Etiology, Pathology and Treatment of Perpetual Insanity

A Graduation Thesis by
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I certify that this thesis has been examined by myself.

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Introduction

Aetiology

Peripheral Sources of Irritation of Two Kinds
vascular and nervous

Vascular

Nervous

Morbid Associations of Central Origin

Pathology

tuberal

Urinary

Complications

Treatment

Digestive, Hepatic and Intestinal Disorders

Inflammatory, Septicemic and Anaemic Conditions

Mania

Melancholia
Aetiology, Pathology and Treatment of Fusceral Insanity.

Introduction.
The field of Fusceral Insanity presents almost in its integrity a microcosm of unexplored science. Here medicine and psychology are most intimately associated; and yet so promising a field has hitherto been comparatively barren of practical results. To embrace it all within the limits of the present thesis would be futile; and a useful purpose can only be served by confining attention to such investigations as may in the present state of our knowledge be exhaustively treated with scientific advantage.

My observations will be founded on a minute study of thirty-five cases which have furnished elaborate records, compiled during the last six years. In a large number, the histories—prepared on a uniform plan—were kindly contributed through the courtesy of many medical friends engaged in private practice. Day and night, clinical records and charts have been accumulated for all the patients and the history of many of those discharged recovered was kept in view for sometime after.

The mass of material, therefore, is manifestly too great and heterogeneous for one essay, and the course which obviously best commends itself is to exclude:

1. Statistical compilations which are barely justified by 35 records only.
2. The reduplication of data and definitions already established.
3. Stray facts which are insufficient to prove or disprove anything.
4. The premonitory, clinical history, and prognosis of the disease which are capable of expansion into an essay by themselves.

and for the purpose of the present thesis to include.


Aetiology.

Every conceivable contributory cause has been quoted in the literature of the subject; but their relative values as factors of the disease have been loosely stated or simply ignored. The precise influences which tend to produce it are sometimes difficult to ascertain, and their name is legion. At the very threshold of the enquiry we are met with such explanations as heredity, previous attacks, (infuriated or otherwise) epilepsy, diseases of pregnancy, the use of instruments, accidents of labour, exposure to cold and so forth.

Unfortunately these are mere outposts of the enquiry, and it is clear that they are indeterminate elements of the causation rather than the causation itself. The laws of cause and effect have not been clearly appreciated here; many of the factors on record may separately be regarded as coincident, while under other circumstances and in certain social combinations they undoubtedly operate on the scale of causation.

The question must be studied on definite lines. Is the disease purely cerebral in its inception and development, or is it essentially peripheral
in its origin? A moment's consideration shows the
instability of either these positions: for if the first
is sound the disease is not puerperal and the
designation puerperal is a moniker; while if the
latter has weight then like conditions of the
parturient and puerperal state must invariably
produce like results, ergo Puerperal Insanity must
be a frequent and necessary sequel of puerperal
invitations.

A scheme of causation and development
can only be framed on reflex principles of the
utmost complexity; and a reference to the phenomena
induced by peripheral stimulants in the decapitated
frog furnishes a rudimentary analogue of the
mechanism of causation in puerperal insanity. It
is a mere truism to state that exposure to cold
can no more be regarded for se as a cause of puer-
peral insanity than the pinch of a frogs foot
can be regarded as the cause of its convulsions yet
under cerebral conditions which we shall presently
consider, it is as purely an excitant as the stimuluses
of a pinch in the case of a decapitated frog. While
in either case the antecedent condition is always the
same, there is nothing specific in the peripheral
stimuluses: for we may substitute for exposure to
cold—laceration of perineum, pelvic peritonitis,
post partum hemorrhage, constipation, pelves and
a host of other peripheral excitants as numerous
as those of experimental physiology. The seductive
 sophistry to which we are exposed in reasoning
from analogy is kept in view for we know as a
matter of fact that physiological experiment and
pathological processes are in many respects
natural.
If the peripheral stimulus cannot be defined as specific, it can yet be regarded in respect of its intensity and duration, and these attributes are of special significance as bearing on the question of causation, for it will be found on analysis of the subject, that the same peripheral irritant is operative at one time and abortive at others in proportion to its momentum, and the degree in which it is involved with other momenta acting in a like direction.

The frog convulsions are a definite effect of a definite stimulus: the stimulus and effect are of the simplest reflex character: the sequence is certain and invariable: and the intervening pause is momentary. Yet in so comparatively low a type as the frog, we know that the resultant of the stimulus is expressed in something more than convulsions, though that something more may elude the vigilance not only of the unaided senses but even of microscopic research. The irradiation of nerve force does not merely enter the muscular system nor is the cessation of visible movement a sufficient indication of the normal calm of the nervous system.

If the inherent complexity of the experimental process is greater than at first sight appears, how much greater must it be in the high organisation labouring towards perfected insanity. Here the peripheral irritant is less definite in its quantity and quality: it is not specific nor certain in its execution, and it is contributory but not all sufficient. It is only operative in proportion to its intensity and duration, and yet more so in proportion to the sum of its morbid associations.

These are of two kinds (a) peripheral
It, central, the former comprising all peripheral irritants capable of inducing moriferous centrifugal currents; the latter embracing all unstable conditions of the central nervous system. The various lights on the subject are here brought to a focus and we proceed to consider in detail the peripheral and central elements in the etiology of the disease.

Let it again be affirmed that there is a multiformity of peripheral stimulus. It is of no genus or species; it is an extrinsic factor of no fixed quantity, of varying intensity and duration, and of varying complexity in respect of the centrifugal currents which may arise from it. Moreover these may reach the brain through vascular as well as nervous channels.

The vascular system generally, and therefore the cerebral circulation may from peripheral sources be poisoned or impoverished; and as a matter of experience, either or both of these conditions are exceedingly frequent in peripheral paresia, and notably rare in their absence.

Toxemia may be the result of (1) diminished, arrested or altered secretions and discharges; (2) septic absorption; (3) zymotic infection; (4) alcoholic excess; and the first of these may be secondarily induced by any of the others. Using the term in its broadest sense, blood-poisoning is extremely prevalent as an antecedent and concomitant of paresial insanity.

The catalogue of arrested secretions and discharges includes the following:—the mucus and digestive, but notably the bile secretion; the urine and sweat; the lochia and milk. In 80 per cent, obstinate constipation or very exceptional diarrhea preceded the mental attack; the stools were as a rule
rule hard and dry, usually very dark, more rarely clay-coloured, dry, irritant or putrescent and of extremely offensive odour. They lacked the antiseptic action of the bile and the mollifying influence of the intestinal muccus. The gaseous products of putrefaction are themselves of no small account in this connection. In examination of the urine demonstrated bile in several cases yet not so frequently as I was led to expect from the colour of the urine and the putrefactive state of the faces. Sometimes where little else was found pigmentary deposits were sparsely distributed over the microscopic field. Bile vomits have not been infrequent in the early history of my postpartum cases, occurring very soon after labour, and not being always unfiilable in the same way. The stomach was in such instances very irritable, and bile was more frequently ejected than anything else. Nervous reaction, portal congestion or a loaded colon and rectum, probably accounting for this, separately or in combination.

The pharynx and fauces were often found relaxed, atonic and irrefrangible to reflex stimuli. The same conditions probably existing in all the involuntary muscles. The tongue was with rare exceptions pale and flabby, and in over 30 per cent creamy, in 10 per cent brown, dry and "typhoid" and in over 3 per cent red and irritable. The mucous tract from mouth to anus was natural, or clogged with inspirated or greenish mucous. The effect on the secretions of such altered mucous is known to be serious, and it is not unreasonable to expect chemical instability of the gastric intestinal fluids and putrefactive
subsequent changes in the fecal accumulations, especially where these persisted for ten days or a fortnight in the colon and rectum.

Retention or very scanty urine was found in over 60 per cent on admission; it was high coloured and of high specific gravity. The percentage would certainly have been greater if taken before the onset of the attack. Albuminuria was found transient in 30 per cent on admission, too late to find the maximum, statistic, the histories in this respect being defective.

The skin was frequently dry, sallow or jaundiced, and sometimes had a fetid or putrid odour. A very uniform state on admission was a profuse redness of the palms and soles, but rarely of the extremities further. The micturition 70 per cent was arrested; the bowels scanty or suppressed in 75 per cent, profuse in 6 per cent, and when it existed at all in any degree, it was intolerably offensive.

The disappearance of these symptoms and discharges was found to have a varying significance with reference to causation in different cases and under different circumstances. The effect was more evident and indisputable in the case of the secretions of the urinary and alimentary tract, but for simple retention of urine a mental or hysterical cause as might be expected was usually found. These abnormal conditions usually preceded the mental outburst by days or weeks and may be taken as evidence of a widespread nerve involvement of the visceral reflexes; they may have a central origin but they react through vascular channels as well as nervous; and as a general rule where
they do exist they have antedated the mental attack. The arrest of milk and lachrymose is either premonitory or coincident; and only where induced antecedently by pelvic or other inflammations can they be regarded as exerting a causative influence.

The late Sir James Simpson directed attention to the frequency of albuminuria at the outbreak of puerperal insanity. He found it in four consecutive cases before suggesting the tract of investigation; and observing how quickly albumen disappeared from the urine after the mental symptoms had developed, he endeavoured to account for it metaphorically thus: "The fire of disease goes on burning in these cases of insanity after the lighted match is merely applied, and the strange morbid clockwork goes on as it were after the key that wound it is withdrawn." His theory has been frequently disputed, sometimes with good reason, but his facts have been proved again and again. Out of his suggestion has grown a broader conception of puerperal causation than was previously obtained; it has brought clearly into relief somatic views of the subject; and opened up more logical methods of investigation. That an arrest of any of the renal scissions can account materially for the onset of the disease, is an idea which is now excluded without reserve, nor is it conceded that a general arrest of secrections can account for it. Yet it cannot be denied (1) that there is a facility in the sources of puerperal blood poisoning and (2) that in proportion to the number of the sources and more sources still - to the intensity of the poisoning is the ratio of potentiality of mental disease.
Septic absorption has been credited with a considerable share in the production of puerperal insanity. In some cases I have found septicemia and insanity develop almost coincidently, and except in the theory of direct nervous propagation it was difficult to prove their relations as cause and effect. In one series it was evident that septic absorption appreciably preceded the mental discharge, while in another series it was equally evident that the mental symptoms were preexistent and became intensified posterior to the inception of the septic process. My collection includes records of 2 well marked cases of septicemia out of a total of 35, and of inflammations affecting the uterus or its neighbourhood, with or without mild septicemia in 10 more. In addition were 2 cases of acute phthisis pulmonalis with extremely offensive lochia, which in a sub-acute form preceded parturition, and after it proved rapidly fatal. In a series of clinical papers published in 'Lancet' Volume 2, 1883 regarded these as possibly septicemic, considered in the light of Koch's researches on the tubercle bacillus which have since attracted so much notice in this country.

Typhoid and scarlet fever were each associated with one case. Both had neurotic histories especially the scarlatina case; and the typhoid patient had insanitary surroundings and an exciting purpurium. It was impossible in either case to fix the date of infection; but it is almost certain (a) judging by a very full history and a post-mortem examination, that the typhoid patient succumbed to fever indeed, some
some days before the mental attack appeared. Intestinal ulceration was far advanced at death; she lived only 19 days after the first mental symptoms were evident, and the typhoid infection was believed to be usually about 21 days. It is evident that as the scarlatina patient was admitted after the mental attack had lasted 14 days and the fever only appeared after admission, it is obvious that she had become infected subsequent to the invasion of mental disease. Such cases are probably more frequently associated with purpuric insanity than is generally supposed. The clinical phenomena of the respective exanthematae types were not accurately or even approximately produced in either case. The typhoid character of the one were not conclusively demonstrated till post mortem, and the scarlatina patient presented symptoms in irregular sequence and despite a medical consultation the diagnosis was not absolutely clear till the stage of desquamation was reached. Alcohol is the last of the blood poisons, with the exception of certain drugs, which however do not call for notice here. In the lower ranks of life alcohol is a popular prescription with the patient and her friends. I have clear evidence of its influence in precipitating purpuric insanity in two cases. One patient with a well marked hereditary history of insanity and suicide, developed an intense craving for stimulants after the birth of her last child, and not many hours after labour obtained and drank an inordinate quantity of whisky. (seven gills within a few hours) while another was intoxicated by an indirect use of relative
relative with wine and whiskey. They both proved most intractable cases, and now after a long residence in the asylum, are showing no signs of recovery. Insanity appeared after the indulgence in both cases but most probably the deiromania in the one case was the first symptom of mental unsoundness as I have found it a frequent symptom of psychical insanity. The effect of any or all of these poisons is to overcharge the blood with excrementitious matter: septic absorption intensifies the blood poisoning more than the others; and alcohol for the time being, if in large quantity, so far as the brain is concerned intensifies most of all whatever the poison or poisons, and whatever the intensity or duration, the result is to poison, stultify functionally active and to overcharge the nervous system. The frequency of psychical delirium and hallucinations, whether or not they amount to insanity, is due to cerebral toxemia, as the evidence of asylum practice and private practice can abundantly testify. The experience of private practitioners will furnish illustrations of toxemia with hallucinations of the special senses, sometimes coherent, often delirious. Thus, a lady heard a bell ringing in one ear and a railway whistle in the other, while a second lady had the double hallucination of hearing steamboat paddles and bagpipe music at one and the same time. They were both cases of psychical fever, exomithematos and septicemic respectively.

With a view to confirm or correct my conclusions regarding the mutual relations of mental disease and blood poisoning, particularly that due to septic absorption and
zymotic contagion, I consulted the tables of the British Medical Association Investigation Committee on Puerperal Pyrexia. They furnish three kinds of evidence bearing upon the present enquiry, and as they are not prepared with reference specially to mental disease, it cannot be regarded as garbled. Symptoms of the first kind are in the order of their appearance, mental, pyrexial, and of the second pyrexial, mental, and of the third kind mental, pyrexial, mental.

In 65 cases out of 354, 18·3 per cent, the mental antecedents of puerperal pyrexia were unfavourable. These appear under the names of (1) previous insanity, (2) insanity of pregnancy, (3) hereditary history of insanity, (4) mental defect, ression (5) shock or emotion, (6) mental worry, (7) nervous excitability, (8) illegitimacy causing nervous excitement, (9) anxiety and overwork, and (10) news of the death of a friend in childbirth. The classes of Pyrexia and the percentages of mental antecedent are as follows.

<table>
<thead>
<tr>
<th>Class</th>
<th>Of Local Origin</th>
<th>Total of all cases (2) 42 cases - 19·6 6.</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>After Difficult Labour</td>
<td>18</td>
</tr>
<tr>
<td>II</td>
<td>Originating in or after Exposure to Contagion</td>
<td>162</td>
</tr>
<tr>
<td>III</td>
<td>After cold and Exposure</td>
<td>13</td>
</tr>
<tr>
<td>IV</td>
<td>After Shock or Emotion</td>
<td>6</td>
</tr>
<tr>
<td>V</td>
<td>From Unassigned Cause</td>
<td>114</td>
</tr>
</tbody>
</table>

The ratio of the second and third kinds is less than what has now been given. Of cases of well proved mental disorder following on puerperal pyrexia the proportion is 8 per cent, and of altering mental-pyrexial-mental cases the proportion is 4·5 per cent.
The last of the blood conditions which we have to consider is a state of poverty and anemia. Such a condition in order to keep within the range of the argument must either be parietal or puerperal in its origin; and it is obvious that it will find most typical expression in anemia resulting from accidental hemorrhage, placenta previa, post-partum hemorrhage, and puerperal abscess formations. Anemia usually complicates the blood conditions already described and increases the excitability of the nerve centers, inducing sleeplessness, giddiness, irritability, emotionality, mental laxitude and incoherence. The physical signs of it are unmistakable; occasionally but not always, hoarse murmurs were audible over the heart, and the breath doouble over the veins at the root of the neck.

The consideration of nervous routes of antepartum disturbance opens out a wide vista of ordinary, visceral and special sense irritations, the schema of which is limitless but sufficiently intelligible by means of typical illustrations. Stimulation of the skin and cold shock are examples of the first; clots in the uterus, pelvic inflammation and constipation, of the second; and disagreeable tastes, smells, sounds and sights of the third. The gravity of any of these will depend on its intensity and persistence, and even more so on the degree of emotional disturbance which it calls forth.

It will be already evident that one single peripheral stimulus may be productive of others. A stimulus of cold produces 1st the sensation of chill; 2nd fright; 3rd possibly inflammation.
inflammation, septicemia or both, and 4th arrest of secretions and discharges. In proportion to its sequence is its potency, and especially so in proportion to its emotional effects. Three clinical illustrations will suffice. (1) a case of flooding which exciting alarm was followed by a chill, (probably a reaction of fear) then by inflammation, septicemia, and finally insanity; the patient had a mild neurotic heredity, and the history of the case clearly marked the sequence described. (2) a case of chill after first child without serious consequences to mind or body; after second parturition she had a chill on third day followed by pelvic inflammation, arrest of labor and gradual excitement culminating by 8th day in an attack of acute and violent mania; no hereditary history was ascertained beyond intemperate habits of father, (3) a patient had rigor on 6th day; within an hour after, she burst into a paroxysm of hysterical excitement, abscess of mamma soon after appeared; the child was illegitimate.

Apart from this question of insanity - the susceptibility of the puerperal female to rigors is well known. They may be due to septic or central causes or to caloric deficiency; but an intimate acquaintance with the subject will clearly establish the fact that there is an inherent tendency - central in its seat - which in nervous cases is almost phenomenal; and which is, and which is remarkably prevalent, either as a primary factor or as a secondary symptom (possibly both) in the history of puerperal insanity. Regress generally
generally anticipated by sleeplessness, often proceed the mental attack; they frequently signify an infective process or a simple inflammation; but in a large proportion of cases, whatever their direct significance, they appear in advance of the mental symptoms. Moreover, they recur frequently as accompaniments of the insanity, not only while there is delirium, but where either it does not exist or its existence is extremely doubtful. When mental disease is fully established, a chill asserts for a time the psychic paroxysm; this has been seen even in acute delirious mania. A chill occurring before the liberation of the mental discharge, well probably operate by conduction upwards, from the medulla to the cerebrum, and by peripheral conduction as well. The pathology of rigor is however outside the present question; and the corollary of cortical disturbance as a result of the nervous discharge (of rigor) in the medulla oblongata, can be affirmed from clinical evidence as well. Indeed taking the rigor as the equivalent of an epileptic seizure, peripheral insanity might in many cases be regarded as a psychic epilepsy.

Of visceral irritations, those having their seat in the uterus or its neighborhood: "hood naturally take a leading place, and none is more serious than the retention of clots in the uterus. A case of subacute depression the "sleap" of a purpural attack - came under my care when again pregnant. History repeated itself and she miscarried. Her mental condition was thereafter an accurate mercurial expression of the uterine conditions. The uterine cavity retained clots from
from time to time, and it was invariably observed that with the retention of a clot excitement rose, with its expulsion a calm ensued. Cause and effect were never more strikingly demonstrated. The mania transitória of labour is an example of fleeting delirium occasionally seen during the third stage, and exemplifying the result of peripheral irritation: but I have one case recorded where the mania began in the second stage and lasted for many weeks after labour. During labour it was acute, but soon after dementia ensued, and ultimately recovery was established. A loaded uterus is a more serious visceral irritant than might be supposed; many cases are exaggerated or excited by this condition: some recover promptly on removal of the cause and many are much relieved by evacuation of the bowels. I have frequently observed the first refreshing sleep occur after defecation. The treatment of local conditions, such as those described, and of pelvic inflammation and mammary abscess, gives indications calculated to strengthen the belief that in these peripheral states we find grave sources of irritation.

By reason of their close anatomical relation with the higher brain centres, and their almost psychic functions it will easily be a priori expected that the special senses may have much to answer for in the production of superficial insanity. Their functions are inseparably associated with mental functions, and the whole well being of the organism depends so much upon the impressions which they create that their share in the causation should as far as possible be carefully ascertained. The ear takes in bad news and conducts
conducts noises intensely: the eye is open to dis:
creasing sights and exciting literature, the functions
of taste and smell are apt to be disordered. The
nerve centres of special sense are hypersensitive. The
most usual excitements of this class are those
affecting sight and hearing: one patient was upset
by hearing a "neighbour's" row on the stage, another
by a quarrel between the husband and his mother-
in-law about the nursing of the patient. One
lady's temperature rose and she became excited for
twenty-four hours without inflammation as a
result of reading an exciting novel. The reverted
state of the nasal and oral secretions is apt to
give rise to a bad smell and taste which can
readily be misinterpreted in the feverish and
exhausted state of the patient.

In proceeding to consider the marked
associations of central origin which may be
productive of the disease, it must be borne in mind
at the outset that it is not possible to absolutely
separate the one group from the other. Anaemia
for example must again be considered; but in
this instance a distinction can easily be drawn
between post-parturient and ante-parturient,
the former occurring rapidly, the other a slow
under-mining pathological condition.

The cerebral conditions in the
paroxysmal female preparatory to an outbreak of
insanity lend expression in the following symptoms:
(1) acuteness of sensory impressions; (2) a state of
nervous tension. (3) emotional irritability—easily
induced: worry, anxiety, perplexity, listlessness,
overflows of passions, extremes of feeling; (4)
diminished self control; (5) restlessness; (6) delusions.
The relative antagonisms of force and resistance are altered by processes of functional activity, nutritive deficiencies or probably both; resistance is yielding before the brute latent energies, which are accumulating in excess, and insanity is on the verge of precipitation. The physiological resistance to explosive discharges in nerve street line whether motor, psychic or otherwise is revealed in the inhibitory strength of the individual. Erratic ideas of the most extravagant kind, morbid thoughts and impulses, absurd motor suggestions, are physiological to humanity at large; but not less so is the inhibitory antagonism to these impulses which is the physiological safeguard of sanity. There is no absolute identity of mental habit in all cases; there are diversities of emotional, moral and intellectual character of appetites and desires, and of self-control; and a complete mental analysis is therefore out of the question in our present inquiry.

The following statement embraces all that need be said upon the subject of sensory perceptions are accentuated or prevented frequently both, if emotional impressions are extremely acute in there is a partial suspension or a disturbance of the balance of inhibitory forces. Thus a condition is obtained nearly allied to insanity or widely removed from it according to the sum of these results; a condition which waits the events of the parturient and puerperal condition to prove abortive or otherwise. This potentiality may be of recent acquisition or it may be a morbid habit acquired or inherited. In its simplest and least dangerous form it is
induced only during pregnancy; in its graver significance it is the result of previous attacks of insanity, or the insane diathesis of heredity.

A natural tendency is noticed especially in neurotic subjects, in nervous and mental disorders during pregnancy. These are usually of the mildest character and rarely do they find expression in actual insanity of pregnancy. If prolonged they react injuriously on the highest centres of the nervous system and seriously affect the prognosis when labour is imminent. I found that mental causes were insidiously at work for weeks or months of pregnancy in many of my puerperal cases. A morbid habit was created; a disposition to brood over and magnify the anxieties, disappointments and bereavements of the past, or to foster the religious emotions, up to a state of morbid exaltation. Whenever a mother had lost a child, the subject was sure to engross her thoughts, to prey upon her mind, with the intensity of disease and to colour her delusions afterwards. I was struck with the remarkable frequency of such bereavements in the history of my puerperal cases. The other causes of mental disturbance not amounting to insanity during pregnancy were (1) desertion by husband; (2) poverty, (3) illegitimacy, (4) fright, (5) dread of confinement, (6) varied disorders of health during pregnancy, (7) insufficient food or none after lactation, and frequent pregnancies, (8) frequently recurring miscarriages.

In five cases of postpartum insanity out of 35, there was a history of hysteria and in 5 others of previous attacks of insanity.
of which were puerperal. It does not by any
means follow that where insanity had occurred
previously to marriage, and was completely recovered
from it, should reappear with the first pregnancy
or puerperium. It is well known that it misses
many opportunities for breaking out a fresh, but
yet, a priori inference is sound that these crises
are of grave import, and must not be lightly
regarded. The insanities of puberty and woman-
hood are very oft to relapse, and they are grave
antecedents in puerperal cases.

The question of heredity in the
literature of puerperal insanity has received
considerable attention from Dr. Patty Tuke and
others. I found it difficult to get a full and
candid statement on the subject when ascertaining
from the friends the history of each case, but by
enquiries pursued further a field, and information
afforded after recovery by the patient herself. I have
been able to prepare a reliable statement of hereditary
histories so far as it goes. It is not so exhaustive
as it might be, had questions suggested by a study
of some later cases been anticipated earlier.

Heredity may be studied in
(a) the history of progenitors and collaterals, and
(b) the health of the progeny. The history of
progenitors and collaterals must be regarded
beyond the mere question of nervous disease and
interference: uterine and allied affections must
also have a place in this calculation; for undoubt-
isly whether latent or active, they originate a
nervous impression in the mother which finds
expression in the nervous formation of the
offspring. Out of 35 cases, many of which could
not
not be satisfactorily investigated in this respect, owing to lapse of time or otherwise I found four well marked cases of uterine disease in the mother of the patient, two cases being of cancer.

Where an hereditary history of insanity could not be traced in preceding generations, heredity became almost a certainty by reason of the collateral evidence of insanity in other members of the same family, insanity or an insane diathesis being known in one of more sisters of six cases. Further in some cases a suspicion of heredity was avoided either on admission or after recovery by the size, form and symmetry of the cranium, the facial development and expression, the physique generally, and the degree of intelligence and mental vigour evinced on recovery. Two of the patients recovered, could not at their best, be very much excelled above the type of educable imbecile, although their mental and physical development were sufficient to allow them "a bare pass" in the world at large.

In the health of the progeny there is often a foreshadowing of the future nervous history of the mother, a latent neurosis in the latter, finding early expression in the child, years before there is any suspicion of mental disease in the parent. In this vicarious way what is potential in the parent, becomes kinetic in the child; and in my more recent enquiries into family histories, this pregenetic feature has been sufficiently frequent as to render it probable, that had the matter been as thoroughly sifted in the beginning as at the end, evidence of this kind would have considerably increased.
increased. Putting aside primiparous cases, which numbered 43 out of 33; and 7 multifarious whose histories are in this respect defective, it was found that out of the remaining 16 multifarious, 5 showed in their families distinct evidence of neurotic disease. Idiocy, imbecility, epilepsy, acute hydrocephalus and cerebral congestion were the varieties recorded, hydrocephalus being the most frequent. This represents 33 per cent of gross neurosis in the progeny of multifarious cases; but I am disposed to look on it as a minimum.

Having regard to all these phases of the question of heredity, I have prepared the following tabular statement of the facts which I have been enabled to ascertain.
Heredity is here represented from many points of view, and in a variety of combinations, which do not however include idiocy of which in its hereditary forms I have no statistics. The sum total of heredity is probably still underestimated, despite all my efforts to get at the root of the matter. The " nervoussness and excitability," which was sometimes rather wrongly conceded by informants, has in my experience been another name for mild attacks of insanity, which were transient and had been successfully treated at home.

Twenty out of a total of 33 known cases had therefore a basis of heredity, great or small, and yet I must repeat that I consider this statement is an under-estimate for the reason that it had been amplified from time to time after the patient in question had passed from under our care. Many additional facts were incidentally conveyed by strangers or discovered by personal investigation made at the patient's home. Dr. Batty Tuke found heredity in 22 out of 43 cases, and he found what the foregoing statement seems to confirm, that in a greater proportion of cases it exists on the female side of the family.

There are many acquired brain conditions which may precede and aid in developing puerperal insanity, and which might appropriately be dealt with here. Such are for example, idiocy, brain injury, and meningitis; but as they have not come within my experience and as I believe they have only a rare connection with puerperal insanity, they need not occupy further notice.

In determining cause and effect, we cannot always grasp mathematical certainties.
Paraxeral Insanity is not so beautifully simple as a case of irritant poisoning, nor so definite in its sequenes as a case of zymotic disease. The lines of causative conduction are so innumerable, elusive and interminable, that finality of research is not to be looked for. Holding in his hand the various threads of causation, so far as they are disentangled, the physician's power of directing the paraxeral course of his patient is greatly increased. He can anticipate and thus avert strokes of causation or minimize their force and effects.
Pathology. This has been the least investigated branch of the subject. Deaths are not frequent and when they do occur, post mortems are difficult to obtain, not only in private practice, but in asylum practice as well. The earlier writers on the subject, inferred the pathology from the clinical features; some contended that furor mania, which was their only conception of puerperal insanity, was a convertible term for meningitis cerebri; while Gooch laid down the law rather paradoxically "that the disease is not one of congestion or inflammation, but one of excitement without fever". Tyler Smith observes "no constant morbid changes are found within the head, and most frequently the only condition found in the brain is that of unusual paleness and exsanguinity." Many pathologists have often remarked upon the extremely empty condition of the blood vessels particularly the veins.

Simpson's suggestion that there is an essential connection between puerperal insanity and renal disorder has already been referred to. He supposed it probable that certain changes in the renal secretion might induce secondary chemical changes in the blood. Several theories have been evolved from this idea, giving prominence especially to the supposed septic action on the brain of urea and carbonate of ammonia. Sir James, in support of the general principle of toxemia observes "In the blood of the puerperal female, greatly modified as it is in the normal state.
status of pregnancy and delivery, and containing as it does after parturition the effete elements of the involving or disintegrating uterus, and the materials for the new lacteal secretion—ferments and agents may possibly exist, which are more apt to develop special morbid poisons out of the retained renal sections, than happens in other states of the system. But I repeat the whole subject is yet quite dark and conjectural, and will remain so till pathological chemistry is able to cast some light upon it.

My observations on the pathological aspect of the question will be arranged as follows:

1. A study of the naked eye and microscopic appearance of the brain;
2. A report of urine analyses and microscopic examination;
3. A statement of pathological complications.

The conclusions hitherto arrived at regarding the condition of the brain have been mainly obtained by inference from clinical evidence. Now was the inference of common acceptance sound, because general anemia and exhaustion cannot legitimately presuppose local anemia, where functions are abnormally active, or where there exists seals of irritation septic or otherwise. Anemia does not under congestion and inflammation impossible; it rather favours the development of such pathological processes. Witness the inflammatory conditions of low asthenic types, erysipelas in exhausted and morbid cases, congestions of trophic origin, hyperaemia, phlegmonea, teneoilitis, stomatitis and the inflammatory varieties induced in depressed states of the system. That a asthenic phlegmonea does sometimes prove the pathological equivalent
equivalent of purperal insanity has been too evident to be disputed; but the great bulk of cases as a rule have been classed pathologically under cerebral anemia. There is no certain and sufficient evidence to justify this allocation; the inference from symptomatology are not to be depended on without pathological confirmation; and it is even doubtful if the earlier records of post-mortem appearances are of much value.

It must however be admitted that it is easier to mistake anemia for congestion than the converse, by confounding the veins with the arterial system, especially in an examination of the brain, and on the other hand though less evident it is no less true, that congested zones and patches may be overlooked in brains which are in many convolutions anemic. My post-mortem records include three cases of cerebral congestion (one with meningitis) two of which will be more particularly detailed afterwards, especially with reference to histological appearances. The late Dr. Boyd of Somervelt Asylum in three out of five post-mortem examinations found cerebral congestion (one with meningitis). He was a careful pathological observer and his statements are worthy of reliance.

When the disease becomes chronic or death ensues from pneumonia or some other serious inflammation in the body cavity, or as in one of Dr. Boyd's cases where the patient is literally reduced to skin and bone (she weighed 52 lbs.) "it is not surprising to find paleness and cyanosis." Further where heredity is strongly marked without prolonged acute encephalitis hyperemia is probably rare. But where
as is the usual experience mental and motor excitement, delirium and hallucinations of special sense are prominent symptoms, especially with concomitant toxemia of some kind or other. I believe the facts of pathology demonstrate cerebral congestion and sometimes fibrinosis.

My most exhaustive record of purpural brain pathology is furnished by the typhoid case already quoted. The naked eye description is as follows:

Cranium. Removed with difficulty owing to duramater adherions of recent origin. Bone appeared normal, but inner table was blood stained around the terminals of the blood vessels.

Para natal. Flaccid a little from slight arachnoid effusion, when opened into anteriorly, no notable structural or vascular changes.

Para natal. Extreme congestion in parts, normal condition in others; very fine network of arteriole injection, almost invariably over left cerebrum, being scarcely noticeable however on inner aspect of occipital lobe. On right cerebrum the congestion was rare and chiefly observed over angular gyrus and callosomarginal convolution. The consistence throughout very good.

Section. The marked congestion of left cerebrum as compared with right is still more evident, especially affecting the inner cortical layer of grey matter, but it is again absent in the inner occipital convolutions. The right cerebrum before and after section was lateralized and at its base with the exceptions above noted found to be pale.

Weights. Cerebellum pons and medulla 5 3/4 oz.
Right cerebrum 20 1/4 oz. Left cerebrum 23 1/4 oz.
After the naked-eye examination, the brain was preserved for microscopic sections by Professor Hamilton's method viz: In Müller's fluid and spirits for three weeks, changing it weekly; after three weeks it was preserved week after week in the graduated solutions of bichromate of ammonia recommended by Professor Hamilton; it was then treated with a saccharine solution, and afterwards placed in mucilage, according to the same direction. Finally it was cut in sections by means of ice and other microtomes. Some of these were mounted unstained, others were stained with carmine, logwood, aniline, and chloride of gold, rendered semi-transparent with oil of cloves, and mounted in damar. The most successful stains were carmine and anilin. Sections were made of all the convolutions, so that no part should escape scrutiny. The cerebellum, tons and medulla were in like manner prepared and examined. The result is brought out clearly as follows.

(a) extreme vascularity extending from the pia mater inwards, particularly noticeable in the unimemst, and by its effects on the outermost layer of the grey matter—this statement is susceptible of modification, with regard to the anemic convolutions notably those of the right hemisphere (b) tortuous and irregular vessels, but no thickening or other morbid alteration of coats; often found extremely engorged almost to absolute blocking (c) dilatation of perivascular spaces so marked as in some parts to give an almost honeycomb appearance; walls of spaces dense and fibrous. (d) perivascular sheaths loaded with small cells, and here and there impregnated with crystals and...
and pigment granules; minute extravasations
seen in the brain substance near the vessels
(9) the nuclei of neuroglia exceedingly numerous,
appearing in linear, circular or semi-circular clusters
along the course or near the bifurcation of the
blood vessels.
(10) in several convolutions the superficial layer
of gray matter was densely crowded with neuroglia
cells.
(11) except in the medulla there was no evidence
of nerve cell degeneration; the nuclei were
prominent and distinct, and the cell processes
were well defined in their length and branches.
(12) there was no evidence of gross lesion, but in the
nerve structure was scattered very minute finely
granular clusters which stained with carmine,
and measured from about 1000 to 1600 is of an
inch in diameter. They were found in close
proximity to the walls of the vessels and were
sometimes found at the bifurcations.
(13) of somewhat larger size were found some-
transparent annular or spaces with no uncommon
structural characters; there were rare.
(14) the changes in the medulla oblongata were less
marked, but not different in kind from those
already mentioned, with this exception that in the
medulla the nerve cells are undergoing fuscos
degeneration. It is no uncommon thing to find
this latter change in the medulla while the
integrity of the cerebrum is well maintained. The
cells are also unshapely and irregular in many
instances. The enlarged pia-vascular spaces
were here unusually frequent and involved the
folds of the olivary body especially.
As the changes in the cerebellum are a faint reflex of what has been already described, they are purely vascular.

The lesion is therefore widespread; it is in some parts more accentuated than in others, and microscopically the congestion is more evident than the naked eye appearances would lead us to expect. I was led from the clinical symptoms (hallucinations especially of sight and hearing) to expect a greater intensity of congestion and its effects in the convolutions desired to subserv the functions of special sense, and it will be found on reference to the sections which accompany this thesis, that in the angular gyrus and tempro-sphenoidal lobe this is apparent.

It would be mere iteration to go over the histology of the second case, for the condensed statement immediately preceding would entail important particulars identify the second case as well. The latter was one of purpural septicemia with manieal symptoms, the vascularinity was even more extreme than in No. 1, and the hemorrhages more marked and frequent. There are many attenuated and vacant spaces mostly perivascular, which are densely surrounded by neuroglial tissue.

Note. The microscopic sections labelled "in 115. C (No. 1) are those of the typhoid case. Those labelled "purpural fever" are from the brain of the septicemia patient (No. 2).
The value of an examination of the urinary constituents in the present investigation depends on (1) the promptness with which it is made, and whenever possible it should date from the first warning of the mental attack. (2) quantitative and qualitative analysis (3) on microscopic examination. (4) on fluid and solid measures. (5) and on an estimate of body weight, inceota and the other excretions.

The first condition is rarely obtained, and is possible only in private practice, but exceedingly improbable unless the subject is to the physician in attendance, one of special interest. It has attended to in my practice immediately on the admission of the patient, provided they were sufficiently recent. Some were, though, comparatively recent, transferred from other asylums while others had been treated at home for two or three weeks prior to admission. These have not been allowed to obscure the calculation. The difficulty however did not end here; for some were so profuse, or wet and dirty in their habits as to render complete or prolonged investigation impossible. Sulkily I have got over the difficulty by getting the nurses to draw off the urine by catheter, a proceeding which is possible even in the most troublesome cases by administering hypodermic injections of hypogenamine. The latter course however I did not need to resort to. Its unnecessary to explain the methods of examination further than to state:

1. that the urine was collected and placed in a graduated vessel by a trained nurse: as far as possible it was kept separate from feces: when
when admixture occurred a supplementary estimate was made.

2. The night urine was calculated from 8 p.m.
to 6 a.m. and the day urine for the remaining
14 hours. As far as possible - and this was the
rule rather than the exception - the day urine was
examined after 3 p.m. and the night urine
between 10 a.m. and 12 noon.

3. The tests used for albumen were (a) heat, nitric
acid; (c) ferric acid; for sugar (a) Eiger's Potassa
and heat, (b) Fehlings' method, (c) picric acid;
and for bile pigment pigments gmelinc test.

4. The volumetric estimation of phosphoric acid
was arrived at by means of standard solutions
of Acetate of Soda and Uranium respectively
(V. Thudichum) and for Urea and Chlrides of
Sodium. I adapted Liegeois methods.

It will be seen in the following
tables that the record of results is of two kinds,
the first incomplete, the second more perfect
in details. The first table counts for so much
as regards (a) fluid and solid measure 
(b) presence
or absence of albuminuria and (c) in a less
degree as regards deposits and microscopic
appearances; it is confirmatory of the conclusions
of the second table, which are summed up
somewhat as follows.

First. The earlier the urine is examined, the more
certainly is it found to be scanty and of high
specific gravity.

Second. The lowest fluid measure for urine was 2 oz.
The lowest total for 24 hours was 14

The average total for 24 hours not extending...
Beyond first three days and nights was *16/6 of average health total 40.6 or
20.6. Third. The lowest solid measure calculated by Christison's formula was per diem 40.3 grains or 2.6 grammes,
noctem 9.2 " 2.68 "
The lowest for 24 hours was 80.6 " 5.86 " and the average for 24 hours not extending beyond first 3 days night*16.3.7. 40.62 "
Average in health 40.660 "
These calculations as is evident from unavoidable gaps in the tables and owing to occasional extenuation before admission must be taken as rough estimates.

Fourth. That these figures are all the more remarkable in view of the following facts.
(a) that on admission the urine drawn off was in some cases the accumulation of more than 12 hours
(b) the continuous excitement and sleeplessness of several patients.
(c) frequent dryness of skin and frequent constipation of bowels; but that the deficient intake of the first few days of residence and notably of the days preceding admission will help to counterbalance the discounting causes which have just been described.

Fifth. Taking a range of observation wider than is comprised in these tables, albumen was present in 9 out of 23; the precipitate was usually slight; in one it continued in day and night long after its sleep; in one from night urine; in another it continued day and night for 16 days, and faintly reappeared during convalescence.

Sixth. Sugar was not present though Dr. Savage of Bethlehem Hospital has found it in some cases, I have tried for it carefully, and having failed to
find it conclude that in Dr. Savage's experience it was the result of chloroform inhalation or chloral treatment.

Seventh. Bile is a rare appearance though I have looked for it in cases where a jaundiced appearance or clay-colored stools would suggest its presence. It was not present in more than two instances, and these were cases of septicemia.

Eighth. Chlorides were found scarcely traceable, being so low as 16 grammes in 24 hours; for 14 hours of day were the minimum was 09 grammes and for 10 hours of night urine 24 grammes. The daily average in health is 16.5 grammes according to Vogel. The following facts must here be taken into account:
1. the diet deficient in quantity and saline quality.
2. the appetite impaired.
3. the low state of health and nutrition.
4. although the mental excitement was considerable, the degree of muscular excitement, was not increased in proportion; indeed the patient was often kept in a recumbent position fairly well.
5. the sum total of pyrexia could scarcely be regarded as high, and a rise of temperature was in Case I of Second Series accompanied by an increase of chlorides.
6. A movement of the bowels was rarely or insufficiently obtained within the first 48 hours of residence though faces might be formed abundantly.
7. The want of mucous secretion implies another diminution of chlorides, for Chloride of Sodium is an important constituent in mucous and a stimulant of its secretion.
8. Again, the chlorides were the last of the urinary
urinary constituents to return to their normal quantity.

The following conclusions then become obvious.

A. That a deficiency of chlorides may be partially, but insufficiently accounted for by (a) the anorexia and atonic dyspepsia, (b) saline deficiency in the food administered, (c) sluggish digestion owing to artificial instead of natural alimentation. These found in a series of investigations, that feeding by stomach pump, even with food to some extent pre-digested, does not stimulate digestion or absorption well, and that a third of the quantity so administered is voluntarily taken by the patient stimulates the secretions and promotes more vigorous digestion. (d) the pyrexia which must in these cases be regarded as only of moderate import. (e) moisture of skin. The historical case had the minimum of chlorides.

B. That these causes are to some extent discounted by the following factors of increase. (a) mental and bodily activity, the former especially when sleeplessness is taken into account being a considerable factor. (b) pyrexia was in the case where it was highest, attended by an increase in the chlorides, and there was no other hyperpyrexia. (c) the great discrepancy between the normal output and the rather low quantity recorded in these tables. (d) deficiency of other secretions as well. As bearing on the question of excreta it must be recorded that as a general rule respiration was shallow, yet frequent, but in the earlier days and nights of residence the skin was dry. It is exceedingly probable that in some way yet to be ascertained chlorides
Chlorides accumulate in the system and have some pathological significance in this disease, which we know not. The loss to urine and mucous excretions have three possible explanations: (a) chlorine starvation; (b) chlorine infiltration of tissues; (c) chlorinemia.

Ninth. Phosphoric acid was also decreased, being so low as 2 grammes in 24 hours, the minimum being 0.7 grammes for day urine and 2.5 grammes for night urine. The average for 24 hours of health is 3.5 grammes. The amount of ingesta is not so material a calculation here. The diminution varies in degree: in the hysterical case, it is least evident and is restored to the normal state when weeks later the chlorides are low. The hyperphosphorilia already noticed was not attended with any increase, nor can the variations be explained by the degree of mental excitement, for they are all much below par. The quantity rather than the quantity of mental excitement is more likely to account for changes in the excretion of phosphoric acid.

Tenth. The area total descended to 3.68 grammes in 24 hours, the lowest daily quantity was 1.32 grammes and the lowest daily quantity 2.26 grammes; the average quantity in health being from 30 to 40 grammes in 24 hours. Perinna can only be regarded as a striking feature in one case, although to some degree visible in all. It is soon recovered from and in case III I was surprised at its excessive quantity. This patient was overfed with custards, and she chewed by the state of tongue and stomach that digestion was weak; she lost weight rapidly for a time; and,
and yet the excreted urea in inordinate amount for her size and weight, unless we regard it as the sum total for all the excretory channels and as a result of her mental and motor excitement. A reference to the history of each case shows that the relative increase was always in proportion to the infecta, the convalescence or the degree of sickness, and mania in all the cases.

It must be regarded as remarkable in view of the almost complete absence of the chlorides which according to Baral increase the elimination of urea and other nitrogenous excreta.

Eleventh. The deposits on standing were heavier in the earlier days of the disease. This would be expected on cooling owing to the deficiency of water. They were of different kinds (a) phosphates, (b) urates, (c) mucous. Microscopic appearances were of no importance.

Twelfth. The early appearance of bacteria in the urine of the scarlatina patient suggests for future study an investigation of fermentative and putrefactive changes.
<table>
<thead>
<tr>
<th>Nature of Case</th>
<th>Quantity 24 hours</th>
<th>Reaction</th>
<th>Sp. Grav.</th>
<th>Albumen</th>
<th>Sugar</th>
<th>Bilr.</th>
<th>Urea</th>
<th>Sulphates</th>
<th>Chlorides</th>
<th>Deposits</th>
<th>Microscopically</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Septicemia, Cellular</td>
<td>Day Night D N D N D N D N D N D N D N</td>
<td>10.3</td>
<td>acid</td>
<td>10.30</td>
<td>none</td>
<td>none</td>
<td>5%</td>
<td>slight</td>
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<td></td>
<td>1. Small particles bright red, angular, pigment-free, no crystalline, not crystalline</td>
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<td>2. A few epithelial cells</td>
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<td>3. A few small circular, colorless matter</td>
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<td>4. None at first, in blood after</td>
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<tr>
<td>II. Urine disease, Hypertension</td>
<td>Day Night D N D N D N D N D N D N D N</td>
<td>63</td>
<td>acid</td>
<td>10.28</td>
<td>slight</td>
<td>none</td>
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<td>2. Mellow in yellow</td>
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<td>4. Neutral in some</td>
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<td>4. Disappearance</td>
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<tr>
<td>IV. Manic-depressive, Gentleman and Anemic</td>
<td>Day Night D N D N D N D N D N D N D N</td>
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<td>3. Malignant</td>
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<tr>
<td>Date</td>
<td>Age</td>
<td>Temperature</td>
<td>Symptoms</td>
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<tr>
<td>H5/6 W3 &amp; T</td>
<td>28</td>
<td>103.0</td>
<td>No</td>
<td>Heavy phosphate deposit on standing</td>
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<td>TV Scarlet Fever Case</td>
<td>1032</td>
<td>No</td>
<td>No</td>
<td>Heavy phosphate deposit on standing</td>
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<tr>
<td>TV Scarlet Fever Case</td>
<td>1025</td>
<td>No</td>
<td>No</td>
<td>Heavy phosphate deposit on standing</td>
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**Acute Delirious Mania**

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<tr>
<th>Date</th>
<th>Age</th>
<th>Symptoms</th>
<th>Treatment</th>
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</thead>
<tbody>
<tr>
<td>H5/7 W10. T 103.5</td>
<td>Very</td>
<td>Malignant</td>
<td></td>
</tr>
<tr>
<td>Dizziness, skin dry, constipation, and weakness</td>
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</table>
While this illness has been in progress, my thirtieth case has just come in. I have therefore to make a supplementary note on the urine. The history is one of three weeks duration, of weak stomach, refusal of food, constipation, and probably also retention of urine. She was narcotised and had dilated pupils on admission, skin very dry, height 5 ft. 11 inches Weight 7 ft. and Temperature 98.4°. Immediately on admission she passed 28 oz at one micturition. In the following 12 hours from 6 p.m. to 6 a.m. 10 ounces, but as yet no stool, and she had taken no food on that time. In the morning drank custard only when she saw stomach pump - the custard contained 3 grains of calomel. She took a second in the afternoon and a third at night; the sum total of ingesta for first 12 hours of residence was nil but had a pint of water; for second 12 hours 1½ pints of milk and 3 eggs. She had a very small faculty formed dark but rather dry stool 5 hours after calomel, and in the night following a softer one of small quantity. Very excited, violent and sleepless for first two days and nights. Kept exercising an open air. The quantities of urine and fluids for which they are calculated are as follows.

A. On admission - the retention probably of 48 hours, 48 oz.

B. In next 12 hours of night (6 p.m. to 6 a.m.) 10 oz

C. In next 14 hours of day (6 a.m. to 8 p.m.) 4 oz

D. In next 14 hours - 8 p.m. to 10 a.m. 6 oz

1 Qualitative re:

A. albumen none, Bile none, Portwine colouration with Spp. Potass. and Bicarb. Acid, but no other suggestion of sugar. Sp. Gr. 10.10 reaction acid
B as above  No. gr. 10.30 reaction acid.
C as above "  "  " 10.28 "

Purtune colouration fainter.

D as above. Purtune colouration still present specific gravity 10.30 -

2. Quantative

A Phosp. Acid. 35 grmn. Chlorides 57 grmn. Area 5.3
B "  " 17 "  " 18 "  " 3 .
C "  " 1 "  " 06 "  " 1 .
D "  " 16 "  " 09 "  " 2 .

The deposit of A was nil. After standing 24 hours it was merely stringy mucus and very slight. B, C, and D were heavier, partly dissolved on heating and consisted entirely of finely molecular debris and epithelium and mucus corpuscles, finely granules or disintegrating. There was a singular absence of urinary crystals and no bacteria after 12 hours standing.

19\% Johnson's test for sugar produced a result which I at first attributed to the previous exhibition of cholera, but the same was obtained with other samples of healthy urine and I was not surprised to find that boiling liques ferrous and lucerne acid effected a similar colouration, only less intense. On looking up the discussion on the subject between 1875 Pavy and Johnson in the Lancet Vol. II. 1882 I find Pavy disputes the validity of the test on the same grounds. I have not yet found saccharine urine in the other cases when the remaining mentioned tests were employed, and I may remark that the Fehling Solution was perfectly fresh.
Pathological Complications.

The time is not yet ripe for classifying the complications of Puerperal Insanity. They have been too much lost sight of on account of the mental disease itself; and they have been mentioned by writers in vague and general terms, merely to indicate their gravity and seriously to influence their prognosis. According to Bell, Tuke, and others, they affect the prognosis of puerperal insanity very seriously. This I regard as a mistake. My experience leads me to view pathological complications as something tangible, and within the reach of the surgeon or physician, and something that gives palpable indications for treatment. That a strange fatality does follow the appearance of some complications goes without saying; but something of this is due to our error in not recognising the complications soon enough and often enough. We frequently err in neglecting to ascertain their existence, and too often in our examinations lose sight of the pelvic and genital regions altogether. In no class of cases is gynaecological investigation of more importance than in the study of puerperal insanity.

As already indicated, blood poisoning is an important complication of puerperal insanity. Without an actual examination of the blood, and an experimental investigation, it is not possible to demonstrate the milder forms of septicaemia; and though their seats of origin and areas of secondary deposit may be strongly inferred, it is difficult to assume the
the enceprhale in not a few cases where the conclusions are rather speculative. Under atiology I have already referred to this subject and need not again go into detail, merely contenting myself with a statement of some doubts and difficulties that meet the observer from time to time.

(a) The first difficulty is to make sure of a local and primary seat of infection, and this is not always easy with insane patients. For one thing the evidence of pain or its absence must not be implicitly relied on, and the bowels should be thoroughly evacuated before an attempt is made to settle the question. Even then the restlessness of the patient will disturb and distract attention, and as the septic lesion is often slight enough to elude the tactile sense it may be missed altogether.

(b) Sudden rises of temperature whether preceded by a chill or not will often perplex the physician to determine their meaning. They may be septicemia, phthisical, zymotic, nervous or simple influenza, and they may refer purely to intestinal cause. Zymotic disease will soon settle the question so far as it is concerned, and so will phthisis unless it is tubercular, but the differential diagnosis of the others is not so easy, and in one case of periodic pyrexia I had difficulty in deciding between hepato-intestinal disorders and septicemia.

Next in importance to septicemia and its congeners is phthisis pulmonalis. Salt's Case records 3 cases of death from phthisis, out of 73 patients labouring under paroxysmal insanity.
insanity and Dr. Boyd gives 2 out of 103. By number 10 out of 35. Bronchitis pneumonia and heart disease have so far as these statistics go, been less frequent but they are recorded. I have found no record of mammary abscess in the experience of others but it was a complication of 2 cases of melanocholia under my care. The abnormal conditions of the uterine site have been already referred to.

Rarely was a recent case admitted that did not exhibit uterine or allied symptoms of abnormal character, the most frequent being pain on pressure in the hypogastrum and scanty extremely offensive lochia. Precise of examination was not always possible, but if accuracy of diagnosis was not assured, the certainty of some form of uterine or allied disease was frequently established. Three post-mortem cases showed pelvis inflammation, and a dirty sloughy offensive placental site in the typhoid case; one case recovered, had pelvic cellulitis; another retention of clots in uterus with high fever, and deeply seated pain in right iliac region; while a third complained only of tenderness on pressure over uterus. There are facts illustrations of many other cases which might be quoted, and suffice to show the importance of attending to the conditions of the uterus and pelvic cavity.

Anemia is a complication which in varying degree is as frequent as the insanity itself. It is a subject which in this connection opens up a prospect of profitable study; and a series of clinical estimates of hemoglobin and hemacytes by means of
the hemoglobinometer and hematocytometer would be of great value.

Temperature: records have been kept of 30 cases extending over weeks and months according to the duration of the disease. As there is no typical temperature of septicaemia, it is still less surprising that there is no typical temperature of purpural insanity. In the latter we have a greater complexity of disease to consider, and therefore a maximum of superficial influences. Charts are a useless litter if they cannot be reduced to a system of intelligible classification; and with a little pains I have been able to range mine under the following heads.

(a) Remittent. (b) Fugitive (c) Convulsive (d) Sub-febrile.
(a) Remittent. The two purest examples of this type were cases of acute tuberculosis, which complicated the mental disease, and proved rapidly fatal; they were cases with uniformly high evening temperature and well-marked morning remissions.
(b) Fugitive. Here the changes are irregularly periodic, the ascent sudden and pronounced or achieved by gradation, the decline remittent or by gradations, the summit acumenated or horizontal for a few days.
(c) Convulsive. So well implied in the name, there is no uniformity of character, the tracing is a combination of ascent, descent, horizontal, convex or concave curves, or both. It is the rarest, and was found best marked in a fatal case of Septicaemia.
(d) Sub-febrile. Moderate and uniform increase.
(e) Combinations. The most common of this class was a combination of (a) and (b) types, remission being a very frequent characteristic.

Two cases: scarlet fever and typhoid
Typhoid complications did not present charts typical of these diseases. The former was remittent in first week, sub-normal in second and third week, and variable within the limits of 98° and 100° in the fourth week; sudden and decided abatement followed the full development of rash at the end of the first week. The latter had not a typical typhoid temperature; the character may be described as "abortive-remittent": it sometimes fell in the evening and rose in the morning. A collection of temperature charts goes along with these things.
Treatment.

Considerable diversity of treatment has hitherto obtained, especially with regard to sedatives. No systematic experiments are recorded; and no very conclusive data have been published. The following quotations from some of the best authorities placed side by side will summarise our present knowledge of the subject.

First. Pot and Stimulants. B. Blouston gave to his practice in other cases, beleris in heavy egg custards—three eggs in each pint of milk, and sometimes scram in addition, beef tea, port, sherry, brandy, "give much food and give it often." D. Leishman of Glasgow, so more afraid of overburdening the digestive organs, he regulated the diet carefully and increases it cautiously.

Second. Open air exercise. Blouston lays great stress on this.

Third. Antipyretics. Blouston gives as much as 40 grains of sulphate of quinia in 8 hours and believes in it.


Sixth. Anamia. Iron (Bucknell & Tuke)

Seventh. Dry skin and scanty urine: saline refrigeratives (Bucknell & Tuke)

Eighth. Sedatives. (a) Blouston seems to use them rarely and gives chloral. (b) Batty Tuke gives morphia.
morphia, in melancholia in large doses, and
says that "sedatives in large doses are contra-indi-
cated in mania." (c) Blandford gives chloral in
mania. (d) Bucknill and Fuller believe in morphia and
put less faith in chloral and Bromide of Potassium.
(e) Rushman says that chloral favours sleep, opium
makes matters worse.

An atiology so intricate and
a pathology so widespread as the foregoing facts,
reveal, must needs furnish indications for treatment
of unusual variety and extent. It is not always
easy to ascertain the indications most urgent, because
there is a danger of ignoring some symptoms,
under-valuing others, and over-estimating what
is secondary, and conditional to what is obscure
and ill-defined. The mental symptoms too often
engross attention to the exclusion of causes which
may operate to produce them; and mistaken notions
of pathology have ere this led to heroic measures
with disastrous results.

It is clear from the facts
elected that no simple and specific lines of treat-
ment can be laid down; for there is an endless
variety of feature presented by the disease. It is
however desirable to classify in this connection,
according as one or more of the following morbid
states gives a pronounced character to the disease.
These are (1) Digestive, Hepatic and Intestinal
Disorders.
(2) Inflammatory, Sebaceous and Arancene
Conditions.
(3) Hysteria.
(4) Mania with intensity of symptoms and sleepliness.
(5) Melancholia.
That these blend together with other abnormal states in one and the same patient is clearly understood, but they are now separately identified as being the conditions most frequently and urgently calling for specific attention.

It is beyond the province of the present thesis and it would be rather presumptuous on its author to enter into a dissertation on everyday therapeutics. The treatment of disorders and diseases of the first and second classes, will be pursued by every practitioner on lines which he has made good by study and experience. Without therefore dictating a course of treatment under these heads, I will give an epitome of my own practice and results.

1. Digestive, Hepatic and Intestinal Disorders.

One patient was fed, owing to the refusal of food, by the stomach pump—without intermissions of voluntary alimentation—for 3 weeks. This was case III. of the Second Urine Series. The tongue and roof of mouth were coated with creamy fur, lips were cyanotic and erected, saliva while insufflated, often frothy, the pharynx relaxed, stomach irritable, face dry and dark or greenish and slimy. Septicemia with diaphragmatic and pleuritic deposits and boils.

She was fed literally with custards, (2 eggs in each), beef tea, milk and whisky. Colomel 1 grain bis die and Acid nit. mur. 1/2 dr. with T. Ducis Vomicae bis die were administered, the colomel powders being intermittent at end of three days, to be repeated as occasion suggested. Castor oil was prescribed from time to time with good effect. Cod-liver oil was given.
and for a month she was under mild Bromide of Potassium treatment. Result: after 3 weeks during which occurred two moderate pyrexial crises, she still refused food, the tongue and mouth cleared up a little and then got heavily furred again: the appetite returned for a day only once, and she was getting so weak as to threaten collapse during feeding. Codliver oil was stopped; then custards, then bromide, and last of all artificial feeding, but neither of these changes of treatment seemed to encourage a healthier state. The stomach was now evacuated from time to time to ascertain the progress of digestion: and after 3½ hours custards were withdrawn little altered from the hour of injection.

Her weight was now taken: 6½ lbs, the stomach was washed out with 1-500 carbolic lotion, and a diet scale arranged, to be jumped (after predigestion with Benger's liquid refresh) at intervals of 4 hours, 4 times a day. The diet was thus prepared: 8 a.m. ½ pint milk, with 1 egg as a custard. 12 noon ½ pint Beef tea with potato in suspension. 4 p.m. custard as at 8 a.m. 8 p.m. milk gruel ½ pint. Two ounces whiskly were given in 24 hours. No medicines given. She lost 5 lbs in the first week. Bromath was now prescribed, and a combination of the Bromides of Potassium and Ammonium. Up to this time food regurgitated in an undigested state on introduction of tube, hence the Bromath treatment. At the end of second week had lost 1 lbs. seemed on the whole better under his bromide combination, but at end of third week this was given up as lips and tongue were...
were becoming dry and a copious rash had appeared. The pyrexial rises were less marked during these three weeks.

At end of third week, the weight was stationary. The tri-bromide combination of potassium, sodium, and ammonia, was tried and suffered a little fate with its predecessor. At end of fourth week, weight was still stationary. She complained of diaphragmatic pain to left side, and had a short troublesome cough at end of 5th week, with the highest temperature yet reached (over 103° for 2 days and 3 nights). Eructations and regurgitation of food had not been troublesome for some days, but secretions were very scanty and tongue and lips dry so that bromides were stopped.

At end of 4th week, weight is 69 lbs. having lost 1 lb in three weeks during which beef peptonoids were used, and later with apparently more gratifying effect carrièke Peptonoided beef liver, oil, milk. I judged at this time that although the "turn of the scale" had not been reached, she was stronger, less limp in our hands, and less cyanotic during the artificial feeding. It ought to be stated that the method of alimentation, was by means of the soft nasal tube, that four nurses were at hand, each trained to a particular duty; and that from the first handling of the patient to the last, the operation took as I have frequently calculated— not more than 45 seconds, therefore exhausting struggles were averted.

From this period onwards she slowly recovered. She began to take her food
food herself, but in very small quantities, compared with what had been injected into the stomach hitherto; sufficient however to turn the scale. Soon she was able - the weather being propitious - to go out into the open air, and in 2 months had risen from 5 ft 6 ins to 6 ft 9 ins. She was of phthisical habit; had not menstruated three months after recovery, and her doctor then wrote me that she was under treatment at home "with rusty sputum and dulness over left lung." This was an extreme case of atony and anorexia. As a rule the treatment was simpler and of shorter duration. Calomel followed by Castor Oil or Epsom Salts; and R. T. "Mar. Phl." and T. Nucis Vomica were the usual combinations, and I often found them serviceable. One case which had been overdosed with alcohol before admission was very tantalising. For a few days the tongue would clear up, the defaecation become active and the mental condition improve, only to relapse again and again. She is now I fear a hopeless chronic with voracious appetite.
2. Inflammatory, Septicemic, and Anemic Conditions

The effect of sulfureous practices on the pelvic and mental conditions was in many cases remarkably gratifying. This treatment was indicated where there were signs of pain, sedate being more
frequently reserved for the deeper metastatic deposits.
Of vaginal injections my favourite is carbolic lotion,
and I put my faith to it because the patient liked it best. In their more acute intervals, they said it soothed them, and in their hyperaesthetic state this was no small boon. To soothe is to
reduce excitement and produce sleep; and uterine medication may have a more direct and salutary influence on the mental condition than has been
suspected. Superficial evidence of septicemia
was found in abscesses, boils, scalp deposits
often resembling warts, and a copious purulent
acne. It is unnecessary to linger over their
appropriate treatment.

Constitutional means may be
employed in two directions. (a) to increase
nutritive processes. (b) to arrest fermentation. The
first of these has already been discussed and in
addition to its more immediate purpose of bring-
ing up nutrition to its normal standard, it
exercises a double purpose in septicemia by
increasing physiological resistance to ferment-
ative change. The latter is a worldwide subject
in itself and can only be referred to here as
having recognition in the treatment of appropriate
cases, albeit in the present state of our knowledge
not of the most exact and definite character.
Mention might be made of many remedies en-
dployed for the purposes just indicated but they
were
were attended with no aggregate results of surpassing excellence, and must be held in reserve.

3. Hysterea. As giving a distinctive character to some cases, and having a special interest from the point of view of treatment, it is desirable to place on record my results. In one patient a quick recovery followed purgative treatment; in another this had no proximate curative effect, and a definite and satisfactory result followed the exhibition of bromide of potassium, 15 grains every four hours. Opium diuresis soon followed, and in three weeks the patient was convalescent.

4. Mania. A moment's consideration of the somatic relations of puerperal insanity will suffice to show that there is no cutting of the Gordian knot by means of neurotic remedies unless in exceptional cases where the disease has been anticipated. The whole mass of evidence before us tends to the conclusion that treatment must be of a composite character, that in short it is a case of having many strings to our bow. To the various neurotic remedies advocated there given a fair trial, in no case with the best possible results as the following experience testifies. 

Case I. Morphine administered in 1/2 grain suppositories every 8 hours, three daily for 18 days, with gastric intestinal correctives reduced the muscular excitement, moderated the mental flux, did not arrest cutaneous secretion, nor diminish appetite, and at first seemed to induce a return to mental stability and coherence; but soon a new and strange mental habit appeared, quite foreign to our usual experience of this form of insanity. The spasmodic, paroxysmal, merely explosive
explosive character of the mental history gave
place to a strange dogged antipathia, suspicion
and delusions of persecution, hitherto fleeting and
superficial, became more deeply rooted and inten-
sified, and the last entry in the case book
regarding this patient is as follows.
"She still manifests strong antipathies to all the
nurses, the matron, and the doctors, and has not
a good word to say of anyone. She is a sour,
cross-grained woman, and yet the shadow of a
smile betrays that she is even at her worst—not so
severe as she would have us believe. The morphia
treatment does not seem to have been successful.
It has prolonged and altered the morbid habit
rendering her less facile and amenable, easily put
out, discontented, never satisfied, and decidedly
 cranky. Otherwise she is coherent, knows what she
is about, has no definite delusions and will
probably do well at home." Three weeks later she
was discharged considerably subdued, and has now
remained out for two years.

Case II. Suppositories were given every 8 hours
7 hours at first, and after two days every 6 hours.
Here also the same appearance of returning reason
quickly occurred, so soon to disappear, for the
drugs of mental disease remained. The same
gastro-intestinal corrections were used as in the
preceding case, the appetite remained good, and
she gained in strength. After she had angry
explosions, was unusually threatening, and said
silly childish things. She evinced strong animosities
towards nurses, and on all and every occasion took
the part of the patients against the nurses,
believing that the latter invariably abused them.
Morally
Morally she was utterly depraved in her ideas, her conceptions of right and wrong were of the lowest character. By and bye she seemed, after a close study of some weeks, to be free from delusion, when suddenly one day she expressed outrageous ideas as to being murdered, and her child (an illegitimate) being fathered by a third party. Later on menstruation appeared, ushered by premonitory epistaxis and afterwards she gradually recovered.

(b) The effects of chloral. I have seen in the treatment pursued prior to their coming under our care. It has merely suspended morbid action for a time, and even induced a saner perception of surroundings: delusions of identity of persons and place having flown for a time, and a pause being marked in the course of the treatment, and ominous pause indeed for the mental reaction was greater than before. In combination with the Bromide of Potassium, 25 grains of the latter to 20 of the former, I have used it as an hypnotic to ward off exhaustion from prolonged mental excitement, and insomnia; and its effect, a good one in itself, has been after two or three applications to restore the periodicity of sleep. As regards any specific action on the mental state I fear this combination has none, but it is a safer hypnotic and sedative than either of the others.

c) My experience of Bromide, his bromide and the tri-bromide combinations has been confined to one ease already described, and exemplify Potas: Bromide to the case of acute hysterical Mania which I have mentioned. It is unnecessary to repeat what has already been said of them.

S. Melancholiae. Morphiae was given in one ease...