she takes an active part and comprehend the emotions she is feeling, whether those of joy, sadness, anger, emotion, fear or terror. The scenes that are being represented to her mind with such vividness are-figure passages in her past life intermixed more or less at times with scenes of pure imagination.

There are two principal types of hallucination, viz.-

Sad and joy— in the latter the patient thinks, for example, that she is transported into a magnificent garden, a sort of Eden, where the flowers are red and the people are clad in the same color. There is plenty of music and the there meets the object of her old affections or her dreaming, and erotic scenes sometimes follow. The sad scenes include, the war, the commune, fire, assassinations &c. and nearly always there is blood shed.

Generally the scenes succeed in exactly the same order— i.e., in the order in which they actually occur, but they may be more or less confused and inverted. Singularly, however, the same gestures and attitudes
accompanied by the same words occur invariably in the same case. These seem to be stereotyped on her brain, and on examination it will be found that they are reproductions of the scenes of violent emotion that preceded or developed in the hysterical epilepsy.

In one patient, ... at the Hôtel-Dieu, whose emotional attitude was very regular, no sooner had the extenuating movements of the second period ceased, than, raising herself into a semi-sitting posture, with clenched fists and menacing expression, she presented a most startling picture of one threatening, giving utterance to such words as "Haine, bite!" or "Faule bite!" Rigane! ... Est-il permis?" while she tries to catch the unpleasant figure which torments her and launches forth into a string of heated invective, but almost instantly the picture changes to

The whole attitude and expression portrayed convulsory effort, for she fell on her knees with her arms extended and hands folded crying, pardon! pardon!

Brusquely she fell on the bed as if struck by an invisible force, with her arms stretched out at right angles from the body, so that an appearance was presented which has been called "Crucifixion," or the position of Crucifixion, as is represented in the following sketch. This form has not been observed in the English cases, owing, no doubt, to religious belief.
After this scene one of intense joy ensues; the patient sees one whom she loves, she beckons to him to come, to come quickly; he has come......... immediately follow gestures which stamp this as the "phase of lubricity" of the emotional attitudes.

Again, fear takes possession of the patient, which at first is that of rats which the bees and appears to fear the attack of, giving out to passionate exclamations of dread and disgust; then it is obviously the fear of some human being which oppresses her and causes her to beg for mercy.

Now, there is no longer fear — she is pleased at hearing streams of music; she herself, commences to learn the time, beats the time, and applauds the soldiers, but only for a short time, for the singing is followed by weeping, which is broken by reproaches to her parents who are supposed to be the cause of her misery.

The musical hallucination always marks the approach of the end of the attack.

During this period of hallucinations the patients are totally insensible to all external irritation excepting ovarian pressure and electricity. The former of the two being most certain and prompt in its action. Thus, by pressing firmly over the ovary, she instantly awakes, and if interrogated at once she will give an account of the scene in which she is in imagination taking part, and the emotions she is feeling, which accurately agrees with and explains the attitude and gesture observed at that moment.

**Duration** — This period of emotional attitudes lasts longer than either of the two preceding ones — generally being from 5 to 15 minutes.

While these periods which properly speaking constitute the attack have a mean duration of from 15 to 20 minutes.
Fourth period

Dilirium

Strictly speaking, on the termination of the third period, that of emotional attitudes, the attack is virtually over. Consciousness partially returns and the patient passes into a state of violent delirium mixed with hallucinations and accompanied sometimes with certain movements. This constitutes the fourth period of the hystero-epileptic attack. Most frequently, the delirium is of a melancholic type, the patient relating her whole past history accompanied with lamentations of: "Ah! Camille... at the Séguétin, nearly always terminated her attacks by some such discourse as the following:

"Ah! père... que je voudrais comprendre ma douleur... Dieu seul... je devrais ne pas le recevoir... J'aurais... je devrais être en femme, il fait de moi sa maîtresse... mais je l'aime trop... tout est perdu pour moi..."

All at once, clothing with her eyes full of tears as though someone was approaching her bed, she says:

"Vieux... t'es voilé..." Then crying pitifully: "Oui, oui... je l'aime et je suis en colère... je souhaite que tout cela finisse..." After a moment's quietness: "Et dire qu'il a eu la chance de te faire connaître... ah!... la nuit qu'il m'a tant aimée, il aurait mieux fait de te causer une punition... Mes mariés... jamais de la vie, jamais un homme ne me sera rien... Ah! Camille, Camille... je veux mon mari dans mes dents!"

Sometimes the delirium rises to despair, or it may be gay, furious, religious or even obscene, depending on the impression of the moment.

During this delirium the patient totally recovers.
consciousness and recognises perfectly well those surrounding her, but at times makes mistakes in their names.

At other times, the delirium is replaced by obstinate silence, so much so that it is impossible to get a word out of them— or, they may laugh and cry without any motion whatever.

As I have stated before, the incoherent delirium is mixed with hallucinations of various kinds, such as, rats, toads or snakes on the bed clothes, causing the greatest alarm of horror— or, it may be of persons known in the past.

On awakening she remembers the hallucinations of this fourth period, and, moreover, has a very firm belief in their reality; even accusing those innocent of deeds supposed by her to be done. Thus, one patient at the Salpetrière accused another of having taken away the flowers from her bed-head, whilst in reality the latter had not been in the ward at all; and to persuade her that it was an hallucination was simply in vain. So strong, indeed, is this assurance, persisting even apart from the traces of the attack in some cases, that it is easy to understand how, in the days of witchcraft and sorcery, women blood themselves accused of crimes for which they would rather suffer than repudiate, and which were but the hallucinations of an hysterical attack.

Some contraction frequently remains after an attack, and may do so indefinitely, in the same manner as the complications of delirium, anaesthesia and analgesia, or those of sight, such as, amblyopia, achromatopsia and anacrasia. These contractions may be general or partial. In the cases of general contraction the attitudes assumed may be most unnatural. Frequently also there is a sort of slow tetanus of the muscles causing most harrowing cries
of pain from the patient who has already become conscious. Also, the muscles of the abdominal wall are so contracted that compression of the bowels becomes very difficult, but, if possible to effect it, the contraction ceases immediately and recommences directly the pressure is withdrawn. Electricity seems to have no influence over these contractions. This state of muscular contraction bears a resemblance to that occurring in the first two periods of the attack but may be easily distinguished, for there is perfect consciousness, the duration is longer, respiration is not usually interfered with, and lastly, there is a great amount of mobility as the patient changes his attitude pretty quickly.

The contractions, however, may be only partial, affecting a single limb, part of face or tongue &c., and then are generally not painful but may last for months or even years. It may affect the breast, and interfere with alimentation, or the bladder may be the seat. Sometimes, on the other hand, the Depleia may be a paralysis or a paresis of certain muscles, such as paralysis of the sphincter urethrae, resulting in incontinence of urine.

And lastly we may add that there is generally a copious secretion of pale, limpid urine.

This fourth period of delirium, which is more a sort of prolongation of the attack than a complementary part, is very difficult to assign a precise duration of; for it may be very short, lasting for some few minutes only, or, at other times, be protracted to some days.
Hystero-epileptic acme

We have now described a typical, regular, and complete hystero-epileptic attack, the four periods of which may be traced more or less completely in all the hystero-epileptic attacks.

An attack, however, rarely occurs alone—generally there is a series, constituting what is called an hystero-epileptic acme, or, as the French term it, "État de réal hystero-épileptique".

In a series the attacks follow each other in two ways: thus—

1. Before one attack is finished another commences and the patient does not regain consciousness. The third period of emotional attitudes is interrupted by the first period (Epileptiform) of a succeeding attack, and the fourth period (Delirium) is altogether wanting, except in the last attack of the series when it exhibits itself.

2. In this second variety, the attacks are separated by an interval of repose, varying in duration. Here the attack is complete in all its four periods.

A series may be composed of from 20 to 100 attacks or even more, and last from 4 to 24 hours. Further, the series themselves may succeed each other with only a few hours intermission in which the patient takes food, and last from 14 to 20 days, or even longer. Gayet quotes the case of a woman who suffered from an almost constant succession of fits extending over 48 days.

A thermometric observation of immense importance, first made by Cazeneuve, distinguishes per se the hystero-epileptic acme from the epileptic acme (Status epilepticus) or as the French call it "État de réal épileptique". I refer to the non-elevation of temperature. And as it seems of such immense importance I think I cannot do better than quote
Charcot's exact words from the English translation of his work, "Leçons sur les maladies des systèmes nerveux."

Thus he says, "whilst, in the 'major aere of epilepsy,' the temperature rises very rapidly to a high degree, and the patient's condition becomes extremely critical, — in the 'major aere of hysterio-epilepsy' on the contrary, the temperature rarely exceeds the normal standard, whilst the concomitant general state of the patient is not of a kind to inspire uneasiness."

At the termination of a series of fits, the patient is fatigued, but the fatigue is not in proportion to the enormous expenditure of muscular force which is used, and, in a few days, she is in her usual state of health. Even when the series of attacks are frequent, the general health does not seem to be affected; a tedious and embroiled.
Principal varieties of the attack

The study of the varieties of the hystero-epileptic attack seems to me to be the most interesting part of the whole subject and certainly it presents the most practical interest inasmuch as the complete attack is rarely seen yet the numerous varieties of it are, I almost might say, every day occurring.

Charcot well known researchers, so long and carefully continued at the Salpêtrière join the key to the isolated (French) pathological facts and the various phenomena so difficult to understand in connection with this disease. They are undoubtedly the dawn of a new era in understanding the strange facts presented to our notice and these in connection with the historical convulsive epidemics of the middle ages.

In the following passage, which is quoted in extenso owing to its importance, Bernay has already clearly indicated the variations in the hysterical attack. Vide, Nouveau dictionnaire de médecine et de chirurgie, article Hystérie. M. 18 page 221. (1874).

Thus he says: "Je m'étend plus longuement sur les expressions passionnées, qui se produisent dans la seconde phase de la période convulsive de l'acée hystérique, parce qu'on apprécie les uns des autres les crises de larmes, qui existent seules dans la forme vulgaire, des troubles plus ou moins complexes que nous venons de énumérer, en arrivant à la convulsion, que, même dans ces cas les plus simples, existe, pendant la phase de connaissance hystérique, une trouble cérébral, un cérébral, dont ces manifestations des passions minées ou partielles sont symptomatiques. Il n'a pas encore dit qu'en pas de ces crises, traité minées seulement, tantôt partiellement, qu'on observe à la fin de l'acée convulsif de la forme vulgaire, pour arriver aux acées plus ou moins profondes sont de véritable deliré, soit de coma, soit de catalepsie, soit d'entraînement, soit d'extase, soit saup de catalepsie, qui ont souvent une durée beaucoup plus longue que dans la forme vulgaire."
Charcot states that Hystero-Syphilis may be modified under two principal forms, thus:—

(3) By extension or predominance of one period over another, the others being reduced to a minimum or even altogether. Thus may be produced:

(1) The Epileptiform Attack
(2) The Demonic
(3) The Estatic
(4) The Dilirious

(2) By intermixture of foreign elements or the fundamental constitution of the attack, as

somnambulism
lethargic sleep
Catalepsy
Modifications of the first period

Epileptiform attacks

Not infrequently the hystero-epileptic attack is limited to its first or epileptiform period. In these epileptiform attacks, as they are termed, the first or epileptiform period is repeated over and over again in its entirety without the second period being ever reached. Thus, the tonic, clonic and resolution phases exhibit themselves, but the extensive movements of the second period do not follow—instead of these, whilst the patient lies quietly in a state of muscular resolution, the debut of another fit is made by the re-appearance of the tonic phase. And thus the cycle repeats. From 15 to 20 attacks, or, even more, may succeed each other without any interruption.

The patient being in a comatose condition, true epilepsy is exactly simulated, with the important exception, however, that the patient may be awake at any moment by presence over the body or by an electric shock.

This leads one to the differential diagnosis between Epilepsy and Hysteric which has occupied the attention of many writers. Indeed, a number of them have stated that the two diseases are extremely distinct. Gorgut in his work, De l'hysteric et de l'epileptique, page 390, states that the difference between them is so small that it is useless to make a separate class for each. Landouzy, in his Traitè complet de l'hysteric, 1856, gives a long table of distinguishing characters based upon his idea of the intrinsic nature of Hysteric.

Lastly, Duure mentions for the first time, in a monograph De l'hystero-epileptique (1856) the very important fact that ovarian compression often arrests, if not always, hysterico-epileptic attacks; whereas, the same is unable to even modify, much less stop, the epileptic attack.
It is only within the past few years, however, that the best and most decisive arguments have been brought forward to distinguish these two neuroses. Charcot and Broussais, who have worked hard in this field, have introduced the thermometre as a very important diagnostic means.

Without going further into differential details I may state that Dorian presence and the thermometre furnish alone the most recent and important distinction. This temperature variation is best observed in the brain cases of the two diseases in question—not in the true hysterical convulsions and the convulsions of the epileptic attack, for in both the temperature rises. This thermal difference is well marked in the following observations copied from Broussais's Recherches sur l'Epilepsie et l'Hystérie, Paris, 1876, at pages 7 and 115.

État du mal épileptique — 9 juin, du 9 h du matin à 11 h, 5 déc.; de 11 h à 6 h du matin, 15; de 6 h à 9 h, 25. Le malade a faire remarquer la surdité; elle a pris deux fois de buisson à la cuiller. La dilatation n'est bien spectaculaire. 7h 15 a 9 h 30.
à 9 heures, ce même, 1h 46, petit réveil, facilement comptable aux radiciels; respiration assez longuement 2 à 60 — Température rapportée 40 à 60°C (à 10h 07).
11 heures, sans aucun accès, 1h 32, res. 60, Temp. bas. 40-4°C.

État du mal hystero-épileptique — de 10 h à du 11 h du matin, on a commencé une tarentarre d'accès épileptiques. L'accès sont d'1 h d'avant accès; elle est tout suspendue, et ne répond pas aux questions; 1h 12,
Temperature restée 37°C (à 9h 58).
14 Mai — de 11 h à 9 h du matin, 4 à 5 accès épileptiques; dans la nuit, 20 accès en tout, de 9h à 11h, ce même, 1h, accès; total en 24 h. 87 accès hystero-épileptiques. Temp. restée 37-7°C.
15 Mai — depuis hier matin 83 accès; la patiente a ceid chaque moment, de calme. 1h 30. Température restée 37-3°C.

It is time to return to the epileptic attack, from which this discussion has somewhat separated us. It may be incomplete, consisting of a series of rapid muscular movements or chokes, with loss of consciousness and loss of sight constituting what is called by the French "Comotion Epileptoides"; or, again, it may consist of a series of visual opiums producing retching and halucinations.
Modifications of the Second Period

Demoniacal Attack

In the Demoniacal attack the first or epileptiform period may not be typical, but is marked from the outset by the violence of the movements which are more exaggerated than in an ordinary regular attack.

The second period, that of extenuated movements, is constituted by contortions and movements of so violent and frightful a nature that they truly defy description, being perfectly demoniacal. Some of them try to kill themselves, strike their clients most violently, tear their hair, and give utterance to fearful cries of agony reminding one of Sophocles' description of the groans of Philoctetes or even the yells of Hercules. Others even try to tear all their clothes to pieces.

The third period (emotional attitudes) is either altogether absent, or is very short.

In the fourth period (delirium) there are most painful cramps in the limbs, which quickly restore the patient to her senses.

Thus, then, the salient features of this kind of attack seem to be the predominance of painful contraction, the most extraordinary and unnatural attitudes which give them the frightful appearance of those who were said to be "possessed" in the middle ages, and, lastly, the persistence of pain which soon brings the patient to her senses and makes her shriek out so frightfully that the whole spectacle is most terrible to witness.

The patients well know the difference between these attacks, which they call their writings (tortillments), and the ordinary ones by the extreme severity of the case. They state that they are conscious during nearly the whole time of intense pain (merely excepting the Epileptiform period) and thus prefer a typical attack because of the complete insensibility which exists during it.
From the foregoing description it will be seen that this
demoniacal attack bears a close resemblance to the description
of those who were said to be 'possessed' in the Middle Ages, so
that it may not be out of place to call to mind a few of these historical
facts. Briquet states that it was towards the year 1830 that the
first epidemic appeared; although ancient history abounds in
examples of Demonomania. However, the first epidemic of this
demonomania took place at a convent in Germany from whence
it spread to Brandenburg, Saxony, Holland as far as Rome where
there were no less than 150 affected with it in the Hospital des Epileptie.

Now comes the query, What did these attacks consist in? Briquet
states that they consisted in extraordinary contortions, unnatural
attitudes and respiratory schemes which caused the whole
community so affected to make noises like some animal in
They were said to be only possible through the agency of the Devil.

The great advance in our knowledge of these singular
psychic-nervous shows how many of the extraordinary religious
beliefs and superstitions of the past are entirely dependent upon
complicated diseased states of the mind and body without any
intervention of the so-called 'possession'. So that what an amount
of bigotry, superstition, folly, and injury to weak minds is
constituted by the discoveries and investigations of such
men as Charcot and Broussais!
Modifications of the third period

Ecstatic attack

This ecstatic form or type of the hystero-epileptic attack may be produced artificially in some form by inhalation of ether. Under the influence of ether the patient enters at once into the Third (emotional) period without passing through the first and second periods at all, and executes plastic poses which exactly correspond with the existing hallucination. These plastic poses last for a long time, sometimes even half an hour. The fact that pressure over the region of the ovary immediately subsides the hallucination and restores consciousness clearly indicates that this form is merely a fragment of a genuine hystero-epileptic attack provoked by the inhalation.

However, when the attacks occur spontaneously, the emotional attitudes of the Third period are from time to time interrupted by some epileptic epileptiform symptoms, such as tonic movements, grinding of teeth.

Pechet states that the patient, in this condition, seems capable of arriving at a maximum of intellectual power, similar to the maximum of muscular power in the convulsions.

These ecstatic attacks were those that distinguished the historical Convulsionists of St. Hilard.

The attitudes assumed are various, but that of so-called exorcism is the most general one, and may be retained immovably for a considerable time.
Modification of the fourth period

Delirious attack

The delirium of the fourth period of the hystero-epileptic attack may be so exaggerated as to almost constitute a special delirious attack, which is merely interrupted by a few epilepticiform symptoms, alluring it to the hystero-epileptic attack.

The delirium may be so acute as to reach the stage of mania. In some, however, it consists of discourses of an exalted, moral and religious nature, as exemplified by the patient Gen... at the Salpêtrière hospital; or, there may be an interminable repetition of songs - thus Marc... at the Salpêtrière sings and gesticulates at the same time.
Before entering upon the study of the varieties of the hysterical epileptic attack resulting from nervous of foreign stimuli on the fundamental constitution of the attack (catalepsy, lethargic sleep & somnambulism) it will be as well to describe some of the new and interesting facts which Charcot has observed and drawn attention to recently—termed by him "provoked hysterical catalepsy and somnambulism".

Charcot and his conferees have been able to study on entirely new grounds a series of pathological and physiological phenomena which, since the works of Braid (Manchester), Laveque, Azam, Broca and Meneert, have rested in comparative obscurity. Indeed, many new facts have been observed and studied, so that the subject has been rescued from the hands of Charlatans and has been subjected to very strict scientific observation in the hope that some of the laws that govern mental phenomena may be elucidated.

It would take up too much space of this paper to give in detail all the observations that have been made; although I shall endeavor to record the principal ones (as a résumé of all) which will be quite sufficient for my purpose of description.

1st Observation

**Action of light in producing hysterical catalepsy & somnambulism**

The state of catalepsy can be induced by placing the patient before some bright light and causing him to fix his attention on it. Thus if the gaze for a short time (some seconds to some minutes) at an electric light, she passes into a cataleptic condition. Now and then this seems to result almost instantaneously.
The patient seems to be fascinated and immobile, with his eyes open and fixed on the light, the conjunctiva being more or less injected. She is perfectly anesthetized, even if she were only semianesthetized before. Her limbs generally speaking retain their normal suppleness and remain in any position into which they have been placed. Further, she can assume any position, however inconvenient it might be when not in this cataleptic state, and retain it as long as desired. The power of speech, of which we shall have more to say directly, does not exist.

In this condition one may study the influence of attitude on the expression of the physiognomy — thus, if the patient's hands be brought together towards her mouth, as in the act of conveying a kiss, a smile appears, raising the corners of the mouth; or the contrary, if the patient be placed in an attitude indicative of horror or demunciation, the physiognomy becomes somber. This is what Sardou calls the phenomenon of 'suggestion.' This cataleptic condition persists as long as the agent, which has caused it (the light), acts on the retina.

If the light be suddenly taken away or hidden by means of a screen or even by drawing down the upper eye lids, then this cataleptic condition gives place to one of lethargy which greatly differs from it, and is not really a state of sleep but rather a somnambulistic condition. It has been called somnambulism, somnambulism by French writers. The upper eye lids droop and wink in a rapid, tremulous manner, whilst the globes roll in their various axes — this is constant and continuous throughout the sleep. She is completely insensible, feels nothing, thinks of nothing, so far as we can determine, and remembers nothing when she awakes.

In this condition of lethargic sleep Charcot has observed a remarkable phenomenon which he designates "hypersensibilité musculaire." Thus, on mechanically exciting a muscle through the skin by pressure or slight friction it contracts and remains contracted until its antagonists is acted upon in the same manner. The contraction is as perfect and isolated as if produced by electricity.
Take the Stigno-clido-manoeuvre for example, where physiological action is difficult to be realized — still when it is slightly struck it contracts and the concave attitude always follows.

Again, if a nerve, as the Facial, be pressed upon all the muscles innervated by it contract.

This is a state of suggestion or subjection which causes them to follow and obey and is the same into which Animal magnetism plunges hysterical persons; and, during its persistance, they cause them to perform such mystical acts. In speaking to her somewhat loudly she rises and directs her attention, with her eyes always closed, to the person speaking, and will do whatsoever is requested, sew, write, count, calculate, recite 72 and often with greater precision than when awake. Total amnesia is present as is proved by the fact that they will write with needles transfixed through the skin and appear unconscious of the fact.

From these two conditions, Cataleptic and Lethargic, the patient can be brought round by one of two methods: by pressure over the ovarian region for instance, or by blowing suddenly on the crista galli region. And on awakening there is always noticed, a little froth, two or three bubbles, between the lips. The patient does not immediately resume complete consciousness and freedom, but may remain in a benumbed state for a quarter of an hour or more; this, however, soon disappears, especially if the open air, and the patient regains his normal condition.

The following table is a resume for comparison:

<table>
<thead>
<tr>
<th>Cataleptic condition</th>
<th>Lethargic condition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eye open - no convolution of globe</td>
<td>Eye closed or half closed, wrinkling of lids, convolution of globes, constant wrinkling</td>
</tr>
<tr>
<td>No wrinkling</td>
<td>Some muscular rigidity</td>
</tr>
<tr>
<td>Muscular tautness</td>
<td>Some muscular rigidity</td>
</tr>
<tr>
<td>Limbs retain any position they may be placed in</td>
<td>Limbs do not retain any position they may be placed in</td>
</tr>
<tr>
<td>No muscular hypersensitivity</td>
<td>Muscular hypersensitivity present</td>
</tr>
</tbody>
</table>
Second observation

Hemilethargy and hemicatalalpsy co-existing in a patient

In the 1st observation we saw that Catalaplay was produced by means of a bright light and was followed by lethargy or suddenly shutting it off. But it is found that on again exposing the light the Catalaplay condition returns, and to do this it is merely necessary to elevate the drooped eye- lids of the lethargic patient. Thus, then, by elevating or depressing the eye-lids, the light being present, we may produce either condition at will.

But M. Lempire discovered that on rendering a patient Cataleptic by means of the light and closing one eye (left me for example), the left side fell into a condition of lethargic sleep with its attendant muscular hyporeceptability, whilst the opposite side, in which the eye is open, remained Cataleptic, its limbs retaining any position given them. Thus the patient is hemilethargy and hemicatalalpsy at the same time. These changes may be effected as rapidly and as frequently as one may desire. Lempire further found that in the lethargic condition opening the left eye did not interfere with speech, whereas opening of the right eye immediately destroyed it—clearly pointing to the conclusion, long ago arrived at on other grounds, that the faculty of speech has its local habitus in the right half of the cerebral.

Third observation

Artificial permanent contracture

In the lethargic condition it was shown that contracture could be produced at will by gently stroking a muscle; if the patient however be awakened (by various pressure or blowing in the eyes) the contracture disappears. But if, instead of awaking her, she be rendered Cataleptic then the contracture persists. And on awaking her from this induced state of Catalaplay with contracture it is found that the contracture remains indefinitely
and the patient having returned to herself again presents all
the features of an hysterical with permanent contracture.

By the influence of a magnet a very remarkable trans-
ference of the contracture may take place — this in the placing
the pole of a horseshoe magnet close to the right arm, when the
contracture is left sided, it is noticed to gradually disappear
in the left (left) and make its reappearance in the right arm.
This process of transference has been utilized in the cure of a
hospital Sister, as reported in Le progrès médical 18:35-36-37. 1878.

Fourth Observation

It has long been known that we can render a cock (fowl) in
a state analagous to that of catalepsy in human beings by means of
a bright light, but which is never followed by the lethargie condition.
And more recently, in Germany, Peyer (Die katalepsie und der
Katherschellenprotusmus, 1878) has induced the cataleptic condition
by various means in different animals, such as, pigeons, rabbit,
sparrows. He attributed it to terror or shock.

Chasek does not attempt to find the cause of these phenomena,
but simply compares them with those observed in hysterical patients,
pointing out that it presents an interesting subject in comparative
pathology.

Fifth Observation

Catalepsy & Lethargy produced by vibrations of a diapason

In addition to the action of light, vigorous vibrations have
the power of rendering hystero-epileptics a cataleptic and
lethargic condition — Thus, by causing a large diapason (vibrating
about 64 times per second) to vibrate the patient soon becomes
cataleptic, with open eyes, totally regardless of surrounding objects,
The limbs preserving any attitude they may be placed in.
Further, on suddenly stopping the vibrations of the diapason the
limbs fall into a state of repose and the patient is cataleptic
and whilst in this condition of catalepsy by again causing the
diapason to vibrate the cataleptic state is reproduced.

Thus it seems that the suppression of the agent which
has provoked the catalepsy gives rise to the lethargy; but the
suppression must be sudden, for if the vibrations be allowed
to gradually die out the cataleptic state persists.

Closing the eye-lids in this cataleptic condition produced by
sonorous vibrations does not give rise to lethargy as was seen to be
the case when produced by means of light.

Sixth Observation

Catalepsy a Lethargy produced by a gong

Some hypno-epileptics seem to be rendered cataleptic by
the sound of a gong; on suddenly striking it, they instantly
become immobile in an attitude of fright, with their hands held up
to their face, as if to diminish the dazzling sound: the eyes are
open and the face bears an expression of fear.

Closing the eye-lids does not render them lethargic; but on
striking the gong again and suddenly stopping the vibrations
lethargy follows, and whilst in this lethargic condition striking
the gong again renders them cataleptic.

On awaking (by means of pressure over the ovary) they have no
remembrance of the sound that produced the catalepsy.

Seventh Observation

Lethargy produced by fixed stare ½

Besides the action of light and sound, fixation of look seems to be
able to produce the Nemineuse or Lethargic state. Or sitting at a distance
of about two feet in front of the patient and making her look steadily at a finger held a short distance from the centre of her forehead, it is noticed that after a shorter or longer time the patient passes into a state of catalepsy.

Sometimes, simply staring fixedly at the patient's eyes affects the same end quicker.

In many hystero-epileptics pressure on the globe of the eye suffices to bring about the cataleptic condition.

Once the patient enters this mesmeric sleep it is merely necessary to elevate the eye lids (the eyes being closed) to change the condition to that of catalepsy, and vice versa at one's wish.

Having described some of the principal phenomena of induced hysterical catalepsy and somnambulism, it will be more easy for me to enter on a description of the three attacks (cataleptic, lithic and somnambulistic) resulting from intermixtures on the fundamental constitution of the hystero-epileptic attack.

**Varieties by intermixtures**

**Attack of catalepsy**

The attacks of hysterical catalepsy are most frequently preceded by prodromata similar to those of the hystero-epileptic attacks, viz.: states hystericiæ, palpitations, nausea in seas, pains in head. &c.

Poussin, in his *L'Esprit des Maladies*, page 71, describes two ways in which the hysterical and cataleptic attacks combine—firstly, the attack begins by convulsive movements which are quickly replaced by absolute immobility—secondly, the cataleptic rigidity first appears and is replaced by hysterical phenomena.

Ephraim mentions a third combination, in which the convulsions and the rigidity alternate, one half of the body
being in a cataleptic condition whilst the other takes on
disordered movements. Charcot's observations on hemi-catalepsy
and hemi-catalepsy embolised in the 2nd Observation assist us in
understanding this very singular mode of combination.

Dr. Buznet, in the Archives gériatres de Medecine, 1860,
reports a case of hystero-catalepsy complicated with catalepsy
in which the catalepsy took the place of the 3rd or emotional
period of the attack. It may, however, take the place of more
than one period of the attack.

Thus one is naturally led to ask whether hysterica and
catalepsy are two distinct nervous? Buznet and Pavlov
decidedly say they are, for they state that the latter former is
scarcely ever met with excepting in females, whilst the latter is
common amongst men. Still Buznet admits that there exists
a certain affinity between them.

Puel also believes in the distinction between these two nerves, yet
he says they complicate each other without ever blending.

On the other hand, there are writers who state that not only
is hysteria a complication of catalepsy, but that these two affections
only form one and the same disease, having two modes of
existence. Gericot holds this opinion and states in the Dict. de Medecine:

"Pour raisons que la catalepsie et l'hystérie ont la même siège, sont
produites par la même cause de cause, nécessitent le même mode de traitement, que
les différences qu'elles présentent ne sont que dans leurs formes."

Certainly, the case of production of cataleptic phenomena
in hysterical patients is an additional proof in favour of the mode
of origin that exists in these two nerves.

Lastly, it may be well to quote the words of Fabret, in his
article on catalepsy in les Archives gen. de médecine, 1867. 5iere

"Les faits sont le plus souvent disparates, ne se ressemblent en quelconque
sorte sur pas au point, la raideur cataleptique, et différent les uns
des autres par l'ensemble de leur symptômes et par leur manière. On se trouve
ainsi en présence d'un symptôme et non d'une maladie. L'état cataleptique
True catalepsy existing without any foreign element is an exceedingly rare thing.

It seems to me that it is not absolutely necessary for the due comprehension of facts to believe in the identity of nature between hysteria and catalepsy. It is sufficient to know that cataleptic symptoms are met with in a great number of nervous affections; the brain being impressed in some way or other gives rise to cataleptic symptoms without the necessary intervention of the cataleptic nervous. So that it seems to me rational to believe in hysteria-catalepsy without true catalepsy, in the same manner as hysteria-epilepsy where there is not true epilepsy.

**Varieties by intermixture**

**Attack of Letheany**

Briquet although having had a large experience in hysteria has only met with about 3 cases of hysteria with attacks consisting of true letheany. In these cases the attack invariably began with a vivid reduction of the face, jaws clenched, and a momentary rigidity of the limbs which soon ceased. In one of his cases the attack always commenced by a sense of constriction at the epigastrium that followed the gloom hystericus and lasted cause 'la strangulation'.

In all these cases the patient fell asleep rapidly; there was nothing peculiar to be observed in the face, respiration was normal, pulse regular, skin cool, and limbs flaccid.

With all the facts of hysterical lethargy related by various writers, is there a state similar to that which Charcot has been able to produce artificially in some varieties of the sleepers? Certainly the resemblance is very great. And although no state has been observed and related that corresponds with that which Charcot has observed and termed Muscular Hypersuggestibility, yet it must be remembered that this is a symptom which requires to be very carefully watched for, and, therefore, may easily pass by unnoticed. In making this comparison we must remember the similarity of the phenomena of the delirium, for in the artificially induced lethargy the patient, on the point of sleeping, exhibits some epileptoidal signs, such as slowing of respiration, movements of deflection, and sometimes slight rigidity of the limbs. According to Brejquet, certain phenomena inaugurated the attack of hysterical sleep.

"Le délire de la hystérie, dit Brejquet, avait toujours été précédé de convulsions ou de contraction tonique des muscles dont la durée avait été variable. Chez plusieurs, ces convulsions s'atténuèrent à la fin, et à un peu de calme des membres. Chez d'autres il y avait un vrai ataque convulsif complet, et chez d'autres encore, elles cèdèrent après avoir duré cinq heures."

Thus then the lethargy or normal sleep is generally preceded by convulsive phenomena, sometimes reduced to a few epileptoidal signs, and so may constitute the whole of the hysterical attack.

The sleep may last from one to several days — thus in Surgey Villermay's Traité des Maladies nerveuses on p. 476, a case is told of in which the sleep lasted 8 days. But Pindell in his Observations on Lethargy (These i. 1838) relates a case that slept for 6 months, during which time she heard and saw everything going on around her, but was unable to arise herself from her fearful position — however she awoke only in time to save herself from being buried alive.

Numerous other singular cases might be cited, including the historical one reported by Aubrey Park; but they are very rare and probably a luxury are false.
Varieties by intermixture

Attack of Somnambulism

According to Many, Spontaneous Somnambulism differs from Artificial or Induced Somnambulism in being less complete and presenting the principal features of induced lethargy—thus, the patient is asleep and insensible; the globes of the eyes are constricted, insensible is completely abolished, and the patient rises, walks, and performs certain actions.

It is generally allied to some neurosis, as hysteria.

Almost always, this hysterical somnambulism is preceded by epileptoid symptoms and sometimes even by convulsions.

Briguet mentions a case of a young hysterical girl who had always two hysterical attacks for them—One of these took place at night and was an ordinary hysterical attack lasting for about a quarter of an hour; the other took place regularly between 6 and 7 o’clock in the evening and was an attack of Somnambulism. She used to get up and go to an adjacent window, staring with such attention that she could not be distrusted, for the head nothing that was said to her and appeared to see nothing else but what she was staring at.

The attack of somnambulism often terminaties in hysterical convulsions. After the period of emotional attitudes with its hallucinations, the patient becomes somnambulistic without any transition therein. Apparently, this second state arises from the preceding one. Thus the hallucination which precedes it one and the fixed idea which directs the other, take their origin from the same source. For example, in the emotional period, the patient sees her children who are about to perish and call her to help them. Whereas, in the somnambulistic condition, it is the prepossession of removal of her children, the desire to see them and her affection for them, which directs all her acts. The disease reproduces the mental state of the patient in the intervals of the attacks, as we have seen in the description already written, the passion or emotional attitudes belonging to subject from the past scenes of real life. Thus, to hear her house and see her children are the object of all her acts and desires, as she often states.
In spite of the analogies which we have made between the period of emotional attitudes and somnambulism, the two conditions do not lose their different characters. Although in the emotional period there were hallucinations, in the somnambulistic condition the action no longer exists, and the patient, delivered up to herself, follows the course of her fixed idea. In the somnambulistic condition the senses and faculties remain, somewhat restricted, always in correspondence with the dominant idea and exclusively limited to its compass. Lastly, if the patient after the attack remembers having seen her children and heard them call her, she does not remember any of the acts to which she committed herself during the somnambulistic attack.

Thus then, it seems that hysterical somnambulism presents manifest affinities to the 3rd period (emotional period) of the hystero-epileptic attack; and, further, exhibits itself mixed with the emotional attitudes or else replaces them in the course of an attack.
Treatment

We now turn with great interest to the subject of treatment, and the question which strikes us is, have these long and

interesting researches, upon so complicated and distressing a disease, resulted in methods of cure or alleviation?

To this question I think we may give an answer in the affirmative; for much new and valuable therapeutic evidence has, during the past few years, been adduced, which we will at once commence to consider.

With regard to prophylaxis, although playing an important part in the treatment of the cause or origin of the disease, I shall not wait to lay down the indications, but proceed to

Inhalations

Inhalations of Chloroform, Ether and sometimes the

subcutaneous injection of chloroform arrest the convulsions, bring about resolution, and cause sleep which is not unfre-

quently followed by a peculiar delirium.

Inhalations of Petrol of Amyl (C₄H₉O₂) which was discovered in 1844 by Balard and subsequently experimented upon by

Dr. Benj. W. Richardson in 1855, have been much used in Epilepsy, Hysteria and Hysterico-Epilepsy; principally, however, in

America and England. At the Salpêtrière in Paris

Dr. Bourneville has tried it in a vast number of cases which

have been recorded in the Recherches cliniques et therapeutiques

sur l'Epilepsie et l'Hystérie. He was the first to use it

in Hysterico-Epilepsy. The convulsions are immediately

arrested, and, further, the use of it has the advantage of

diminishing the number of the attacks. It is not well borne
however, and therefore somewhat prevents its more general employment.

As to the properties of this important agent in this disease Bourneville writes as follows (ib. cit. page 112).

"Le traité d'angle est un des access d'épilepsie, d'hystérie ou d'hystéro-épilepsie, une action intolérable; mais s'agit-il d'une influence sur la marche des accidents curieux? C'est là une question pour la solution de laquelle nous attendons de nouveaux faits. Une malade, après les répétitions de traité d'angle, est restée huit semaines sans avoir de crises; une autre n'a pas eu de nouvelles attaques, bien qu'il se soit écoulé quatre mois depuis que nous lui avons fait suivre le traité d'angle. S'agit-il d'une amélioration due au meilleur ou d'une simple coïncidence? C'est ce qu'il nous est impossible de déterminer."

**Ice**

The application of ice on the region of the ovaries is impracticable during the attack, but applied when the prodromata are first noticed it diminishes the intensity of the attack and may even prevent the convulsions altogether.

**Electricity**

The use of the continuous current has been found to be very valuable as a palliative. The continuous application of a current of from 5 to 10 elements of Trowell's pile is unable to arrest the attack, but will diminish its intensity, and the series will be fewer in number. It acts as a useful palliative in the hystero-epileptic clonic (État de mal hystero-épileptique of the French writers).

A current of from 10 to 15 elements will cut short the convulsions, the patient falling into a delicious condition analogous to that of the fourth period of the ordinary attack. In some cases, however, by passing a current of from 40 to 50 elements through the head, the most violent attacks can be
Compression of Ovary

Probably the most useful outcome of these long and very interesting researches is the knowledge of the fact that pressure on the ovary will not only arrest a convulsive attack, when at its height, but also prevent its arrival when the patient knows, by the prodromata, that it is imminent. This fact was not unknown to the Conventualists of the Middle Ages, and Carrel de Montgazon states that violent blows in the Abdomen were given to stay the convulsions. It was, however, forgotten until Clarsett made of it a classic means of treatment, and wrote as follows in his Deformes non des Aesthetes, but des phenoces, p. 271 (Epit. th. 1—5—)

"Let us suppose, he says, that one of these women is taken with a seizure. The patient suddenly falls to the ground, with a thrill and loss of consciousness. The tetricity of the abdomen, which generally accompanies the scene, is carried to a high degree; the body is forcibly bent backwards, the abdomen is prominent, greatly distended, and very resisting.

"The best condition for a perfect demonstration of the effects of ovarian compression, in such a case, is that the patient should be laid horizontally in dorsal decubitus, on the floor, or, if possible, on a mattress. The physician then, kneeling on one knee, presses the child hard or just unto that place, which he has previously learned to regard as the habitual seat of the ovarian pain.

"At first, he must throw all his strength into the effort in order to vanquish the rigidity of the abdominal muscles. But, when this is once overcome and the hand feels the resistance offered by the rim of the pelvis, the scene changes and relaxation of the convulsive phenomenon commences.

The patient soon begins to make mercuries, and sometimes noisy attempts to swallow; then consciousness returns almost at the same time, and now the woman utters noises and weeps, complaining that you are hurting her (as in the
En ordre to be able to keep up pressure for a considerable length of time, which would almost be impossible by manual means, Mr. Poirier, one of Charcot’s interns, has devised an ingenious modification of the Abdominal Tourniquet. In the January Medical 1878 is an article by Poirier describing his "Compresseur des membres" as he terms it, together with some results obtained by its use. Thus, he says:

"L’appareil se compose d’une graisse métallique, destinée à recevoir le bassin, couverte et surmontée par une tige métallique, dont les extrémités furent d’un ton verticale rejoindre les deux bouts d’un arc de cercle cylindrique qui passe en dessous du ventre. Sur cet arc se trouve obtenue une tige à vis supportant une tige métallique arrondie. Sur cette tige, secondo tige supportant la grande vis de pression.

Les deux tiges peuvent être fixées par une vis sur un point quelconque de la tige cylindrique qui les supporte, il s’insuit que l’on peut diriger l’axe de la grande vis de pression dans telle direction que l’on souhaite, et la maintenir immuable dans cette direction.

A l’utilisation de la grande vis de pression est visée une pelotte compressive sur le tissu à pression continue au moyen d’un ressort à spirale; la pelote est cylindre conique qui forme de fer à cheval, suivant que l’on le professe de renforcer une seul ou deux plaies (voir figure 9, B. C.)."
"Drug cones de tire, pouvant entrer plus ou moins profondément entre la gouttière et le cane métallique qui la supporte, permettant de confiner les dimensions de la gouttière à celle des masses différents; deux convolvus à toute adhérer de faire l'appareil.

"Preuve application du compresseur, on pose la gouttière dans la maladie, et on l'adapte au travail (en tout inférieur s'appelle de chaque côté sur la saillie du grand trochanter). On engage ensuite les deux extrémités de l'axe métallique dans les trous de la cane et on les fixe plus ou moins profondément à l'aide de vis, suivant que la contene de la maladie est plus ou moins gonflé. Ces fixe et les vis des bagues étant plus ou moins descendues, on cherche l'ouverture de la main gacheuse, tandis que la droite approche la grand vis et la place dans une direction telle que la fente qui la témoin vienne remplacer la main qui comprime. Il ne reste plus alors qu'à tourner les deux vis pour guider cette direction et à tourner la grand vis de pression jusqu'à ce que la fente compresseur soit venue remplacer la main qui lui cédé peu à peu la place."

By means of this instrument direct and limited pressure on the hyperesthetic vary or source can be kept up constantly for an indefinite period. It can be easily adjusted, and the patient can manage it themselves, increasing or diminishing the pressure as they know by their own sensations; they are more or less removed. Further, they can turn in bed, lie on the side, rise up to as to change them and rest or sleep without moving the tourniquet. The compression is from the beginning absolutely painless and may be borne consecutively for 40 hours without any bad consequences whatever, otherwise than a little reduction of the skin.

As long as the pressure is exerted, no convulsion attacks occur, and any attack once commenced may be instantly cut short by the tourniquet being applied.

The hypoesthenie effects do not exist whilst the pressure is kept up, but return directly it is relaxed.

All patients are not equally sensitive to Marieu compressing, some requiring a little force, others a much greater one, in order to overcome the resistance of the abdominal walls - whilst at other times it seems to exert no influence whatever in relieving them."
Act infrequently has been in Charcot's wards at the Salpétrière a patient lying quietly and happily in bed, branded by the ovarian compressor, who, were it not for the pressure it exerts upon the ovary, would be the prey of a series of hystero-epileptic attacks. This fact, indeed, may be forcibly demonstrated by removing the instrument, when instantly the convulsive attack commences; but it is as certain and easily arrested on being re-adjusted.

Lastly, it must not be forgotten that pressure on the ovary in a patient not in a convulsive condition is capable of producing the aura hysterica and even a convulsive attack.

Since writing the above I notice that The Brit. Med. Journ., April 2nd, mentions a case, from Mr. Beattie's wards in the Larmor Hospital, in which compression was followed by fatal peritonitis. The details of the case were submitted to the Paris Société d'Anthropologie, from which we gather that moderate pressure with the hand was made on the left ovary of a hysterical patient, who, up to that time, had been in good health; on the following day peritonitis set in, and in two days after the patient died.

We also come to the last and certainly most interesting line of treatment, viz.

**Metalloscopy and Metallotherapy**

From the most ancient times the application of metals to the human body has been believed to exercise a more or less energetic influence upon the nervous system. In almost every part of the globe the Ancients wore charms and amulets which were supposed to perform marvellous acts.
Paracelsus is said to have applied metallic substances to the skin
to relieve internal complaints, and, two hundred years later,
Pomme gained renown by treating nervous disorders by means
of copper baths. In modern times these notions have received much
support from the discoveries of galvanism and electricity in the
eighteenth century, and the reduction round by the knowledge
of these powerful agents added a fresh impetus to the study of
metallotherapy — thus, galvanic batteries and the application of
copper metals were greatly used as curative agents. And
more recently, when electricity began to be applied scientifically
to medicine, numerous methods of external treatment by metallic
substances were employed, of which the following are the principal
one: statics of zinc and copper, by Raefelt; application of pounded
zinc and iron, by Scafe; Goldberger used galvanic chains; and
lately, Pavlovski brought forward belts and chains of zinc
and copper which have a wide-spread popularity.

Metallotherapy is a new phase of this ancient practice;
it was introduced by Dr. Burg in 1848, who wrote a work titled,
Metallotherapy, 1853, description of his extensive observations and
experiments on the subject. His views, however, have generally
been received with coldness and were discredited by his medical
enemies until about four years ago, when they were taken up
by M. Charcot, the distinguished physician to the Salpetriere
Hospital in Paris.

The method of procedure of Dr. Burg was first by means
of small rings to pick out the metal which had an influence
on the patient, and then to cover him with the same, keeping it
on till the beneficial changes took place. Judging from the
number of published cases it seems strange that the profession
has so long kept aloof.

Charest has revived the system of Dr. Burg in the
Treatment of Spasmydrosis, his views being published in the
Jan. 19, 1878. These observations have been confirmed at various times in the medical journals, both in England and abroad.

In August, 1876, through the influence of Charcot, Dr. Bong obtained from the Société de Biologie the appointment of a commission consisting of Dr. Charcot, Buge and Dumonsthalier, to investigate the alleged phenomenon; the commission presented a report on April 14, 1877.

The points to be investigated were:—Do metals applied externally to patients with anaesthesia, chiefly hysterical, bring back sensation in the parts affected and are they individually influenced by one metal and not by others? Does the metal found active externally prove equally beneficial on internal administration?

Thus, the laws of Bong's doctrine of Metallo-anaesthesia and Metallo-therapy respectively.

The patients experimented upon were chiefly those affected with hysterical semi-anaesthesia, in which cases both superficial and deep common sensibility were abolished to such a degree that not the slightest reaction is exhibited when long needles are thrust through parts which are normally sensitive.

Taste and smell are usually abolished, and there is diminution in visual acuity (Amblyopia), with more or less colour-blindness (Achromatopsia). The skin on the affected side is paler than on the other side, the temperature is lower, and the muscular power is less.

The commission found that sensibility returns under the influence of a certain metal. Plates of gold, copper, zinc &c., were fastened on the anaesthetic part, and after from 10 to 15 minutes, if the metal used was the right one—different patients presenting especial affinity to particular metals—sensibility returned at the point of application, and gradually extended to the whole of the anaesthetic area. The patient at first feels a sensation of numbness or heat, the face becomes red, and pricking with a needle causes great pain; the muscular power often increases, and curiously, also, the needle puncture previously made now bleeds freely, though before scarcely a drop of blood
showed itself even when the needle was thrust through the limb; so that the circulation in the affected limbs is more active.

The termination of this state is also shown by the thermometrical rise with the increased blood supply. The special organs also recover their functions. But these phenomena are found to be very transient; by the following day the anaesthesia is returned, and the patient experimented upon day after day never showed any signs of permanent or real amendment. Although closely, strange to say, having tried the application of metals in two cases of "organic" hemianesthesia, obtained a permanent return of sensibility. After each experiment, the patients complained of various constitutional symptoms, chiefly fatigue, headache, and a tendency to sleep. But perhaps the most remarkable phenomenon of all, and one that took both the patient and experimenters by surprise, is that whilst sensation, muscular strength, and circulation were restored on the one side, they disappeared in a proportionate degree in the parts symmetrically opposite. This phenomenon, the Commission termed "Transference of Sensibility" (Phénomène du transfert). Also when colorimetry is present, in which the patient loses the idea of colours in a certain mathematical regularity, they regain the knowledge of these in the same order in which they were lost.

As Dr. Burg believes that the effects of the metals are due to the production of superficial currents of electricity, which influence the nerves of the part, M. Raynaud performed some experiments with a view to determine the validity of this hypothesis. He found that plates of pure gold in contact with the skin caused a deflection of 3° in the needle of a delicate galvanometer with 20,000 turns of fine wire, whilst ordinary molybdenum (an alloy) caused a deflection of 12°. He then substituted for the metal an electrical current which he found acted like the plates themselves, while the currents were equal in strength to those indicated by the plates. On the application of one electrode to the forehead and the other to the foot, sensibility returned from above downwards, and from below
upwards, and was accompanied by transference or loss of sensibility on the sound side. He also noticed that there are certain points in the galvanometric scale which are always the same for the same patients, currents of this strength causing return of sensibility, while stronger or weaker ones remain without effect, or until another point in the scale is reached at which the current is again effective.

The foregoing conclusion of the Commission were presented on April 14, 1877, in a report to the Société de Biologie. They then proceeded to investigate Dr. Burg's second proposition, "That the external metallic attitude being known, the same metal administered internally will determine the same results as its external application." They assured themselves of the hysterical condition of each patient before commencing the therapeutic experiments, and the drop was administered by Charcot himself or his assistant, M. Belmont.

The Commission's second report to the Society in August 1878 (vide British Medical Journal, Oct. 12, 1878) begins with a recapitulation, and then gives the details of the following cases:

Case 1, M. — Sensation to Gold. — Began on July 11th to take 2 centigrammes, gradually increased to 5 centigrammes (7 p.) of Chloride of Gold and Sodium; by July 28th there was complete return of general and special sensation, with increased muscular power and improved general health. These results were maintained. On Aug. 28th plates of gold were applied to see what would follow. Sensation, both general and special, gradually vanished, and after an hour hemi-anesthesia was almost complete, hearing was feeble, vision became confused, smell and taste abolished, muscular power diminished. After the removal of the plates sensation returned in 9 minutes, in an inverse order of that of its disappearance.

Case 2, A. — Sensation to Gold. — Restored to Health by Chloride of Gold in doses of 1/3 p., gradually increased to nearly the pain. The application of gold plates was followed by precisely the same phenomena as in the preceding case.
Case 3, B. — Sensitive to Copper—On June 19th she began to take two pills (1/2 drachm) gradually increased to four, of Bicarbonate of Copper and St. Christian's, which contained a small quantity of Copper. Sensation had completely returned by July 14th. A month afterwards copper plates were applied with the same phenomena resulting as in the previous cases.

Case 4, B. — Sensitive to Gold—She is hystero-epileptic, anæsthetic on right, analgesic on the left. Began to take chloride of gold, and in a week recovered sensation; after another fortnight sensation was normal and her general health improved, whilst the epileptic fits continued.

Case 5, W. — Sensitive to Gold—Completely anæsthetic; anaephoræmic. The internal administration of gold restored sensation and muscular power, and for a month she had no hysterical fit.

Several of the experiments performed in the above cases were witnessed by Claude Bernard, Didier, and Vulpian.

The report states that the same patient may be sensitive to some extent to more than one metal, but if metals to which she is not sensitive are substituted without her knowledge, no phenomena are produced—thus excluding the action of expectant attention believed to be the supposed metallic action. In Case 2, gold plates fixed on wood produced no modification of the sensibility, but expectant attention being thus removed, simple discs of gold produced the results previously obtained. In Case 3, at the suggestion of M. Vulpian, plates of Platinum were substituted for copper without her knowledge, but no result followed; the copper being replaced, the usual phenomena followed. In Cases 1, 3, 5 the employment of weak electrical currents was followed by exactly the same phenomena as the application of metals, viz., the disappearance of the recently altered sensation. They also discovered that platinum plates, which were inactive when applied without preparation, (Cases 1 and 3) became active when attached for fifteen minutes to the electrodes of the electrical pile, being followed by the usual positive results. They concluded from this that the plates remained
charged with electricity, and owing to this condition, produced resembling anaesthesia &c. They further discovered by chance that if another metal were placed upon that in contact with the skin no result followed. Also when an anaesthesia was produced by the application of one metal it could be made more by the superposition of another. Next, imagining that the effect of the metals was produced by a special impression from the periphery to the nerve centres, they tested this by placing a second metal on the central side of the first, and then observed that this stopped the evolution of the Metalloscopic phenomena, while no interference followed if it were placed on the metal side. They also tried the application of a gold bacelet on one arm and a silver one on the other, when the results proved negative. If the silver were left in place after having removed the gold from the left arm there was no result; but if the silver were removed from the right arm and gold was applied to the left, metallic anaesthesia quickly spread from the left arm to the whole body. The action of silver seemed to neutralize that of gold. A gold bacelet with copper clamps had not this inhibitory effect.

Case 6. Mr. — Hystericl Achromatopexy — In this case gold clamps were attached to the temples; in 20 minutes she could distinguish blue and yellow. For about a month gold was used internally and externally, when she could distinguish all the colours. A week later the application of gold brought back the achromatopexy, the perception of colours being lost in a certain mathematical order, which excluded any suspicion of fraud.

The conclusions arrived at by the Commission naturally drew a large amount of attention to the Phenomena of Metalloscopy, and many illustrative cases have been published in the medical journals from time to time, of which the following may be quoted.

The Gazette des Hôpitaux; No. 87, 1878, publishes a case from l'Hôpital de la Pitié of a woman, who since 1870 had been subject to hysterical epileptic seizures, which occurred as often as three times daily. Her sexual health was bad, suffering from severe dysmenorrhea;
She was found sensitive to silver plates. Accordingly, silver was administered internally, and her state gradually improved.

Dr. Laccoury, in the *Registre Medical*, Jan. 25, 1810, reports a case in which the simple application of a magnet to the skin sufficed to send the patient into a cataleptic condition, with complete anaesthesia, from which she could be aroused by opening her eyes or by removing the magnet. The patient, who was hysterical, was quite ignorant of the experiments which had been performed at the Salpêtrière, and had never been subjected to any previous experiment. She was blindfolded, and not allowed to know what was being done, or what were the expected results.

Besides, these results were as unexpected by the operator as by the patient. Negative results followed the application of the other end of the magnet, or a piece of soft iron, while the magnet always produced the same results when applied in the ordinary way.

M. Selon, in the same journal, reports the case of a case of hemiaesthesia by localised faciation, and the case of a case of hysterical contraction of the left hand and forearm of two months' standing, by means of the continuous current used for 3 days, and 10 hours daily. In neither of these cases was transeience noticed.

M. Dibois, in the *Registre Medical*, Feb. 1819, describes a case of lead poisoning in a man with hemiaesthesia, accompanied by achromatopsia, ambylophia, anopsia, loss of smell, taste and hearing. He had had two attacks of colic previously. A magnet was applied in the presence of Prof. Chasset and Tillet; in a quarter of an hour it was found that sensibility had returned in almost the whole of the affected side of the body, with restoration of the special senses. The improvement continued until complete cure resulted.

M. Dibois remarks: "In England, Caravatte has attributed the effects of the magnet and of metallic therapy, in hysterical anaesthesia, to a sustained attention on the part of the patients (expectant attention). In the present case no such explanation can be proposed. Our patient was absolutely ignorant of the purpose we had in view; he knew only that we were going to electrify him.
and for many months he had been febrile without any benefit.

We will go further: we could not have influenced him, for the cure took place at a time when we scarcely expected it. The affair happened thus:

In order to answer the objections of those who maintain that the imagination plays the principal part in these cases, we resolved to make at first a blank experiment. The hand of the patient was placed between the two poles of the electro-magnet of Faraday, without their being bent in communication with the pile; at the end of a quarter of an hour sensibility returned, to the great astonishment of the patient, and somewhat to our own. What had happened? The bars of soft iron of the apparatus, which had been some time in use, were magnetised, and attracted iron in the most manifest manner; so that the magnetic action was produced independently of us. Will anyone pretend that the imagination of the patient and the operators played the principal part?

Dr. Anderson of Eden, relates (Brit. Med. Journ., Feb. 8th, 1877) a curious case of hysteria of neck (hemicranites, abdominalgyna, loss of smell, hearing and taste, with contraction of finger) with aphasia, which was cured by gold, and cured by the internal administration of Chloride of gold and Solium. The aphasia was cured by the use of the continuous current. He tested the current produced by the application of gold, and found that it scarcely deflected the needle of the galvanometer. And remarks that if the effects of metals were due to the electrical currents set up by them, they should be all alike effective. He refers to the theory of a specific action of the electric metal, but unknown nature.

Prof. Weitsthal, of Berlin (Berliner klinische wochenschrift, No. 10, 1878, London Med. Record, Nov. 1878) having witnessed some of Eschat's experiments, has repeated them with similar results. The first case he describes is one of left hemicranites of the skin and muscles of special sense, with loss of muscular sense in a hysterical patient, in which silver applications to the left forearm restored sensation without transfusion at the first attempt; during another application, however, the phenomenon was observed. In a second case of hemicranites (non-hysterical) after attempted suicide with chloral, silver plates were fixed to the ulnar side of the hand and sensation partially returned. This was not permanent and subsequent attempts proved negative.
In a third case, hemianesthetic, both gold and iron restored sensation.
In the fourth case, anesthetic (hyposthetic) a small galvanic element made of a small plate of zinc and brass with a wet piece of linen between, was applied to the skin of the left forearm, the zinc plate being underneath. Sensation returned partially. A powerful horse-shoe magnet was then applied, with a return of sensibility; and though the position of the magnet was often changed, yet the south pole always acted more energetically. Prof. Westphal then tried in the third case plates of coffee with a layer of varnish or sealing wax next the skin, and obtained similar results. In the Carter experiment the bandage was so tight as to produce anesthesia of the hand. Every workman in this case acted similarly, but again the bandage was too tight. Finally, several observations showed that mustard plasters brought back sensation at their seat of action.

Prof. Schiff, recognizing that certain remarkable facts had been discovered, decided to make special investigations of the phenomena at the Salpêtrière. His speculations are described by Dr. Sigerson (Brit. Med. Jour. Feb. 8, 79), as follows:—"Before the patient Bar—was brought into the hall certain preparations were made by Prof. Schiff; and in particular, a screen was placed across the table, so that it should be impossible for the patient to notice the slightest movement of the fingers required to make or break the contact. There were present, Prof. Schiff, M. Regnard, and myself. Nothing was said by the distinguished physiologist as to what he anticipated, or whether anything was expected; the experiments were conducted in almost complete silence, and the results left to speak for themselves. When the patient had taken her place in front of the table, M. Regnard closed her eyes, and demonstrated, by pricking, the presence of slight hemianesthesia. Then the small screen was placed upon an anesthetic finger which was passed through it; and a given space of time was allowed to elapse. Return of feeling always hitherto taken place in a shorter space, but here there was none. Next, another five minutes were allowed to elapse, and recovery of sensation in the finger was detected, the patient withdrawing her hand when the finger was pricked."
During the first period the circuit was open; during the second, it was closed. The experiment was repeated with identical results.

It will be seen that this experiment exactly fulfils the conditions laid down by Dr. Carpenter. Dying to the interposition of the screen, the patient could not have seen Professor Schiff's hand making or breaking the contact.

In another of Schiff's experiments a large heliroid was so placed that one end was opposite the patient's mouth, a roll of paper being placed between the heliroid and her mouth, so that the breath was passed through paper tube. When the contact was made, the sensibility was restored, but not till then. Prof. Schiff seems to be perfectly satisfied with the facts, but considers it is not absolutely proved that electricity is the agent, until similar phenomena have occurred in experiments on animals.

In the Brit. Med. Jour. for July 13, 1879 two interesting cases are reported by St. Wills at St. John's Hospital. Used in the same journal for Jan. 18, 1879 he makes some remarks on hemianesthesia and its cure. He contends that neither galvanism nor mental influence can explain the effects of metals in hysteria; in fact, no explanation can be forthcoming until we are acquainted with nerve force. He says it is clear that other substances besides metals will induce a cure, but this cure does not depend upon the will of the patient; hemianesthesia and loss of special senses cannot be due to any effort or want of effort on the part of the patient; she may say she is blind when she is not, but she cannot induce hysterical amnesia.

At the same time St. Wills admits that moral means may suffice to effect a cure of hemianesthesia, and quotes a case of a girl who had resorted to all forms of medical therapy, but who got well when purposely neglected; "An experience," he says, "which all medical men must have had in hysterical disorders. Their treatment is often as positively bad as neglect is as positively good."
Mr. A. Hughes Bennett (Brit. Med. Jour. Oct. 12, 1878) describes a case of slight hemianesthesia and anaesthesia in which plates of zinc restored sensibility in the right arm, and ultimately all over the body. Subsequently other kinds of metals produced the same effects as the zinc. And, finally, wooden discs acted in the same way as the metallic ones. The anaesthesia became very variable in position, and the applications were now no longer followed by any constant results. Dr. Bennett concludes that the effects of metalotherapy are of mental and not of physical origin (Brit. Med. Jour. Nov. 23, 1878).

In the Brit. Med. Jour. for Oct. 12, 1878, Mr. Hughes relates an experiment similar to that of Prof. Westphal, of hemianesthesia removed by a bismuth, the restoration taking place over the entire arm, and being accompanied by loss of sensibility on the sound side—three results passing off in a few hours.

Prof. Charcot made observations with Siemens (as a sort of battery with coils of insulated wire through which an electrical current circulates), with ordinary magnets and with Faraday's very powerful electro-magnet fed by 15 Siemens elements. He exhibited three cases to the Societe de Biologie, viz:—

1. A, blind, hysterical hemianesthesia—When one of the poles of the magnet is applied, the usual phenomena of transfer follow; whereas, on applying the neutral point, no effect is produced. And if the application is protracted, there follows a reversion of the original state of matters. Finally, upon removal, another transfer occurs, followed soon after by another reversion to the primitive condition.

2. A man affected with organic lesion of brain and hemianesthesia. After applying the electro-magnet to the anaesthetic arm for 20 minutes sensation returned to the entire side of the body. No transference was observed. And apparently it is a permanent one.
3. Such, having placed the patient's arm in the solenoid, and the current made, there follows transference and later on excision. The same phenomenon now occurs on breaking the current. In some hysterical cases these changes take place with great rapidity.

Chassé states that these experiments have been repeated, with similar results, in hospital and private practice many times.

Dr. Puysard in the Practitioner, Oct. 1868 reports a case illustrating the phenomenon of transfer, thus: A girl, aged about 14, suffered from apparently epileptic seizures which were preceded by an aura in the left wrist. The aura was cut short by the application of a blight to the forearm, the fits also became less frequent and were then inaugurated by an aura originating in the right wrist. Subsequently the aura returned to its former seat, and one or two fits a week occurred, uninfluenced by treatment. The patient died at the age of 20 of acute phthisis. In the Brit. Med. Jour. 1868:26:74 Dr. Gowers relates the results of the post-mortem examination, where the sole lesion discovered in the brain was a small gliomatous tumour, of the size of a walnut, situated in the white substance of the left hemisphere above the middle of the lateral ventricle. He remarks that beside the interest due to the fact that the aura, and probably therefore, the convolution, arose on the same side as the lesion, the migration to the opposite side in an organic brain disease is certainly a rare event.

Prof. Maggiore, of Rome, in 1869 obtained marked results from the application of magnets to cats.

Dr. Hermann Vierordt, of Tübingen (Centralblatt f. die med. Wissenschaft, Jan. 4th 1879) attempted to decide whether there is any change of sensibility produced in the animals experimented upon by metallic application. He used frogs, whose cerebral lobes were removed so as to prevent spontaneous movements, and fastened them in a vertical position upon a stage of glass and
cork, with their legs hanging down. Zieze was usually applied, but lead was once used. The experiments began about a quarter of an hour after the saturation of the cerebral lobes, and the subsequent time was divided into periods of 25 to 30 minutes, in each of which sensibility was tested by touching or pinching the longest toe; in every alternate period the metal was applied, and the results tabulated. It was shown that the reactions to the stimulus, by drawing up the excited leg, occurred twice as often, and drawing up both legs many times oftener when the metals were applied than when they were not.

Prof. McKendrick (Jour of Anat. and Phys. Jan. 1879) relates some experiments on the influence of an electro-magnet on nerve. It appears that on making and breaking the circuit of the electro-magnet, a nerve resting on its poles is irritated, and a sensitive galvanometer connected with its poles is also very slightly affected. Also, a portion of nerve stretched between the poles, so as to touch each, will not cause contraction in a muscle when touched by a copper wire during the passage of the current through the arm of the electro-magnet.

Finally, Dr. McKendrick says, "it appears to be highly probable that nervous activity may be affected by magnetic actions, and the experimental problems is to determine the conditions in which this may be done."

Dr. H. Tuke, in the journal of Mental Science, Jan. 1879, gives an account of his visit to the Salpétière, and reviews the facts. Apparently he inclined to the opinion that they may be explained by the influence of the mind on the body, but, at the same time, sees the difficulty of saying so. He points out that the argument against the reality of metallic influence, from the fact that in some instances inert bodies have produced similar effects, would be very much like denying the action of opium or morphine, because bread pills are known to have produced sleep or purgation. So that it does not "necessarily" prove it.

In a reprint of his paper Dr. Tuke adds some valuable facts
Supplied by Dr. Müller of Graz, who repeated the Calpatricus experiments under circumstances which rendered deception very improbable. Dyes of wood, bone, coke, glass and marble were used in one case, among others, for test experiments; but results were followed unless the active metal, tin, was applied. The usual phenomena of recovery and transfer in cases of anaesthesia, aphasia, hemiplegia and contraction were observed, and a new fact noted, viz., transference of hemiplegia.

In the presence of such an array of independent witnesses it would be premature, Dr. Luke concludes, without further experiments, to assume that the influence of metallic applications is solely ascribable to expectant attention.

Dr. Carpenter (Brit. Med. Jour. Dec. 16, 78) appears to be less cautious, and ventures to predict with confidence that a carefully conducted series of experiments will completely disprove the influence of Mr. Charpentier.

Having quoted a number of illustrative cases, it will be seen that the facts demonstrated by Charpentier, and embodied in the observations at page 204 of this paper, are intimately connected with the phenomena of metallic and magnetic sensibility in electricity, and tend to throw much light upon the difficult problems they raise.

With such novel and startling facts at hand as the foregoing, one not unnaturally finds some difficulty in forming a hypothesis to explain them. In the Jan. number of Brain for 1879, M. de Watteville relates the main outlines of these inquiries, and concludes by expressing his opinion which is of value as coming from one well versed in the application of electricity in medicine. He says: "We hear the theory of a metallic or magnetic action upon obscure arrangements of the nervous system dismissed summarily as "too exploded," exploded by a name? When were the phenomena subjected to a searching scientific investigation? A hundred years ago Science, by her irreproachable practices, has discredit upon the whole subject, but there is not one atom of truth to show that magnets and the like can have influence the human organism. There is no innate improbability that a physical force like magnetism closely connected as it is with electricity may influence it; and the fact before us at least makes further inquiry an important necessity. Naturally enough, "expectant attention" - the device of machinery of the physicist in trouble - has been made responsible for all the phenomena.
attributed to metallic and magnetic influence. That it may and does explain much, is a proposition which will not be denied. But that it explains all, is one that requires some conclusive argument from those who hold this view. The character of the observer is much for the facts recorded, and the obtained meaning put upon the expression "suggestion atention," in due to make it account for all the phenomena, needs as cautious in adopting too readily a theory that seems to be merely a screen for our ignorance... Such proof is supposed to be furnished in respect to "metallic influence" by the fact that other bodies, such as wood, are productive of the same results as metals, how it may be admitted by all, except, perhaps, by a thorough-going sceptic, that metals, as such, have no specific influence, that their action may be electrical, not dynamical, but statal. If this is true, it is obvious that nothing is proved by the substitution of wood for metal, since, as everybody knows, a piece of wood applied to the skin will be at a different potential from the body, and though unable to gain rise to a current, will, as well as any metal, exert a statal influence upon the tissues beneath.

In reviewing the whole question, one point may be admitted, namely, the genuine nature of these remarkable phenomena; for every possible precaution has been taken to detect malingering or unconscious deception and to test the real accuracy of the results - the patients being blindfolded carefully before and during the entire period of the experiment; not a word being spoken concerning the nature of the experiment; no suggestive ideas given and no leading question asked.

Also I think it cannot be denied that the Commission has established as fact that certain important results do follow the application of metals. And what was at first regarded as a chimera of fancy has been proved to be a fact capable of verification by independent observers. And it has been shown that similar results can be produced by the influence of the magnetic and electric currents.

Whatever part the imagination of the patient may play, it seems a very curious fact that the application of dried, metallic or wooden, should have such a very marked influence - may, more than this, one would expect that the application of electricity, say from an induction coil, would excite as much interest in her and certainly act as powerfully on her psychical faculties. However, imaginative hysterical patients may be, the effects produced are not transient; whilst in cases with organic lesions permanent cures have resulted.
Probably no unprejudiced reader, having perused this mass of evidence, will deny that 'expectant attention' cannot explain everything. It cannot account for a patient recovering her perception of colours in exact correspondence with physiological law, as related in the Second report of the Commission to the Société de Biologie. But perhaps the most powerful argument, within its own limits, against the interference of this psychical cause is that supplied by the discovery of what is termed the 'Phenomenon of Transfer.' It was evidently quite beyond the capacity of the patients to form an idea of the possibility of such an occurrence. Dr. Bury never thought of it; neither did any member of the Commission anticipate such an occurrence — indeed, it took all by surprise, and in one case, we are told, homoeopathy. Warts removed by 'Charring' are not reproduced on the other side of the body. So that entirely 'unexpected' results can hardly be put to the credit of expectant attention, more especially when they occur in a large number of cases. Further, it cannot account for the positive and constant results of certain agencies and the negative results of others, the different effects of different metals, of the two poles of the magnet, or of the magnet with the circuit closed or open. Can it account for the action of Silicwood, where there is nothing to indicate to the patient that a current circulates in the coil of wire? Yet it is found that the mere application of the apparatus is not followed by any manifestation, but that the effects follow only when the current is sent through the wires, which is easily done, entirely without the patient's knowledge. I think we may safely say that it cannot account for this — further this bit of experimental evidence seems to negative Dr. Carpenter's objection (vide Brit. Med. Journ. Nov. 14, 78) to the correctness of observations. Such facts as the permanence of anaesthesia caused bysuper-imposing another metal, the prevention of anaesthesia by partly another metal on the central side of the first, and the absolute presencelessness of the same metal when placed on the distal side, are also quite opposed to the view of 'expectant attention.' Expectant attention or mental emotion cannot account for the beneficial effects produced in 'organic' hemianesthesia and hemichorea; and, lastly, it cannot account for pressure over the tragi region restoring consciousness when the patient is in an unconscious condition.
The argument of the supporters of this objection, expectant attention, is based upon former experiments, such as those of Mr. Wakeley on Dr. Elliotson's patients; when impotence was detected, or upon such observations as those of Dr. Burnett and Prof. Westphal, who obtained similar results with cord or bone dusts. Well, admitting that in one or two instances the application of these apparently inefficient objects has been followed by results, still it does not render their production by any other agency impossible—widely different causes, physical and psychical, (as exemplified by syncope produced by injury or emotion) may produce apparently identical results; and, consequently, it must be stated that a demonstration of the efficiency of any one of these factors in a given case does not exclude the potential efficiency of the others. Further, it is not to the purpose to bring forward such experiments unless it can be shown that in them also the influence of expectant attention has been as carefully eliminated as in Charcot's cases. How was this to be done in the cases referred to above? I think not,—for the patient of Dr. Burnett became sensitive to words only after having been the subject of successful metallic experiments; or, in truth, after she was so well cured to the result that any metal seemed to produce the effect. Prof. Westphal's case (the third) was also somewhat unsatisfactory, inasmuch as she was sensitive to both gold and iron, an exception proving the exception that her attention was early aroused; besides, the effects of the varnished plates and wire wires were complicated by the construction of the bandages, which were so tight as to produce occlusion of the hand.

The practical point to be decided seems to be:—Are the beneficial changes due to some electrical effect produced by the particular metal, or do they result from the influence of the application exercises on the brain, which affects the body in a reflex secondary manner? Well, this is truly a most difficult and important question to decide—Prof. Charcot hesitates giving an answer to it, but says "that the question is deserving of careful attention" and further states that in such investigations one "should keep aloof as much as possible, both from the arbitrary scepticism..."
which too often arise from pedantic ignorance, and from the naive credulosity which characterizes the disbelief of a man's faith. It is better, therefore, to steer clear of these two reefs, which are equally dangerous, that the observer must "know how to steer."

So that in endeavours to sum up this all important question it may be stated that there are numerous and undisputed facts of the nervous system, under certain disturbed conditions, being influenced by agencies of various kinds, and obscure in their mode of action: yet, the explanations of these facts are not as yet sufficiently verified by experiment to be regarded as satisfactory. And instead of allowing ourselves to be ruled by blind scepticism when our attention is directed to hitherto unknown phenomena, it behoves us to remember how very imperfect is our knowledge of the functions of the brain, and try to apply our new knowledge to the elucidation of its problems. Therefore let us preserve an attitude of "expectant attention" towards these singular observations. Their practical bearing it is impossible to foresee; at present there is no reason to believe that it will be very great, but their scientific interest in reference to the influence of metals and magnets on the human organism cannot be over-estimated as yet than not formed an opinion upon the cases affected by the internal administration of the specific metal, but the cases are so far too few, and the influences of drugs administered internally too obscure to tempt me to hazard a conclusion.

Finally, in concluding this somewhat lengthy section of my paper, I cannot do better than quote the memorable words of Claude Bernard, who expressed his ignorance whilst witnessing the strange facts: "his words are: "The physiology of the nervous system is yet but very little advanced. If its functions were to be waited for by pathology, the latter would be exposed to the danger of allowing important phenomena to escape. It is better that it should not wait, but rather continue to register facts, which are as to many problems, the solution of which must afterwards be sought out by physiology."
A good rein, morley, one that I am sure will炕熟. It is perhaps a little difficult.