Thesis for Degree of M.D.

by

George H Bankier, M.B.

A Thesis

on

The Convulsions of Infants and young children; based upon an analysis of 38 recorded cases.

ProQuest LLC.
789 East Eisenhower Parkway
P.O. Box 1346
Ann Arbor, MI 48106 – 1346

The Convulsions of Infants and young children.

Synopsis of Thesis.

Infantile convulsions — importance of the disease on account of its great frequency and fatality. Presumed reasons, anatomico-physiological ones, of this peculiar frequency considered. (pages 1 — 12). — Facts in relation to the disease derived from the study of the 38 cases recorded in this thesis. — Causes of the disease in these cases. Dentition, Gastric disorder, and Teething by far the most important causes, and Dentition preëminently so: various individual causes. (12 — 35). — Mortality of the disease, considered in reference to those causes from which in these cases the occurrence ensued (35 — 44). — Age of the various cases, and the average age of all cases considered (44-52). — Influence of Sex, Twin births, Scrofula, and Hereditary tendency, as predisposing causes of the disease (52-54). — Diagnosis of the disease; in what cases difficult. (54-59). — Prognosis; its gravity. Affec-

tions in which, judging from these cases, a favorable prognosis may be given, &c.. (59 – 66). — Treatment. Mainly considered under two groups, (a) those cases of a sthenic, and (b) those of an asthenic character. The various local and constitutional means useful in the treatment of the disease. (66 – 84).

The practical utility of endeavouring to make a faithful study of a class of diseases so abundantly and peculiarly fatal to infants and young children as that class of diseases which forms the subject of this thesis, is great, viewed both in its medico-scientific aspect, and as affecting very seriously the well-being of the commonwealth.

It is clearly shown by statistics how large is the number of deaths due to the class of diseases now about to be considered. For according to the Registrar-General, convulsions in infancy are so frequent that they cause 3.3 per cent. of all deaths from diseases of the ner-

vous system which occur in the first year of infantile life.

A Knowledge of the causes of the disease, and especially of those causes which give rise to so great an infantile mortality, is probably the most important point to be inquired into in studying the subject now on hand; and such Knowledge can only be properly acquired by carefully recorded observations of cases, of which one writing on such a subject ought to have had actual experience.

The cases referred to as forming the basis of this thesis have all been under my care, and individually studied for the purpose of obtaining practical information about the affections now under discussion.

It is necessary here to state that I am not taking account in this essay of convulsions in children arising from causes which I have not experienced: this thesis is based upon con-

vulsions produced by those causes which were present in the several cases recorded here; — but these cases will be found to include the great majority of causes by which infantile convulsions are produced. I wish also to state that I am dealing with the convulsions of infants and young children, especially of infants, the age of the oldest case being 4½ years. In fact I am mainly considering convulsions as they occur from the day of birth until about the completion of the first dentition; and I am not at all considering any cases which occurred at an age approaching near that period of childhood when the second dentition begins.

In those periods of human life which are marked by rapid development and quickness of growth of vitally important organs, or by an accession or cessation of a highly important function, it is sometimes

found that that organ which is the seat of the changes now spoken of is at such a time liable to certain diseases; and though the organ which is undergoing such changes in its structure and function may not be itself diseased, yet a train of diseased symptoms the cause of which is directly traceable to the changes which the organ in question is undergoing may often be observed. For example scirrhus, encephaloid cancer, &c, in the majority of cases manifest themselves in the female breast at about the age of 45 — 50 years, or at that period in which the function of the ovaries and consequently the menstrual discharge ceases. Again when that class of symptoms to which the name of hysteria has been given (the term is here used in its common acceptation) arises, it is found that in the female this class of symptoms begins in a large proportion of cases at the age of puber-

ty, at that critical age when the constitution is undergoing changes in connection with the accession of a vitally important function peculiar to the female sex.

So too at the time of infancy and early childhood. For from birth up till about the 4th year of infantile existence the most highly important part of the young human organism is undergoing a very rapid development and growth, and this is so to a far greater degree than any such change which takes place in any other part of the young child. It is found that the nervous system here alluded to is in quite a proportionate degree more liable to become the seat of disease, especially during the first twelve or eighteen months of infantile existence; for during this period the first dentition is undergoing its most rapid development, a process which renders the infant peculiarly susceptible to the

occurrence of nervous diseases, and markedly convulsions, which children not of so tender an age, or at any rate children in whom the process of the first dentition is completed, are affected with far less frequently.

Considering the human adult brain (the cerebrum) as the organ of the infinitely highest function known of, and a function from its nature the most imperfectly understood, we have always to bear in mind the great difference which exists between the function of the adult brain and that of the infant and young child; for the main function of the latter is the superintendence of motor power. This is probably the most important physiological fact to bear in mind in studying diseases of the infantile nervous system. This preponderance in the infant of the spinal over the cerebral system is in fact the main cause of the great frequency

of convulsions in infancy and early childhood, and an occurrence of such convulsions is at this time induced by various agencies often formed in action which irritate the spinal system. Such for instance as teething where the pressure of the tooth on the gum irritates the spinal cord through the medium of the sensory portion of the trifacial nerve, by the semilunar ganglion being connected with filaments from the carotid plexus of the sympathetic. Again, worms diarrhoea and constipation are agencies which act by the irritation being conveyed from the sympathetic to the spinal system through the medium of the superior and inferior mesenteric plexuses which transmit the impression to the semilunar ganglia of the solar plexus, whence it is conveyed to the spinal nerves. Another very fruitful cause of irritation of the spinal system is gastric disorder, the pneumogastric

nerve being here the conveying agent. Spasm of the glottis from whatever cause it may be produced is another instance, and here the spinal exciting medium is the inferior or recurrent laryngeal nerve.

Another important cause of the frequency of convulsions in the infant and young child, also an anatomico-physiological one, is spoken of at some length by West in his "Diseases of Infancy and Childhood" at pages 29 and 30 of the 1874 ed^n. The explanation of the subject he there offers is too long to quote, but the substance of the argument is this. That an important agent in the production of convulsions in infancy is the condition of the cranium at that period of life. For while this in the adult is a compact bony case, in infancy it is quite otherwise, for the unossified state of the sutures and the membranous condition of the fonta-

nelles allows of the brain being excessively distended with blood, while the soft condition of the substance of the brain itself also materially favors this event; and the same cause which allows of the engorgement of the infants brain also permits of its being depleted to an extreme degree. Now both of these conditions give rise to and are met with either the one or the other in most cases of infantile convulsions.

A convulsion as a physiological act consists of two stages; a first or tonic stage which is one of involuntary contraction of the muscular fibres; and a second or clonic stage likewise involuntary in which there is alternate contraction and relaxation of the muscular fibres.

Infantile convulsions are divided by Trousseau into symptomatic and sympathetic. In the former the convulsions appear to be due to an a-

× Non. seq.

A priori conclusion that cases were without lesion ∴

No lesion to be expected ∴

Little good from trying to find one !!

× how to know, without trying?

tomical lesions discoverable in the nervous system after death; whereas the latter are in no case caused by any such anatomical lesions, or at any rate if such lesions exist the most minute dissections have as yet failed to detect them. It is to this latter class that almost all the cases recorded in this thesis are referable.

Consequently, as no pathological lesions were to be expected in any of the cases, excepting that one which occurred in connection with hemiplegia, but little practical good would have resulted from post mortem examinations. And even though the affections of these children had been of the greatest pathological interest it would have been impossible for any post mortem examinations to have been made, seeing the cases were all among private patients who would not have allowed any such investigations.

Trousseau further divides convulsions into reflex convulsions, in which particular

by the diaphragm is affected; external convulsions; spasms; general, partial, and reflex convulsions. All these varieties are exemplified in the cases referred to in this essay.

I will now take up in detail a consideration of the most important points in connection with this subject which my cases illustrate, and in order to facilitate this study the table represented on page 13 has been drawn up, in which the cases are grouped in the order of their occurrence, and the cause, age, sex, and termination of the various cases indicated. (see page 13).

The first point which suggests itself on a review of all these cases is — What was the CAUSE of convulsions in these various cases; is there any one cause which seems specially to predominate over others in the production of the disease; or are there a few predominant causes to which the majority of the cases can be assigned?

A Table representing the Cause, Age, Sex, and Termination of 38 cases of Infantile Convulsions.

No. of case	Cause.	Age.	Sex.	Termination.
I	Cessation of Otorrhoea.	10 mos.	♂	Death.
II	Inanition.	3 mos.	♂	Death.
III	Inanition.	1½ mos.	♂	Recovery.
IV	Inanition.	3 wks.	♀	Death.
V	Teething.	5 mos.	♂	Recovery.
VI	Incipient Tubercular Meningitis?	2 yrs.	♀	Improvement.
VII	Teething.	18 mos.	♀	Recovery.
VIII	Gastric disorder.	3 yrs.	♂	Recovery.
IX	Teething.	9 mos.	♀	Death.
X	Retention of urine from malformation of penis.	3 days	♀	Death.
XI	Sequelae of Measles.	10 mos.	♀	Death.
XII	Incipient Tubercular Meningitis?	15 mos.	♀	Recovery.
XIII	Spina bifida.	3 wks.	♂	Death.
XIV	Syphilitic Inanition.	2½ mos.	♀	Death.
XV	Congestion of Brain.	4 yrs.	♀	Recovery.
XVI	Double bronchio-pneumonia.	11 mos.	♀	Death.
XVII	Severe burn.	2½ yrs.	♂	Death.
XVIII	Bronchitis.	3 mos.	♀	Death.
XIX	Hooping-cough.	14 mos.	♂	Recovery.
XX	Inanition.	10 days	♀	Death.
XXI	Teething.	13 mos.	♀	Recovery.
XXII	Gastric disorder.	4 y 3 m.	♂	Recovery.
XXIII	Gastric disorder.	5½ mos.	♀	Recovery.
XXIV	Gastric disorder.	20 mos.	♀	Recovery.
XXV	Ulceration of scrotum & nates	2 wks.	♀	Death.
XXVI	Gastric disorder.	3 yrs.	♀	Recovery.
XXVII	Fright.	4½ yrs.	♂	Recovery.
XXVIII	Fall.	2 yrs.	♂	Recovery.
XXIX	Inanition.	14 days	♀	Recovery.
XXX	Inanition.	3 wks.	♂	Death.
XXXI	Vaccination.	3½ mos.	♂	Death.
XXXII	Worms.	3 y 5 m.	♂	Death.
XXXIII	Hemiplegia.	2 y 2 m.	♂	Death.
XXXIV	Inanition.	11 mos.	♂	Death.
XXXV	Epilepsy.	9½ wks.	♀	Recurrent fits.
XXXVI	Scarlet fever rash.	3 y 5 m.	♂	Recovery.
XXXVII	Exhaustion from diarrhoea.	8 wks.	♂	Death.
XXXVIII	Inanition.	9 mos.	♂	Death.

In the 38 cases in question there is seen to be one cause which proportionally much more than any other induced the occurrence of convulsions, inasmuch as 9 cases, or nearly $\frac{1}{4}^{th}$ of the whole number, were produced by inanition. Gastric disorder was the cause of 5 cases; teething of 4; 2 cases which exhibited very similar symptoms I have not been able to positively assign a name to; and each of the remaining cases was produced by a different cause, 1 case being attributable to each of the following causes, viz- cessation of otorrhoea (case I); retention of urine (X); sequilae of measles (XI); spina bifida (XIII); congestion of brain (XV); bronchopneumonia (XVI); severe burn (XVII); bronchitis (XVIII); hooping-cough (XIX); ulceration of scrotum (XXV); fright (XXVII); a fall (XXVIII); vaccination (XXXI); worms (XXXII); hemiplegia (XXXIII); epilepsy (XXXV); scarlet fever rash coming to its height (XXXVI);

and diarrhoea (XXXVII).
By looking at these causes it will be seen that it is better to adopt a classification of the cases based upon the various causes which gave rise to the convulsions, than to class them into cases occurring from lung, urinary, febrile, cerebral, or other diseases affecting important organs or systems, because the great majority of cases have occurred from affections very diverse in their nature, and consequently are not capable of being grouped on the principle last mentioned.
Adopting then the classification to which I have thought it best under the circumstances to adhere, there are seen to be three causes which have been in these cases of such marked potency in the production of infantile convulsions, that they call for special consideration, viz – I Inanition; II Gastric disor-

der; III Teething.
Of the 9 cases from Inanition (cases 2, 3, 4, 14, 20, 29, 30, 34, 38,) 7 died and 2 recovered, thus showing inanition to be not merely a very frequent but also a terribly fatal cause of the disease. It is interesting to note as a fact not as completely in accordance with the experience of high authorities such as West, Rilliet, and Barthez, nor tally-ing as much with one's reasonable anticipations as might have been ex-pected, that seven of these nine cases were children brought up by their mothers milk, the remaining two only being brought up by cows milk; though it must be mentioned that these two were among the seven fatal ca-ses of inanition, the two that recover-ed being both reared by their mothers breast milk. One would have expect-ed a larger proportion of those that died among these inanition cases not to have been brought up by the breast

for among the causes producing incanition and death in infants the rearing of them away from the mothers breast is by the above-mentioned high authorities considered the most fruitful. The exceeding great infantile mortality resulting from this cause is spoken of as a subject of the highest importance on account of its vital significance, by West in his "Diseases of Children", at page 552 of his 1844 edn. He there quotes from the statistical experience of M. Gaillard, the statistics being taken from two French foundling hospitals, in each of which the infants were brought up on essentially different kinds of nutriment, namely in the one hospital by their mother's breast milk, and in the other they were fed. The mortality of those brought up by the breast was 35 per cent., this mortality occurring between the ages of one day and twelve months; while the mortality

of those fed, occurring in infants of the same age, was 80 per cent.. And further, in connection with the same subject it is shewn that though an infant may be brought up by the breast, yet if this source of nutriment be derived not from the mother the following is the result, namely, "that while among children suckled by their mothers only 18.36 per cent. die within a year after their birth, 29 per cent. of those put out to wet nurse die during the same period." This is a fact taken from the experience of M. Boiston and occurring among children in foundling hospitals.

One would think, and naturally so, that whatever be the means of nutriment substituted for the mother's breast milk, whether the milk of a healthy wet-nurse of course the best substitute for that of the mother, or milk obtained from the cow, goat, or other of the lower animals diluted with wa-

ter, farinaceous food, &c, that the infant's natural food would be incomparably the best suited for it; and that it should derive that food from its own mother, for the double reason that the infant is most probably thereby much more carefully nourished and its well-being provided for with the greatest possible solicitude, and also that if the infant obtains its sustenance from a wet nurse it is obvious that this must be at the expense of the infant of the wet-nurse, which being deprived of its natural and due sustenance runs a great risk of itself becoming the subject of incanition.

The number as well as the fatality of the cases of convulsions under consideration due to incanition having been proportionally so very great, and the almost vital connection which exists between the proper rearing of an infant and the occurrence of incanition, are facts of so serious a nature as to neces-

sitate dwelling further on this subject.
That the infants natural food is incomparably the best suited for it is shewn by its easy assimilation, its appropriately nutritive properties, and its capability for duly keeping up the animal heat by affording those materials for respiration which an analysis of the composition of human milk shews it to possess.
With regard to this last point it is well worthy of note that in all these cases of incanition except one (case 14) the temperature was markedly lower than natural, as recorded in the report of them; but not from the cause now under consideration as seven of these nine cases were brought up by their mothers breast milk, the remaining two only by being reared by cows milk (cases 14 & 20). However in these cases other circumstances, spoken of further on, conducive to disease existed, which by reducing the child to a state of incanition, would

prevent the proper assimilation of the milk, and thus the infant could be but very imperfectly nourished; besides which the large proportion of sugar and butter which is present in human milk was not capable of resolution into carbonic acid and water, whereby the generation of heat which would otherwise have been ensured not taking place, a general lowering of the temperature would necessarily ensue, and materially assist in reducing the vitality of the infant. In connection with this subject it seems to me on a review of my cases, that although the rearing of an infant away from the breast is an acknowledged cause the potency of which in the production of incanition can hardly be exaggerated, yet although this is usually by far the most important cause of this condition other causes and influences are likewise at work, such as bad hygienic surroundings, scrofula, the fact of a child being a twin,

&c, and produce incanition in a considerable proportion of cases: indeed as above stated most of my cases were produced by influences of this nature. Such agencies do not seem to have been as much taken into account in the production of incanition, judging from the various works on childrens diseases quoted in this thesis, as one would have expected. That other causes of this nature act very deleteriously in producing incanition is a fact amply testified by these cases. For of the five fatal cases brought up by the breast (cases 2, 4, 30, 34, 38) one of them, case 2, was a twin child and of a scrofulous family; another, case 4, was extremely puny from birth and also of a scrofulous family; the third was a remarkably small emaciated twin child its twin brother having died at the day of birth and it itself at the age of three and a half weeks, never rallying from the prostrate condition it

manifested from birth; the fourth case, an infant much neglected by its parents was always extremely small and delicate since it was born and died at the age of eleven months, never having cut any of its teeth, nor were any of them near the surface of the gum; and the fifth of these cases of incanition besides having very bad hygienic surroundings had probably a hereditary tendency to convulsions, for it was one out of a family of twelve children and six of its little brothers and sisters had all died before it at or under the age of two years, in convulsions. So that although these five fatal cases were brought up by the breast they do not seem to afford a good criterion of the benefit of their natural nutriment, as in all of them strong predisposing and exciting causes to incanition existed, more especially when it is considered that all of them were children of parents among the poorer classes of society, and their

by gienic surroundings, especially as regarded pure air and light, very imperfect.
Before leaving this subject I think it is worth while here to cite a good case I happen to have recorded, which shows remarkably well by contrast, the deleterious influence exerted by other nutriment than the mother's breast milk in the rearing of an infant. Of two infants, twins, both healthy at birth, one was brought up, after both getting the breast for a fortnight, by the breast, and the other by cows milk. The one brought up by the breast had when sixteen days old, convulsions, from which I did not expect it to recover: but it did recover, being however at this time very puny-looking as compared with its twin sister. However after recovery from the convulsions the breast infant rapidly outgrew its neighbour which was reared by the bottle; at the age of three months it was considerably larger and healthier look-

ing; at the age of six months the difference was still more marked, the breast infant being about twice the size of its neighbour. The difference in health was quite as much marked as that of size; for excepting a slight cough they both had at the age of five months the breast infant was remarkably healthy never having had, since the convulsions, any ailment; but its sister brought up by cows milk was on the contrary, from the third month onwards, constantly ailing, sometimes very seriously, with diarrhoea, sickness, and irritability, which conditions were the means of still further increasing the infants' puny appearance.

Next to inanition the most ~~com~~ frequent cause of convulsions in these cases was **gastric disorder**. Five cases were caused by this, namely, cases 8, 22, 23, 24, & 26.

It is curious to notice that an interesting occurrence sometimes met with in

practice is here very well exemplified; for a glance at the table of cases will show that four of these cases occurred almost consecutively, and this is noteworthy not only with regard to the order of their occurrence, but also as regards the time at which they occurred, for these four happened between the 3rd and 10th of June 1896.

"The various agents which were the immediate causes of the convulsions in these cases were those which I now give in sequence corresponding to the cases, namely, excess of toffee, black currant jam, being reared by cows milk, salmon, unripe gooseberries. The causes of these five cases are too obvious to require dwelling upon, but a reading of the report of them in the appendix will I think be found interesting. However five does not seem to be a large proportion due to this cause out of a total of thirty-eight cases, when the average age (16 months) of all the cases

is taken into consideration. At any rate the frequency of gastric disorder in producing infantile convulsions would appear to vary a good deal in different places, when it is considered that I have only met with three five cases in over two years time, whereas I remember very distinctly when six months an assistant in Hanley in Staffordshire in 1874 seeing quite half a dozen cases in that time, produced by gastric disorder, in most cases brought on by the children being given bacon to suck and eat. This may have been one of those peculiar runs of certain cases sometimes experienced in medical practice, but at any rate the fact made such an impression on my mind at the time that I then resolved that after qualification I would make special notes of all the cases I came across of this among one or two other diseases as likely to form a good subject for a thesis — which accordingly I have since done.

It is rather strange to notice that none of these five cases of convulsions due to gastric disorder occurred at the time of the infants being weaned; at that transition stage when children cease deriving nutriment from the breast and get food from other sources. Indeed in four of these cases the age of the youngest was considerably beyond the age at which weaning is generally adopted. Weaning as a cause of diseases among infants is held by MM. Rilliet & Barthez to act very powerfully, for they say at p. 11 Vol. I of their Traité des Maladies des Enfans, 2e éd. 1853, "Le sevrage est, à nos yeux, une cause plus puissante de maladies que la dentition".

Teething was the cause of four cases of convulsions; cases 5, 4, 9, & 21. The respective ages of these cases were 5 mos., 18 mos., 9 mos., 13 mos., so that they occurred just at the age when the process of first dentition is undergoing

very rapid development. MM. Rilliet & Barthez concisely express how critical a time is the period of first dentition to the infant and young child, in a quotation from a Parisian physician, M. Guersant, at p. 214 Vol. I of their work already referred to. M. Guersant says "La dentition n'est pas plus une maladie que la puberté, mais néanmoins cette époque très remarquable de l'ossification est souvent critique pour l'enfant comme le sont dans un âge plus avancé les époques de la menstruation, de l'accouchement, de la cessation des règles". So that a much larger number of cases directly assignable to this cause than four, might reasonably have been expected.

Case 9 died, and the three others recovered. An interesting fact noted in these cases is that in the fatal case the fontanelle was throughout depressed, while in the three other cases it

was remarkably prominent, there being marked congestion of the brain in these three last cases, while the opposite condition was present in the fatal one. I know the history of this fatal case from the day of its birth, having attended its mother when it was born. It had always been a remarkably fine healthy child, its parents were both healthy, it was reared by the breast, and its hygienic surroundings were good; and I feel convinced that had medical aid at once been obtained in this case when the child was first ill it would not have proved fatal. But the parents put off sending until the child had been ill two or three days, and then when seen it was in a state of considerable prostration almost amounting to collapse.

There four cases were remarkably healthy children; they were all brought up by the breast. They will be again referred to when considering the treat-

ment of infantile convulsions.
The three most potent causes of convulsions in these cases having now been considered, namely those caused by incaution, gastric disorder, & teething, there remain to be considered before passing to those cases each of which was produced by a different cause, two cases (6 & 12) which exhibited many of the most important symptoms characteristic of tubercular meningitis; namely, pain in the head which caused the child to awake at night at the same time putting its hand to its head, obstinate constipation, marked intolerance of light, excessive irritability, and both the children were of scrofulous families. One very important symptom was however certainly absent, namely, vomiting. According to Vogel this symptom is of the highest importance in the diagnosis of the disease.
But though these two cases exhibited the above-mentioned symptoms which are so characteristic of the first stage

of tubercular meningitis, yet both were much improved by the treatment adopted; one (12) made a good recovery becoming quite well though delicate, and the other (6) got into tolerable health though often ailing from head symptoms afterwards. Consequently as an uncertainty exists as to what name should be assigned to these two cases I have not classified them absolutely but have put them down as cases of Incipient Tubercular Meningitis, this name being followed by a note of interrogation.

Now the propriety of assigning these two cases to this cause may be questioned, when it is remembered that high authorities on this subject agree that this disease is a peculiarly and rapidly fatal one. Vogel considers the prognosis of such cases absolutely fatal and the duration of the disease after once its symptoms have manifested themselves to be from two to three

weeks. West expresses his opinion with regard to the fatality of the disease in terms almost as strong, and likewise fixes two to three weeks as being in most cases the duration of it. Steiner's opinion also agrees with that of the two above-mentioned authors as regards the fatality and duration of this disease which he calls 'basal meningitis'. And MM. Rilliet & Barthez while hoping that one day nature will perhaps permit us to find a method of treatment followed by success, yet state "que la méningite tuberculeuse suit la loi de toutes les affections tuberculeuses, c'est-a-dire qu'elle est le plus souvent mortelle." Is this great weight of evidence in connection with the fatal nature of tubercular meningitis which has made me feel it to be perhaps presumptuous to class these cases in the doubtful way done as cases of this disease: but as the symptoms resembled that disease far more

closely than any other I thought it right to classify them accordingly.
Having now considered those cases capable of being classified into the above three or four groups in which many the causes of the convulsions in about one-half of the entire number of cases have been considered, there now remains the other half in which class no two of the cases were produced by the same cause.
It will not be necessary to consider the causes of these individual cases at the same length as has been accorded to the three or four classes already taken up, because almost all the causes of the 18 cases just about to be spoken of are comparatively exceptional ones, or at any rate scarcely any of these cases has been produced by anything which stands prominently forth as a cause which is in general a frequent one in producing infantile convulsions in anything like

a preponderating number of cases, though it will be seen that many of them are nevertheless causes well known in the production of the disease. The individual cases are all mentioned at pages 14 & 15 of this thesis to which I now refer, to save the necessity of again enumerating them. Most of them are cases of considerable interest, their history being I think well worth a perusal; and taken as a whole these separate cases illustrate very well to what a great variety of causes infantile convulsions may be due.

The next point, and one the importance of which at once suggests itself on reviewing these cases, apart from the higher significance of the statistical facts quoted at the commencement of this thesis, is, the **mortality** of infantile convulsions.

The extreme fatality of this class of diseases is amply borne out by my cases. For of 38 cases recorded 20 resulted in death, 1 improved, 1 had recurrent fits

(epileptic) and only the remaining 16 cases recovered completely; and even of these sixteen recoveries I quite keep in mind the possibility and in some few of the cases the probability of a recurrence of fits in future if any cause for their production sufficiently strong come into operation. The different causes which produced this mortality are these, viz—

4	died from	Inanition.
1	"	" Teething.
1	"	" Cessation of Diarrhoea.
1	"	" Retention of urine.
1	"	" Sequelae of Measles.
1	"	" Spina bifida.
1	"	" Broncho-pneumonia.
1	"	" Severe burn.
1	"	" Bronchitis.
1	"	" Ulceration of Scrotum & nates.
1	"	" Vaccination.
1	"	" Worms.
1	"	" Hemiplegia.
1	"	" Diarrhoea.
Total 20		

Thus it is seen that inanition is a far more potent cause of death than any other, for 7 of the 20 deaths resulted from this cause alone, or fully 1/3rd of the entire mortality. It will not be necessary to speak further of these seven deaths produced by inanition for this subject was pretty fully discussed when speaking of it as a cause of convulsions, at pages 16–24 of this thesis. It is there shown that inanition was not produced by probably its most common cause among the better classes, namely, the rearing of the child away from the mother's breast. but that in these cases there were other and very serious causes in connection with each individual case which were abundantly sufficient to account for inanition in the various cases.

Of the remaining 13 deaths in two of them were produced by the same cause, and it is seen by looking at these causes that the fatality of several of them arose from affections of so serious

a nature as to render death almost inevitable. Of these thirteen fatal cases the following ones were from causes the mere mention of which shows how grave the prognosis must necessarily have been.— (a) Sudden cessation of otorrhoea (case 1). This is a well known cause and occurred in a scrofulous child, head symptoms being produced, and the child dying on the third day after the ceasing of the discharge. (b) Retention of urine from malformation of penis (10). Probably death was produced in this case by uraemic poisoning occurring in an infant very weakly from birth. (c) Sequelae of Measles (11). Convulsions setting in and continuous during the last three days of life occurred one month after apparent recovery from measles, the child at this date having caught cold which much weakened it, and while in this prostrate condition the convulsions ensued. (d) Spina bifida (13), in which convulsions occurred and death ensued when one

month old, apparently from pressure on the necessarily imperfectly protected spinal cord; the infant thus acted on being likewise gradually weakened by a sanious purulent-looking fluid which discharged from the surface of the spinal tumour from the day of birth until death. (e) Broncho-pneumonia (double)(16). In this case the convulsions and death were probably partly the consequence of the prostration to which the child was reduced by the severe inflammation of both lungs, and they may also partly have been produced by the blood necessarily imperfectly oxygenated on account of the greater part of the lung substance being disabled by inflammation, acting as a poisonous agent in circulating through the medulla oblongata, and especially stimulating that inner part of the medulla from which the pneumogastric nerves have origin, a complete stoppage being perhaps thus put to the already greatly impeded respiration. (f) Severe

born (14). The cause here was shock. On the second day of the injury the child had an attack of vomiting and this was followed in the evening by convulsions which carried it off. (g) Ulceration of scrotum and nates (25). The death in this case too was from shock produced by the pain and discharge from the ulcerated surface. (h) A lesion producing Hemiplegia (33). This child took convulsions followed by hemiplegia at the age of six months when cutting her first teeth; she remained hemiplegic, though a lively and comparatively healthy child till the age of 2yrs & 2 mon. when she had a second attack of convulsions followed by a semi-comatose condition in which she died. In the remaining five individual fatal cases the convulsions originated from causes of such a nature that in all of them a fairly good prognosis might under ordinary circumstances have been given; or at any rate they were not causes of so serious a nature as to necessarily in-

volue a very bad or almost fatal prognosis as in those cases which have just been discussed. In these five cases the causes of the convulsions, or the diseases affecting the child when the convulsions occurred were as follows – teething, bronchitis, vaccination, worms, and diarrhoea. Now although these causes, excepting perhaps bronchitis were none of them of a nature to warrant a very unfavorable prognosis yet there were circumstances in connection with each case which greatly added to the peril of the child. In the first of these fatal cases, that of teething (9) before medical aid was sent for the infant was allowed to sink into a state of collapse from which it never rallied. The infant which had bronchitis (18) when convulsions occurred, was and always had been from birth a child so remarkably delicate that it is probable its system could not have withstood an attack of bronchitis alone, the characteristic convulsions which ushered

in its death being indeed apparently brought on by the weakness which was the result of the primary disease; and a predisposing cause seems also to have existed, for the mother informed me she had previously lost her only other child in exactly the same way.

Vaccination (31) as a cause of disease & convulsions "per se" is in the highest degree improbable, always supposing healthy lymph is used. But in this case the air of the small room in which the child lived was remarkably impure and peculiarly offensive. The child was healthy when vaccinated, the lymph good, and the vaccination took well, but the arm gradually became very much inflamed from the elbow up to the shoulder and a general feverish condition was produced which continued until the twenty-first day, when the child took violent convulsions from which it died within twenty-four hours. Probably the impure air acted in the same way in weakening the

child ill, as does air impregnated with the malaria from a defective drain in producing sometimes fatal erysipelas after vaccination.

In the fatal case in which the convulsions were attributable to worms (32) lumbrici were the entozoa with which the child was affected. She passed two lumbrici each about five inches long and one-sixth of an inch in diameter, being at this time fevered. Her feverish condition increased, and two meals after resulted in congestion of the brain, which was followed by convulsions and death. The child's father had died in advanced phthisis pulmonalis six weeks previously. The fact of one only out of the entire thirty-eight cases being attributable to worms is not in keeping with one's expectations; for all authors class worms as a common cause of convulsions in young children. However lumbrici, which are generally considered to be the entozoa most frequently present

in such cases, were in this case the cause of the affection.

In the remaining fatal case the infant had one convulsion, which occurred while it was in a state of extreme exhaustion from diarrhoea (37); this diarrhoea having occurred just after the child had convalesced from scarlet fever, perhaps from its having taken a cold which affected the mucous membrane of the bowel.

Age. A review of the different ages at which convulsions occurred in all these varied cases shews the extreme limits to be 3 days (10) the age of the youngest case recorded, and 4½ years (27) that of the oldest. The average age of all the cases is 15·9 months. The following is the number of cases which occurred assignable to the different periods of infantile life.

(see next page)

Age of all cases, in months.

4 – 5 yrs	54 months		
	51	"	= 3 cases
	48	"	
3 – 4 yrs	41	"	
	41	"	= 4 "
	36	"	
	36	"	
2 – 3 yrs	26	"	
	24	"	= 4 "
	30	"	
	30	"	
18 mos. – 2 y	20	"	= 1 "
1 y – 18 mos	13	"	
	14	"	
	15	"	= 6 "
	16	"	
	18	"	
	14	"	
6 mos – 1 y	9	"	
	11	"	= 5 "
	11	"	
	9	"	
	10	"	
1 m – 6 mos.	2	"	
	2	"	
	3 ½	"	
	5 ½	"	= 8 "
	3	"	
	2 ½	"	
	5	"	
	3	"	
under 1 month (Total 3½ mos)	3 wks.	"	
	3 days	"	
	3 wks	"	
	10 days	"	= 4 "
	2 wks	"	
	2 wks	"	Total 38 cases
	3 wks	"	
Total	60 4 months		

Average age of all cases proved to be about 16 months.

38) 60 4 (15·94

38

224

190

·340

342

·280

266

·14

It may thus be stated that the most common period of infantile life at which children are affected with convulsions is from birth till about the age of eighteen months, this time thus including that age when the first dentition is undergoing its most rapid development; this process in the human subject usually beginning at about the sixth month, and ending at about the twenty-fourth to thirtieth.

Now 25 of my 38 cases occurred under the age of 18 months, and 1 at that age making thus a total of 26 cases not beyond the age of 18 months; further of 5 others 3 occurred under and 2 at the age of 30 months, thus making a total of 31 cases out of the entire 38 not above 30 months old: or more than four-fifths of the aggregate number of cases occurred before the completion of the development of the first dentition.

Thus an analysis of the age of these

cases having shewn the great bulk of them to have occurred during the progress of the first dentition, the fact of the peculiar susceptibility of children to disease during this period is hereby amply confirmed. A further consideration of the ages of the various cases shows that certain of the diseases, particularly those from which a proportionally large number of cases was produced are especially liable to occur at certain periods of infantile life. Thus it is seen that of those cases of convulsions which arose from the most common cause of the disease, namely inanition, the oldest of the nine cases from this cause was aged 14 months, the respective ages of them all being 3 mon., 14 mon., 3 wks., 2½ mon., 10 days, 14 days, 3 wks., 11 mon., 8 wks.; and it is seen that 4 of these 9 occurred at or under the age of 3 weeks. It may therefore be inferred from this that almost all, or at any rate the great majority of cases of inanition occur during the first year of in-

fantile life, and further that probably a very large proportion and perhaps the great bulk of these cases, are not above or under the age of three months. So that the time of the greatest liability of a child becoming the subject of inanition is at any rate during the first six months of infantile existence; the child becoming less liable to this condition in proportion to the age it has attained above six months, and its peril and liability consequently greater in proportion to its tender age.

While it thus follows that a child is more susceptible to inanition during its earlier months of existence (which susceptibility the experience derived from French foundling hospitals makes amount to a highly probable certainty, if the infant be deprived of its natural food, or improper nutriment given to it at this period), it is also at the same time much more liable to be injuriously affected by other agencies,

such as bad hygienic surroundings, at this tender age than when it has reached the more mature stage of early childhood; presumably because the younger the infant the more feeble and delicate is its organization; and especially is the nervous element of it at this time peculiarly liable to become the seat of disease.

The age of the five cases of convulsions due to gastric disorder shows that this condition too, as an agent in the production of convulsions is more liable to occur at one age than another. These five cases were aged respectively 3 yrs., 4 yrs. & 3 mos., 5½ mos., 20 mos., 3 yrs.; so that excepting the one aged five and a half months they were mentally considerably over one year of age, three of them indeed being aged from 3 to over 4 years. Consequently the first dentition in four-fifths of these cases was either well advanced or fully developed, and articles of the nature mentioned as producing the gastric disorder in these cases would be given to the children,

which had they been of a more tender age they would probably not have been troubled with. Of course it is well known that gastric disorder occurs at all ages, but it is considered here with special reference to those cases of convulsions, of which it was the cause, in order to note as a singular fact that in one only of these cases did it occur before the development of the first dentition.

With reference to the age of those cases in which the convulsions were due specially to the progress of the first dentition it will be remembered that I before mentioned that these cases occurred at that age when the process of dentition is undergoing its most rapid development, so that it will be unnecessary to speak further of them. In fact it is evident that any cases caused by dentition must necessarily have occurred at that age when the process is undergoing its development.

The age of all the cases capable of

being classified into groups having now been considered, excepting those two which have not had a name positively assigned to them, there now remain to be considered the ages of those 18 cases each of which was produced by a different cause. I have before enumerated these various cases at pages 14 & 15, to which I now refer.

Had the following of these cases, namely, those due to retention of urine, congestion of brain, broncho-pulmonia, severe burn, extensive ulceration of scrotum, frights, a fall, a lesion producing hemiplegia, & scarlet-fever rash coming to its height, occurred in the adult, then the fact of the nervous system being in the latter so much stronger, instead of convulsions occurring the various patients would most probably have been affected with delirium. Most of the remainder of these cases, namely those produced by cessation of diarrhœa, eruption of measles, spina bifida, bronchitis, hooping-cough, vaccination, worms,

epilepsy, and diarrhoea, were four causes the majority of which are almost peculiar to childhood, and though they produced convulsions in these young patients it is likely that had any of them occurred in the adult they would not have been powerful enough to so seriously affect the nervous system as to produce either convulsions or delirium.
Sex, judging from these cases seems on the whole to have had but little effect on a child's taking convulsions. 19 of the patients were males, and 19 females. Of the number of cases due to inanition 5 were females and 4 males. One would have thought that the naturally more delicate female organism would render it more susceptible to being weakened by deleterious influences than the male.
The sex in relation to the mortality was 11 female and 9 male deaths, so that to judge from this one would be inclined to infer that the presumed

greater vigour of the male may be an element conducive to its being more likely to make a good recovery than the female child.

The sex of the child with reference to the recoveries shows that about an equal number of both sexes recovered, 8 females recovering, while 8 males recovered and 1 improved.

Any one of these facts just considered taken separately is of very little practical significance but when taken together one is inclined to think that perhaps they tend to prove what may be a fact in connection with the disease; and though the number of these cases is much too small to draw any practical inference from, yet the general tenor of the results indicated even in this small way being in accordance with what one would have on physiological grounds expected, the facts as they exist are at any rate worth noting.

The influence exerted on a child, as regards

its proneness to take convulsions by the fact of its being a **twin**, is an interesting subject, perhaps worthy of more consideration than seems to have been bestowed upon it by authors.
Considering the fact that the proportion of twin to single births is about 1 twin to every 75 — 80 single ones (Leishman), it is rather remarkable that of these 38 cases of convulsions 3 of the infants affected (all in caution cases) were twins. Thus the number of twins affected with convulsions in the aggregate number of these cases being 3 in 38 this number is seen in reference to the thirty-eight cases to be proportionally to them six times greater than the proportion of twin to single children at birth. I believe it to be the case, though I have not any statistical facts in proof of it, that in most cases of triplets two of the children, at any rate, in the majority of cases die; the reason of which probably is that three infants are not as likely to be as well nourished in the maternal

womb as a smaller number, and are consequently liable to become the subjects of incantation. If this is the case with triplets the same argument in a less degree holds good of twin children. It seems to me that this assumption explains more reasonably and simply than any other the preponderance of twin children which exists in the aggregate number of these cases. One would also expect that twins for the above reason would be more likely to have a fatal termination when affected with convulsions than single children; of my three cases two (female) died, and one (male) recovered. It must likewise be remembered that in cases of twins another cause conducive to incantation is present by the fact of one at any rate of the infants being usually brought up away from the mother's breast on account of there being an insufficiency of milk for both children; this however did not influence the three children in question, for it so happened that they were the very children who

were all along brought up by the breast, the neighbour of each being reared by cow's milk.

Before leaving the subject of twins it may be mentioned that when affected with convulsions they seem to be so at a very early age; at any rate these three cases were aged respectively 14 days, 3 weeks, & 3 months.

Scrofula. 6 children with either the scrofulous or phthisical diathesis appear to be remarkably liable to convulsions, for in fully $\frac{1}{5}^{th}$ of these cases (cases 1, 2, 3, 4, 6, 12, 23, 32) there was either evidence of a strong family tendency to the scrofulous diathesis, or that diathesis was manifest in the infant itself.

Hereditary tendency. Most of the authors already quoted consider that certain children have an inherent tendency to convulsions on account of the mother, or in some cases the father having been affected when young children. I could not get any reliable information

on this point, for hardly any of the mothers knew whether they had ever been subjected to the disease.

Diagnosis. In speaking of the diagnosis of infantile convulsions we consider it with reference to the disease or affection which gave rise to the convulsions, the convulsions themselves being in most cases too apparent to escape the notice even of the most uninitiated. With the exception of two I have not experienced much difficulty in assigning in all my cases what was very probably, and in most cases certainly the cause from which the convulsions originated. A glance at the affections present in the various children when convulsions ensued will at once show that these affections in most of the patients were of such a nature as to render a correct diagnosis being made without very much difficulty.

The only cases in which a difficulty of diagnosis is sometimes experienced are

those in which the convulsions manifest themselves in that form to which the name of inward convulsions is given. Cases of this nature are evidenced by rolling of the eye-balls, occasional strabismus, difficult and spasmodic respiration, a cerebral cough of a hurt dry and harsh nature, and occasional slight twitching of the fingers and toes. Nurses and mothers frequently speak of a child being in inward fits when no outward manifestations of the disease of the nature just mentioned are present; and indeed it is possible for children to be affected with inward convulsions so slight that no outward signs are visible. But no cases of so very doubtful a nature as those last mentioned have been included among the thirty-eight cases which are under consideration.

The diagnosis of each case being so intimately associated with its cause, and the various causes which gave rise to these different cases of convulsions having been

already pretty fully discussed, it is quite unnecessary for me to say anything more about this subject.

The **Prognosis** in infantile convulsions must necessarily be a very grave one, especially if they occur in connection with a disease whose course is pretty far advanced, or one from its nature of grave import. The statistical fact quoted at the beginning of this thesis, that 73.3 per cent. of all deaths from nervous diseases among infants are due to this cause, fully warrants the gravity of the prognosis in the majority of cases being great, even when the convulsions are considered apart from the cause of which they are in most cases the sympathetic manifestation. While this holds good of all cases of infantile convulsions, there would appear to be some affections by which these convulsions are produced, which specially warrant a grave prognosis. Such for example as inanition,

which among the cases of this thesis stands preëminent, 4 of the 9 cases from this cause having died.

The gravity of the affection also under which a child may be labouring when convulsions ensue, materially affects the prognosis; for by looking at the cases of death not due to inanition it will be seen that the affection which were the cause of the convulsions in the fatal cases was in most of them of a very serious nature by itself, without taking into account the additional danger engendered by the occurrence of convulsions.

Those cases of convulsions, which, judging from these cases, would warrant a favorable prognosis, are those due to the two causes gastric disorder and dentition. The prognosis in cases of the former kind would seem to be uncommonly good; for of 5 cases due to gastric disorder each one made an excellent recovery, their age being probably in

their favor, for excepting one child of 5½ months the rest were nearly all considerably above the age of 18 months; the danger of convulsions having a fatal result being, according to Vogel, in proportion to the tender age of the patient — which is quite what one would anticipate. From what I have seen of cases of convulsions due to dentition I think they are among the most favorable in a prognostic point of view, supposing the irritation from the teething occurs in a healthy child, as all my four cases of it were, and that they are seen early so as at once to adopt appropriate treatment. Three of these cases made an excellent recovery, and the fourth would probably have done likewise if the parents had not sent for medical aid when it was too late. I am speaking of cases due purely to dentition, without complication with any other affection, bearing in mind that Vogel says "that excepting those cases which

arise from actual cerebral disease, cases of teething complicated with intestinal affections, offer a worse prognosis than any other cases." As I have not come across cases of this kind to which Vogel refers I am not able to speak practically about them.
Most authors agree that a favorable prognosis may be given as a rule in those cases of convulsions which occur at the outset of the eruptive fevers, as far as the convulsions themselves are concerned, and that the course of the fever is not materially affected by the occurrence of such convulsions. In the case of scarlet fever which exemplified this subject, the fact of the child's having a convulsion did not seem in the slightest degree to affect the course of the disease; and it may be mentioned that the case, though not a very mild one, in so far as there was a considerable amount of albumen in the urine and general anasarca, made an excellent recovery.
The condition of the fontanelle, taken with the general appearance of the infant, seems

of greatness in forming a prognosis. For if the fontanelle is, when the child is first seen, or becomes afterwards, depressed, and the general condition of the child at the same time indicates collapse, then the case will very probably die. Of the 20 fatal cases recorded the fontanelle was depressed in 14 of them; of the remaining 6 in one (case 1) I do not know in what condition the fontanelle was; but in the five others (cases 11, 13, 16, 31, 32) the fontanelle was either not depressed or else prominent.

With reference to the ultimate prognosis of those cases which recover, the question as to whether the child will be ultimately subject to fits must be determined by the nature of the cause with which the fits were associated, the constitution of the patient affected, and the subsequent care taken of the child. If recovery should take place after fits connected with such causes as a lesion producing hemiplegia, spina bifida, &c, then a recurrence may be anticipated from comparatively slight causes, or without

one's being able to assign any exciting cause whatever, the fact of a cerebral lesion in the one case, and a spinal in the other, predisposing to such an occurrence; if from epilepsy then a recurrence may be looked for, whether provocation exist or not. But if there be no disease of this nature, no evidence of structural disease of the brain, the child of a good constitution and without any hereditary tendency to convulsions, the patient well cared for, and its hygienic surroundings good, then one would be warranted in giving a good prognosis; but it may hardly be necessary to say, that these latter conditions are not yet as a rule fulfilled among the lower orders of society, among whom probably by far the greater proportion of infantile convulsions arises.

The prognosis with regard to the probable ultimate effect of the convulsions on the cerebral functions in after life in those cases which recover and in whom the convulsions occasionally recur, must necessarily

be determined by the cause from which the convulsions arise, and the fact of a continued frequency of their recurrence leaving a very exhausting effect on the whole nervous organization. Epileptic convulsions are well known as having a marked tendency to produce mental derangement in after life, and their liability to result in this, seems generally considered to be in proportion to the early age at which the first epileptic attack occurs.

A point which may be considered in connection with the prognosis is a question which is often put to a medical man when a young child is very ill. In such cases it is commonly asked of one - "Will the child go into fits"? A valuable diagnostic sign of much use in forming a prognosis relative to this question, is afforded by the condition of the eye-balls; for when an infant is about to be affected with convulsions these are preceded in most cases by a drawing up and external or internal oscillatory motion of the eye-balls,

or the eyes may be drawn up, fixed, and dull-looking; in some cases too strabismus, most often of a double convergent kind, may exist. But it is of course impossible to give a positive answer to this question, however strong we may consider the probability of any given case resulting in convulsions. And when it is considered that among the public at any rate a man's professional reputation is in a sense partially at stake, it is evident that extreme caution must necessarily be exercised in hazarding a positive answer to such a question.

Treatment. Discrimination is required in the treatment of each individual case which is an illustration of this disease. For those measures which in one case would prove efficacious in saving the patient's life, would in another destroy it; each case must in short be treated according to its own individual requirements.

In a great number of cases the convulsions are secondary to some grave disease or injury, to which the child has been subjected

previous to their occurrence, such being cases in which the treatment must necessarily all along have been directed to the primary disease; it need hardly be said that cases of this kind, of which many examples are afforded among the cases we have been considering, are among the most hopeless we can have to deal with, palliative treatment being in most of such instances the only relief which can be given to the patient.

But there are a considerable number of cases in which experience shows that treatment is of the utmost use, and in which the patient can as certainly be saved by medical aid as it would almost surely be lost were that aid withheld. I allude to those cases not occurring in connection with any previous disease, injury or affection, of a serious nature, nor due to disease of the brain itself. I refer especially, judging from my cases, to those convulsions produced by such causes as gastric disorder, teething, &c.

The treatment of this disease naturally comes under two heads, I the Local, and II the Constitutional treatment. In the former are included all those external applications and agents which have been found useful in treating the disease; such as the use of baths, poultices, ice to the head, blisters, lancing the gums, &c.. The latter deals with the diet, medicines, hygienic surroundings, and other such agencies which act upon the constitution of the child. These two are necessarily so involved in the treatment of every case in which we have reasons for expecting a favorable issue, that they are best considered together.

It seems to me a convenient and precise way of considering the treatment, both local and constitutional, as far as the actual convulsions themselves are concerned, to divide all cases whatsoever, no matter from what cause arising, into two classes, namely,

(a) Those which present unmistakeable symptoms of being of a congestive or sthenic nature.

(b) Those which present symptoms, equally pronounced, of great weakness and collapse. A third class might be made of those cases which cannot be assigned to either of the two classes just mentioned as they partake of some of the characters of both, but as I have had only two or three which were of this nature, such instances are probably comparatively exceptional ones, and when they are met with can be treated according to their special indications.

The reason I have thus arbitrarily divided cases of convulsions into two groups with reference to their treatment, is, that from the experience derived from the cases in which convulsions actually ensued, as well as from those cases, not recorded, in which the occurrence of convulsions, though often seeming imminent, did not ensue, I have found that in almost all instances each individual case was capable of being definitely assigned to one or other of the two groups mentioned above.

But while thus dividing all cases into

two sets in accordance with the distinctive constitutional symptoms by which in each set the disease is manifested, I quite keep in mind the possibility that in some cases the one set of symptoms may change to the other. For instance, a case at first of a sthenic character, may, if it prove fatal, become latterly of an asthenic nature; or the very opposite of this may take place. But this change in the character of a case, especially from an asthenic to a sthenic, I hold to be, judging from my cases, very unusual indeed.
The cases belonging to each set have been differentiated according to those symptoms which were present when the convulsions first occurred, the general characters of the case being at the same time all along taken into account.
Group I. Of this group many examples are afforded among the cases we have been considering, especially among those which terminated favorably. In cases of this kind the infant affected has a prominent and tense anterior fontanelle, the scalp being

often hot and turgid with blood, the veins of the scalp and often too those of the neck and face are seen to be distended, the face flushed, and the eyes sometimes congested. the pulse is usually full, strong, and quick; the temperature of the body is in most of these cases higher than natural. Teething, gastric disorder, hooping-cough, &c. afford good examples of this group, for in almost all the cases illustrating these affections, the above was the condition of the patient. In the treatment of cases of this nature, while bearing in mind the causes which produced them, one's main attention when the patient is in a convulsive attack must be directed to relieving the congestion of the head, and in many cases too the general feverish condition of the system itself.
The local measures most useful for this purpose, are —
(a) Putting the child in a hot bath so that the water shall reach up to the axillae, and keeping it there for five or ten minutes. After removal the child should be

thoroughly dried, warmly clothed, and kept at first in its nurse's arms, afterwards in a cradle or bed.

(b) A poultice, made of equal parts of mustard, and bran or meal, put to the back and lower part of the child's head, so as to cover the space bounded by the occipital protaberance, the vertebra prominens, and the mastoid processes, and kept on for two hours, is not only of great service along with the bath, but will often itself afford the patient marked relief. This external application, the strength of which can be increased or diminished according to the quantity of mustard used, seems to be in cases of this nature of very great service indeed, acting as a derivative, and relieving the great cerebral congestion by giving rise to a certain amount of inflammatory action at the situation of its application.

(c) Some advocate the use of leeches in cases of this nature. I have never used them, because in a considerable proportion of

these cases the above local measures, along with constitutional treatment effected the desired end; and when these measures failed it has with me been in those cases which sometimes occur, in which while the head is congested the general condition is one of weakness and prostration, so that the action of one or more leeches would likely not only not benefit the patient, but probably still further reduce the already weakened vital powers.

(d) For reasons of a very similar nature I have abstained from the use of blisters in these cases, never having except in one case, employed them; thinking that not only was their use not called for, but bearing in mind also the much greater and speedier effect they have on the skin of an infant and young child than on that of the adult, and their tendency to produce subsequent ulceration.

(e) Sometimes cold lotions to the head were

used. Linen dipped in cold water applied to the upper and fore part of the head, and changed every five or ten minutes for an hour or two, seems to afford some relief. But when these cold applications are left in the hands of those who have charge of the child, it will be found that in some cases the cloths are not changed frequently enough, and consequently the linen becoming warm acts not beneficially, but very deleteriously.

Ice-bags are of much use in some of these cases; they were used in case 15 with good effect.

(f) In those cases of congestion of the brain and general feverishness, due either to dentition alone, probably proportionally a very common cause, or in which irritation from this cause exists combined with some other affection, the propriety of lancing the gums must be taken into consideration. Now this is a proceeding in which great care and discrimination ought to be exercised; for if the case is not a suitable

one for it the operation not only gives no relief, but besides inflicting unnecessary pain, harm is also done to the child in many cases on account of the struggles, sometimes of a violent nature, to which the use of the gum-lancet often gives rise. Of my four cases in which convulsions were due purely to dentition alone, I lanced the gums of two (cases 9 & 21), in which the teeth were almost through the swollen and congested gum, and in one (21) the immediate relief and speedy recovery which followed, seemed strongly to justify this act. The other case lanced, in which the parents delayed sending for medical aid until it was far too late, was the only fatal one of these four, the lancing of the gums being here a last resource, adopted to see if the easing of their great swelling and tension, would, along with other measures better the infant's prostrate condition. The two infants (5 & 14) whose gums were not thought in a condition to justify lancing, also made capital recoveries, ap-

pearing much benefitted soon after the treatment adopted.

(g) In such cases of active hyperaemia as those whose treatment we have just been discussing, Trousseau advocates strongly digital compression of the carotid arteries, stating that the results which followed this plan of treatment by him were highly satisfactory. Whatever the practical result of this method of treatment may prove to be after having been tried on a large scale, it seems theoretically a very good plan, and well worth trying. I have not yet however had suitable opportunities for giving it a fair trial.

The constitutional measures useful in this group of cases are pretty clearly indicated. Purgatives, diaphoretics, diuretics, emetics, sedatives, and sometimes anaesthetics, are those medicinal agents, some of which are in most of these cases very useful. The purgative agent to be desired is as a rule not one which acts merely as a laxative, but one whose action

is of a pretty smartly derivative nature as well, such as is obtained by the use of a full dose of calomel, combined with either compound powder of Scammony, or Pulv. Jalapae alone with a carminative, this being afterwards followed up by a saline laxative, given at regular intervals for twelve or twenty-four hours. If such purgatives dont act, or are continually vomited, the bowels must be moved as freely as possible by an enema, thin gruel strained through muslin being a good one. In some cases it is desirable to increase the action of the enema by the addition of castor oil.
For a diaphoretic the solution of acetate of ammonia, and for a diuretic and diaphoretic combined, spirits of nitrous ether, are agents which produce the desired effect in children better than most other medicines of that kind. Emetics are generally considered of much use in cases of convulsions arising from gastric disorder. I have never had occasion to use them yet in cases of this nature, but have had recourse to purgatives. The five cases of gastric disorder recorded, were treated

mainly in the way just stated, and as they all generally made an excellent recovery, probably no better mode of treatment could have been adopted. At the same time however, when the gastric disorder arises from an over-loaded stomach, an emetic would undoubtedly be the proper medicine to give, but none of mine were cases due to this cause, they being produced not by a loaded stomach but by articles which the stomach was unable to digest properly.

The nervous sedatives which have been used in those cases which seemed to require them, were Hyoscyamus, and Bromide of Potassium. Opium and the salts of Morphia, which are so useful in cases in the adult which consume to convulsions in infants, namely those of delirium, are in infantile convulsions of this class quite inadmissible on account of the cerebral congestion they cause. But this objection does not apply to Hyoscyamus, which in suitable doses is of the greatest ??

service as a sedative on the infantile nervous system. Some too, according to Garrod, state that Hyoscyamus has a directly sedative action on the heart, which if correct is so much the more in its favor. In some of these cases I believe considerable benefit followed the use of this drug, while in none, as far as I could observe, were any injurious effects produced by it.

In one case (35) an infant aged three months, in whom the convulsions were purely epileptic, the Bromide of Potassium acted very beneficially, in reducing very much the frequency of the attacks, the convulsions becoming both more violent and far more frequent, when the administration of the drug was stopped.

Sometimes the convulsions are of so very violent a nature that chloroform has to be given. I have never had occasion to use it; but in one of my cases (case 24) the child had had convulsions exactly a year previous to the date at which I attended it for the same affection, and as they were

at that time very violent, the medical man who then attended the child stated that he had been obliged to give chloroform, the result of the use of which was highly satisfactory.

Group II. As before mentioned, the cases included in this group are all those in which unmistakeable symptoms of great weakness and collapse are present. These symptoms are indicated by a depressed fontanelle and sometimes shrunken condition of the bones of the cranium, pale face, cold extremities, and markedly weak pulse. The cases which illustrated this group were those in which the convulsions were either the result of incaution, or else occurred in connection with some very serious disease or affection to which the child had been previously subjected. In both these sets of cases the convulsions which ensued were as a rule the result of the extreme exhaustion to which the child was reduced by the disease or affection from which it had previously been suffering. It is obvious

that measures of the kind adopted in the cases belonging to group I would almost surely have extinguished that small spark of vitality which remained. Our main hope in such cases lies in keeping up the strength of the patient as much as we can. Often the patient is so prostrate as to be able to swallow only an occasional drop or two of nutriment, and perhaps not that. When this is the case nutriment must be administered by means of an enema of thin gruel, or one of beef-tea. If however the patient can swallow fairly well, then a mixture of milk, or milk and water with brandy, should be given, and in older cases gruel and beef-tea as well.

As regards medicine, a good mixture which seems sometimes useful in such cases, is one containing aromatic spirits of Ammonia, with minute doses of Tr. Opii to stimulate and reduce congestion of the brain, and also very small doses of Vinum Ipecacuanhae to allay any gastric irrita-

bility. But there are not cases which as a rule, derive nearly as much benefit from medicine as those which belong to group I.

I think it right to mention however, that in one case, (case 3), the child's life seemed to be undoubtedly saved by a combination of grey powder and opium.

In all cases of this group the child ought to be kept warmly clothed, and the extremities especially so.

Before concluding the subject of treatment, it may not be superfluous to remark, that the fundamental conditions of appropriate diet and healthy hygienic surroundings, are both absolutely necessary, and ought strictly to be enforced. That the diet of an infant until it has attained the age of eight or nine months ought to be exclusively its natural one is a vital point which ought to be most strenuously insisted on, the great frequency and enormous mortality due to that in-

nition which results from a neglect of this, very fully testifies. From the age of nine months to two years milk in some form or other, along with properly regulated farinaceous food, should be the nutriment used. And for a year or two after the age of two years, though a certain proportion of animal diet may be allowed, yet at this time too, milk ought to form the main food of the child.

The hygienic surroundings must likewise be most carefully seen to. The air should be as pure, the temperature as moderate and equable, and the drainage as efficient as possible, and there should be a sufficient amount of properly regulated light. In a considerable proportion of cases however, notwithstanding our exertions, very deleterious influences will, unless the law interferes, continue to exist, until the importance of these necessary salutary conditions is

more commonly known and practically appreciated.

Kendal,
Westmoreland.
May, 1844.

Appendix of Cases.

Case I. Cessation of Diarrhoea.

Mrs Tolls's child. F. 10 mos. Oct 1875.

I attended this child in August 1875, for an eczematous eruption over the back part of the scalp, and of forehead, associated with debility. The eruption had been present one, and the diarrhoea about three months. For both of these conditions poultices were used, and I gave alterative powders containing Hyd. c Creta, Pulv. Doveri, & Sodae Bicarb.; but had not much hope of the child's condition bettering unless its hygienic surroundings were changed, as it was in a room very much over crowded. One day in the following October (15th), the diarrhoea suddenly ceased, the child took convulsions on the third day from the stoppage of the discharge, and died that day, the 18th Oct., without a medical man seeing it. It had never been a healthy child from birth, and was of a scrofulous family.

Case II. Inanition.

Mrs Mitchell's infant. F. 3 mos. Sept 1875.

A twin child, of a scrofulous family. When I first saw it, it had slight convulsive seizures, evidenced by spasmodic flexion of its hands and fingers, and turning up of its eyes. It had a pale dull countenance, depressed fontanelle, small pulse, and cold extremities; it was in a very wasted condition, and would not take the breast. I thought the convulsions due to inanition, the result of its scrofulous diathesis & its being a twin. I gave the infant 5ij doses of Citrate of Magnesia, which moved its bowels freely, and a saline laxative mixture, combined with Hydrocyanic. Under this treatment along with brandy in milk and water the convulsive symptoms completely disappeared in two days. But ten days afterwards the child again took convulsions of a very strong character, and died in three days, notwithstanding the renewal of the previous treatment.

Case III. Inanition.

Mrs Jacob's child. F. 14 mos. Jan 1876.

The mother of this child was of a scrofulous family, but the father was strong and healthy. The infant was not seen by me until very wasted. It was extremely emaciated, and what little flesh was on its limbs was very pale and soft; the general surface of the body was cold, the face pale and delicate-looking, fontanelle markedly depressed, eyes turned up, & the limbs pretty strongly convulsed occasionally; respiration natural; tongue foul, and stools green and offensive. It refused milk bread and other things offered it; and the mother said it had been in this condition, and looked for it by a medical man in the place where she had just come, during the last six weeks, but had gradually got worse. I gave it first a tea-spoonful of fluid magnesia which acted gently on its bowels, and followed this up with white powders each containing gr. ½ of Hyd. c Creta, gr. i of Pulv. Doveri, & gr. i of Sodae Bicarb., one night and morning. It also got five drops of brandy in milk and water three times a day, for about a week. In a week's time the convulsive symptoms had quite disappeared, and it began to take milk pretty freely; its motions had become inoffensive in smell and natural. The brandy was now stopped and the powders continued, but only one given once a day at evening. From this time it got better every day, and at the end of two weeks was quite lively, not so thin, and took its food well. At the end of five weeks it was a plump and strong-looking child.

This case seems to exemplify very well the influence of Mercury and Opium in such cases. For the previous medical man and myself had fully expected the child to die; but as soon as it had had these powders the change for the better in the child's condition was very remarkable. Whether the beneficial influence was the result of the mercury on the absorbents or of the opium on the brain, I know not, but I feel quite convinced that these powders in this case saved the child's life.

Case IV. Inanition.

Mrs Jacob's infant. M. 3 wks. Feb 1876.

The mother of the above case (c III) was delivered by a midwife of a child at the full time, just after her first child got better. This infant for the first five days after birth took the breast though not

as eagerly as a healthy child; at the end of the first week it refused the breast except fitfully, and a few days after refused it altogether. The child which was puny looking from birth now became extremely so. It took strongly-marked convulsions at the end of the second week. Its face was pale, fontanelle depressed, and the temperature of the body lower than natural: Pulse sweet; respiration natural; tongue coated with a white fur; bowels pretty regular & motions natural. It got brandy & milk and water and the same powders as those used in the preceding case but one-fourth the strength. But it died at the end of the third week. The air of the room in which this child lived was very impure, for two families were at that time living in this one room.

Case V. Teething.

Mrs Clark's infant. F. 5 mos.. March 1846.

This infant had convulsions evidenced by twitching of the angles of the mouth, turning up of the eyes, and slight flexion of the fingers, toes, and limbs. The face was pale; the anterior fontanelle full; pupils natural; pulse rather strong; bowels regular; respiration natural; and tongue clean. The incisor teeth of both jaws were felt to be nearing the surface of the gums, care being afforded to the infant when the gums were rubbed; but I did not think the teeth near enough the surface to be lanced. The infant was small, but looked in a healthy condition; it took up till the day I saw it, the first day of the illness, taken the breast well. It was put in a hot bath from the feet up to the axillae; a poultice of half mustard and half linseed meal was put to the back of its head and neck; and it got powders containing Hyd. c Creta, Sodae Bicarb, & Pulv Doveri, followed by a saline laxative mixture. Under this treatment the convulsions soon left it; on the second day of the illness it was much improved, and before the end of a week was perfectly well.

Case VI. Incipient Tubercular Meningitis?

Mrs Allan's child. M. 2½ yrs. Feb 1 1846.

This case was like one of incipient acute hydrocephalus. The child was thin and weakly, had a pale delicate skin, large head, and prominent anterior fontanelle. It used to cry with pain in its head at night and put its hand there. It rolled its eyes, had slight internal strabismus of both eyes, and flexed its fingers and hands, which symptoms along with obstinate constipation and want of appetite made them send for the doctor. These were marked intolerance of light, and the pupils were contracted. Tongue clean and natural looking, appetite bad, pulse weak and quick though not feverishly so; respiration natural. It got a hot bath up to the axillae, a mustard and linseed meal poultice to the back of its head, and a mild calomel purge; its diet was alternately milk with a little brandy in it. Under this treatment the rolling of the eyeballs ceased, its bowels operated naturally, and the spasmodic flexion of the hands and fingers disappeared. It now got grey powders, one night and morning; and five minims of the Syrup of the Iodide of Iron three times a day. At the end of two weeks the child was considerably improved in appearance, and the pain in the head much better, though the child was still irritable. At the end of a month the pain in its head was quite gone, it took its food pretty well, and was but slightly irritable, though it still looked delicate. It was in this latter condition a few months after, when I saw it last.

This child's father had died a few years before of emphysema the result of phthisis.

Case VII. Teething.

Mrs Caldwell's child. M. 18 mos.. April 1846.

This child, which had always previously been in excellent health, took strong convulsions with marked congestion of the brain. Teething seemed clearly the cause, for though no teeth were sufficiently near the surface for the gums to be lanced yet the gums were very irritable and much eared when rubbed. It had had two or three convulsions on the evening previous to the morning on which I saw it, so they called in a doctor who was near at hand, and he put a leech to the head and gave grey powders. Next morning when I saw the child the convulsions were still present: the whole body occasionally stood strongly, and the limbs

fingers and toes were strongly flexed; it was comatose with pupils dilated and insensible to light, its face was turgid, eyes violently rolled about, fontanelle markedly prominent and tense, the mouth was drawn tightly at the angles and the nostrils dilated. Its bowels were rather constipated and motions green and foul-smelling. I put the child in a bath of water as hot as it could bear it, up to the axillae, got a poultice all mustard put on the back of its head and neck for half an hour, followed by a simple poultice, and gave it gr. i/f of Calomel and gr. iii of Pulv. Jalapae, followed by a saline laxative. The child's condition after this treatment soon improved: on the third day it was pretty well, and on the fourth quite so.

Case VIII. Gastric disorder.

Mrs Cuthbert's child, 3 yrs. F. 1st Jan'y 1876. This little girl suddenly took a fit and fell in a perfectly comatose condition, struggling a good deal. She had previously from birth until now been always quite healthy. She was the daughter of an over-seer of miners and her father and mother had gone away for a day's holiday, leaving this child and some other children in charge of a girl. All the children had a large quantity of toffee and other sweetmeats, of which this child in particular had taken largely, on the day of the fit. When I saw her the struggling had ceased; she was partially comatose, head hot and tense, face flushed, pupils dilated, pulse full and quick, and the skin over her whole body very hot. I gave her a 3 gr. Calomel purge, no other additional treatment being possible, on account of the want of necessary means for such, in the house. Next day I found the Calomel had acted freely on her bowels, she was quite well and running about, and had no further bad symptoms.

Case IX. Teething.

Mrs McDougal's infant. M. 9 mos. April 1876. This child ought to have been seen two or three days before it was seen, as it had been ill for that amount of time previously. When I saw it the child was in very violent convulsions, having been first affected with them a short time before my arrival. The face was pale, eyes fixed and staring, with dilated pupils; lips tightly compressed and twitched at the angles; fontanelle natural; pulse weak; respiration natural. Two of the lower incisor teeth were near the surface, the gum above being swollen and tense. I lanced these two teeth, had the child put into a hot bath up to the waist, a poultice of one-third mustard & two-thirds oatmeal put to the back of its head, and gave the child gr. i of Calomel, followed by a laxative and sedative mixture; and it got brandy in milk and water occasionally. Next day the child's general condition remained unaltered, though the convulsions had ceased; on the third day it was still extremely prostrate, and on the fifth again took convulsions and died after being in them five hours.

Case X. Retention of urine.

Mrs Bryce's infant. M. 3 days. Jan'y 1876. This infant died in convulsions the third day after birth. It was very thin and puny looking, though of average length; it never took the breast and was not tongue-tied. It had a malformation of the glans penis, the urethra instead of passing through the middle passed through the very bottom of the glans, the aperture not being easily seen, though it seemed patent on testing with a probe, and on palpation the bladder did not appear distended. The infant micturated very little, the quantity of water passed being carefully watched for. The child's bowels were moved several times after birth. The only thing it was able to take was a little gin in milk and water, and this with great difficulty. On the third day from birth it had slight convulsions, the eyes, lips, fingers, and toes, being mainly affected; fontanelle depressed; face pale; pulse very weak; extremities cold; and tongue rather foul. It

died on the third day after birth. The father and mother of this infant were quite healthy, and the mother had good health while carrying it; the child was born at full time. It may be mentioned that there was a peculiarity in the insertion of the cord at its placental end; for it was inserted not into the placenta but into the amnion, by four small divisions, the cord dividing thus at a distance of four inches from the placenta. Perhaps this peculiarity may have deleteriously affected the condition of the child while in utero.*

Case XI. Sequelae of Measles.

Mrs Muir's child. M. 16 mos. June 1845.

This child had measles and apparently got quite well. But a month afterwards it became unwell and had cough, sickness, constipation, and peevishness. It gradually got worse, and the last day or two had convulsions, though not of a violent character; the face was very pale; pulse weak and quick; fontanelle not depressed. The child got laxatives, febrifuges, grey powders, and latterly stimulants, but none of these agents seemed to do any good, and it died after being in almost continuous convulsions for three days previous to death.

Case XII. Incipient Tubercular Meningitis?

Mrs Kerr's son. M. 15 mos. July 1845.

It had been noticed for some weeks before I saw this child that it had been getting thinner, lost its appetite, not slept well at night, been very irritable, had put its hand often to its head as if in pain there, and its eyes had become very irritable to light. When I saw the child it looked very ill being in slight convulsions evidenced by its tightly clenched hands, flexed toes, and rolling eye-balls; there was internal convergent strabismus of the right eye. The child was very delicate-looking its limbs being thin and its face pale; the pupils were not contracted; its head was large and the blue veins stood out prominently both on the temples and scalp, showing through the clear delicate skin; fontanelle tense and full; pulse quick and rather weak; bowels obstinately confined, with foul-smelling motions; tongue coated with a white fur; respiration natural. The child's limbs were bathed in hot water, and its head poulticed with equal parts of mustard and linseed meal; it got a calomel and jalap powder nearly every night for a week, and a diaphoretic mixture. After this it improved rapidly, the symptoms of impending convulsions disappearing after the first day of treatment, and the bad symptoms it had had previous to the attack not recurring; while tolerance of light and cheerfulness were soon apparent. At the end of three days the child was considerably improved as regards bodily health, and at the end of ten days seemed perfectly well. The mother of this child had a scrofulous delicate constitution.

Case XIII. Spina bifida.

Mrs Ross' infant. F. 3 wks. Septr 1845.

When born, this infant, a small ill-nourished looking one, had at the lower part of its back at the fourth and fifth lumbar vertebrae, a pinkish, soft, semi-translucent, fluctuent tumour, about the size of a large walnut, with a yellow surface which discharged a thin, sanious, purulent-looking fluid; above and below the tumour the edge of the gap in the spinal canal could be distinctly felt. The child could move its legs freely, and did not appear to suffer pain, or any other bad symptom. It was brought up by the bottle which it took greedily. Excepting its puny appearance there was no evidence of ill-health in the infant until the fourth week, when it seemed in pain, moved its legs spasmodically, and could suffer no pressure on the tumour without great pain being caused. At the end of the fourth week it one day suddenly took convulsions, and died before my arrival.

Case XIV. Syphilitic Inanition.

Mrs Rippin's infant. M. 2½ mos. Novr 1845.

This was a unhealthy, small infant, and had been so from birth. As its mother had phlegmasia dolens it was brought up by the bottle. When two months old it took convulsions; the face was pale and thin, fontanell depressed, pupils dilated and not responding to light; pulse weak; bowels ra-

* The first 10 of these cases occurred among miners children; the remaining 28, with the exception of two or three paupers occurred among private patients. This is the cause of the want of sequence observable in the dates at which the cases occurred; for the mining cases were recorded quite separately along with some other cases which occurred among that class: all cases which occurred among private patients which were thought worth making notes of were recorded by themselves: and in considering the [illegible]

ther bowls; tongue coated with a white fur; respiration natural. There was an erythematous rash very rash over the child's body, which looked very like a syphilitic eruption. The child got its feet bathed in hot water, some powders containing Hyd. c Creta, Pulv. Rhei, and Sod. Bicarb., and brandy in milk and water; after this treatment it improved for ten days. But at the end of two weeks from the first convulsive attack it took another and much stronger fit, dying after being in convulsions, more or less, for five days.

Case XV. Congestion of Brain.

Mrs Valentine's child. M. Hyt. Dec 1845.

This was a fine healthy-looking boy, who took very violent convulsions. I did not see him when in the fit, as he was attended to by the doctor whom I was then assisting. When I saw the child in the evening, he was quite quiet with no trace of convulsions, but was practically comatose; his face was flushed; pupils widely dilated and imperfectly responsible to light; head hot, and anterior fontanelle full and tense. The child was put in a hot bath up to the axillae; ice-bags were put to the head; he got gr. ij of Calomel every 3 hours; and then Solution of Potassium in a mixture. This treatment seemed to exert a very beneficial influence, for in two days he was almost well, and at the end of a week in his usual good health.

A year previously he had had a fit of an exactly similar nature. The most careful inquiries and examination failed to detect any cause to which these convulsions could be assigned, so I put the case down as one of congestion of the brain, this condition being unusually well-marked. The father and mother of this child were both strong and healthy.

Case XVI. Broncho-pneumonia.

Mrs McLellan's child. M. 11 mos. Dec 1845.

This child had severe broncho-pneumonia of both lungs, and after being ill for two weeks died in convulsions. During the first few days the child was highly fevered, &, but after the second lung became involved he gradually weakened, and during the last two days was extremely prostrate, drops of brandy in milk and water being all he could take, and hardly that. It was while in this condition his head became congested, and he took convulsions of a well-marked strongly not strong character. His feet were bathed in hot water, a mustard poultice put on the back of his head, and his bowels were gently moved with castor oil. After being in the convulsions off and on for two days he died.

Case XVII. Severe burn.

Mrs Liddell's child. F. 2½ yrs. Jan 1846.

The parents of this child thought it was not looking well, and the father, thinking she was going to have a fit, put her into a bath of hot water; the water being excessively hot caused a large burn all over both buttocks, round the inside of the thighs to the vulva, and over the soles of both feet. The burn, the whole surface of which ulcerated, was dressed with Lin. Calcis; and the child being much prostrated, as evidenced by weak pulse, cold extremities, and depressed fontanelle, got stimulants to a certain extent, reaction being carefully watched. The child quickly got weaker; on the morning of the second day it had several vomitings, and in the evening of that day took convulsions, and died after being in them a few hours. It had always been previously a healthy child.

Case XVIII. Bronchitis.

Mrs Duffy's infant. M. 3 mos. Jan 1846.

I attended this infant, a very delicate one, for bronchitis; it gradually got weakened by this and refused the breast, taking nothing but drops of brandy in milk. It died after nine days illness, the death being preceded by convulsions, or more properly speaking, spasms. The convulsions were mainly characterized by twitching in of the thumbs on the hands, and of the hands on the wrists; also twitching of the toes of each foot, the big toe being at the same time widely separated from the rest, there was roll

ing of the eye-balls, and internal strabismus of the left eye-ball; the fontanelle was depressed, the face very thin and pale, and pulse imperceptible. The convulsions which set in the day before the child died were present up till the time of death. This was Mrs D- only child, and she stated that she had had one which died two years before in exactly the same way.

Case XIX. Hooping-cough.

Mrs Paton's child. F. 14 mos. March 18 96. Hooping cough had been present in this case for two or three weeks, characterized by occasional uncommonly severe paroxysms of coughing. The child had a good constitution, and had been previously always healthy, after the hooping-cough had been present the above time I was one day sent for hurriedly, and found the child in violent convulsions, the limbs and mouth being strongly convulsed; face highly flushed; head hot and fontanelle very full; eyes fixed and staring, with pupils dilated and insensible to light; the child seemed as nearly asphyxiated as it was possible for a child to be. I got it put in a hot bath; a strong mustard poultice was put to the back of the head; and a calomel purge given. These measures seemed much to benefit it, for the convulsive symptoms had quite disappeared at the end of that day and in a few days the infant had only the hooping cough to contend with, from which it afterwards made a good recovery.

Case XX. Emaciation.

Mrs Brown's infant. M. 10 days. April 18 96. This infant died at the above age from emaciation, its death being preceded by convulsions. It was weaned from birth, and brought up by the bottle, as the mother had no milk; but as it would not take the bottle it got brandy in milk and water. The child was pale and extremely small; the bones of the head looked and felt loose and collapsed; fontanelle much depressed; eyes dull, upturned and fixed; and the general condition that of collapse. The tongue was very foul, and the bowels too loose. On the 10th day it was seized with convulsive movements of the limbs and rolling of the eyes, and died the day after in this condition.

Case XXI. Teething.

Mrs Barberry's child. M. 13 mos. April 18 96. It took convulsions in connection with teething. The child had always been until now quite healthy. The cause was very evident, for two molar teeth were felt near the surface, the gum above each being much swollen, tender, and congested. The character of the convulsions was violent; the head was hot and congested looking; the face red, and pulse quick, full, and strong. The gums above the teeth were lanced, the child put into a hot bath, a strong mustard poultice put on the back of its head, and a calomel and jalap powder given. In the evening it was much improved, and free from convulsive symptoms. The next day the child got a saline laxative mixture containing Sodium-Potassium-Tartrate. Two days after it was quite well.

Case XXII. Gastric disorder.

Mrs Lancaster's child. F. Hy. 3 mos. June 18 96. I was called to see this little girl on the evening of Saturday, 10th June, she being in violent convulsions when I arrived. These convulsions were characterized by strong flexion of all the limbs and wrenching of the body; there was much distortion of the face, the eyes being convulsively rolled and upturned, and the lips tightly clenched. The face was flushed and delicate, with fair skin and blue veins standing out prominently; the pupils were dilated; the head, which was of large size, was hot, with full, tense, and throbbing anterior fontanelle; pulse rapid and full; surface of the body hot; bowels regular; tongue foul. She was put into a hot bath up to the axillae, got a mustard and meal poultice put to the back of the head and the front of the head was bathed in cold water; internally, a sulphate

of magnesia mixture was given, followed by grey powders. I visited fully an hour; when I left her the convulsions had quite ceased, and she was in a light sleep. The next day she was much improved, and at the end of the week in her usual health.

She had on the day she had convulsions been eating some black currant jam, the seeds and skins of which were thought the exciting cause of her attack. One year and four days previously she had had a fit of a similar nature, but more violent, for which the doctor who then attended her gave chloroform with good effect.

Case XXIII. Gastric disorder.

Mrs Patterson's infant. Æt. 5½ mos. June 1876. I was called on the evening of 7th June to see this infant. Before I got there it had had slight convulsions. It looked in a wealthy condition, and had convulsive movements of the fingers, hands, and eye-balls; its face was pale and thin, with the temporal veins prominent; the pupils were dilated. Head hot and tense, with full anterior fontanelle; pulse quick and weak; there was considerable sickness, its milk coming from the stomach in curdled lumps; bowels very constipated; respiration natural. The gums were neither full nor tender, and the teeth did not appear at all near the surface. Had the child's feet bathed in hot water, and a mustard and meal poultice put to the front of its head; it got powders containing Hyd. c Cret., Pulv. Rhei, & Sodæ Bicarb., followed by a saline carminative and stimulant mixture. Next morning it was rather improved, but not much so, its bowels not having been moved. Towards the evening of the second day its bowels were freely moved and the child almost immediately afterwards seemed much improved; for the convulsions altogether ceased and the head became less full and hot, though the stomach still continued irritable. On the third day the infant was much improved in every respect; at the end of a week it was quite well and battening the bottle eagerly, almost too much so.

This child was of a remarkably scrofulous family.

Case XXIV. Gastric disorder.

Mrs Henderson's child. Æt. 20 mos. June 1876. On the 3rd of June 1876 I was called to see this child in convulsions. It had previous to this day always been in fair health, but a few hours after getting a small quantity of salmon it took well-marked convulsions. The child had turning up of the eye-balls, and clonic movements of the limbs; its face was pale, head which was rather large, tense and hot with full fontanelle; pulse rapid and full; skin of body hot; there was sickness but nothing vomited; bowels regular; tongue foul; no teeth were making the gums irritable. It was put into a hot bath, the back of its head poulticed, and got a mixture containing Senna & Nitrous Ether, followed by grey powders. Next day it was much better being quite free from convulsions, and the feverish and other bad symptoms absent; three days after it was quite well, and remained so.

Case XXV. Ulceration of Scrotum & mates.

Mrs Henderson's infant. Æt. 2 mos. July 1876. It was noticed a few days after the birth of this infant that the scrotum was tender, rather swollen and inflamed-looking; its water was not passed as freely as it ought to have been, and the child was in a feverish condition; the skin of the scrotum became moist and eczematous looking. The parts were well covered with fullers earth, and the bowels moved by fluid magnesia. Ut

the end of eight days the skin of the scrotum and penis was much excoriated, the testicles also were much swollen and the whole of these parts looked highly irritable. Lin. Calcis was now applied. Micturition became more and more difficult; the child seemed now utterly prostrate, and was semi-comatose at times, while when conscious suffered great pain from the diseased parts; the pupils were contracted; fontanelle depressed; and pulse very feeble. In this condition it died on the eleventh day of the illness, being in pretty strong convulsions the greater part of the last two days.

Case XXVI. Gastric disorder.

Mr Postlethwaite's child. M. 3yrs.. June 1846. A little boy who had never been a strong child, and had had convulsions before. This time his convulsions seemed to have been brought on by eating unripe gooseberries. He was in convulsions when I was called to see him on the evening of Sunday the 4th of June. The convulsions were not of a violent nature, though they had been so before my arrival. He had fixed upturned eyes, and convulsed mouth; his face was hot and red; pupils dilated; head, which was unnaturally large, was hot, and the anterior fontanelle remarkably full and tense; the skin all over the body was hot, and the child's pulse very rapid and full; the motions were excessively foul-smelling, and consisted of green slimy matter; the tongue was coated with a thick white-yellow fur. The child was put into a hot bath up to the axillae for ten minutes; a full strength mustard poultice was put to the back of his head; he got a mixture containing the Sulphate and Carbonate of Magnesia; and grey powders. Next day the convulsive symptoms had quite disappeared, and the bowels had been freely moved; but the child was exceedingly irritable when disturbed, and the pulse still about 130. On the fourth day he was much improved in most respects, though still irritable; his motions were now not odorously so offensive, and seemed natural in consistence. On the eighth day the child was pretty well, and at the end of two weeks in his usual state of health.

Case XXVII. Fright.

Mr Postlethwaite's child. F. 4½ yrs.. June 1846. This little girl was sister to the preceding child (case 26). The day after her brother's illness she took convulsions, having been much frightened by a drunken man who had come into her father's farm-house. The convulsions had ceased when I got there, and she was in a state of coma. Her face was fully, pulse quick and small, eyes dull, pupils and fontanelle natural, bowels loose and motions offensive; the skin of the body and feet was lower in temperature than natural. The child's feet were bathed in hot water; it got grey powder, and a rhubarb and chalk mixture; and brandy in milk. It took some days to rally, but gradually got better, and at the end of ten days was quite well.

Case XXVIII. Fall.

Mrs Cheeseman's child. F. 2yrs.. July 1846. This child, which had previously been healthy, fell off a chair, and its occiput came into sharp contact with the ground. At the time was rendered insensible, during the first twenty-four hours it was in a partially comatose state. Next day it went into convulsions, though not of a violent type; the face was flushed and motionless, except that the eye-balls were upturned occasionally; the pulse was quick and rather full; and the child was

sill; the head seemed painful and the limbs were moved convulsively. It was put in a hot bath up to the waist when the convulsive symptoms first shewed themselves; its head was poulticed behind, partly to relieve the pain, and partly as a derivative; it got a calomel and scammony powder, followed by a Sulphate of Magnesia and Senna mixture. The next morning we were told that the child was almost recovered, and did not require visiting.

Case XXIX. Inanition.

Mrs Brown's infant. M. 14 days. July 1846. This was a twin child and was much the larger of the two at birth and for a few days after it. But on the 12th day it stopped taking the breast, and would take nothing whatever; in two days it became remarkably small and puny-looking, the bones of the head fell in, the face became much less, and pale still and cold; eyes closed, body, except when the fingers toes and limbs were twitched convulsively, was quite motionless, and the general surface of the body was cold; altogether the infant looked as if it would die of inanition. Its feet were bathed in hot water, and it got mj doses of brandy in milk occasionally; no drugs were given. In three or four days the infant seemed rallying, took to the breast occasionally, and was warmer throughout the body; at the end of the second week of its illness it was much improved, considerably larger, head pretty full, took to the breast well, and was lively. At the end of the fifth week from birth it was in perfect health and rather a fine-looking infant.

Case XXX. Inanition.

Mrs Nicol's infant. F. 3 wks. August 1846. I was called in to see this child one afternoon in the beginning of August 1846. The infant had had convulsions in the morning. When I got there the convulsions had ceased, and it was perfectly still; it was very small in bulk though of average length, was quite motionless with eyes closed, face cold, bones of head collapsed-looking, and fontanelle depressed; the feet were cold, and pulse feeble; bowels quite regular and motions natural. I gave it a mixture containing m½ doses of Sp. Am. Aromat. & Tr Hyoscyami, ordered it mj of brandy every ½ hour, and the feet to be bathed in hot water. Next day when I saw it the infant was almost well, and on the following day quite so, and took to the breast as well as it used to do. This infant was a twin, and its twin brother died when a day old, in convulsions, being extremely feeble when born.

I was again called in to see this infant on the 29th of August 1846. It had taken convulsions two days previously but the mother had not sent then. It was almost lifeless, the whole of the body, limbs & face being cold, hands and feet livid, pulse imperceptible, and the only sign of life was an occasional faint respiratory gasp. It was treated the same as before, but died in the evening.

Case XXXI. Vaccination.

Mrs Sweeney's infant. F. 3½ mos. Octr 1846. This child had been vaccinated on the 12th Sept, being apparently a healthy child. The arm after the vaccination became considerably inflamed and this condition gradually extended until the whole arm from the elbow to the shoulder was affected. The child at the same time became very cross and feverish, and on the 4th of Octr took convulsions of a violent kind; its face neck and chest were swollen and red through the violent efforts of crying and the convulsions combined; the head was hot and the anterior fontanelle very prominent

j

and full; the eyes were upturned and congested and mouth tightly compressed; the arms and body were slightly convulsively, though the legs and feet were not at all affected. The skin was very hot, pulse very quick, bowels rather confined and motion natural in color but offensive; tongue pretty clean, and not any sickness. I gave the child gr 8 doses of Rochelle salt every four hours, combined with a sweet solution of senna; got it put in a hot bath up to the navel for five minutes, and a poultice of linseed meal put to the back of its head and neck. The next day the child was very prostrate having been much worse during the night with strong convulsions, and it died on the 5th Oct. at 4 p.m. The atmosphere of the room in which this child lived was very impure, due to a want of proper ventilation and cleanliness combined.

Case XXXII. Worms.

Mrs Wilkinson's child. F. 3 yrs 5 mos. Oct 18/6. I had been attending and treating this child for worms for a fortnight, she having passed both lumbrici. Her feverish symptoms in connection with the worms gradually increased. By the 31st Oct. she was highly fevered with congested head, enormously dilated pupils, upturned eyes, pale countenance, cold extremities, and a rather weak pulse of 116; on this day well-marked convulsions set in. These convulsions were peculiarly characterized by an almost rotatory movement in both arms and wrists, due to extreme pronation. She could swallow nothing but bran-dy in milk and water. The great congestion of the head not being relieved by mustard poultices and a partial hot bath I on the 5th Nov. blistered a part of the back of her head and neck with Emp. Cantharidis and the next morning she seemed much relieved in every respect, and even tattled and laughed a little. But on the second day after her temporary improvement she died, being strongly convulsed the last twenty four hours of life.

The mother of this child was a healthy woman, but the father had died six weeks before in advanced phthisis pulmonalis.

Case XXXIII. Hemiplegia.

Mrs Carradice's child. F. 2 yrs, 2½ mos. Nov 7/6. I first saw this child on the 31st Oct 1866. She had been paralyzed all down the left side since she was six months old, at which time she took convulsions while cutting her first teeth. She had never had any renewal of the convulsions since then until now, having on the contrary through hemiplegic been a lively and rather precocious child. Her face was not affected by the hemiplegia. From what I could make out her stools and urine did not appear to have been passed involuntarily. When I saw her on the day above-mentioned she had slight convulsive seizures; the pulse was weak, face dull and pale, eyes dull and pupils contracted, skin of body and extremities lower in temperature than normal, fontanelle markedly depressed; and the child was very irritable on even the slightest examination or meddling, although she did not appear to suffer any pain either in the spine or head. Her bowels were rather costive so I gave her grey powders which at first seemed to relieve her, she also got a saline laxative during the day. By the 11th Nov. she was excessively prostrate, hardly taking nutriment even by drops; at this time her eye-balls were much congested, and the pupils not contracted as before. She died on

the morning of the 12th, being in a semi-comatose state the last twelve hours of life.
There was nothing apparent in the family history of interest as throwing light on this case.

Case XXXIV. Inanition.

Mrs Prider's infant. F. 11 mos. Nov 1876.
This child was extremely emaciated and small, and although 11 months old did not look larger than an ordinary infant of two months. It had not cut any of its teeth and there were no signs of the near approach of any of them to the gum. Its mother thinking its lungs were affected came for advice; but the cough really proved to be cerebral, being one among other head symptoms. The child's head was remarkably soft with very large fontanelles and gaping sutures. Pulse very feeble; bowels rather loose and motions green and offensive; tongue pretty clean; skin dry and muddy-looking; no sickness; the infant's belly was painful on examination and swollen; respiration natural but weak; feet and hands cold and almost purple at times; the infant did not cry and her condition seemed more marked by apathy than anything else. It had been brought up by the breast, and at this time took to it occasionally at first, but latterly refused it, so it got brandy in milk and water and some gruel in drops. The treatment adopted seemed at first as if going to do good. Though no teeth were near the surface of the gum yet as rubbing the gums gave much ease I cut the gums over the lower incisors; I gave her grey powders with rhubarb; and a mixture containing m i doses of Sp. Am. Aromat. and m ½ of Tr. Opii in Aqua Anethi; her feet were bathed in hot water, thoroughly dried and wrapped in warm flannel. She seemed after this decidedly easier for a day or two, but they gradually worsened, and died on 26th Nov in strong convulsions.

Case XXXV. Epilepsy.

Mrs Hayhurst's inf. M. 9½ mth. — 8 mos. Nov 1876 till May 1877.
This infant, which was brought up by the bottle, was first affected with convulsions at the age of 9½ weeks, on the 28th Nov 1876. They were sthenic in their nature and very violent. They were treated with marked success. It again had very violent convulsions on the 1st of Feb 1877. On neither of these occasions could any cause be assigned. The infant was affected a third time with very violent convulsions on the 18th of Feb and this time they showed remarkably distinctive symptoms of being epileptic in character. It was observed that immediately preceding this third attack the child foamed at the mouth; the attack began in the right leg which was violently flexed and shaken, then the right arm was affected, the thumb of the right hand being tightly clenched on the palm; then up the right side of the face and down the left, the eyes being rolled and the nostrils and mouth contorted; then the convulsions passed down the left arm and left leg, but these limbs were only slightly affected as compared with the right side. In addition to poulticing, bathing, &c, I gave the child gr i doses of Bromide of Potassium three times a day and when this was stopped it was noticed that the child's fits occurred very much more frequently than before; the dose required to be eventually increased to three grains three times a day.
This was a well-grown stout healthy looking infant. It had once had a sister which had died in convulsions, and another sister now quite strong had had convulsions when an infant. The father and mother were healthy and strong.

Case XXXVI. Scarlet-fever rash.

Mrs Swainson's child. F. 3 yrs, 1 5 mos. Dec 1876.
This was a case in which a child took convulsions

as a scarlet fever rash was coming to its height, the rash first appeared on the 19th Decr, and the child took convulsions on the 20th. For about an hour before the fit the child's eyes were observed to be turned up, then they became fixed and staring, and the child became unconscious and struggled convulsively with its limbs. Its head was congested, pupils dilated, and pulse full quick and strong. The child had vomited on the day previous to taking the fit; its bowels had not been moved for two days. It was put into a hot bath; had a meal poultice with some mustard in it put on the back of its head and neck, and its bowels were well moved with a sweet solution of senna. It made a good recovery. The occurrence of the convulsions did not seem to deleteriously affect the child. It subsequently had a considerable degree of albuminuria and general anasarca, from which it made an excellent recovery under appropriate treatment.

Case XXXVII. Exhaustion from Diarrhoea.

Mr Braithwaite's infant. F. 8 mths. Feby 1877.

This child took convulsions on the 16th of Feby 1877, being at the time in a state of extreme exhaustion from diarrhoea. It had just recovered from scarlet fever, the rash of the fever having appeared six weeks previous to this attack of diarrhoea. [illegible] the child had got cold, which affected the mucous membrane of its intestines. The nurse had allowed the diarrhoea to run on to the third day before sending for medical aid. The child, previously plump and healthy-looking all through the course of the fever, was, on the third day of the diarrhoea when I first saw it, extremely emaciated, the bones of the head collapsed with markedly sunk in fontanelle, eyes dull and covered with a film, pulse almost imperceptible at the wrists on the third day of the diarrhoea, and quite so on the fourth, but the extremities were not cold. The condition gradually worsened and on the fifth day the infant took well-marked convulsions with upturned fixed eyes, convulsive movements of the arms and legs, and short spasmodic respiration; it died on this day. Medicines, milk, and whatever was given to this infant, came through it just as they were given.

Case XXXVIII. Inanition.

Mrs Marks' infant. F. 9 mos. March 1877.

This child was small for its age and very emaciated; its face was pale; eyes dull and heavy-looking with dilated pupils; head hot and fontanelle rather depressed; it turned up and rolled its eyes constantly. It was not at first violently convulsed but had turning in of the thumbs into the palms of the hands where they remained tightly clenched, and the large toe of each foot was turned outwards and upwards from the rest. However in the evening it had strong convulsions affecting the whole body. The surface of the body was dry and hot; pulse 160 and feeble; respiration 82 per minute and breathing natural; tongue coated with a white fur; bowels rather loose and motions foul-smelling, dark, and liquid. It was bathed up to the waist in hot water, a mustard and linseed meal poultice put to the back of its head, and minute doses of Tr. Opii given; a course of treatment which had, four months before, when the child was in a similar condition, much benefitted it. But all remedial efforts this time proved useless for the child died the next day. The mother of this infant had originally twelve children, of whom six had died at or before the age of two years, and all of them in convulsions. She herself was strong and healthy, and the father seemed the same, but the latter was a very heavy and constant drinker. The atmosphere of the room was always very impure, apparently from too many being in it.