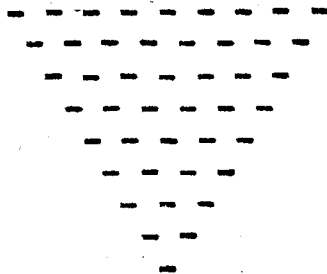


'CASES OF CEREBRAL IRRITATION
IN CHILDREN.'

By

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In the past year I had the opportunity of seeing a series of cases in childhood characterized by a meningeal symptom group complex, which I considered would be justifiable of publication, especially, on account of the large amount of interest that has arisen in the past few years in connection with encephalitis lethargica and more recently with epidemic encephalitis in children.

A comparison of the cases with encephalitis on the one hand, and meningitis on the other, might be of some value in a consideration, especially, of their etiology and pathology.

Before describing the cases, which I wish to put on record for the purpose of contrast, I have selected a case which presented the features of an Encephalitis Lethargica, and one of Tuberculous Meningitis, both of which came under my observation during the same period.

(1) Case of Encephalitis Lethargica in a Child.

M.R., a girl, aet. $7\frac{6}{12}$ years, admitted on 19th July, 1920, on account of marked somnolence and myoclonic contractions of three weeks duration.

There was nothing worthy of note in relation to birth, the delivery having been natural and without complication. The development, mental and physical, was/

was uneventful, though she did not make much progress at school, and was always very nervous.

In November, 1917, during the influenzal epidemic she had an attack of influenza followed by loss of power of lower limbs. As far as could be ascertained she did not regain the power of them for four months.

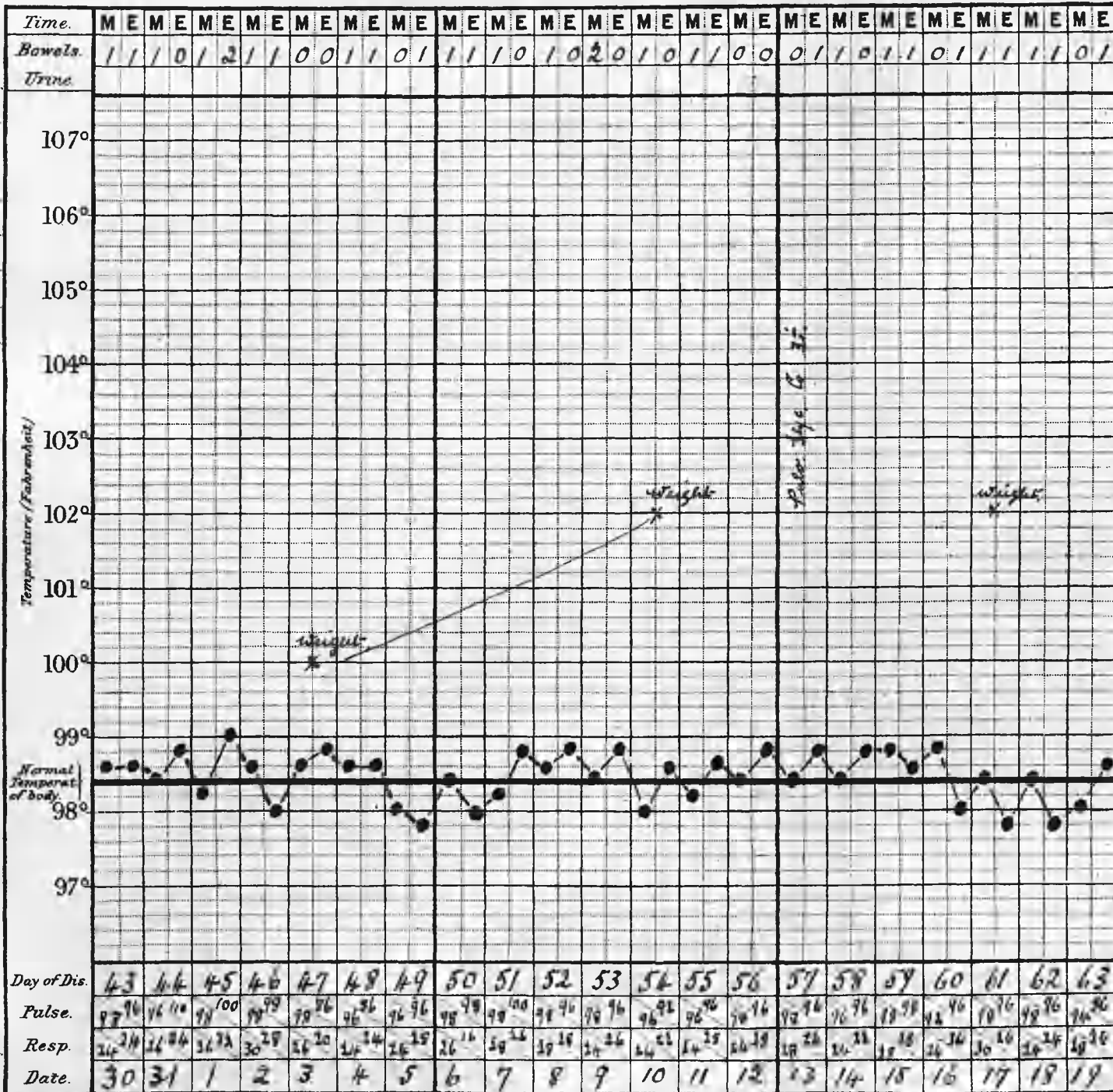
The family history contained little of note, the mother having enjoyed good health till her death from influenzal pneumonia in 1918, while the father at the time of her admission was in good health. There was another child who was well. There had been no mis-carriage, nor was there any evidence of specific disease in the family. The only nervous history obtained was that an aunt was in an asylum. The true facts of this illness were not obtained.

On July, 1st 1920, while in the garden, she complained of sudden pain over the top and sides of the head, and found that she could no longer lift the objects with which she had been playing. Several hours after being put to bed convulsive jerkings of arms and legs set in, unaccompanied by loss of consciousness. This state lasted till July 14th, sometimes more marked, sometimes less so. On July 6th, she had difficulty/

In page 3.
(u).

THE MEDICAL SUPPLY ASSOCIATION.

DISEASE.



Date of admission.
19th July 1920

result Better.

Entered Hospital 1920.

Printed and Published by W. & A. GUY, 14, Gate Street, Kingsway, W.C. 2

September 1920.

September 1920.

difficulty in swallowing and lost the power of speech, regaining it again on July 14th, when it again suddenly developed.

On admission, 19th July 1920, she was pale and poorly nourished, and was in a stuporous condition, lying quietly with a vacant stare, while from time to time she put her hands, with difficulty, to her head as if indicative of pain. She could not talk or help herself in any way though it was apparent, if a loud tone were used, that she could understand to a certain degree what was said. There was no vomiting, but she was markedly constipated and urine was passed in bed. There was no nystagmus, while the pupils were equal and reacted to light. There was marked stiffness of the cervical muscles with slight retraction of the head; a degree of rigidity of the muscles of the lower limbs was present and the arms were held flexed. The muscles showed continuous twitchings. The knee jerks, arm reflexes, and abdominal reflexes were all increased. The foot reflexes were flexor, ankle clonus was absent, while Kernig's sign was marked. On stimulation of the spinal muscles a condition resembling opisthotonus was produced. The sensory sensations were not affected, protopathic at any time. Epicritic sensations, tested later/

later when she could respond, were found unaffected. Examination of various organs revealed nothing worthy of note. The bladder was distended and the catheter had to be passed on one occasion shortly after admission. The pulse was irregular in force and rhythm.

Fundi. White discs but not considered pathological.

Blood. Negative to Wassermann reaction.

Blood film. Nothing abnormal to be seen on film examination.

Von Pirquet. Reaction negative.

Lumbar Puncture. The fluid, drawn off under slightly increased pressure, was clear, and no clot formed on standing. To bacteriological examination it was negative, while sugar reducing substances were present. There was no excess of globulin and the cells were within normal limits.

Several days after admission she awakened somewhat and said a few indistinct words, while about ten days later she spoke more clearly, laughed hysterically and asked for food. As there was marked difficulty in swallowing, it had to be given in the form of slops. The tremors were still marked, the limbs were very stiff, while the reflexes remained much the same with a tendency to increase on the left side.

Three weeks later she could talk, while the difficulty in/

in swallowing had disappeared. The reflexes remained the same, but the tendency to twitching had gone.

She ultimately, six weeks after admission, improved considerably in general health, took her food well, was able to stand and walk, but the latter however, with difficulty, and accompanied by some spasticity. The knee reflexes were not now increased.

The slight spasticity remained till she was discharged three months after admission, but on being seen one month later she was walking well and there were no sequelae.

(11) Case of Tuberculous Meningitis.

S.M., a girl, aet. $2\frac{1}{2}$ years, admitted on 19th August, 1920, on account of a semi-comatose condition of several days duration.

The family history showed evidence of tuberculosis on the father's side.

The child had had whooping cough six weeks before onset of present trouble, previous to which there had been no illness.

Enquiry elicited the fact that the present condition began a week before admission, with vomiting, lethargy, feverishness and, apparently, abdominal pain, while later constipation developed. The lethargy became gradually more/

DISEASE.

Time.	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E
Bowels.	0	2																		
Urine.																				
Temperature (Fahrenheit)																				
Day of Dis.	1	2																		
Pulse.	140	156																		
Resp.	40	45																		
Date.																				

Notes of Case.

Time } 8 M.
 a girl.
 70 } 2 1/2 years
 et } gland.
 use Book N°

Temperature (Fahrenheit)

Case 244-1010

Number 1010
Case of 5-10-10

Normal Temperature of body

Chart No 2.

Date of admission. Sept. 19th 1920

Result Died

more marked, and passed into a semi-comatose condition, and the urine was passed involuntarily.

On admission, the child was semi-comatose, lying quietly with eyes open, pupils dilated, fixed and unequal, without, however, any strabismus or nystagmus, while hyperaesthesia was marked. She was fairly well nourished and did not show any undue restlessness or irritability. She had a markedly toxic appearance, while the breathing was rapid, shallow and quiet; the pulse was rapid and irregular. The right arm was stiff, the abdomen retracted. There was an absence of increase of reflexes, the abdominal being absent, and the head and back could be moved passively and showed no extension. Kernig's sign was absent.

Chest. Slight relative dulness was present over right posterior aspect. No adventitious sounds were present.

Abdomen. A few small masses were palpable in left iliac region.

Throat Swab was negative to examination.

Lumbar puncture. The fluid was clear, under no increase of pressure, and contained numerous lymphocytes and a few tubercle bacilli. Sugar reducing substances were not increased. Culture was sterile.

The/

The day after admission the child had a generalised convulsion with twitching, chiefly affecting right arm and leg. The stiffness of right arm disappeared, and was replaced by marked hypotonus of arm and leg muscles. The same evening child died in a convulsion.

A post-mortem examination was refused.

Cases presenting a symptom complex which has received, by various writers, the term 'Meningismus'.

Definition.

The term Meningismus indicates a meningeal symptom group complex, the result of irritation of the neuro-muscular mechanism, without the production of any localising symptoms, due to the toxic products from a focus of infection in some part of the body, or to reflex action, and which is characterised by a cerebro-spinal fluid, either under ordinary or increased pressure, and showing no departure from normal on cytological, chemical, or cultural examination.

It is stated that it may occur in association with the following conditions:-

- (1) Teething.
- (2) Worms.
- (3) Gastro-intestinal disorders.
- (4) Middle ear affections.
- (5) Pneumonia.
- (6) Exanthemata.
- (7) Acute cervical adenitis.
- (8) Peritonsillar infection.
- (9) Operations on cranium and venous sinuses.

The/

The Use and Value of the term.

The term meningism is used, not to denote a disease, but merely a clinical entity, symptomatic of some causal focus in the body, acting either through the medium of its toxic products, or by setting up a reflex action.

Several terms have been used to denote conditions, giving rise to meningeal symptoms, which do not show symptoms of typical meningitis. Sevestre¹, in 1890, wrote of cases of grippe giving rise to meningeal symptoms, and called it grippal pseudo-meningitis. Pissavy², 1903, spoke of three types of meningeal symptoms accompanying grippe: (1) Congestive, or cases in which patient recovers quickly, (2) Serous, or cases with increased fluid, (3) suppurative, or cases produced by suppurative organisms.

Dupré³ in 1894, included under the term meningism those meningeal symptoms and such drowsy states as had been noted by Zueller⁴ during an influenzal epidemic in 1712, and which had been again referred to in the epidemic that swept over Europe in 1889 - 90 and again in 1893-94.

The application of the term by Dupré³ merely indicated a clinical entity and many cases so included may have been true cases of meningitis, but with the advent of lumbar puncture, with cultural, chemical and microscopical examination/

examination of the cerebro-spinal fluid, the conception of meningism has changed, and the term became exclusively applied to cases which showed signs of meningeal irritation in association with a cerebro-spinal fluid sterile, and normal as to its cells and chemical contents. Hence the group combining meningismus could, in the great majority of cases, be definitely distinguished from cases of true meningitis.

Even yet there is, apparently, some difference of opinion as regards the nomenclature, some using pseudo-meningitis, serous meningitis, meningitis sine meningitide, or meningitis infectosa circumscripta to denote the same condition. This latter, however, denotes a definitely known pathological lesion and hence is applied to a condition outside the group of true meningism.

In view of the recent work done on encephalitis, where the cerebro-spinal fluid may be found normal in ~~in~~ a condition characterised by manifold and diverse symptoms, the value of the term meningism may be doubted. In association, however, with the transitory nature of the symptoms, their confinement to the neuromuscular mechanism without any localising signs, and the/

the presence of a bodily focus presumably causal, the term would appear to be worthy of consideration as indicating a condition quite distinct from encephalitis or meningitis, while previous post-mortem examinations in such cases were associated with negative results.

CASE HISTORIES.

Case 1. - A.H.H., a boy, aet. $1\frac{11}{12}$ year, admitted on 15th July, 1920, as a suspected case of tuberculous meningitis.

There was nothing to note in relation to birth. He was a full time child and the delivery was natural. He was, however, a very weakly child and through time showed a degree of backwardness associated with late teething, and at the time of his admission he had not begun to talk, walk, support head, or seize objects, though he was taking notice. There had been no convulsions. He had no otorrhoea and had none of the exanthemata.

The mother and father had good health, and so also the other child of the family. There was no history of tuberculous trouble on either side.

On admission the child was poorly nourished, the skin dry and hanging in folds. The facies were suggestive of adenoids, while the skeleton showed slight rhachitic/

rhachitic changes. There was present a certain stuporous state, slight stiffness of neck, and a degree of rigidity in arms and legs; the latter were more markedly affected and somewhat flexed. The knee jerks were markedly increased. Kernig's sign was present but not marked. The foot reflexes were plantar. There was no ankle clonus. The eyes presented no change.

There was considerable pain on handling, much more than could be accounted for by the degree of rickets present.

Physical examination of chest and abdomen revealed nothing worthy of note.

Lumbar puncture. The fluid was clear, under some pressure, presented no increased number of cells, reduced Fehling's, and showed normal amount of globulin, and culturally ~~was~~ negative.

On third day after admission the child became very acutely ill, with marked pallor, pinched features, and had a temperature of 103°F. He became semi-comatose with increase of the existing stiffness of neck, amounting almost to rigidity, while the rigidity of the lower limbs became very marked. There was retraction of the abdomen, and Kernig's sign was marked. The pupils were dilated, equal, and reacted to light. The temperature/

temperature remained high and reached 104.8°F before death, on third day after admission.

Post Mortem. The meninges showed no signs of thickening or inflammation, while there was an absence of oedema of brain, and nothing to be noted macroscopically in lateral ventricles, pons or medulla.

In chest a portion of upper left pleura was adherent. The other organs presented no abnormality to naked eye examination.

Case 2. - E.B., a girl, aet. $1\frac{2}{12}$ year, admitted on account of screaming fits and extension of head.

The birth was natural and at full term. She was fed from the beginning on a questionable patent food, and was receiving twelve ounce feeds three hourly at the time of admission. At no time had there been any trouble with bowels nor had the child vomited. There had been no convulsions up to a period of ten days before admission. When the child did not appear satisfied with her food she began to scream, throw her head to and fro, and apply her hands to the head as if suffering pain. There was also a noticeable throwing back of head, from time to time, as if it were retracted. The limbs moved freely, the bowels were open, and urine was passed normally.

One other child of the family had died of meningitis. There was no history of tuberculous trouble on either side.

On admission the child showed a marked waxy pallor with some puffiness and dark colouring below the eyes, and emitted an unnatural, hard, temperamental cry. She was well nourished, but showed a degree of backwardness in so far as she had not tried to walk or talk, and did not take the usual notice shown by even a sick baby. There were no skeletal changes present, but slight oedema of the lower limbs was noted.

Examination revealed a slight stiffness of neck and considerable resistance to passive flexion of the head and back. The knee jerks were sluggish; the foot reflexes were plantar.

On the evening of the day of admission there developed a suspicious area of dulness over the left lung posteriorly. It was indefinite and deep seated, but became marked later. The pulse was irregular in force and rhythm. With the development of the pneumonia the nervous signs became very much more prominent, and before her death, which occurred on the fourth day after admission, there was definite retraction of the head and marked rigidity of arms and/

and legs, while the cry became definitely cephalic. No nystagmus or **squint** were present. The pupils were equal and active.

Post Mortem. There was no thickening or congestion of the meninges, no oedema of brain or distension of the ventricles.

Chest. Red hepatization of left lower lobe was found. The upper lobe of left side, the lower portion of middle, and upper lobe of right side, were markedly congested and beginning to undergo the change of red hepatization.

Case 3. - W.R.J., a boy, aet. 5 years, admitted on 4th May, 1920, as a case of tuberculous meningitis.

The early history revealed nothing worthy of note, the labour having been at full time and without complication, and the development, mental and physical, was uneventful.

The family history was good, the other children and the parents were well, while no tuberculous record on either side could be elicited. There had been no miscarriage, but one child was stillborn.

The child had been well up to a period six days previous to his admission, when he vomited, began to scream, as if in pain, developed a cough, and his parents noticed a marked physical change in that he was becoming/

THE MEDICAL SUPPLY ASSOCIATION.

DISEASE.

Time.	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E
Bowels.	0	0	1	0	1	0	0	1	0	0	1	0	0	1	0					
Urine.																				
Temperature (Fahrenheit)																				
Day of Dis	1	2	3	4	5	6	7	8	9											
Pulse.	114	112	138	118	116	124	125	124	108	100	98	134	84							
Resp.	52	50	59	56	59	48	78	46	44	44	36	34	32	30	26	27	26			
Date.	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19				

Notes of Case.

name W.R. J.
 age 5 years.
 case Book N°

Chart N° 5.

Line of incubation
 Ad. Reaction 30.
 Incubation Period - 24h.
 Incubation Period - 24h.
 Removed from hospital.

Normal Temperature of body.

Date of admission.
 - May 4th 1910.

Result Better.

becoming thinner. His mental attitude was apathetic and drowsy.

On admission he was found to be semi-comatose, thin and pale, emitting at times a cephalic cry, while there was considerable irritability on handling. The respirations were rapid, the pulse respiration ratio disproportionate (See chart No.5.) There was a marked stiffness of the cervical muscles, slight extension of the spine, with increased knee jerks and a positive Babinski's sign. Kernig's sign was marked, and the abdomen was retracted. No strabismus was detected, while pupils were equal and reacted to light.

Examination of lungs revealed nothing abnormal.

Urine. Acetone was present. The reaction was acid, the specific gravity normal.

Lumbar puncture. No fluid could be obtained.

The boy remained in this condition during the nine days he was in hospital. He seemed to be making little improvement, and his parents decided to take him home on account of/

of his apparent hopeless state.

Recovery took place at home and we learned that about six weeks later he was able to run about, apparently quite well, and there was no development of any sequelae. He was seen by us on several occasions at a later date.

Case 4. - I.S., a girl, aet. $3\frac{5}{12}$ years, admitted on 7th May, 1920, as a case of tuberculous meningitis.

There was nothing worthy of note in the early history, the labour having been normal and at full term. She had been breast fed for one year, after which the food had been a mixed one of Allenbury's and portions of general household diet.

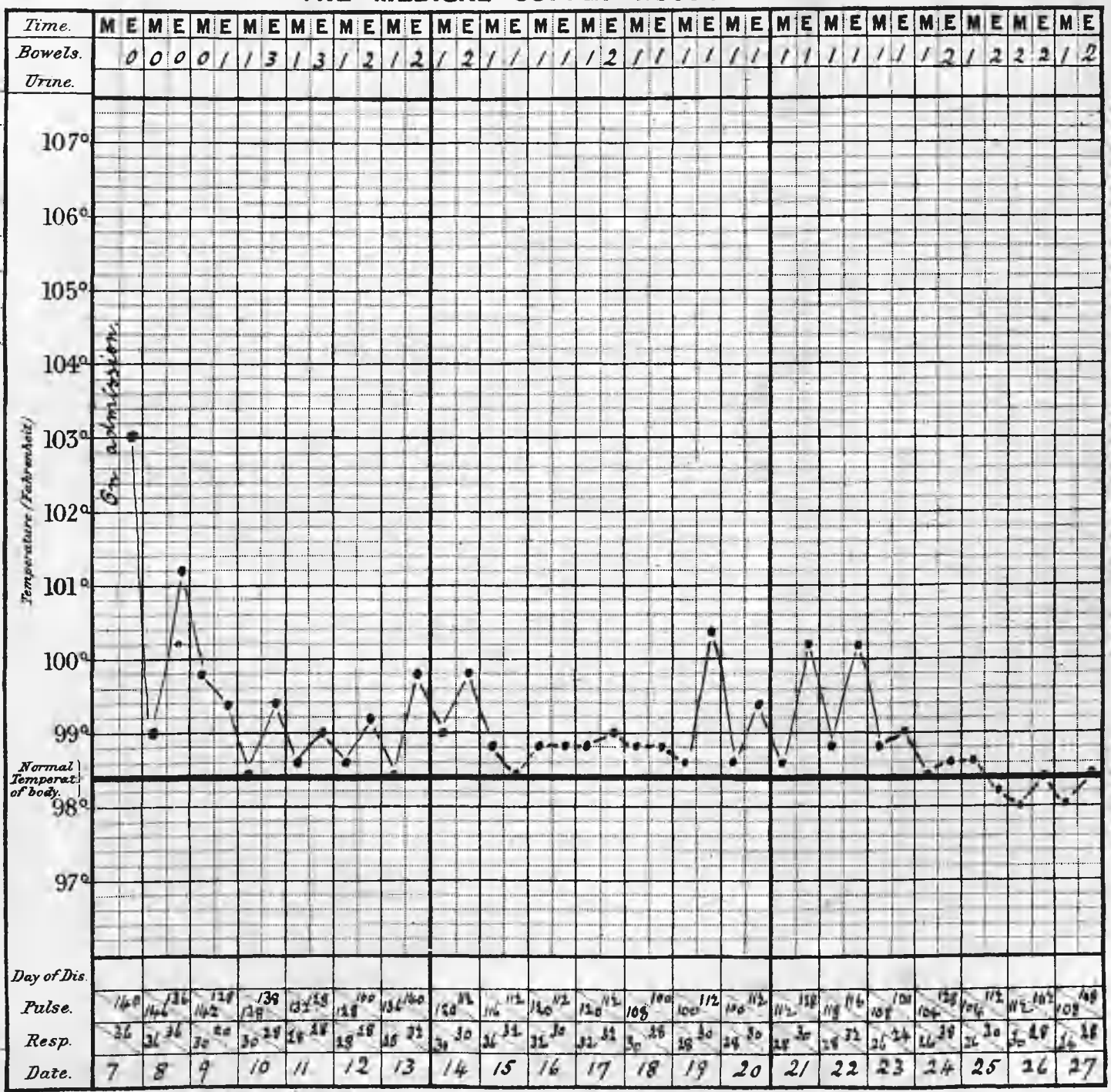
The parents and the other three children of the family were well, while there was no tuberculous or neuropathic family history. The hygienic conditions were fair.

The child took ill three weeks before admission. She screamed at nights and took but little food. During the four days previous to being brought to hospital she lay very quietly. There had been a noticeable physical change, the patient becoming thinner.

On/

THE MEDICAL SUPPLY ASSOCIATION.

DISEASE.



Notes of Case.

me } I s
 re } a girl
 it } 2 1/2 years
 se Book N°

Chart N° 6.

Date of admission.
 May 7th 1920.
 result Better.

THE MEDICAL SUPPLY ASSOCIATION.

DISEASE.

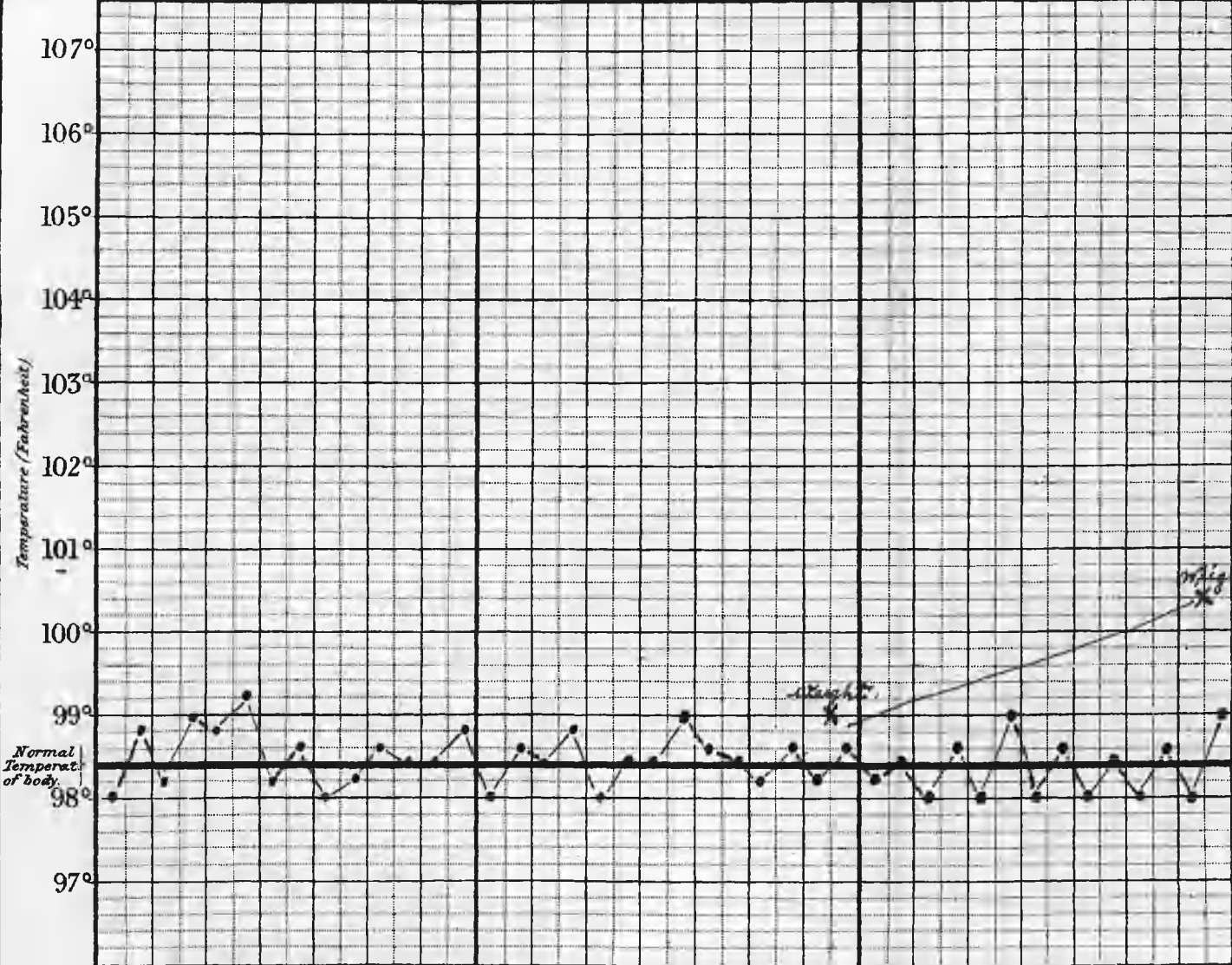
Time.	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E											
Bowels.	/	/	/	/	/	/	/	/	0	2	/	2	/	2	/	2	0	2	0	/	3	/	2	/	3	0	/	1	1	0	0	1	1
Urine.																																	

Notes of Case.

ne { I s.
a girl.
e. 2 $\frac{5}{12}$ years.
re Book No.

17 lbs. 2 ozs.

16 lbs. 8 ozs.



Day of Dis.																																		
Pulse.	100	108	104	98	116	100	104	76	76	98	98	108	112	78	112	98	98	104	98	108	76	100	98	98	100	98	100	98	100	98	100	98	100	
Resp.	26	28	24	28	26	24	28	28	30	28	28	26	24	26	24	28	26	26	28	26	26	26	26	26	26	26	26	26	26	26	26	26		
Date.	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17													

Date of admission.
May 7th 1920.
Sult Beller

THE MEDICAL SUPPLY ASSOCIATION.

DISEASE.

Time.	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E	M	E
Bowels.	0	1	0																	
Urine.																				
Notes of Case.	<p>2-5 a girl 2 5/12 years</p>																			
ne																				
e																				
Book N ^o	17 lbs. 4 ozs.																			
Temperature (Fahrenheit)																				
Temperature (Centigrade)																				
Normal Temperature of body.	98°																			
Day of Dis.																				
Pulse.	108	98	98																	
Resp.	32	30	26																	
Date.	18	19																		

Notes of Case.

ne { 2-5
a girl
2 5/12 years

Book N^o

17 lbs. 4 ozs.

Date of admission.
May 17th 1920.

result Better.

On admission she was extremely ill, semi-conscious, somewhat wasted, lying curled up in bed with stiffness of the neck muscles, a degree of rigidity of the muscles of the back, exaggerated knee jerks and a well marked Kernig's sign, while tremors of the extremities were marked. Photo-phobia was present.

Examination of the lungs revealed impaired resonance at right apex posteriorly. There was nothing else to note on physical examination.

Lumbar puncture. The fluid was clear, under increased pressure, and was negative bacteriologically; sugar reducing substances were present; there was no excess of globulin, and the cells were within normal limits.

The general condition remained unchanged for a fortnight after admission, with changing reflexes, and irregular but not high temperature. The temperature on admission was 103°F, after this never much over 100°F., and remittent for a few days when it came down to normal accompanied by a like fall in pulse and respiration (See chart No.6) From fourteenth day onward there was a gradual improvement, and by the twentieth day she was able to sit up, and the nervous symptoms had gone.

She/

She completely recovered and went home on the forty fourth day after admission without any sequelae.

Case 5. - G.W., a boy, aet. $\frac{5}{12}$ year, admitted on 17th September 1920, on account of vomiting, with relaxed and blood stained motions.

There was nothing to note in the early history, the birth having been normal, and the infant fed on the breast till three months old without any apparent disorder. Following this, glaxo had been used. During this time he had suffered from no infectious trouble or other ailment.

The family history presented nothing worthy of note. One child had died of pneumonia.

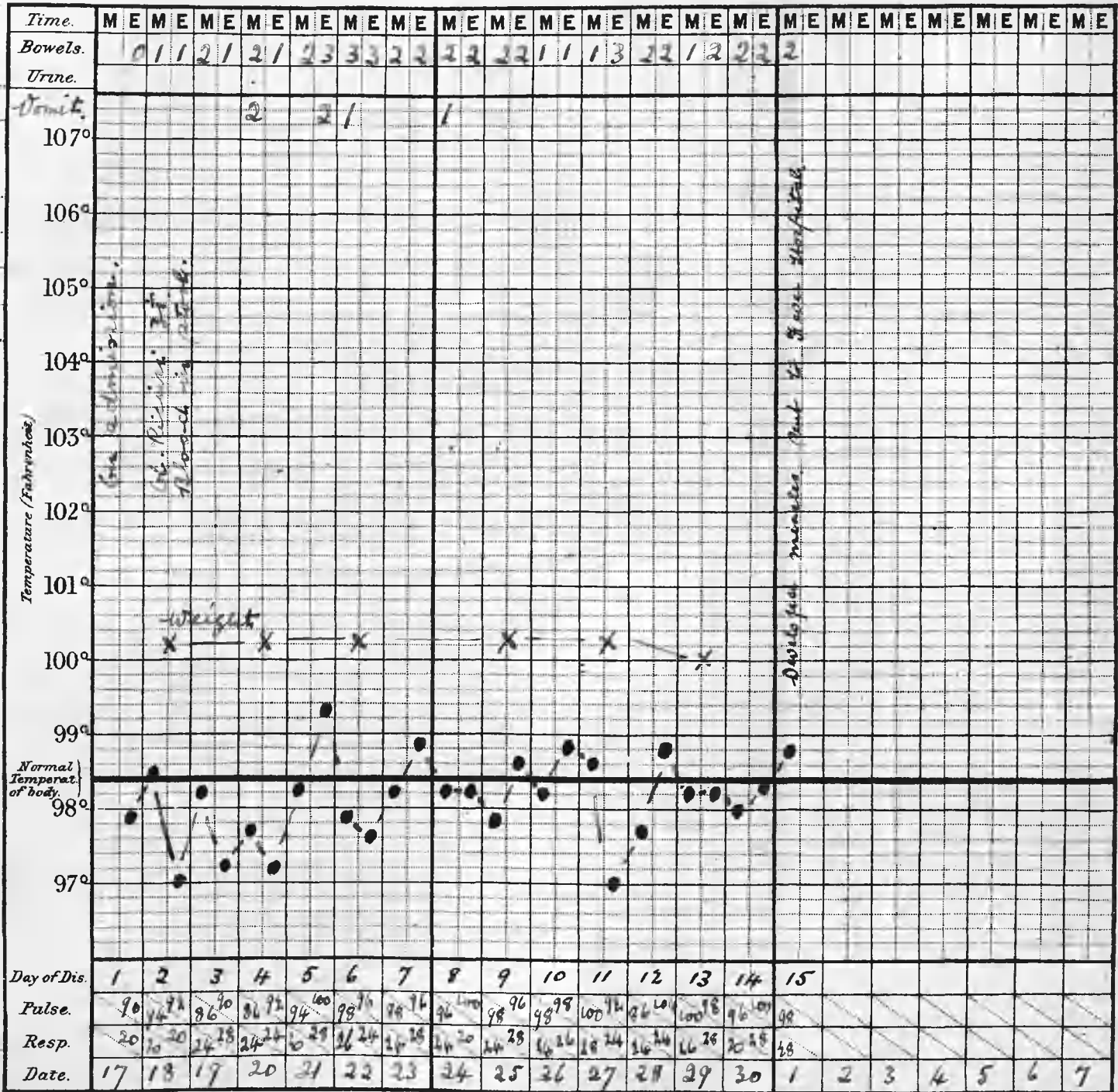
The hygienic conditions at home were, however, bad and the infant had been neglected.

The patient had shown no symptoms of disturbance till three weeks previous to admission, when he vomited after food, and the stools became relaxed, foul smelling, and occasionally streaked with blood.

On admission the infant appeared markedly toxic, pale and thin, with skin hanging in folds over thighs, and the chest was sparsely covered. The/

THE MEDICAL SUPPLY ASSOCIATION.

DISEASE.



Notes of Case.
 G. W.
 A. Loy.
 5 1/2 months.
 Book No.

Chart No 7.

Date of admission.
 Sept 17th 1920.
 sult Belter

The stools were relaxed and foul smelling. The head was markedly retracted, the back extended, while the legs were drawn up onto the abdomen, but they could be extended passively with an effort, and also the head and back, could, likewise, be flexed. The knee jerks were active; the foot reflexes were plantar. Kernig's sign was absent. Photophobia was marked.

Examination of chest revealed a few sibilant and sonorous rhonchi. The anterior fontanelle presented no change. Lumbar puncture. The fluid was clear under normal pressure; no pus cells present; no organisms seen; culture negative; no increase of globulin; the fluid was insufficient in quantity to test for reducing substances.

By the third day after admission the nervous symptoms had passed off, but the child had a peculiar cry suggestive of mental deficiency. Though the photophobia had gone, there was still a tendency to keep eyelids closed.

From this time onward there was a marked improvement in his general condition, and when discharged, on fourteenth day after admission, there had/

had been no return of the nervous signs, though child still lay with eyes closed and emitted the peculiar cry.

Note. The child developed measles in the hospital and had to be sent to the Fever Hospital, hence the reason of its dismissal at this time.

Case 6. - J.W.D., a boy, aet. $1\frac{10}{12}$ year, was admitted on 21st October 1920, on account of having 'gone off his feet', of having a tendency, periodically, to keep the head very far back, and this was accompanied by arching of the back.

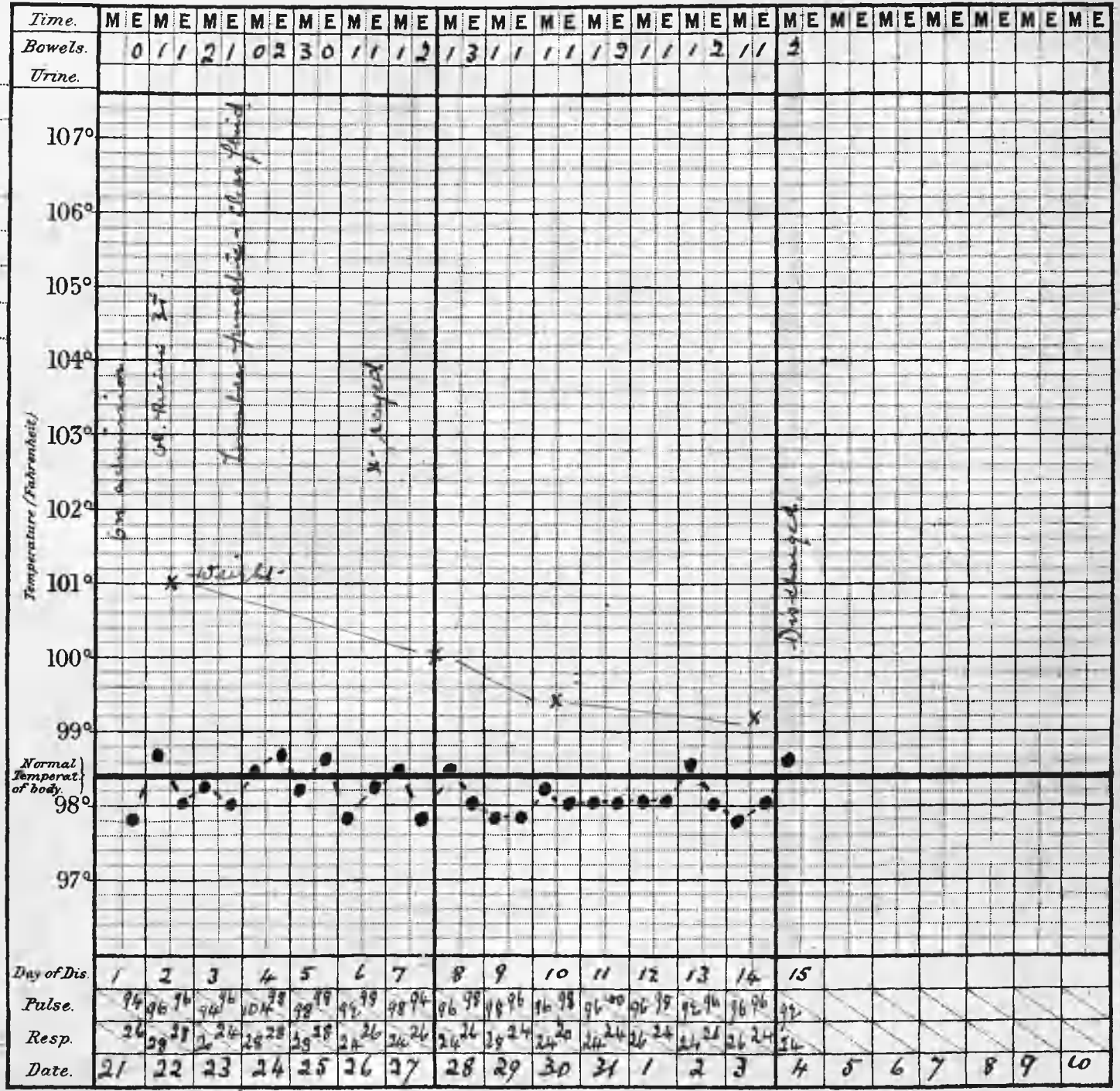
Enquiry revealed the fact that he had had diarrhoea with foul smelling stools some months before admission. There was a history of a fall several months earlier without apparent ill effect. At no time had he suffered from any infectious disease or febrile attack.

After weaning at fourteen months the diet had been unsuitable. He received the ordinary household food, and portions of meat were even included.

The family history showed that out of ten children, of whom he was the youngest, ~~these~~ had died/

THE MEDICAL SUPPLY ASSOCIATION.

DISEASE.



Notes of Case.

101
 J.W.D.
 a boy
 1 1/2 years

Book No.

Chart No. 8.

Date of admission.

Oct. 21st 1920.

Subj. Better

died of what was described as 'fits'. The Father and Mother at the time of the birth of the child had reached the respective ages of fifty one and forty one. Both, however, were well.

The onset of the trouble occurred one morning, a few days before admission, when the left leg gave way under him while he was getting out of his cot. With this sudden onset was associated a passing attack of vomiting, costiveness of the bowels, and irritability.

On being brought to hospital the child did not seem to be very ill. He was well nourished, of good colour, and had no marked signs of discomfort. The skeleton presented no changes beyond slight prominence of the frontal eminences, nor could any localised swelling or pain be elicited. The head was kept rigid and extended, the back markedly extended, and the legs were flexed on the abdomen. Kernig's sign was present. The knee jerks were sluggish, and especially so on the right side. The foot reflexes were plantar, though there was a tendency to extension of the great toes. The legs were markedly/

markedly hyperaesthetic. The abdominal reflexes were active. The eyes presented no change.

Physical examination of chest and abdomen showed no departure from normal.

Ophthalmoscopic examination showed normal fundi.

Ears. The meati contained a little wax and dried epithelial debris, but no signs of inflammation were present.

Lumbar puncture. The fluid was drawn off with difficulty, without any increase of pressure, and mixed with blood probably from puncture of a superficial vessel.

Microscopically the specimen showed:-

Red corpuscles, 60,000 per c.m.m.

White cells, 200 per c.m.m.

Proportion of polymorpho -

nuclears 40%.

The presence of inflammatory cells was excluded by an associated differential blood count, when 44% polymorpho nuclears were found, as against 40% in the fluid.

A few intracellular gram positive cocci (staphylacocci) were present, probably due to contamination. No intracellular organisms/

organisms were seen. Albumin was slightly increased, probably due to presence of blood. Globulin was normal. Reduction of Fehling's was normal.

Von Pirquet. Negative.

The child gradually improved, and by the third day after admission was sitting up, and by ninth day had none of its former symptoms beyond slight pain in the left leg. The reflexes changed slightly from time to time, the left knee jerk becoming more marked, the right sluggish, while foot reflexes became more markedly plantar with less tendency to extension of great toes. The abdominal reflexes remained active throughout. The legs could always be moved voluntarily.

The child was discharged, well, a fortnight after admission. He was seen subsequently, when he was running about, and there were no sequelae noted.

Case 7. - J.E., a boy, aet. 6 months, admitted on 1st September, 1920, as a marasmic case.

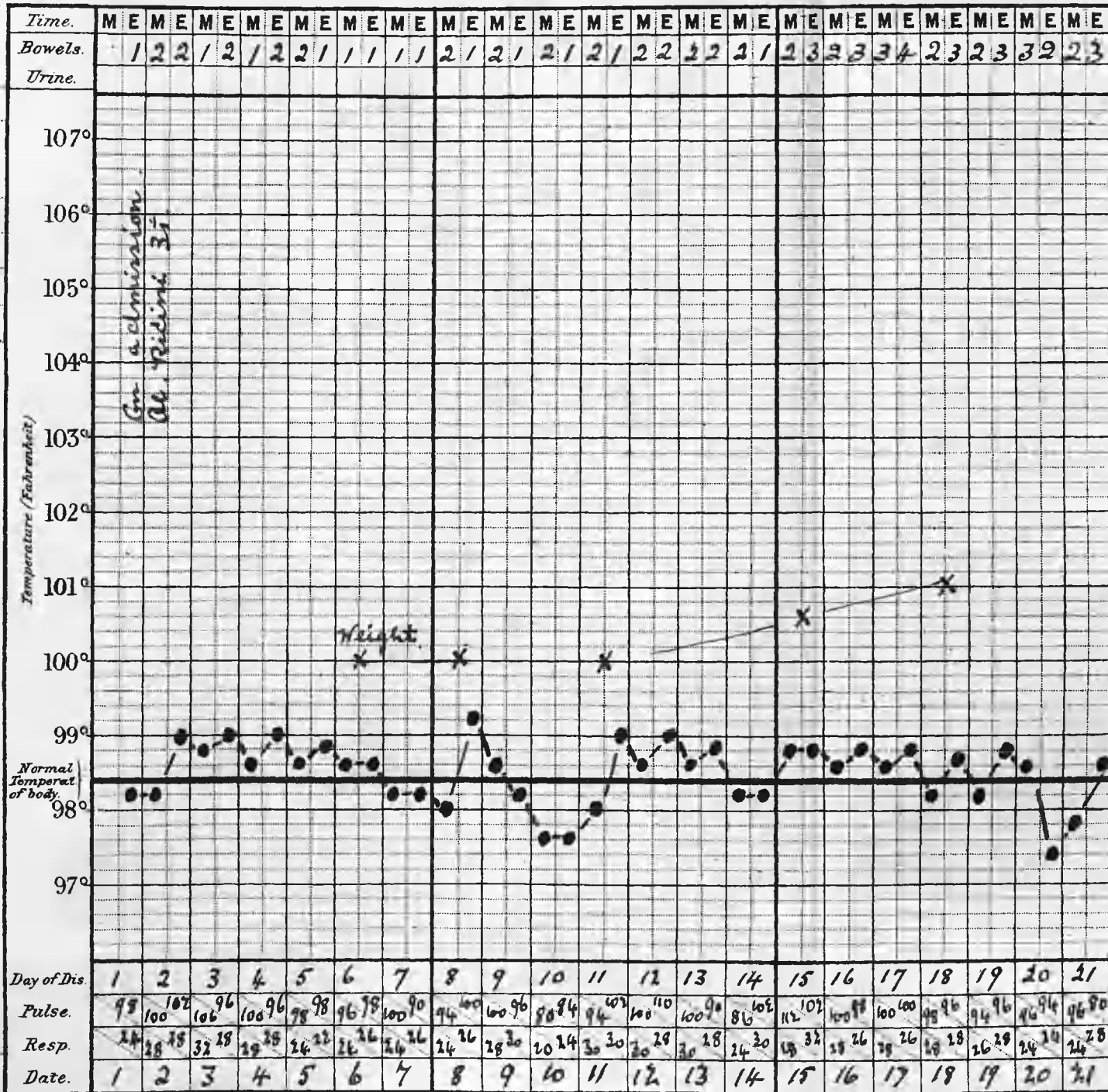
The birth was at full time without complication, while the family history presented no features worthy of note.

The child was marasmic due to irregular and imperfect feeding, with resulting vomiting and constipation.

On admission there was no sign of nervous involvement. The child at first improved on weak diet and regular feeding/

THE MEDICAL SUPPLY ASSOCIATION.

DISEASE.



Notes of Case.

Name { J. E.
 Age { a boy.
 Sex { 6 months.
 Case Book No.

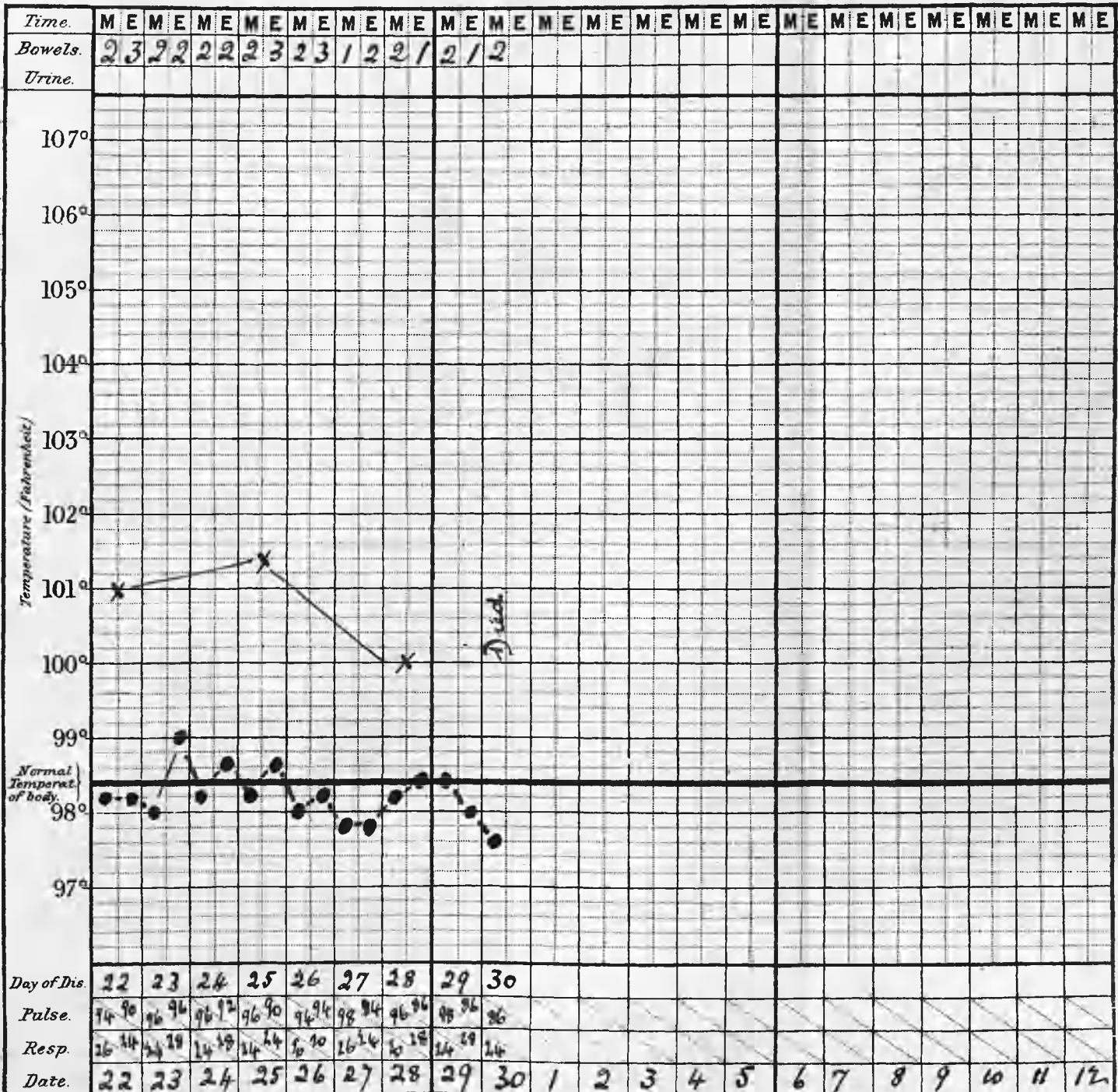
Chart No 9.

Normal Temperature of body.

Date of admission.
 1st Sept. 1920.
 Result - Died.

THE MEDICAL SUPPLY ASSOCIATION.

DISEASE.



Notes of Case.

me J. E.
a boy
6 months.

se Book N°

Date of admission.
1st Sept. 1920.

result Died.

feeding, and grey powder as an aperient. One day, the ninth after admission, with accompanying change of colour, pinching of face and distension of abdomen, he developed a slight stiffness of neck muscles with slight retraction, which passed off after a day, when food was further reduced and the abdominal trouble improved. Accompanying this retraction there was no severe symptom such as vomiting or diarrhoea.

Following the occurrence of this transitory meningeal symptom there was slight improvement with gain in weight, the bowels moving regularly and showing no signs of undigested products.

The improvement, in turn, was followed by a sudden and marked loss of weight on 28th September, and the child died, in an asthenic state, a few days later without the appearance of any further symptoms.

Table of Contrast.

The following table of contrast was drafted from the symptoms presented by the cases then under observation, when the above cases were recorded. (See over page.)

Discussion.

Granted that those cases should be regarded as falling into the group meningismus, certain points present/

ISMUS.

MENINGITIS.

ENCEPHALITIS.

udden onset.
(may be intermittent).

I. Sudden onset.

I. Sudden onset.

Cerebral symptoms.

II. Cerebral symptoms.

II. Cerebral symptoms.

• Headache.

1. -----

1. Headache.

• Vomiting, very occasionally. (more often associated with gastro intestinal disturbance.)

2. Vomiting.

2. -----

• -----

3. -----

3. Constipation.

• Temperature. (If associated with pulmonary or acute enteritic affection may be raised).

4. Rapid rise.

4. Slight & irregular.

• Pulse. No marked change. (If acute lesion present it becomes rapid).

5. Rapid and irregular.

5. Irregular.

• Convulsions. (None unless associated with acute pulmonary or other lesion).

6. Initial convulsions, or convulsions during course.

6. -----

• Mental change. No mental change usually. If pulmonary lesion may have delirium, cephalic cry, stuporous state sometimes; cephalic cry with mental maldevelopment.

7. Semi-coma, Lethargy.

7. Marked stupor. (could be roused from stupor). Vacant stare. Loss of speech. Dysphagia.

MENINGISMUS.

MENINGITIS.

ENCEPHALITIS.

I. Physical signs.

III. Physical signs.

III. Physical signs.

1. Stiffness of neck muscles.

1. -----

1. Stiffness of neck muscles.

2. Rigidity and retraction of head.

2. -----

2. Slight rigidity.

3. -----

3. -----

3. Slight opisthotonus.

4. Reflexes exaggerated.

4. Knee jerk (right side increased).

4. Reflexes increased.

5. -----

5. -----

5. Myoclonic contractions.

6. Contra-lateral reflex (occasionally).

6. -----

6. -----

7. Neck sign. (Bruzinski, indefinite).

7. -----

7. -----

8. Kernig's sign.

8. -----

8. -----

9. Babinski's sign. (usually indefinite)

9. -----

9. -----

10. Hyperaesthesia.

10. Hyperaesthesia.

10. -----

11. Pain on manipulation (occasionally).

11. Pain on manipulation.

11. -----

12. Photophobia.

12. Eyes widely open.

12. -----

13. Never any localising symptoms.

13. Localising symptoms.

13. Localising symptoms.

Cerebro-spinal fluid.

IV. Cerebro-spinal fluid.

IV. Cerebro-spinal fluid.

No change except in pressure.

Tubercle bacilli; inflammatory cells.

No change except in slight increase in pressure.

present themselves for consideration.

(a) Causation.

The causes of meningismus may be divided into (a) Exciting, - certain fairly well defined clinical entities which have been found by experience to be associated with meningism, and proved as distinct from meningitis by absence of any abnormality in cerebro-spinal fluid, negative post-mortem findings, macroscopic and microscopic, and even experimental.

(b) Predisposing, - a suitable soil on which the products of those bodily disorders may act.

As an exciting cause of this condition various observers, especially the French writers, have attributed it entirely to reflex action. Some, on the other hand, have attributed the cause to the combination of a reflex disturbance and a toxæmia, while again, others regard it entirely as due to the influence of an infection acting alone. Worms have been shown by Dupre³ and others as an exciting cause prone to give rise to symptoms of meningeal disturbance. Teething has been regarded similarly, and Heiman⁵ holds toxic and irritative lesions can in addition produce the disturbed reflex action.

A notable instance of the influence of worms
in/

in producing reflex meningeal symptoms was the case described by Anglin Whitelocke, where, at an operation of appendicectomy, he found an escape of threadworms from the appendix into the general peritoneal cavity.

As a combined toxic and reflex disturbance we may place the gastro-intestinal disturbances of children amongst the most important. Either those partaking of the form of the acute diarrhoeas of children or the subacute such as are associated with improper and irregular feeding, and where diarrhoea with loose foul smelling motions may be met with or on the other hand constipation, may be noted.

In the infective diseases of children the pulmonary lesion of a pneumonia may frequently be associated with such symptoms, and especially where the signs in the chest are indefinite the meningeal syndrome may dominate the aspect of the case. In such cases the chest lesion for a time may have been indefinite, and the pulse respiration rate may have been no guide. Other cases may have shown very little disturbance, as far as the chart is concerned, further than a few rales and the slight increase of respiration.

Cases/

Cases have been reported of this condition occurring in small-pox (Puig)⁷, and acute cervical adenitis^{and} peritonsillar infection (Coues)⁸.

Marasmic and debilitating diseases of children, apart altogether from any definite infection, may give rise to this group of symptoms. But in the cases where it has been associated with rickets one must also take into consideration the question of how far the gastro-intestinal disturbance of itself may have been a causal factor.

There are certain cases conforming in all respects to cases of meningismus, which are frequently admitted as tuberculous meningitis, and in them the symptoms are more persistent. Examination reveals no focus which could be considered as causal of the condition, and usually after a longer or shorter period they recover and admit of no further investigation. McHamill⁷, Barbier and Gougelet¹⁰ express no opinion as to their nature, but Aperti believes them to be of infectious or toxic origin.

As a predisposing factor the relatively large size of the brain at birth as compared with the body weight and the rapidity of growth and training of the nervous system¹¹ may be regarded as a sufficient explanation, but as emphasised by Guthrie¹² such explanation/

explanation does not fully explain the facts, and he lays stress on the emotional temperament of the child, and Dupré and Heiman consider hysteria as a predisposing factor.

Symptoms.

The symptoms of the clinical entity meningismus vary in extent, in intensity, and in time of onset.

Usually sudden in onset, they may appear at any period during the course of the causal factor, may be transitory or persistent, while any given case may be characterised by an absence of some of those symptoms enumerated as typical.

In a subacute lesion the symptoms are confined to the neuro-muscular mechanism: stiffness of the neck muscles, or rigidity and retraction of the head, extension of back, rarely opisthotonus, increased abdominal reflexes and retraction of the abdominal wall, exaggerated knee jerks and Kernig's sign, are present. Ankle clonus is never present, while Babinski's sign is indefinite and of uncertain value especially in those cases under two years of age. Photophobia and hyperaesthesia are frequently present.

Of mental symptoms, the cephalic cry in such cases/

cases can usually be accounted for by indications of nervous maldevelopment. Fever, if present, is slight and irregular, while the pulse shows no marked change.

In the pneumonic cases cerebral symptoms may be present in addition: headache, vomiting, delirium, convulsions, cephalic cry, apathy, unconsciousness, with rapid rise of temperature and variations in pulse. Levison["] reports that when the pneumonic lesion becomes fully developed the meningeal symptoms of head retraction etc. become less marked and finally disappear, but we did not experience this, and found the intensity of the symptoms increased with the development of the pneumonic signs, and persisted till the crisis or death occurred.

Likewise in those cases produced by reflex action the extent of the symptoms varied with the seat of the causal factor, the type of disease, and the suitability of the soil.

Diagnosis.

In a condition such as meningismus regarding whose pathology there is no consensus of opinion, one must base the diagnosis on a review of the case as a whole, and a consideration of the presence or absence of that group of factors, which has, in the past, been found/

found associated with the syndrome, and confirmed by pathological investigation.

As none of the symptoms enumerated under meningismus is pathognomonic, the cases may be grouped into (a) those with symptoms confined to the neuro-muscular mechanism, and (b) those with cerebral symptoms in addition. The first class is usually associated with subacute lesions, the second class with acute lesions, though ~~at~~ factors causing reflex action may give rise to one or other symptom complex.

Mental symptoms, if occurring in the absence of acute lesions, are associated with maldevelopment of the nervous system, of which there are usually other signs in evidence.

Perhaps, however, the most important diagnostic point is the absence of any localising sign. This was impressed upon one by the case of a baby aged eleven months, admitted on account of severe infective diarrhoea. The child shortly after admission improved, the stools becoming less frequent and more digested. There were certain symptoms present, however, which one did not grasp at first. The palpebral fissures were kept widely open, the abdomen was retracted, in marked contrast to the well nourished limbs, while the child had a habit of banging its head against the pillow/

pillow, emitting a peculiar temperamental cry.

The child in spite of the intestinal improvement did not make much progress, and the pupils became unequal. There were no other evidences of nervous affection, as retraction of head or Kernig's sign. Post-mortem there was found a small patch of broncho-pneumonia, a marked injection of brain membranes, a very slight exudation of lymph, an increase of cerebro-spinal fluid in pia-arachnoid space, and some distension of the ventricles. The only localising symptom was the inequality of the pupils.

Lastly a negative finding from examination of the cerebro-spinal fluid is an important factor. The fluid is clear with no cellular increase, no excess of globulin, absence of albumen, reduces Fehling and gives negative bacteriological results.

Pathology.

The pathology of meningismus would appear to be a debatable point, the lesions assigned in the literature being many and diverse. Levison¹³ described an increased intracranial blood pressure, others an increased cerebro-spinal fluid - serous meningitis, while a lesion of the locus niger has been mentioned.

In including cases under this group one has considered only those which showed an absence of formed elements in the cerebro-spinal fluid, and which/

which were negative to pathological investigation.

Osler¹⁴ mentions a series of two thousand pathological examinations of cases of meningismus. In only eleven was any definite pathological lesion found.

A fallacy may, however, be associated with the finding of a normal cerebro-spinal fluid as in the following example. The case was one of infective diarrhoea with a symptom complex considered to be of the nature of a meningism. Post-mortem, a slight inflammation of the pia mater with exudation of lymph over the upper portions of both cerebral hemispheres was found. Lumbar puncture was done the day preceding death, and examination of it showed no abnormality. J.M.Brady¹⁵ mentions a similar type of case.

Hence slight cases of meningeal inflammation may clear up, and, the fluid having been normal, they may be included under the term meningism, where, in reality, they have been mild cases of meningitis. This seems to me sufficient to explain the erroneous inclusion of cases with slight increase of globulin, albumin and cells, under the term, as is done by Plaut, Rhem and Schotmüller. Levison¹⁶ mentions that out of his series of one hundred cases of cerebro-spinal fluids examined from cases grouped as meningism fifteen showed a slight increase/

increase of cells. Du Bois and Neal¹⁶, again, mention under meningism an increase of cells with slight excess of globulin in two cases of pertussis: (a) endothelial cells and polynuclears equally divided, (b) polynuclears 95%. They also mention a case of typhus with 95% mononuclears, and a case of heat-stroke with faint increase of albumin and slight increase of cells, chiefly polynuclears. In this latter case there was no reduction of Fehling's.

These cases exhibiting an increase in the formed elements would indicate an inflammatory reaction - a definite pathological entity. They should, therefore, be excluded from the group, meningism.

Those groupings and opinions show clearly how varied the application of the term may be from want of proof to the contrary in any given case, as to whether it has merely a functional basis or is the result of a definite pathological entity which clears up and admits of no further investigation.

It is, however, generally recognised and borne out by one's own experience, and further supported/

supported by post-mortem investigation that the fluid associated with the typical meningism shows no departure from normal, and, in this respect, investigations have abundantly proved that, in the large majority of cases, normal fluids indicate normal meninges, but not necessarily a normal medulla. On the other hand when there is an increase of cells or chemical contents the case has to be excluded from the group meningism.

It would appear that the cause of the symptoms must not be assigned to any one factor, but to different factors in different cases.

From a pathological point of view cases of meningismus must be divided into two great groups:-

Group I. Comprising cases exhibiting increased cerebro-spinal pressure.

Group II. Those without any increase in pressure.

Group I. The cases in this group all show on lumbar puncture, a definite increase in cerebro-spinal pressure, and are therefore comparable with cases of acute meningitis. The most important differential feature is that in cases of meningismus there/

there is no alteration in the characters of the fluid withdrawn such as would suggest an inflammatory reaction in the meninges.

Group II. In this group there is no evidence that the cerebro-spinal fluid is under pressure, and the symptoms may be supposed to be due either to (a) interference with the nerve cells, or (b) disturbance of the reflex mechanism.

Cases falling under class (a) may be compared with cases of encephalitis. The important differential feature is that in meningismus there are no definite gross pathological lesions to be noted in the nerve cells, and no perineural exudations or inflammatory changes have been noted.^{17,18} One is then forced to assume some chemical change in the nerve cell associated with the presence of a circulating toxin.

In class (b) is included a large number of cases usually labelled reflex. The reflex may be a fairly local one, as from the ear or teeth, where the only symptom may be head retraction. In other cases, however, the reflex response may be widespread, even to the point of producing a general convulsion. In these latter cases we are dealing either with a nervous system which constitutionally is over excitable, as already/

already discussed, or affected by a circulating toxin.

Prognosis.

Little may be required to add as far as prognosis is concerned. It is invariably favourable, and even in the cases where the symptoms are more persistent and liable to occasion a diagnosis of tuberculous meningitis from want of definite proof to the contrary, we have the experience of the case ultimately clearing and following a favourable course.

The treatment is purely symptomatic.

Conclusion.

How far then do our cases meet with the facts above described?

In regard to causation one considers that in five of the cases, I, II, V, VI, VII, there was sufficient evidence present to assign a cause to the meningeal state. In cases III and IV, however, no definite causal focus could be detected. In case IV there was impaired resonance over upper portion of right lung posteriorly, but examination of case III gave no clue as to the origin of the syndrome.

The symptoms in cases V, VI and VII were confined to the neuro-muscular mechanism. In case I the cephalic/

cephalic cry was considered to be due to the defective mentality of the child, while the cerebral symptoms of case **II**, were attributable to the causal pneumonia. In none of the cases was there any localising sign, while case **III** had to be reviewed as a whole and considered in conjunction with other examinations. The mental state of both **III** and **IV** excluded them from encephalitis. With the exception of the two last mentioned cases and case **I**, which died, the symptoms were more or less transitory and showed improvement coincident with that of the general state.

The cerebro-spinal fluid of the four cases examined, **I**, **IV**, **V** and **VI**, showed no increase in the cell elements or globulin, and was negative to bacteriological examination; there was no albumin present, while Fehling's solution was reduced.

A post-mortem examination was held in two of the fatal cases, and careful macroscopical examination failed to show gross lesion of brain or membranes present, and even congestion and oedema were excluded. No histological examination was/

was made.

The cause of death in two of the cases, I and VII, was attributed to asthenia, the other, case II, to pneumonia. In one of the former, case VIF, all signs of the meningeal syndrome had disappeared twenty four days before death.

The other cases recovered and showed no sequelae.

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