

Etiology, Pathology and Treatment.
Puerperal Insanity.

A Graduation Thesis.

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I certify that this thesis has been
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Etiology, Pathology and Treatment of Puerperal Insanity.

Introduction.

The field of Puerperal 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 some time 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 prodromata, 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.

1. The Aetiology. (2) The Pathology (3) The Treatment.

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, (puerperal 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 indiscriminate 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 coincidents, while under other circumstances and in certain serial combinations they undoubtedly operate in 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

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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 misnomer: 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 irritations.

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 stimulus 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 per se as a cause of puerperal insanity than the pinch of a frog's foot can be regarded as the cause of its convulsions, yet under cerebral conditions which we shall presently consider, it is as surely an excitant as the stimulus of a pinch in the case of a decapitated frog. While in either case the central condition is always the same, there is nothing specific in the peripheral stimulus: for we may substitute for exposure to cold:— laceration of perineum, pelvic peritonitis, post partum hemorrhage, constipation, piles, 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 oivi generis.

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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 peripheral insanity. Here the peripheral excitant 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

b, central, the former comprising all peripheral irritants capable of inducing morific centripetal 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 aetiology 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 centripetal 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 pyrexia, and notably rare in their absence.

Toxaemia 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 peripheral 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 diarrhoea preceded the mental attack: the stools were as a rule

rule hard and dry, usually very dark, more rarely claycoloured, dry, brittle or putrescent and of extremely offensive odour. They lacked the antiseptic action of the bile and the mollifying influence of the intestinal mucus. The gaseous products of putrefaction are themselves of no small account in this connection. An examination of the urine demonstrated bile in several cases yet not so frequently as I was led to expect from the colour of the skin and the putrefactive state of the faeces. 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 puerperal cases, occurring very soon after labour, and not being always explicable 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 unresponsive to reflex stimulus, 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 mucus tract from mouth to anus was natural, or clogged with inspissated or greenish mucus. The effect on the secretions of such altered mucus is known to be serious, and it is not unreasonable to expect chemical instability of the gastro intestinal fluids, and putrefactive

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putrefactive changes in the faecal 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 repulsive odour. A very uniform state on admission was a profuse crop of acne pustules over the buttocks, but rarely if ever extending further. The milk in 70 per cent was arrested: the lochia 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 secretions 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 prima via kidneys and skin: but for simple retention of urine a mental or hysterical cause as might be expected was usually found. These abnormal conditions usually precede the mental outburst by days or weeks and may be taken as evidence of a widespread neurosis 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

they do exist they have antedated the mental attack. The arrest of milk and lochia is either premonitory or coincident; and only where induced anteriorly 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 this track 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 peripheral 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 secretions 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 secretions can account for it. Yet it cannot be denied (1) that there is a fertility in the sources of puerperal blood poisoning and (2) that in proportion to the number of the sources and more serious 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 septicaemia and insanity develop almost coincidentally, and except on 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 pre-existent and became intensified posterior to the inception of the septic process. My collection includes records of 8 well marked cases of septicaemia out of a total of 35; and of inflammations affecting the uterus or its neighbourhood; with or without mild septicaemia 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 I regarded these as possibly septicaemic, 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 puerperium. 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 induced
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 incubation is believed to be usually about 21 days. (b) 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 puerperal insanity than is generally supposed. The clinical phenomena of the respective exanthematous types were not accurately or even approximately produced in either case. The typhoid characters 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 puerperal 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 indiscreet relative

relative with wine and whiskey. They both proved most intractable cases, and now after a long residence in the asylum, are shewing no signs of recovery. Insanity appeared after the indulgence in both cases but most probably the dipsomania in the one case was the first symptom of mental unsoundness as I have found it a frequent symptom of puerperal insanity. The effect of any or all of these avasts 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, structurally functionally active and to overcharge the nervous system. The frequency of puerperal delirium and hallucinations, whether or not they amount to insanity, is due to cerebral toxicemia, as the evidence of asylum practice and private practice can abundantly testify. The experience of private practitioners will furnish illustrations of toxicemia 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 puerperal fever, exanthematous 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

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 depression (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 childbed.

The classes of Pyrexia and the percentages of mental antecedent are as follows.

Class	Description	Total of all	Mental antecedent
I.	Of Local Origin	42 cases	19 p. c.
II.	After Difficult Labour	18	22.2
III.	Originating in or after Exposure to Contagion	162	13
IV.	after Cold and Exposure	13	7.8
V.	after Shock or Emotion	6	100
VI.	From Unassigned Cause	114	21

The ratio of the second and third kinds is less than what has now been given. Of cases of well pronounced mental disorder following on puerperal pyrexia, the proportion is 8 per cent, and of alternating mental-pyrexial-mental cases the proportion is 4.3 per cent.

The last of the blood conditions which we have to consider is a state of poverty and anaemia. Such a condition in order to keep within the range of the argument must either be par-
:turient or puerperal in its origin; and it is obvious that it will find most typical expression in anaemia resulting from accidental hemorrhage, placenta praevia, post-partum hemorrhage and puerperal abscess formations. Anaemia usually complicates the blood conditions already described and increases the excitability of the nerve centres, inducing sleeplessness, giddiness, irritability, emo-
:tionalism, mental lassitude and inebriance. The physical signs of it are unmistakable: occasionally but not always, hoarse murmurs were audible over the heart, and the bruit de diable over the veins at the root of the neck.

The consideration of nervous routes of centripetal 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. Laceration of the perineum 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, septicæmic or both, and 4th arrest of secretions and discharges. In proportion to its sequences 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, sept. icæmia, and finally insanity: the patient had a mild neurotic heredity, and the history of the case clearly marked the sequences 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 lochia 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. Rigors, generally

generally anticipated by sleeplessness, often precede 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 occur frequently as accompaniments of the insanity, not only where there is septicæmia, but where either it does not exist or its existence is extremely doubtful. When mental disease is fully established, a chill arrests for a time the psychic phenomena; this has been seen even in acute delirious mania. A chill occurring before the liberation of the mental discharge, will probably operate by conduction upwards, from the medulla to the cerebrum, and by peripheral conduction as well. The pathology of rigors is however outside the present question; and the corollary of cortical disturbance as a result of the nervous discharge (of rigors) in the medulla oblongata, can be affirmed from clinical evidence as well. Indeed taking the rigor as the equivalent of an epileptic seizure: puerperal insanity might in many cases be regarded as a psychic epilepsy.

Of visceral irritations, those having their seat in the uterus or its neighbourhood naturally take a leading place, and none is more serious than the retention of clots in the uterus. A case of sub-acute depression - the "dregs" of a puerperal 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 transitoria 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 rectum 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 as 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 peripheral 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

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conducts noises intensely: the eye is open to dis-
tressing 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 "neighbours" row in the stave, 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 perverted
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 querulous and
exhausted state of the patient.

In proceeding to consider the morbid
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
puerperal female preparatory to an outbreak of
insanity find expression in the following symptoms
(1) acuteness of sensory impressions; (2) a state of
nervous tension. (3) emotional irritability - easily
induced worry, anxiety, peevishness, fretfulness,
explosions of passions, extremes of feeling; (4)
diminished self control; (5) restlessness; (6) sleeplessness.

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The relative antagonisms of force and resistance are altered by ^{morbid} excess of functional activity, nutritive deficiencies or probably both; resistance is yielding before the hitherto latent energies, which are accumulating in excess; and insanity is on the verge of precipitation. The physiological resistance to explosive discharges in nerve structure 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 enquiry.

The following statement embraces all that need be said upon the subject (a), sensory perceptions are accentuated or perverted - frequently both; (b), emotional impressions are extremely acute (c), 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, to 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 invariably 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) various disorders of health during pregnancy, (7) insufficient pause or none after lactation, and frequent pregnancies, (8) frequently recurring miscarriages.

In five cases of puerperal insanity out of 35, there was a history of hysteria and in 5 others of previous attacks of insanity

2 of which were puerperal. It does not by any means follow that where insanity had occurred previous 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 ^{the} a priori inference is sound that these crises are of grave import, and must not be lightly regarded. The insanities of puberty and ^{early} womanhood are very apt 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. Batty 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 intemperance; uterine and allied affections must also have a place in this calculation; for undoubtedly 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 or more sisters of six cases. Further in some cases a suspicion of heredity was aroused 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 exalted 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 progenetic 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 13 out of 35; and 7 multiparous whose histories are in this respect defective, it was found that out of the remaining 15 multiparous, 5 shewed 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 multiparous 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.

Hereditary is here represented from many points of view, and in a variety of combinations which do not however include epilepsy of which in its hereditary form 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 "nervousness and excitability" which was sometimes sparingly 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 underestimate for the reason that it had been amplified from time to time after the patients in question had passed from under our care. Many additional facts were incidentally communicated by strangers or discovered by personal investigation made at the patients 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, epilepsy, 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.

Puerperal

Puerperal Insanity is not so beautifully simple as a case of iuxta poisoning, nor so definite in its sequences as a case of zymotic disease. The lines of causative conduction are so innumerable, reflective 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 puerperal course of his patient is greatly increased. He can anticipate and thus avert strokes of causation or minimise 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 furious mania, which was their only conception of puerperal insanity, was a convertible term for meningo-cerebritis; while Gooch laid down the law rather paradoxically "that the disease is not one of congestion or inflammation, but one of excitement without power". 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 secondarily, 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 toxæmia observes "In the blood of the puerperal female, greatly modified as it is in the normal
states,

states of pregnancy and delivery, and containing as it does after parturition the effete elements of the involing 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 secretions, 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 appearances of the brain; (2) A report of urine analysis and microscopic examination and (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. Nor was the inference of common acceptance sound, because general anaemia and exhaustion cannot legitimately presuppose local anaemia, where functions are abnormally active, or where there exists seats of irritation septic or otherwise. Asthenia does not render 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 moribund cases, congestions of trophic origin, hypostatic pneumonia, tonsillitis, stomatitis and the inflammatory varieties induced in depressed states of the system. That an asthenic phrenitis does sometimes prove the pathological equivalent

equivalent of puerperal insanity has been too evident to be disputed; but the great bulk of cases as a rule have been classed pathologically under cerebral anaemia. There is no certain and sufficient evidence to justify this allocation; the inferences 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 anaemia for congestion than the converse, by confounding the venous with the arterial system, especially in an examination of the pia mater; but 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 W^r. Boyd of Somerset 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 W^r. 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 exsanguinity." Further where heredity is strongly marked without prolonged acute excitement, hyperaemia is probably rare. But where

as is the usual experience mental and motor excitement, delirium and hallucinations of special senses are prominent symptoms, especially with concomitant toxæmia of some kind or other. I believe the facts of pathology demonstrate cerebral congestion and sometimes phlebitis.

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

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

Pura Mater. Flaccid a little from slight arachnoid effusion, when opened into anteriorly. No notable structural or vascular changes.

Pia Mater. 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 calloso-marginal 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 ^{almost} absent in the inner occipital convolutions, ^{especially the right.} The right cerebrum before and after section was laterally 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 3

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 dammar. The most successful stains were carmine and aniline.

Sections were made of all the convolutions, so that no part should escape scrutiny. The cerebellum pons 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 innermost, 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

3

and pigment granules: minute extravasations seen in the brain substance near the vessels

(e) 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.

(f) in several convolutions the superficial layer of grey matter was densely crowded with neuroglia cells.

(g) 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

(h) 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 1600th of an inch in diameter. They were found in close proximity to the walls of the vessels and were sometimes found at the bifurcations.

(i) of somewhat larger size were found semi-transparent attenuated spaces with no uncommon structural character. these were rare.

(j) the changes in the medulla oblongata ^{were} ~~are~~ less marked, but not different in kind from those already mentioned, with this exception that in the medulla the nerve cells ^{were} ~~are~~ undergoing fuscous 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 perivascular spaces were here unusually frequent and involved the folds of the olivary body especially

(No. 1) 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 ^{look for} expect a greater intensity of congestion and its effects in the convolutions believed to subserve the functions of special sense, and it will be found on reference to the sections which accompany this thesis, that ^{at least} in the angular gyrus and temporo-sphenoidal tip this is apparent.

It would be more iteration to go over the histology of the second case, for the condensed statement immediately preceding would in all important particulars identify the second case as well. The latter was one of purpural septicaemia with maniacal symptoms, the vascularity was even more extreme than in No 1, and the hemorrhages more marked and frequent. There ^{were} ~~are~~ many attenuated and vacant spaces mostly perivascular, which ^{were} ~~are~~ densely surrounded by neuroglia tissue.

Note. The microscopic sections labelled "No. 1" are those of the typhoid case. Those labelled "purpural fever" are from the brain of the septicaemic patient (No. 2.)

The value of an examination of the urinary constituents in, ^{such as} 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) on qualitative and quantitative analysis. (3) on microscopic examination. (4) on fluid and solid measures. (5) and on an estimate of body weight, ingesta 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 been attended to in my practice immediately on the admission of the patients, provided they were sufficiently recent, ^{cases}. 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 observe the calculation. The difficulty however did not end here; for some were so perverse, or wet and dirty in their habits, as to render complete or prolonged investigation impossible. Latterly 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 hyoscyamine. The latter course however I did not need to resort to. It is 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 faeces: when

beyond first three days and nights was *16.6 oz
Average health total 40 to 60 "

Third. The lowest solid measure calculated by Christison's formula was per diem 40.3 grains or 2.6 grammes

" " " " noctem 93.9 " " 6.08 "

The lowest for 24 hours was 80.6 " " 5.86 "

and the average for 24 hours not extending beyond first 3 days & nights *463.7 " " *30.62 "

Average in health 40 to 60 "

*These calculations as is evident from unavoidable gaps in the tables and owing to occasional retention 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 ingesta 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 observations 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 urine long after its disappearance from night urine: in another it continued day and night for 16 days, and faintly reappeared during convalescence.

Sixth. Sugar was not present though W. Savage of Bethlehem Hospital has found it in some cases. I have tested for it carefully, and having failed to find

find it conclude that in Dr. Savages 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 claycoloured stools would suggest its presence. It was not present in more than two instances, and these were cases of septicæmia.

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 ^{always} 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 feces might be formed abundantly.
- 7- The arrest of mucus secretion implies another diminution of chlorides, for Chloride of Sodium is an important constituent in mucus 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. I have 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 if voluntarily taken by the patient, stimulates the secretions^{latter} 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 hysterical 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 ~~observed~~ quantity recorded in these tables. (d) deficiency of other excreta as well. As bearing on the question of excreta it must be recorded that as a general rule, respiration was shallow, yet frequently, but ^{only} 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

97. chlorides accumulate in the system and have some pathological significance in this disease which we know not. The loss to urine and mucous secretions 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 minima being .07 grammes for day urine and .25 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 hyperpyrexia 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 quality rather than the quantity of mental excitement is more likely to account for changes in the excretion of phosphoric acid.

Tenth. The urea total descended to 3.68 grammes in 24 hours, the lowest daily quantity was 1.32 grammes and the lowest nightly quantity 2.26 grammes. the average quantity in health being from 30 to 40 grammes in 24 hours. Diminution 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 over fed with custards, and she showed by the state of tongue and stomach, that digestion was weak. she lost weight rapidly for a time; and,

and yet she 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 ingesta, the convalescence or the degree of sleeplessness, and mania in all the cases.

It must, ^{yet} be regarded as remarkable in view of the almost complete absence of the chlorides which according to Barval 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) mucus. 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.

<p>H 576 N 84 J. Bowel, very watery, skin dry, Fed by spoon. Custards, Beef tea</p>	<p>28</p>	<p>ac</p>	<p>1030</p>	<p>yes</p>	<p>none</p>	<p>none</p>	<p>Heavy phosphate deposit on standing</p>	<p>Heavy phosphate deposit on standing</p>	<p>(1) Yellow pigment granules free acid infiltrating cells (2) Bacteria thickly, appeared in standing (3) A few ovalates (4) Abundance of phosphate (5) Fatty debris from cell disintegrating after a day's standing</p>
<p>TV Scarlet Fever Case - Sub-acute excitement with stupor H 576 W 8 st 3 T 100° to 102° Obstruction of bowels. Skin dry, hard Custards and milk</p>	<p>Very scanty feculent white later profuse</p>	<p>ac " "</p>	<p>1032 1030 1025</p>	<p>no " "</p>	<p>no " "</p>	<p>scanty later abundant</p>	<p>Heavy phosphate deposit on standing</p>	<p>Heavy phosphate deposit on standing</p>	<p>(1) Yellow pigment granules free acid infiltrating cells (2) Bacteria thickly, appeared in standing (3) A few ovalates (4) Abundance of phosphate (5) Fatty debris from cell disintegrating after a day's standing</p>
<p>T Acute Delirious Mania with Acute Phthisis Pulmonalis H 577 W 7 st 10 T 103.8° Diarrhea, skin dry, Custards and Beef tea</p>	<p>Very scanty</p>	<p>ac</p>	<p>High Sp. Grav.</p>	<p>yes</p>	<p>none</p>	<p>none</p>	<p>Heavy phosphate deposit on standing</p>	<p>Heavy phosphate deposit on standing</p>	<p>(1) Yellow pigment granules free acid infiltrating cells (2) Bacteria thickly, appeared in standing (3) A few ovalates (4) Abundance of phosphate (5) Fatty debris from cell disintegrating after a day's standing</p>

While this thesis has been in progress my thirtysixth 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 4 ft 11 inches Weight 7 st. and Temperature 98.4. Immediately on admission she passed 48 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 in that time. In the morning drank custard only when she saw stomach pump - this 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 ^{she} had a pint of water; for second 12 hours 1 1/2 pints of milk and 3 eggs. She had a very small faecally formed dark but rather dry stool 8 hours after ^{giving} 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 in open air. The quantities of urine and periods 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 "
C. In next 14 hours of day (6 a.m. to 8 p.m.)	4 "
D. In next 14 hours - 8 p.m. to 10 a.m.	6 "

Qualitative &c.

A. albumen none, Bile none, Portwine colouration with Liq: Potass. and Pieric Acid, but no other suggestion of sugar. Sp: Gr: 10-10 reaction acid

B as above Sp. gr: 10.30 reaction acid

C as above " " 10.28 " "

Portwine colouration fainter.

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

2. Quantative

A Phosph. Acid .35 grms. chlorides .57 grms. Urea 5.3

B " " .17 " " .15 " " 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, pink, dissolved on heating and consisted copiously of finely molecular debris and epithelium and mucus corpuscles, finely granular or disintegrating. There was a singular absence of urinary crystals and no bacteria after 12 hours standing.

Dr. Johnson's test for sugar produced a result which I at first attributed to the previous exhibition of chloral, but the same was obtained with other samples of healthy urine and I was not surprised to find that boiling liquor potassae and picric acid effected a similar colouration, only less intense. On looking up the discussion on the subject between Drs. Pavy and Johnson in the *Lancet* Vol: II 1882 I find Dr. 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's 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 Batty 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 septicæmia; and though their seats of origin and areas of secondary deposit may be strongly inferred, it is difficult to assume the

the onus probandi in not a few cases where the conclusions are rather speculative. Under aetiology 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) His 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 septicæmic, phthisical, zymotic, neurotic or simple inflammatory, and they may refer purely to intestinal causes. 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 disorder and septicæmia.

Next in importance to septicæmia and its congeners is phthisis pulmonalis. Batty Tuke records 3 cases of death from phthisis, out of 73 patients labouring under puerperal

insanity

insanity and Dr. Boyd gives 2 out of 63. My number is 3 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 melancholia under my care. The abnormal conditions of the *princeps viae* 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 hypogastrium and scanty extremely offensive lochia. Precision 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 pelvic 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 fair 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 haemoglobin and haemocytes by means of the

the haemoglobinometer and haemacytometer 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 puerperal insanity. In the latter we have a greater complexity of disease to consider, and therefore a maximum of pyrexial 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) erratic (d) sub-febrile.

(a) Remittent. The two purest examples of this type were cases of acute phthisis, 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 accentuated or horizontal for a few days.

(c) Erratic. As well implied in the name, there is no uniformity of character, the tracing is a combination of ascent, descent, horizontals, 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) & (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 this thesis.

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. Diet and Stimulants. Dr. Clouston true to his practice in other cases, believes in heavy egg custards - three eggs in each pint of milk, and sometimes cream in addition, beef tea, port, cherry brandy. "give much food and give it often". Dr. Leishman of Glasgow is more afraid of overburdening the digestive organs. He regulates the diet carefully and increases it cautiously.

Second. Open air exercise - Clouston lays great stress on this.

Third. Antipyretics. Clouston gives as much as 40 grains of Sulphate of Quinia in 8 hours and believes in it.

Fourth. Uterine treatment. (a) Clouston: vaginal injections of Carbolic lotion: poultices. (b) Bueknell and Tuke: - vaginal injections of lundy. Emetics of Ipecacuanha.

Fifth Treatment of Constipation and Indigestion. Bueknell & Tuke: - Calomel, Black draught, aloes, Scammony, Castor oil. Enemata.

Sixth. Anamia. Iron (Bueknell & Tuke)

Seventh. Dry skin and scanty urine - Saline Diaphoretics (Bueknell & Tuke.)

Eighth. Sedatives (a) Clouston 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 contraindicated in mania". (c) Blandford gives chloral in mania. (d) Bucknill & Tuke believe in morphia and put less faith in chloral and Bromide of Potassium. (e) Lushman says that chloral favours sleep. Opium makes matters worse.

An aetiology 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, undervaluing others, and overestimating 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 elicited that no simple and specific lines of treatment 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, Septicæmic and Anæmic Conditions.

(3) Hysteria.

(4) Mania with intensity of symptoms and sleeplessness

(5) Melancholia " " "

That

2

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 in its author to enter into a dissertation on every day 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.

I. Digestive, Hepatic and Intestinal Disorders.

One patient was fed, owing to the refusal of food, by the stomach pump - with rare intermissions of voluntary alimentation - for 8 weeks. This was case III. of the Second Urine Series. The tongue and root of mouth were coated with creamy fur, lips were cyanotic and crested, saliva white inspissated, often frothy, the pharynx relaxed, stomach invariable, feces dry and dark or greenish and slimy. Septicæmia with diaphragmatic and pleuritic deposits and boils.

She was fed liberally with custards, (2 eggs in each) beef tea, milk and whisky. Calomel 1 grain bis die and Acid nit mur. Dil. with ℞ Nucis Vomica ter die were administered, the calomel powders being intermitted at end of three days, to be repeated as occasion suggested. Castor oil was prescribed from time to time with good effect. Codliver's oil was given, and

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 $3\frac{1}{2}$ hours custards were withdrawn little altered from the hour of injection.

Her weight was now taken - 6 st. 2 lbs, the stomach was washed out with 1-500 carbolic lotion, and a diet scale arranged, to be pumped (after predigestion with Bengers liquid pepsine) at intervals of 4 hours, 4 times a day. The diet was thus prepared. 8 a.m. $\frac{3}{4}$ pint milk, with 1 egg as a custard. 12 noon $\frac{3}{4}$ pint Beef tea with potatoes in suspension. 4 p.m. custard as at 8 a.m. 8 p.m. milk gruel $\frac{3}{4}$ pint. Two ounces whisky were given in 24 hours. No medicines given. She lost 5 lbs in the first week. Bismuth 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 Bismuth treatment. at the end of second week, had lost 4 lbs. seemed on the whole better under bio-bromide combination, but at end of third week this was given up as lips and tongue

were

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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 like fate with its predecessors. 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 7th week, weight 5 st. 6 lbs, having lost 1 lb in three weeks during which beef peptonoids were used, and later with apparently more gratifying effect Carnie's Peptonised Cod liver oil and 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 oral 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 5st 6 lbs to 6st 9 lbs. 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 dullness 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; Acid Nit. Mur: Pil. and Tr. 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 digestion 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: Septicæmic; and Anæmic Conditions

The effect of pelvic poultices on the pelvic and mental conditions was in many cases remarkably gratifying. This treatment was indicated where there were signs of pain, Iodine being more frequently reserved for the deeper metastatic deposits. Of vaginal injections my favourite is carbolic lotion, and I pin my faith to it because the patients liked it best. In their more lucid intervals, they said it soothed them, and in their hyperæsthetic state this was no small boon. To sooth 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 septicæmia was found in abscesses, boils, scalp deposits often resembling wens, and a copious pustular ære. 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 bringing up nutrition to its normal standard, it exercises a double purpose in septicæmia by increasing physiological resistance to fermentative 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 employed for the purposes just indicated: but they were

were attended with no aggregate results of surpassing excellence, and must be held in reserve.

3. Hysteria. 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, 45 grains every four hours. Copious 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 shew 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 I have given a fair trial, in no case with the best possible results as the following experience testifies

Case I. ~~of~~ Morphine administered in $\frac{1}{2}$ grain suppositories every 8 hours, thrice daily for 18 days, with gastro intestinal correctives, reduced the muscular excitement, moderated the mental furor, 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

explorative character of the mental history gave place to a strange dogged antipathies, suspicion and delusions of persecution, hitherto fleeting and superficial, became more deeply rooted and intensified 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 doctor, 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 ⁹ hours at first, and after two days every 6 hours. Here also the same appearance of returning reason quickly occurred, as soon to disappear, for the drugs of mental disease remained. The same gastro-intestinal correctives were used as in the preceding case, the appetite remained good, and she gained in strength. Often she had angry explosions, was unusually threatening, and said silly childish things. She evinced strong animus to 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 works, to be free from delusions, when suddenly one day she expressed outrageous ideas as to being married, and her child (an illegitimate) being fathered by a third party. Later on menstruation appeared, ushered by promontory 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 ^{excitement} treatment, and of 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 exhibitions, 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, bis-bromide and the tri-bromide combinations has been confined to one case already described, and of simple Potass. Bromide to the case of acute Hysterical Mania which I have mentioned. It is unnecessary to repeat what has already been said of them.

(5. Melancholia, Morpheii was given in one case
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