

Acute cerebral meningitis, or hydrocephalus / by C. Evans Reeves.

Contributors

Reeves, C. E. 1828-1880.
Royal College of Surgeons of England

Publication/Creation

Glasgow : Printed by William Mackenzie, 1858.

Persistent URL

<https://wellcomecollection.org/works/edma2p9b>

Provider

Royal College of Surgeons

License and attribution

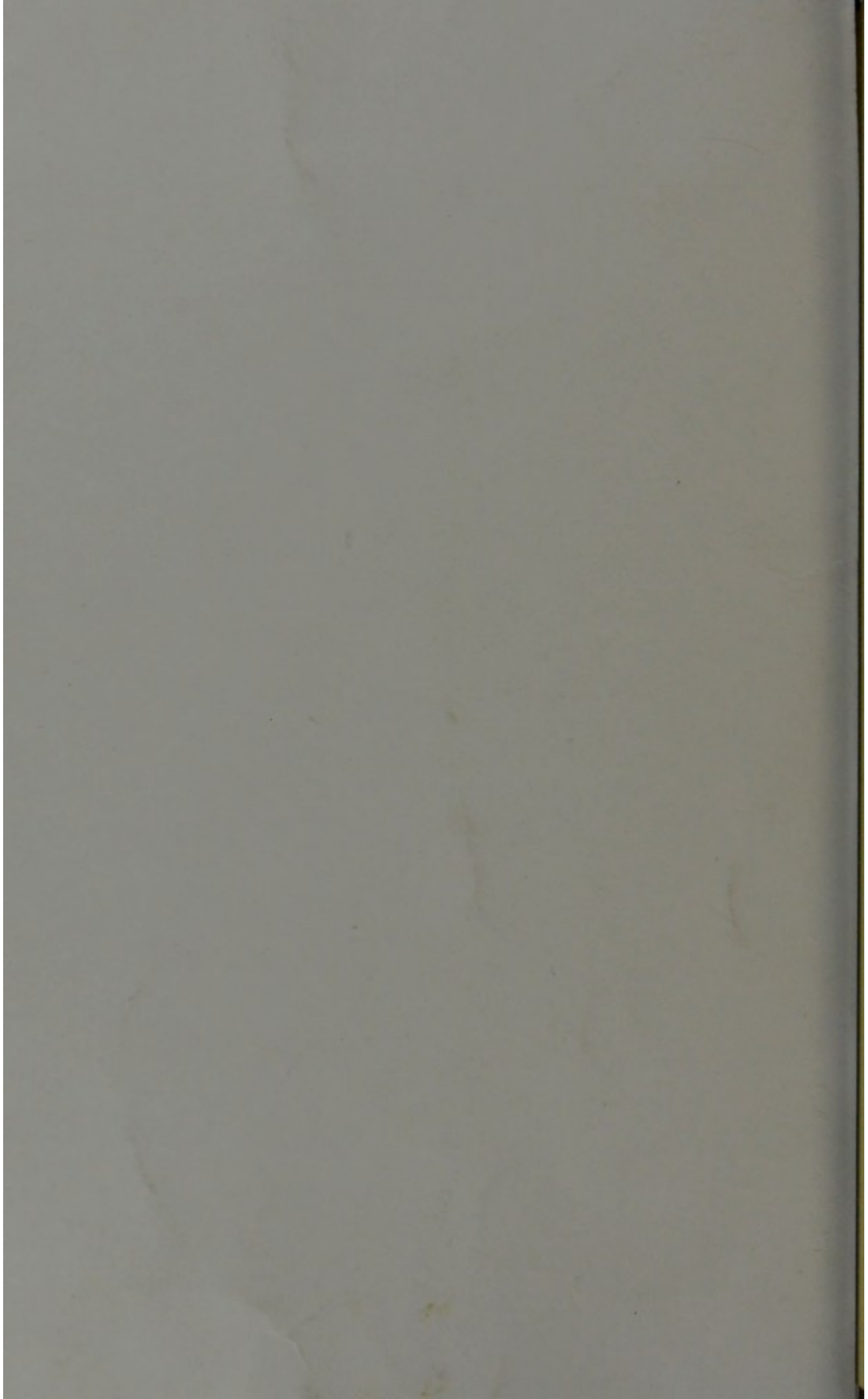
This material has been provided by This material has been provided by The Royal College of Surgeons of England. The original may be consulted at The Royal College of Surgeons of England. where the originals may be consulted. This work has been identified as being free of known restrictions under copyright law, including all related and neighbouring rights and is being made available under the Creative Commons, Public Domain Mark.

You can copy, modify, distribute and perform the work, even for commercial purposes, without asking permission.



Wellcome Collection
183 Euston Road
London NW1 2BE UK
T +44 (0)20 7611 8722
E library@wellcomecollection.org
<https://wellcomecollection.org>





*The Lectures, of the Royal College of
Surgeons, with the authors Emphases*
ACUTE CEREBRAL MENINGITIS,

OR

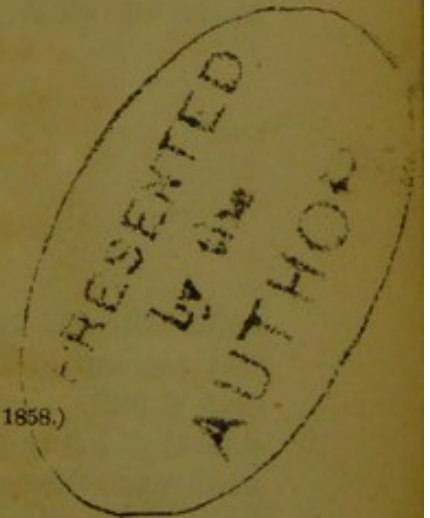
HYDROCEPHALUS.

BY

C. EVANS REEVES, M.D.



(From the GLASGOW MEDICAL JOURNAL, Part XXI., April, 1858.)



GLASGOW:

PRINTED BY WILLIAM MACKENZIE, 45 & 47 HOWARD STREET.

1858.

ACUTE CEREBRAL MENINGITIS

ACUTE CEREBRAL MENINGITIS

HANDWRITING

BY JAMES H. HARRIS, M.D.



CLARSON
PRINTED BY WILLIAM J. HARRIS, 12 N. BROAD ST.

1908

ACUTE CEREBRAL MENINGITIS,

OR

HYDROCEPHALUS.

THE subject of the following paper is chiefly founded on cases which have fallen under my observation during ten or twelve years. Feeling, however, that my own labours could do but little towards elucidating all the circumstances which influence the disease, I have carefully examined every source likely to assist in rendering its history as complete as possible.

13 Henrietta Street, Cavendish Square,
London.

CAUSES.

1. *Influence of Sex.*—Ludwig* considered that females after the tenth year were more liable to this disease than males; but that before this age, both were equally susceptible. This is also the opinion of Drs. Cheyne,† Carmichael, Smith,‡ and Copland.§ Dr. Smith states, that he “had never seen a male suffering from the disease after the 9th year, but several females at 12 and 13.” Guersent,|| Foville,¶ Breschet,** also make the same observation. Dr. Bright,†† from the cases which he observed, found that they were twice as liable; Coindet‡‡ and D’Espine,§§ from the mortality in the canton of Geneva, found that both were nearly equally liable, for the former states that out of 209 cases registered during 10 years, 105 were females; the latter, that out of 59 in 1835, 34 belonged to this sex. Duges observes, “that

* De Hydrop. Cerebri, Lips., 1774.

† On Hydrocephalus, 2d. ed., 1819.

‡ Hydrocephalus, 2d. ed., 1814.

§ Dict. of Medicine.

|| Dict. de Mèd. Pratique—Meningite.

¶ Dict. de Mèd. et Chir.—Hydrocephale.

** Journale Complément, tome vi.

†† Reports of Medical Cases.

‡‡ Sur l’Hydrocephale, Geneva, 1817.

§§ Annales de Hygiène, tome xxiii.

at the Hôpital des Enfants in 1817, both sexes suffered equally; but in 1815, it was more frequent among the males." The same has been observed in Philadelphia;* thus in 1832, 102 males died to 78 females; but in 1833, 87 males to 83 females; and in 1834, 99 males to 97 females.

In London, where the mortality is always greater among males than females, in some years it is much less marked than in others.

In the rural districts, both in England and Ireland, the mortality is greater among females than in the urban. In Ireland,† in the rural districts, 80·6 females died to 100 males; in the urban, 77·5 to 100.

Males seem certainly more predisposed to this disease than females, and this continues with some slight variation throughout life.

Camper‡ and Fothergill§ observed, that males were more liable than females; of 35 cases observed by Goelis,|| 20 were males; 7 out of 10 by Abercrombie;¶ 88 out of 116 by Duchatelet and Martinet;*** 23 out of 33 by Ridliet and Barthez;†† 13 out of 20 by Schweniger;‡‡ 52 out of 81 by Hirrich;§§ 31 out of 53 by myself; Maunthner||| states, that out of 1747 cases of diseases of the brain admitted into the children's hospital at Vienna, 913 of the number were males. Brecheteau¶¶ and Dance also found that the liability was greater among males than females.

The bills of mortality of this country, Paris, New York, Philadelphia, and other towns in the United States, also prove that the liability to this disease is greater on the part of males than females.

The following table compiled from the registrar-general's report of the mortality in London from 1847 to 1853, will show the relative liability of the two sexes during seven years—

	Males.	Females.	Excess on the part of Males.
1847	912	758	154
1848	847	643	204
1849	825	639	186
1850	781	576	205
1851	941	688	253
1852	911	709	202
1853	909	663	246

During some periods of life the liability is, I have found, more pronounced than in others. Thus it seems to be strongly marked during the first 12 months of life, for of 29 cases which I have collected and observed, 21 were males; less during the second and

* Emerson—American Journal of Medical Science, 1835.

† Census of 1851. ‡ Mem. de la Soc. Royale de Mèd., tome vii.

§ Works by Dr. Elliot, 1781. || Ueber Wasserschlagn. ¶ De l'Arachnitis.

** Maladies des Enfants. †† Ueber Tuberculose. ‡‡ Ueber Wasser Kopf.

§§ Krank. des Gehirns und Rückenmarks. ||| Thèse de Paris, an xiv.

¶¶ Arch. Gên. de Mèd., 1830.

third 12 months, for out of 43 cases which occurred during the former, 29 were males, and of 31 during the latter, 21. From the third to the sixth year the liability was less marked, for out of 59 cases, 34 were males; but from the sixth to the tenth year it was more pronounced, for out of 49 cases, 33 were males. From the tenth to the fifteenth year, the liability was rather more marked in females, for out of 39 cases, 21 were females. After the 15th year, males again became more predisposed, and this continued with but slight variations up to the sixtieth year.

The bills of mortality of London, as will be seen from the following table compiled from the registrar-general's report for seven years, show that the mortality is greatest among males during the first year of life, diminishing up to the fifth year, when it becomes, up to the tenth year, rather more pronounced among females; from the tenth to the fifteenth year, it again becomes more pronounced on the part of males; from the fifteenth to the thirtieth, nearly equal in both sexes; from the thirtieth to the thirty-fifth, again more pronounced among males; but after this period, the liability is rather more marked on the part of females.

	Males.	Females.	Excess on the part	
			Of Males.	Of Females.
Under 1 year,.....	2182	1519	663	—
1 year,.....	1867	1427	440	—
2 years,.....	839	652	187	—
3 ".....	405	356	45	—
4 ".....	277	224	53	—
5 ".....	434	388	46	—
10 ".....	48	65	—	17
15 ".....	19	5	14	—
20 ".....	6	5	1	—
25 ".....	5	5	—	—
30 ".....	5	4	1	—
35 ".....	4	1	3	—
40 ".....	3	6	—	3
Beyond,.....	9	16	—	7

II. *Influence of Age.*—Whytt* considered that it occurred more frequently between the second and sixth year than at any other period of life, for 19 out of 20 cases seen by him were between these ages; Ludwig, between the fifth and tenth; Coindet, between the second and fifth; Cheyne, from the time of weaning up to puberty; and Guersent, during second dentition. Of 209 cases extracted by Coindet from the bills of mortality of Geneva, 99 were 4 years of age and under, and 55, 8 years and under; of 59 by D'Espine, 27 were under 3 years of age, and 20 between 7 and 10; of 22 observed by Percival,† 11 were under 5 years of age, 6 from 5 to 10, and 5 from 10 to 15; of 18 given by Brecheteau, 8 were under 5 years, 6 from 5 to 10, and 3 from 10 to 15; of 90 collected and observed by Piët,‡ 67 were under 8 years of age;

* Dropsy of the Brain.

† Edin. Med. Com., vol. v.

‡ Thèse de Paris, 1836.

of 81 by Hirrich, 45 of the number occurred during the first 4 years of life, and 14 during the second; of 33 by Rilliet and Barthez, 12 were between 1 and 5 years, 17 between 5 and 10, and 4 between 10 and 15. Of 2085 cases contained in Emerson's paper, and in his work on the mortality of Philadelphia, 729 were under 1 year; 1047 from 1 to 5; 245 from 5 to 10; and 64 from 10 to 20. Of 1747 collected by Maunthner, 221 were under 7 months, 741 between 7 and 24 months, 632 between 24 months and 7 years, and 153 between 7 and 12 years.

It sometimes occurs during the period of intra-uterine existence. Two cases have fallen under my notice, in one where the child, which was born at the seventh month, died in 36 hours; in another where it was born at the eighth, and died in 60 hours. It does not seem to be very liable to occur during the first three months of life. In 2 of the 53 cases which I have seen, the children were under 3 months; one was 12 days old—the disease occurred in connection with erysipelas; the other 5 weeks—purulent discharge from one of the ears had existed since birth, and the lungs contained tubercles. Kiwisch* met with the disease in an infant 2 days old, and Rush† in one 6 weeks. Guersent states that he has several times seen simple meningitis in the new-born, and that Baron had also observed it. He met with 2 cases, in one the child was 6 weeks old, in the other 8; the lungs in the latter case contained tubercular excavations. During the second and third months of life, the disease seems to become rather more frequent. I have, however, only seen 2 cases; in one the child was 4 months, in the other 5. Whytt states, that one of the 20 cases which he treated was under 6 months. Popper‡ has recorded the case of a hydrocephalic woman, who had a family of 8 children, 3 of whom died from the fourteenth to the sixteenth week, and 3 about the thirty-third; the other 2 lived 10 and 11 months. Hirrich has recorded 3 cases in which the patients were under 6 months, one being 3 months old, the other two, 19 and 26 weeks; Rilliet,§ one in which the child was 4 months, Goelis, 5 months, and Hahn,|| the same. During the first 12 months of life, the disease seems less liable to occur than during the second. It is more common during the latter than at any other period; it is also frequent from the third to the fourth year, less so from the fourth to the fifth, and from the fifth to the sixth; but it again becomes frequent from the sixth to the seventh, diminishing gradually every year up to the twelfth, when it again becomes rather frequent.

* Oestreich, *Med. Jahrbücher*, bd. xxi. † *Medical Obs. and Inquiries*.

‡ *Schmidt's Jahrbücher*. Sup. band., 1845.

§ *Arch. Gén. de Méd.*, 1846.

|| *Ibid*, 1849.

TABLE
 COMPILED FROM THE REGISTRAR-GENERAL'S REPORT OF THE MORTALITY IN LONDON DURING SEVEN YEARS, SHOWING THE
 COMPARATIVE MORTALITY IN EACH SEX FOR FOURTEEN PERIODS.

	Under 1 year.		1 year.		2 years.		3 years.		4 years.		5 years.		10 years.		15 years.		20 years.		25 years.		30 years.		35 years.		40 years.		Beyond 40 years.					
	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.	M.	F.				
1847	329	247	271	232	111	92	59	55	41	32	84	83	5	8	4	0	1	0	1	0	0	1	0	1	0	1	0	1	0	1	2	1
1848	285	202	249	185	116	94	68	58	50	28	60	54	9	12	5	1	0	1	0	1	0	1	0	1	1	2	1	1	2	3	0	
1849	276	183	237	190	126	103	50	57	46	39	77	40	5	15	2	1	1	4	1	1	0	0	0	0	2	1	1	1	1	1	1	
1850	279	199	246	170	97	71	52	40	36	29	52	51	9	11	4	0	1	0	1	0	1	1	1	2	0	0	1	1	3	2	2	
1851	335	238	284	190	136	112	70	44	33	36	70	56	3	8	1	2	2	2	2	2	0	2	0	1	0	0	0	0	0	2	2	
1852	350	228	284	256	135	74	50	59	35	28	49	54	6	6	2	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	3	3
1853	328	222	296	204	118	106	56	43	36	32	62	50	11	3	1	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	6	6
	2182	1519	1867	1427	839	652	405	356	277	224	454	388	48	63	19	5	5	5	6	5	5	5	4	4	4	4	3	6	9	16	16	

The following table will show the ages and sex of 338 cases collected and observed by myself, and the relative liability for 34 periods of life.

	Males.	Females.	Total.	
Before 3 months,	—	—	6	} 1st year, 35 cases.
From 3 to 6 months,.....	6	2	8	
“ 6 to 9 “	7	3	10	
“ 9 to 12 “	8	3	11	} 2nd year, 43 cases.
“ 12 to 15 “	9	4	13	
“ 15 to 18 “	6	2	8	
“ 18 to 21 “	7	5	12	} 3rd year, 31 cases.
“ 21 to 24 “	7	3	10	
“ 24 to 27 “	8	2	10	
“ 27 to 30 “	4	2	6	} 3rd year, 31 cases.
“ 30 to 33 “	3	2	5	
“ 33 to 36 “	6	4	10	
“ 3 to 4 years,	18	12	30	
“ 4 to 5 “	8	7	15	
“ 5 to 6 “	8	6	14	
“ 6 to 7 “	16	6	22	
“ 7 to 8 “	10	7	17	
“ 8 to 9 “	11	5	16	
“ 9 to 10 “	8	3	11	
“ 10 to 11 “	3	3	6	
“ 11 to 12 “	1	4	5	
“ 12 to 13 “	4	7	13	
“ 13 to 14 “	5	5	10	
“ 14 to 15 “	3	2	5	
“ 15 to 18 “	5	2	7	
“ 18 to 21 “	9	3	12	
“ 21 to 24 “	2	2	4	
“ 24 to 27 “	3	3	6	
“ 27 to 30 “	5	1	6	
“ 30 to 35 “	3	3	6	
“ 35 to 40 “	2	1	3	
“ 40 to 50 “	3	1	4	
“ 50 to 60 “	4	2	6	
Beyond 60 “	5	7	12	
	212	126	344	

III. *Influence of the Seasons.*—Cheyne considered that the disease was more common in summer than at any other period of the year. Of the 22 cases in which he has stated the time when the disease occurred, 2 were observed in the first 3 months of the year, 8 during the second, 7 during the third, and 5 during the fourth. In 1807-8, when measles was very fatal, he attended 5 cases of this disease in the months of April, May, and June, all of which occurred soon after the eruption had declined. Jadelot* and Piet are also of the same opinion. The latter author states, that 12 out of the 24 cases which he observed, occurred in the summer months. In the table which he has given of the cases which he collected and observed, the greatest number, however, occurred during the first 3 months of the year. Maunthner considers that diseases of the brain are more common among children in June, July, and August, than in any other months. From the examination of the table given in his work of the number of cases admitted into the hospital during 6 years, in January, 91 entered;

* Jour. de Mèd., an xiv.

February, 94; March, 97; April, 183; May, 197; June, 228; July, 229; August, 192; September, 134; October, 131; November, 112; December, 69. In some of the months, particularly in April, May, June, July, and August, hooping-cough and typhus were very prevalent. In Ireland (census of 1851), the mortality was most pronounced in the summer season. In Malta, the greatest number of deaths occurred in the month of August. The mortality was, however, nearly as great in the first 3 months of the year as in the third. Of 47 deaths, 12 occurred in the first 3 months, 10 in the second, 13 in the third, and 7 in the fourth. Coindet on the other hand, considered that the disease was most frequently observed in the months of March, April, and November, seasons of eruptive and catarrhal affections; and this is also the opinion of Guersent, who observes that the disease is more frequently observed in Paris in the spring and autumn, than at any other season. From the observations of Hirrich, the disease seems to be more liable to occur, at least in Regensburg, in the spring and summer, than in the autumn and winter. Of the 81 cases recorded by him, 20 occurred in the months of March, April, and May; 26 in June, July, and August; 18 in September, October, and November; and 17 in December, January, and February. It would seem from the examination of 314 cases which I have collected and observed, quite unconnected with any epidemic tendency, that the disease occurs more frequently during the first 3 months of the year than the second, during the second than the third, and again more frequently during the last than the fourth. The greatest number of cases occurred during the months of March, May, and January; the smallest in November, December, and September. In Piet's table, formed from the cases collected by himself and those contained in the works of Senn, Charpentier, and Gerhard, March and July were the months in which the greatest number of cases occurred.

The following table will show the number of cases which occurred in each month, and each 3 months to Piet and myself.

	Myself.	Piet.		Myself.	Piet.
January,	33	5	July,.....	24	10
February,	24	3	August,.....	25	4
March,.....	45	10	September,.....	18	0
Total in 1st 3 months, ..	102	18	Total in 3rd 3 months,...	67	14
April,.....	27	6	October,.....	28	5
May,.....	34	3	November,.....	14	4
June,.....	27	5	December,.....	15	2
Total in 2nd 3 months, ..	88	14	Total in 4th 3 months,...	57	11

The examination of the bills of mortality in London during a period of 9 years, would almost lead to the supposition, that the

seasons had but little influence over the disease; but a careful analysis shows that the mortality is rather more pronounced during the first 3 months of the year than the second, during the second than the third, and during the third than the fourth. Out of 16,003 deaths registered during 9 years—

4210	occurred during the	1st 3 months	of the year.
4148	"	"	2nd "
4028	"	"	3rd "
3617	"	"	4th "

The mortality was not every year most marked in the first 3 months. Thus in 4 years, 1845, 1846, 1847, and 1848, this was the case; in 3 years, 1840, 1841, and 1845, it was most pronounced in the second; in 2 years, 1840 and 1843, in the third; and in 1 year, 1843, in the fourth.

The examination of the bills of mortality of Glasgow, Edinburgh, and Geneva, also shows that the mortality is always greater during the first 6 months of the year than the second, although it is not always, as will be seen from the following table, most pronounced during the first 3 months.

GLASGOW,		3 years, 1852-53-54 †	
13 years—1800 to 1812, inclusive.*			
January,	49	.....	119
February,	54	.....	110
March,	59	.....	131
April,	64	.....	109
May,	63	.....	114
June,	48	.....	120
July,	49	.....	113
August,	37	.....	109
September,	41	.....	105
October,	42	.....	81
November,	25	.....	64
December,	39	.....	82
1st 3 months, 162.		1st 3 months, 360.	
2nd 3 months, 175.		2nd 3 months, 343.	
3rd 3 months, 127.		3rd 3 months, 327.	
4th 3 months, 106.		4th 3 months, 227.	
EDINBURGH AND LEITH,		GENEVA,	
1848, 11 months. ‡		10 years—1806 to 1813, inclusive; § and 1835. ¶	
January,	5	.....	19
February,	17	.....	28
March,	15	.....	26
April,	10	.....	34
May,	15	.....	21
June,	14	.....	28
July,	7	.....	20
August,	12	.....	15
September,	14	.....	12
October,	21	.....	20
November,	6	.....	20
December, .....	—	.....	16
1st 3 months, 37.		1st 3 months, 73.	
2nd 3 months, 39.		2nd 3 months, 83.	
3rd 3 months, 33.		3rd 3 months, 47.	
		4th 3 months, 56.	

IV. *Influence of Population.*—Both Vieusens and Coindet considered it to be a disease of towns. This opinion was founded on the observation of the disease in Geneva in the early part of this century. D'Espine, however, found from his observations on the mortality in the canton in 1835, that the disease, or at least the number of deaths were the same, both in the towns and in the

* Watt's Mortality in Glasgow for 30 years.

† Strang's Mortality of Edinburgh.

‡ Patrick's Mortality of Glasgow.

§ Coindet. ¶ D'Espine.

country. The population, it may be observed, is nearly equally distributed between the towns and the country. Whenever a large number of persons are closely packed together in badly drained and ventilated places—hydrocephalus is sure to be frequently observed, particularly if measles, scarlet fever, and continued and remittent fevers, diarrhæa, pneumonia, bronchitis, and scrofulous diseases are of frequent occurrence. It is under these circumstances that the disease has been observed to occur as an epidemic in some towns on the continent and in some garrisons. In London,* with a population estimated in 1838 at 1,884,844, contained in an area of 70 square miles; 1769 deaths occurred from diseases of the nervous system; while in the counties of Cornwall, Devonshire, Dorset, Somerset, and Wilts, with a nearly equal population, viz., of 1,743,125, contained in an area of 7,933 square miles, only 603 deaths occurred. This preponderance in the mortality is not confined to London, as will be seen from the annexed table—

	Population in 1831.	Area in sq. acres.	Deaths from Hydroce- phalus.
Manchester and Salford,	236,935	37,797	101
Liverpool and West Derby,	218,233	38,060	137
Leeds,	135,581	41,520	80
Birmingham,	110,914	2,660	35
Total,	701,663	79,837	353

While in Wiltshire and Dorsetshire, with a population of 373,790 (about half the number), only 66 deaths were registered.

In Ireland the mortality is greater in the town than in the rural districts.

In Geneva the mortality was 1 in 1000; yet, according to Tissot,† it was nearly unknown in Switzerland. In Paris the mortality is also great; yet the elder Levrat,‡ who had practised in the provinces for 50 years, had never seen a case.

It is interesting to trace the progress of the mortality from diseases of the brain in London, Glasgow, and other towns over a number of years, and the influence of population on it. In London,§ from 1690 to 1710, a period of 20 years, the greatest number of deaths registered in one year, was 28; in several years only 6 were registered; in others, 9, 10, 11, 14, and 15. From 1710 to 1720, there was a marked increase, and the numbers rose from 40 in 1711, to 222 in 1720. During the next 4 years, from

* Registrar-General's Report, 1838.

† Oeuvres Complet, ii. 184. ‡ Levrat fils. Hydrocephale, Lyons, 1838.

§ Prior to 1790, diseases of the brain of a phrenitic and dropsical nature were registered under the head of Headmould-shot, Horseshoe-head, and Water in the head. Marshall.

1720 to 1724, the average number was 250; the next year it fell to 145, and in 1733, to 71. In 1734, 116 were registered, and the numbers continued to increase up to 1740, when 280 deaths occurred; but in the next year they fell to 109, and in 1744, to 46. In 1754, 336 deaths were registered; in 1760, 414; 1762, 300; 1767, 344; 1769, 318; 1772, 385; 1774, 554; 1777, 536; and in 1780, 578; but in 1782, only 78. In 1790, when dropsy of the brain was first registered, only 48 deaths were entered; the number, however, gradually increased each year up to 1813, when 297 deaths occurred. In 1814, the number amounted to 421; this continued to be the average annual mortality up to 1820, when the number sank to 332, and in 1821, to 290. In 1822, the number rose to 324; in 1823, to 570, and in 1824, to 762, which was the average yearly number, except in 1826, when 676 deaths were registered; and in 1829 and 1831, when the numbers rose to 855 and 853. From 1840 to 1853, the number of deaths in each year ranged from 1357 to 1829. In 1840, the deaths were twice as numerous as in 1831, and as will be seen from the following table, 272 more than in 1850.

1840	1841	1842	1843	1844	1845	1846	1847	1848	1849
1829	1732	1742	1819	1808	1763	1717	1670	1490	1464
			1850	1851	1852	1853			
			1357	1629	1620	1572			

The following table will show the increase of population and mortality from hydrocephalus in London from 1801 to 1851.

	Population within Bills of Mortality.	No. of Deaths from Hydrocephalus.
1801	747,043	72
1811	856,313	299
1821	1,011,948	290

	Population in Metropolis and Suburbs.	Deaths.
1831	1,594,890	853
1838	1,884,884	1708
1851	2,361,640	1629

In Glasgow* in 1783, only 6 deaths were registered; in 1790, the number had increased to 35; in 1804, to 46; and in 1811, to 63. In 1852,† 393 deaths were registered, and in 1853, 454.

In Dublin in 1842, 194 deaths were registered; in 1845, 303; and in 1849, 310. The number registered in the intermediate years varied considerably; in 1847, it was 151, and in 1848, 185.

In the United States as in this country, the increase of town population has been attended by a large increase in the mortality from hydrocephalus.

In New York,‡ with a population in 1805 of 75,770, 16 deaths

* From Watt's Mortality of Glasgow during 30 years.

† From Patrick's Mortality, Births, and Marriages in Glasgow.

‡ From Brigham's Disorders and Functions of the Brain, New York, 1840.

were registered from this disease; in 1810, the population had increased to 96,373, and the deaths to 42; in 1835, the population had increased to 270,089, and the deaths from hydrocephalus to 368.

In Boston,* with a population in 1812 of 35,260, 6 deaths were registered; in 1824, with a population of 55,284, 33; in 1836, with a population of 79,464, 68; in 1840,† the population was 93,383, 429 deaths were registered during 4 years, from 1840 to 1845; in 1845, the population was 114,366; 361 deaths were registered in 3 years, from 1846 to 1848 inclusive.

In Philadelphia,‡ 41 and 35 deaths were registered in 1810 and 1811; but in 1825 and 1826, the deaths had increased to 138 and 123. During the first 4 years of this period, from 1810 to 1814, the mortality ranged from 35 to 48; during the next 5 years, from 60 to 90; and during the next 7, from 1819 to 1826 inclusive, from 98 to 124, 138 and 144. In 1810, the population was 98,282, 41 deaths were registered; in 1820, it had increased to 121,980, and the deaths from hydrocephalus to 114.

In Baltimore,§ cases appear to have been registered as having died from convulsions, when the cause of death was hydrocephalus. The following table will show the increase of population and the increase in the number of deaths from both diseases.

	Population.	Hydrocephalus.	Convulsions.
1845	121,161	1	81
1846	127,219	21	73
1847	133,579	70	81
1848	140,450	79	106
1850	169,054	122	92
1854	—	165	116

In Geneva there is a strong contrast in the increase of the population and in the increase of the mortality from hydrocephalus compared with the towns in the United States and England. In 1755, its population was 21,816;|| in 1789, under the influence of the troubled state of France, it had increased to 26,140; but in 1805, it sunk to 22,300. In 1811, it had risen to 23,000; in 1834, to 27,177; and in 1838,¶ to 28,000. The mortality from hydrocephalus during a period of 9 years, from 1805 to 1816, was about 20 in each year. In 1838,** the population of the whole canton was 58,663, and 59 deaths took place. The mortality was equal in the towns and in the country; this would give about 28 deaths for the town itself.

In Paris, Odier estimated from the mortality in Geneva, that

* From Shattuck's Am. Jour. of Med. Science, 1841.

† From Curtis's Public Hygiene of Massachusetts, in first Report of Committee on Public Hygiene, Philadelphia, 1849.

‡ From Emerson.

§ From Wynne's Sanitary Report of Baltimore in first Report of Committee.

|| From Frick's Amer. Jour. of Med. Science, 1855.

¶ From Mallet's Annales de Hygiène, tome xvii.

** From D'Espine.

about 400 died annually from this disease. Bouvier,* however, estimated the number at 750. The population of Paris in 1809,† was 668,777; in 1851,‡ it had only increased to 1,105,326, about 400,000 in 42 years. In 1822,§ 243 deaths occurred from acute cerebral disease, and 1832 from convulsions; in 1849,|| the deaths from the first had increased to 1500, while the deaths from the second amounted only to 938; in 1852, the deaths were 1290, from the first, and 616 from the second. The mortality from inflammatory diseases of the brain is much greater in Paris than in London, for in the former 1 in 857 of its population died in 1851, while in the latter 1 in 1137. In Paris the mortality from diseases of the nervous system was 1 in 387 of its population; in London, 1 in 718.

The mortality from hydrocephalus is also generally greater in the towns of the United States than in those of England, as will be seen from the following table. In the United Kingdom, Glasgow and Dublin are the towns in which the mortality is most pronounced; in the United States, New York and Lowell.

London, with a population in 1851 of 2,361,640,	lost 1 in 1388.
Manchester, " " 1851 "	236,935, " 1 " 2345.
Liverpool, " " 1851 "	218,233, " 1 " 2322.
Leeds, " " 1851 "	135,581, " 1 " 1694.
Birmingham, " " 1851 "	110,914, " 1 " 3453.
Glasgow, " " 1851 "	347,000, " 1 " 857—in 1852.
Dublin, " " 1841 "	238,531, " 1 " 1158—in 1842.
Geneva (town), " " 1838 "	28,000, " 1 " 1000.
New York, " " 1835 "	270,089, " 1 " 735.
Boston, " " 1845 "	114,366, " 1 " 961.
Philadelphia, " " 1820 "	121,980, " 1 " 1070.
Baltimore, " " 1850 "	169,054, " 1 " 1394.
Lowell, " " 1849 "	291,27, " 1 " 832.

V. *Influence of Climate.*—Climate seems to exert less influence in predisposing to this disease than an overcrowded population and bad drainage. England with a population in 1851 of 17,927,609, lost 9,436 from this disease; of this number London, with a population of 2,361,640, lost 1629. Ireland with a population in 1841 of 8,175,124, lost in 10 years from 1841 to 1851 12,429. Cheyne states that the disease was more common in Scotland than in Ireland. The mortality is greater in Glasgow than Dublin.

In France.—In Paris the mortality from acute cerebral affections is great.

In Germany.—Nasse¶ estimates that 100,000 die annually in all the German States. Prussia alone, he considers, loses from 32,000 to 36,000. These estimates are evidently too high.

Prussia possesses a population of about 16 million. The bills

* Brachet sur l'Hydrocephale, Paris, 1818.

† From Trebuchet's Annales de Hygiène, tome xliv.

‡ Ibid, tome l.

§ Ibid, tome xlvi.

|| Ibid, 1857.

¶ Med. Chir. Zeitung, cited by Dr. J. R. Bennett.

of mortality of Berlin* in 1833, show that out of 4009 deaths under 15 years of age, 196 were from acute inflammation of the brain or its membranes; in 1835, the deaths below 15 were 3,477, of this number 257 were from acute inflammation of the brain or its membrane. These results correspond closely with those observed in London.

In Bonn,† Dr. Wolff, from an estimate founded on the mortality for 15 years, that the deaths from hydrocephalus compared with those from other diseases was as 1 to 3·27.

In Russia the disease seems to be less frequently observed than in France, England, Germany, and the United States.

Lichtenstädt‡ mentions inflammation of the membranes of the brain as one of the causes of the mortality in children in the first year of life in St. Petersburg, but without entering into any details, or speaking of it as an important disease. In the report of the cases admitted into the children's hospital of St. Petersburg§ during 6 years from 1846 to 1851, out of 3402 cases only 17 were from inflammation of the brain and its membranes. During 3 other years from 1853 to 1855,|| out of 1980 cases admitted, 11 were from disease of the brain.

In Sweden, the disease is not mentioned in the bills of mortality published in Marshall's work. In the Crown Princess Louisa's Hospital for sick children in Stockholm,¶ out of 315 cases admitted, 2 were from acute meningitis, 2 from dropsy of the ventricles, 6 from œdema of the membranes, 1 from tubercles of the brain, and 6 from œdema of the brain. Out of 414 cases of disease which occurred in the General Home for children in the same town,** 4 were from meningitis, 1 from dropsy of the ventricles, 7 from congestion of the brain and its membranes, 24 from œdema of the brain and its membranes, 3 from hypertrophy, and 1 from softening and hæmorrhage. "In some years meningitis occurred as an epidemic, while in others it was scarcely observed."

In Austria.—In Vienna, out of 2447 cases treated in 1853†† at the St. Joseph's Hospital for children, only 14 of the number were suffering from hydrocephalus. Out of 151,836 cases treated during 7 years in the children's hospital,‡‡ 1747 of the number were suffering from diseases of the brain or its membranes.

The following table will show the number of cases of all diseases, and the number from diseases of the brain which occurred in institutions for diseases of children in St. Petersburg, Stockholm, Vienna, Edinburgh, and London.

* Bennett, page 44. † Ibid.

‡ Ueber die Ursachen der grossen Sterblichkeit die Kindern des Erstens Lebensjahres, 1837.

§ Weisse Journal für Kinder Krankheiten, 1855.

|| Ibid. 1856. ¶ From Düben, Ibid. 1856.

** From Abelin Jour. für Kinderkrank, 1855.

†† From Samek Jour. für Kinderkrank, 1854.

‡‡ Maunthner.

	No. of Cases of all Diseases.	Diseases of the Brain.
<i>St. Petersburg</i> —Children's Hospital, 9 years,	5382	28
<i>Stockholm</i> —Crown Princess' Hospital, 1 year,	315	17
" —Home for Children, 1 year,	414	40
<i>Vienna</i> —St. Joseph's Hospital, 1 year,	2447	14
" —Hospital for Children, 7 years,	15,836	1747
<i>Edinburgh</i> —New Dispensary,* 2 years,	201	49
<i>London</i> —Universal Dispensary for Diseases of } Children, 1 year, † }	8647	310

In Malta, the disease seems to be but rarely observed, for during a period of 13 years, from 1822 to 1834, only 47 deaths were registered. † In some years no deaths occurred, in others 3, 4, and 5. In 1822, with a civil population exclusive of Gozo of 95,484, 3 deaths occurred; in 1834, with a population of 103,054, 4.

In India, the disease does not seem to be common. In Bombay, § the annual mortality from meningitis and hydrocephalus was never more than 8, as will be seen from the following table—

	Hydrocephalus and meningitis.	Convulsions.	All Causes.
1853	8	118	13,922
1854	7	70	17,742
1855	8	59	14,647
1856	5	51	15,495

In Martinique, Ruzf met with several cases. It is said to be unknown in Persia. Dr. Hyslop || met with 2 cases while practising during 3 years at Baghdad.

In New Orleans, the mortality from hydrocephalus and other diseases of the brain seems to be high. The different diseases are so confused, that it is impossible to draw any deductions from the table; for under the head of diseases of the nervous system are grouped hydrocephalus, meningitis, cerebritis, encephalitis, softening of the brain, disease of the brain, congestion of the brain, convulsions, &c. The population in 1849 was 105,398; of this number 69,588 were whites, and 35,810 coloured; two-thirds of the latter were slaves. The deaths from diseases of the nervous system amounted to 1112, 842 of which number occurred among the white population, while only 271 among the coloured. The mortality from all diseases is very high in New Orleans, being 60.6 per 1000, while in Philadelphia it is 23.7; New York, 26.3; Baltimore, 25.6; and in Boston, 20.3. ¶

* Alison's Pathology of Scrofula. Edinburgh Medico-Chir. Trans. vol. ii.

† Davis' Annals of Universal Dispensary during the first four years.

‡ From Statist. Report on the Sickness and Mortality of the troops in the Mediterranean, 1839.

§ Leith's Mortality of Bombay.

|| Trans. of Medical and Physical Society of Bombay, 1853-4.

¶ From Stark's Vital Statistics of New Orleans, Edin., 1851.

From the foregoing it will be seen, 1st, That males are generally more liable to the disease than females. At some periods of life, however, the liability is less pronounced among males than in others; the same is also observed in some years, and in some districts, particularly in the rural. 2d. That it is more liable to occur from the sixth month to the third year than at any other period of life. 3d. That it occurs more frequently in the first and second three months of the year than in the third and fourth. In some towns, however, it is more frequently observed during the summer than the other months; generally measles, or scarlet-fever, or some other epidemic disease, prevails at the same time. As an epidemic, it has generally prevailed in the spring and first part of summer, but occasionally in the autumn. 4th. That it is much more common in towns, particularly in those in which the population increases rapidly. 5th. That climate exerts but little influence in exciting or predisposing to it, for it is frequent in the large towns of England, France, Germany, and the United States, but rare in those of Russia, Sweden, India, Persia, and the Mediterranean.

VI. *Asan Epidemic*.*—The works of Rheumelius, Plater, Ingrassus, Forestus, Lancisus, Pasquier, Willis, Sauvages, and several other writers, show that an epidemic cerebral disease has been prevalent at different times in Europe. It raged in 1503, 1510, and 1517, throughout Europe; in France in 1545, where it carried off a great number of children; in 1557 and 1559 in Germany, Holland, Spain, and Sicily. In the three first countries it occurred in connection with epidemic catarrh. It appeared in 1553 in Silesia, and proved very destructive; in 1571 in the province of Mansfelt, in Upper Saxony; in 1572 in Bavaria; in 1573 in the canton of Berne; and in 1578 in that of Bale. In 1580 it again raged in Europe. This time it occurred in connection with epidemic catarrh. The Catholic and Huguenot armies suffered severely from it in 1616.

It appeared in London in 1661. "The winter," observes Willis,¹ "had been very mild, and the spring wet. After the equinox an anomalous fever appeared, to which the name of "new disease" was given. At the end of a month it became epidemic, attacking chiefly children and youths. Some old and middle-aged men were also seized. In the first stage there was lassitude and loss of appetite, followed by vertigo, noise in the ears, delirium, and fever, more or less severe. In the second, which generally set in about the eighth day, the cerebral disorder increased, or stupor appeared, and the motions were

* From the Glasgow Medical Journal, Part XXII., July, 1858.

¹ De Morb. Convuls.

passed involuntarily. The delirium generally ended in death. Sometimes death was preceded by convulsions. In a child who died from the disease, the membranes of the brain were gorged with blood, the substance of the brain soft and watery, and the ventricles distended with clear water, to the amount of half a pint."

Willan¹ states, "that in the spring of 1800 hydrocephalus appeared to assume an epidemic character." In 1757, in the months of October and November, the disease raged at Aumale;² and in March, 1788, in Munster in Westphalia.³ It has been several times observed during the present century, under nearly similar circumstances, and at the same time of the year, as in London in 1661, in several towns on the Continent. It occurred in Harburg⁴ in 1811 or 1812, in the spring and first months of summer. It was observed at Wiesenthard⁵ some years later, from the middle of March to the end of May. The winter had been mild; the first part of March the same, the thermometer ranging from 14° to 16° Reaumur; the sky clear, and the wind south-east, south, or south-west. Towards the middle of the month the thermometer sank to 6° and 4°, and the wind changed to the north-east: 150 cases occurred. Of 24 observed by Albert, the youngest was 3 months, the eldest 9 years; the majority, 18 out of 24, were from 18 months to 6 years. Both sexes suffered equally. The disease occurred in Eisenach, in 1835,⁶ under nearly similar circumstances, in the spring and first part of summer. Croup, catarrh, nettle-rash, and scarlet fever, also existed, but it was the most prominent disease.

Vieussens describes an epidemic fever, which raged at Geneva in 1805. Gardien considered it to be hydrocephalus. Coindet does not mention this fever. He observes, however, that hydrocephalus had a great tendency to occur during the existence of catarrhal and eruptive diseases; and that during an epidemic of scarlet fever, which raged in several of the communes of Faucigny, it was very frequent. Goelis states that in Vienna, during one year, when scarlet fever was very mild and irregular, hydrocephalus was very common; and Maunthner, that in September, October, and November, 1839, the two frequently occurred in connection. Hufeland⁷ observed the same in Berlin in 1811, and Davis⁸ in London, in 1818 and 1819.

Cheyne met with it frequently after measles in 1807 and 1808; and Jadelot⁹ during epidemic inflammation of the serous membranes. Davis states, that in the winters of 1818 and 1819, synochus was common in London. It was frequently attended

¹ Diseases of London.

² Marteau de Grandvilliers, cited by Ozanam sur les Epidémies.

³ Salamann, *ibid.*

⁴ Michaelis, *Hufeland's Jour. für Heilkund*, 1812.

⁵ Albert, *ibid.*, 1830.

⁶ Jahn, *Versuche für die Prak. Heilkund.*

⁷ Polyklinik, cited by Itard.

⁸ *Annals of Universal Dispensary.*

⁹ *Jour. de Méd., an. xiv.*

by considerable cerebral congestion, which ended in hydrocephalus. Schaefer¹ observes that it occurred in Regensburg, in connection with typhus, in the month of July, 1811; and Maunthner in Vienna, with the same disease, in the spring and summer of 1842, and with hooping-cough in 1840 and 1842. The disorder was very prevalent in the Hôpital des Enfants at Paris, in 1802, 1813,² 1827, and 1836.³ The mortality from acute cerebral disease was very great in Paris in 1826 and 1827, 1212 dying in the 2 years; while in 1822, 243 died; in 1834, 233; and in 1836, 330. An epidemic cerebral disease occurred in 1824 at Turin.⁴ In the Valois,⁵ the disease has long been considered to be endemic. At Stockholm,⁶ in the General Home for children, in some years the disease assumed an epidemic character. The same has also been observed, I believe, at Barmen.

It has been frequently observed to occur, as an epidemic, in connection with inflammation of the membranes of the spinal cord (*cerebro-spinal meningitis*). It seems most liable to occur among soldiers. The circumstances which seem to favour its development are, bad food, drunkenness, mental anxiety and fatigue, combined with hot, damp, dirty, badly ventilated, and overcrowded quarters. Robust recruits, fresh from agricultural or out-of-door employments, and troops from an active campaign or a colder climate, when brought within the influences of these causes, are very liable to be seized with this form of the disease.

“It was,” Boyle states, “very prevalent among the English troops stationed at Sicily during the last French war. It was also frequently observed among the French troops during the wars of the republic and the empire, and several times since in one or other of the French garrisons, particularly at Metz, but never very extensively. From 1837 to 1842, however, it raged with more or less violence in nearly every garrison, extending in several places to the adjacent houses. It was also prevalent in the garrisons in Algiers.”

In 1846⁷ the disease appeared in Ireland. It was first noticed by Dr. Darby, in the months of May, February, and March, in the Rathdown Union Workhouse, and in April and May, in the Belfast Workhouse. It was also observed by Dr. Mayne, and Mr. Shannon, in the South Dublin Workhouse. Dr. McDowel met with two cases; Dr. Law and Mr. Smyly also met with several. It has been also observed in the New England and south-western states of America;⁸ by Dr. Hicks of Vicksburg, Mississippi; Dr. Taylor of Whiteville, Tennessee; and Dr. Ames of Montgomery, Alabama.

VII. *Influence of hereditary Transmission and Health of Parents*

¹ Hufeland's Journal, vol. xxxiii.

² Brecheteau, Thèse de Paris, an. xiv.

³ Pepin, *ibid*, 1841.

⁴ Bellingeri, Storia della Enceph. Epidem., 1825.

Bennett.

⁶ Abelin.

⁷ Mayne, Dublin Medical Journal, 1846.

⁸ Wood, Practice of Medicine, 4th edition.

in exciting or predisposing to the Disease.—Willis observed the occurrence of the disease in the child of a family, several of whom had died from convulsions; and he states, that the family of the child who died from epidemic cerebral disease were liable to disorders of the brain. Morgagni states that a child, who died from hydrocephalus, had lost a brother from the same disease. Rowley¹ saw several children in the same family die of the disease, and Cheyne attended families who had lost a large number of children. In one family 5 had died, and in two others 10 or 11. Popper saw the 8 children of a hydrocephalic mother die of the disease; Underwood,² 6 in one family; Armstrong, 4. In the *Journal Générale de Médecine*,³ it is stated that 4 died in one; in another, 3. Carmichel Smith, Douroseul,⁴ and Trousseau⁵ have each seen 3. Formey, the elder Portenschlag, Baader, Schafer,⁶ Goelis, Coindet, Guersent, and Lichtenstadt, have seen the disease occur in families, and transmitted.

Dr. West⁷ states that in 20 cases, either the father, mother, uncle or aunt, had died from consumption. I carefully noted the family history in 25 of the 53 cases which fell under my notice. The circumstances which seem to favour the development of the disease are—1. Delicacy on the part of the mother, more so than on the part of the father; 2. An insane or epileptic tendency on the part of either father or mother; 3. Extreme youth or age on the part of both parents; 4. The father advanced in years, the mother very young, particularly when a feeble constitution exists in one or both. The children of cousins seem particularly liable to this disease. The mothers in 7 of the 25 families were more or less delicate; in 5 others, they had either died from disease of the lungs, or were suffering from it; in 3 they were either insane, or liable to epilepsy; 1 was suffering from cancer of the uterus; in the remaining 9 they were generally healthy. The families of the mothers, in 7 of the 25 cases, were liable to diseases of the lungs, and in 1 to disease of the brain; in the remaining 17, but little was known of their families, or they presented no particular diseases. The fathers in 4 of the 25 families were delicate; in 4 they had either died from, or were suffering from, disease of the lungs; in 5 they were either epileptic, insane, or had suffered from cerebral symptoms; 1 had died from disease of the spine, 1 from cancer of the liver. In the remaining 9 they were healthy; 4 of this number were greatly addicted to drink, and 2 suffered from gout. The families of the fathers were consumptive or scrofulous in 6; they had a tendency to cerebral disease in 7; in the remaining 12 cases, but little was known of their families, or they presented no particular diseases. The 25 families had con-

¹ Watery Head of Children.

² Diseases of Children.

³ Tome vi., 289.

⁴ Urbe, Thèse de Paris, 1841.

⁵ Leçons Orales.

⁶ Goelis.

⁷ Medical Gazette, 1847.

tained 146 children. Of this number, 51 were more or less healthy; 7 epileptic or idiotic; 69 had died either from convulsions or hydrocephalus, 12 from acute or chronic diseases of the lungs, 4 from diseases of a scrofulous character, and 6 from scarlet fever, fever or measles.

VIII. *Influence of Scrofula.*—This is one of the most frequent predisposing causes of hydrocephalus. It has been recognised by Sauvages, Baumes,¹ Percival, Cheyne, Coindet, and Lobstein. Whytt, without referring to the existence of any scrofulous tendency, observes that “several of the children in whom he observed the disease were very delicate.” Percival found a scrofulous tendency in a large number of the cases he observed, and Piet states, that in 63 out of 87 cases which he collected and observed, tubercles existed in different organs. In some of the cases which fell under my observation, the children were apparently strong; yet they were generally soon reduced by fatigue or illness. In others they were more or less delicate, their skins being either fine, more or less coloured, or pale and muddy; their heads generally large, the veins of the neck and temples prominent, and their mental powers generally precocious. In a large number of the cases, there had existed some time or another—frequently at the time when the disease appeared—eruptions of a scrofulous character, generally on the scalp—scrofulous ophthalmia—purulent discharge from the ears, vagina, and in one case from the urethra—pneumonia, bronchitis, rickets, enlarged joints—tubercles in the lungs, mesentery, or some other organ.

IX. *Influence of continued Fever.*—When meningitis sets in during fever, it rarely makes its appearance before the 7th or 8th day, or after the 17th, or after the 12th day of convalescence. Thus, of 18 cases, in 8 the disease set in during the fever, in 10 during convalescence. Of the 8 cases, in one, a male, aged 20,² it set in on the 8th day; in a second, a male, aged 8,³ on the 8th; in a third, a male, aged 40,⁴ on the 9th; in a fourth, a male, aged 14,⁵ on the 10th; in a fifth, a male, aged 18,⁶ on the 12th; in a sixth, a female, aged 14;⁷ and in a seventh, a female,⁸ on the 17th. In the last case, deafness existed from the commencement. In an eighth, a male, aged 12,⁹ the disease set in during bilious fever. Gluge¹⁰ found the disease in the body of a soldier, who died from fever.

Of the 10 cases, in which the disease occurred during convalescence, in one, a female, aged 7,¹¹ it appeared on the 2nd day; in a second, a male, aged 11,¹² on the 7th, from exposure to cold and wet; in a third, a male, aged 13,¹³ on the 9th, from eating and

¹ Annales de Montpellier, tome i.

² Morgagni, Epist. vii., art. 9.

³ Cheyne.

⁴ Morgagni, Epist. iv., art. 8.

⁵ Myself.

⁶ Ibid.

⁷ Abercrombie.

⁸ Morgagni, Epist. vi., 4.

⁹ Coindet.

¹⁰ Atlas der Pathol. Anatomie, 9^{te} Lieferung.

¹¹ Cheyne.

¹² Myself.

¹³ Ibid.

drinking to excess; in a fourth, a male, aged 4,¹ on the 10th; in a fifth, a male, aged 21; and in a sixth, a female, aged 10,² on the 10th or 11th. In neither of these cases was there any apparent cause for the disease. Both were very delicate, and tubercles existed in the lungs. The father of one had died from ulceration of the bowels; the mother of the other from phthisis. In a seventh case, a female, aged 4,³ vomiting and purging of bile set in, followed by hydrocephalus; in an eighth, a male, aged 24,⁴ from exposure to cold, when convalescent from fever and dysentery; in a ninth, a male, aged 60,⁵ during convalescence from bilious fever; in a tenth, a female, aged 1 $\frac{3}{4}$,⁶ during convalescence from mild gastric fever.

X. *Influence of Remittent Fever.*—This fever seems to have a strong tendency to terminate in meningitis, particularly when it follows scarlet fever, measles, pneumonia, or hooping-cough, or when these diseases occur during it. The meningitis generally assumes the tubercular form. This was the case in 6 out of the 53 cases which I have observed. The tendency of this fever to excite meningitis has been observed by Woodhouse,⁷ Cheyne, and Carmichel Smith. I have not been able to find more than 3 cases recorded. Of the 9 cases collected and observed, in one, a female, aged 5 years, the fever had existed for 3 or 4 months before the meningitis set in. Her mother had died from phthisis, and a brother from convulsions. In a second, a male, aged 3, the fever had existed about 3 months; in a third, a male, aged 3 $\frac{1}{2}$, from 2 to 3 months, when scrofulous ophthalmia set in, followed at the end of 4 weeks by meningitis; in a fourth, a male, aged 1 $\frac{1}{2}$, the symptoms had existed for some time. The meningitis set in after the exposure. In a fifth, a male, aged 2 $\frac{3}{4}$, the fever had existed for 3 or 4 months, accompanied by cough, which at one time was convulsive, when measles set in, and with it meningitis; in a sixth, a female, aged 6, the remittent fever set in after scarlet fever, and terminated, from no assignable cause, at the end of 4 months in meningitis;⁸ in a seventh, a female, aged 4,⁹ the fever had followed pneumonia, and at the end of 6 months passed into meningitis; in an 8th, a female, aged 1 $\frac{1}{2}$,¹⁰ who had suffered from rickets in the first months of life; and in a ninth, a male, aged 7,¹¹ it passed into meningitis.

XI. *Influence of Intermittent Fever.*—There are but few instances recorded of ague exciting or predisposing to meningitis. Of 8 cases which I have been able to collect, in 3 the disease occurred during the fever; in 5, either on cachexia, dropsy, measles, or

¹ Cheyne.² Myself.³ Cheyne.⁴ Wepfer, *Obs. Anatomica*, 421.⁵ Parent-Duchatelet et Martinet.⁶ Bennett.⁷ Rush, *Medical Observations and Inquiries*, vol. ii., 2nd edit., 1805.⁸ Myself.⁹ Hughes, *Guy's Hospital Reports*, 1841.¹⁰ Goelis.¹¹ Mill's *Diseases of the Brain*.

scrofula, which had followed it. Fontanius¹ mentions the case of a youth, who was taken with meningitis while suffering from ague; and Bard,² 2 cases, one a male, aged 17, who had been suffering 5 or 6 months—the other a male, aged 50. Of the 5 cases in which the meningitis occurred during affections supervening on ague—in one, recorded in the *Nova Acta Physico-Med.*, it occurred in a state of cachexia; in a second, a female, aged 5½, recorded by Chardell³—the fever had left her very sensitive to cold—the meningitis occurred from exposure; in a third, a female, aged 7, recorded by Gerhard,⁴ on scrofula which occurred on ague, which had existed 7 months; in a fourth, a male, aged 19, it supervened on dropsy, which had followed the fever; in a fifth, a male, aged 8 months, recorded by Goelis, on measles and anasarca, which occurred after tertian ague.

XII. *Influence of Scarlet Fever.*—This seems to be a frequent exciting and predisposing cause of meningitis. Of 25 cases which I have collected and observed, in 10 it acted as an excitant; in 2 of the number there was a strong predisposition to disease of the brain; in 15 it acted as a predisposant. The meningitis may set in, 1st, during the premonitory stage of the fever. This occurred in 3 of the 25 cases. 2dly, During the eruptive stage. This occurred in 9 of the 25 cases. 3dly, During the disquamatory stage, or one or other of the secondary affections. This occurred in 13 of the cases. The tendency of meningitis to occur during scarlet fever has been noticed by Hopfengartner,⁵ Fermoy,⁶ Carmichel Smith, and Maunthner; after it by Coindet, in an epidemic which raged in one of the districts in the canton of Geneva in 1806; by Goelis in one at Vienna, and Hufeland in one at Berlin.

Of the 3 cases in which the meningitis set in during the *premonitory stage*, one was a male, aged 5; the second, a male, aged 7.⁷ They were brothers, and several of the family had died from disease of the brain. The fever and the meningitis were developed simultaneously. In the third case, a male, aged 9,⁸ the eruption appeared 2 days after the symptoms of meningitis had set in.

Of the 9 cases in which the meningitis set in during the *eruptive stage*, in one a female, aged 7,⁹ it occurred on the fourth day, from exposure to cold; in a second, a female, aged 2,¹⁰ on the 4th day; and in a third, a female, aged 6,¹¹ also on the 4th day; in a fourth, a male, aged 6,¹² the disease commenced with a violent convulsion on the 5th day. The eruption was preceded by a convulsion, and he had had several attacks during dentition. In a fifth, a female, aged 8,¹³ on the 5th day; in a sixth, a male, aged

¹ Analect., cap. ii.

² Jour. Gen. de Med., tome xxxii.

³ Thèse de Paris, an. 8.

⁴ American Journal of Med. Science.

⁵ Untersuchung ueber der Gehirn Wassersucht. Stutgard, 1802.

⁶ Horn's Archives.

⁷ Myself.

⁸ Berton Malad. des Enfants.

⁹ Myself.

¹⁰ Goelis.

¹¹ Piet.

¹² Myself.

¹³ Abercrombie.

3,¹ on the 5th; in a seventh, a male, aged 4,² on the 6th day; in an eighth, a male, aged 6 $\frac{3}{4}$,³ it occurred during the eruption, four years before he had had an attack, considered to be hydrocephalic; in a ninth, a male, aged 23,⁴ it occurred during the eruptive stage.

Of the 13 cases in which the meningitis set in during the decline of the disease, or during one or other of its secondary affections— in 2 cases, one a male, aged 3, the other a female, aged 2, it set in on the 8th or 9th day after the eruption had begun to decline; in a third, a female, aged 1 $\frac{1}{2}$ year, about the 10th or 12th day; in a fourth, a male, aged 2 years, with a large head and of delicate constitution, by a fall on the head; in a fifth, a male, aged 2 $\frac{1}{2}$,³ or 4 days after anasarca had set in, which, from exposure, increased rapidly, and was accompanied by severe congestion of the lungs, followed in 2 days by meningitis; in a sixth, a female, aged 7, it set in suddenly on the 8th day of anasarca;⁵ in a seventh, a female,⁶ it set in “during dropsy;” in an eighth, a male, aged 4,⁷ on the 10th day of œdema of the face and hands, and swelling of the parotid glands; in a ninth case, a patient aged nine months,⁸ it set in some days after the fever had ceased; in a tenth, a female, aged 7 years,⁹ on the 15th day, from exposure to cold; in an eleventh, a male, aged 9,¹⁰ 30 days after the first appearance of the eruption, from exposure to cold; in a twelfth, a male, aged 11,¹¹ 27 days after the fever had disappeared, on the cessation of a slight purulent discharge from one of the ears, from which he had suffered at different times for some years. The fever had left him in a state of great debility. Several of his brothers and sisters had died from disease of the brain. In a twelfth, a female, aged 6,¹² remittent fever set in after the scarlet fever; and this terminated, from no assignable cause, in meningitis.

XIII. *Influence of Measles.*—Measles, like scarlet fever, may act either as an excitant or predisposant. It is much more liable to act as the latter than as the former, for it was observed in 15 out of 18 cases. Its influence as a predisposant was noticed by Whytt, who states that he had seen several cases of hydrocephalus occur “after measles;” and by Cheyne, who met with 5 cases of hydrocephalus, all of which occurred within 8 weeks after the eruption had disappeared. Coindet also considered that it predisposed to hydrocephalus.

The disease may occur—1st, During the premonitory stage. This was observed in only 1 case. 2dly, During the eruptive stage. This was observed in 3 cases. 3dly, During or after one or other of its concomitant or secondary affections, as pneumonia,

¹ Adelman, *Allgemein. Med. Zeit.*, 1836. ² Coignet, *Thèse de Paris*, 1837.

³ Hirrich.

⁴ Parent-Duchatelet et Martinet.

⁵ Myself.

⁶ Frank, *Acta Inst. Clinica.*, an. 2, 1808.

⁷ Goelis.

⁸ Schmidt's *Jahrbücher*, 1839.

⁹ Piet.

¹⁰ Coindet.

¹¹ Myself.

¹² *Ibid.*

anasarca, remittent fever, tuberculosis &c. This was observed in 14 of the cases.

In the case in which it occurred during the premonitory stage, the patient was a delicate female, aged 3. She had had several attacks of convulsions, and the disease commenced with a convulsive attack. Her mother had died from consumption.

In the 3 cases in which the disease set in during the eruptive stage, in one, a female, aged $1\frac{1}{2}$ year, it commenced with convulsions; in a second, a male, aged $2\frac{3}{4}$, previously the subject of remittent fever and cough; in a third, a female, aged 4,¹ on the 3d day of pneumonia, which set in with the measles.

In the 14 cases in which the disease followed measles, in one, an infant, aged 16 months,² in which the measles was accompanied by cough; in a second, aged 9 months,² after measles, accompanied by pneumonia; in a third, a female, aged 8,³ on pneumonia, which had followed the eruption; in a fourth, a male, aged 24,⁴ it followed pneumonia and diarrhoea, which had supervened on measles; in a fifth, a female, aged $2\frac{3}{4}$,⁵ 4 weeks after measles, accompanied by pneumonia; in a sixth, a delicate female, aged 10 months,⁶ 3 months after the eruption, which had left her very weak; in a seventh, a male, aged $9\frac{3}{4}$ years,⁷ 3 months after the eruption, which had been followed by cough; in an eighth, a male, aged 7.⁸ On the eruption disappearing, convulsions set in. In a ninth, a female, aged 7,⁹ frequently subject to an eruption on the scalp, about a week after the measles had disappeared; in a tenth, a male, aged 8 months,¹⁰ who was brought into the hospital suffering from tertian fever and inflammation of the toe, it followed on measles, with œdema of the hands and feet; in an eleventh, a female, aged 11 months,¹¹ on anasarca, which had followed measles, from exposure to cold; in a twelfth, a male, aged 6,¹² it followed a fall on the head, about 4 weeks after measles; in a thirteenth, a male, aged 4,¹³ chicken-pox followed the measles, and this, again, was followed by hydrocephalus; in a fourteenth, a female, aged 12,¹⁴ the measles was followed by disease of the scalp, and later by cough, convulsions, stomatitis, pneumonia, and anasarca, and then by hydrocephalus.

XIV. *Influence of Small-Pox and Cow-Pox.*—But few instances have been recorded of meningitis occurring in connection with small-pox; as in scarlet fever and measles it may set in during the premonitory, eruptive, or desquamatory stages, or on one or other of its secondary affections. Of 7 cases which I have found recorded, in one, a male, aged 4,¹⁵ the meningitis set in during the premonitory stage. The pock was small and dry. Rush saw it

¹ Myself.² Mills.³ Charpentier, Hydrocephale Aigue.⁴ Parent-Duchatelet et Martinet.⁵ Hirrich.⁶ Bennett.⁷ Maunthner.⁸ Evans, Edin. Med. Com., vol. x.⁹ Maunthner.¹⁰ Goelis.¹¹ Schmidt's Jahrbücher, 1837.¹² Cheyne.¹³ Ibid.¹⁴ Berton.¹⁵ Gubert, Jour. Complement. tome xxxv.

occur during this stage. In 2 cases the meningitis set in during the eruptive stage; in one, a male, aged 4;¹ in a second, a male, aged 22.² Coindet has observed that it sometimes occurs during this stage, and Rush states that Lettsome had seen a case. In the 2 remaining cases, the meningitis set in, in one, a female, aged 7,³ during the desquamation of the disease; in another,⁴ the small-pox left bronchitis, on which phthisis supervened, and on this meningitis.

In cow-pox the disease sometimes occurs during the height of the eruption, when much inflammation exists around the pock. I have seen 2 cases. One a stout male, aged 2. Five punctures had been made on one arm; the inflammation and sympathetic fever were severe. The other a female, aged 18 months. The inflammation in this case was severe. She had from the 9th to the 13th day several large patches of erysipelas on different parts of the body. On the evening of the 13th day she was seized with convulsions, and died on the 18th. Goelis met with 3 cases. In one, a female, aged 12 months, the disease set in on the sudden subsidence of the eruption; in the other 2, males, aged 6 and 7 months, it set in when the pock was at its height.

XV. *Influence of Erysipelas.*—The disease is very liable to occur during erysipelas, particularly of the face or scalp. In 13 out of 21 cases, the meningitis set in during the existence of the eruption—in one, a female, aged 32; in a second, a female, aged 45; in a third, a male, aged 60; in a fourth, a male, aged 63; in a fifth, a male, aged 28. The last patient had just recovered from *delirium tremens* when the disease set in. They were all addicted to drink, and the disease was seated in the face and scalp.⁵ In a sixth case, a male, aged 52,⁶ it occurred during erysipelas of the face. Vague pains in the head preceded the eruption for some days. Beclard⁷ died from meningitis, which had supervened on erysipelas of the face. In an eighth case, a male, aged 11 months,⁸ it occurred on erysipelas of one of the legs, accompanied by symptoms of gastritis; in a ninth, a male, aged 53,⁹ on phlegmonous erysipelas of the arm. Frank¹⁰ met with 4 cases, in which meningitis occurred during erysipelas. They were all females. One was 15 years of age.

In 8 cases, the meningitis set in either from the retropulsion of the eruption, or from metastasis. In one case a male, about 15 years of age¹¹ from repulsion of erysipelas of the leg by external applications, inflammation of the lungs set in, then meningitis; in a second, a male, aged 20,¹² from the repulsion of erysipelas of the

¹ Goelis. ² Dubourg, Arch. Gén. de Méd., 1826. ³ Piet. ⁴ Ibid.

⁵ Myself. ⁶ Recamier in Parent-Duchatelet et Martinet.

⁷ Vianci, Thèse de Paris, 1841. ⁸ Lespagnol, in Parent-Duchatelet et Martinet.

⁹ Cruveilheir, Anat. Pathol., liv. vi. ¹⁰ Interpret-Clinica. Tubin., 1812.

¹¹ Bailly, in Bonet's Sepulchretum, De Phrenitide.

¹² Parent-Duchatelet et Martinet.

face from exposure to cold; in a third, a male, aged 37,¹ erysipelas of the face, accompanied by bilious symptoms, had existed. Under treatment he got well. The erysipelas returned, then disappeared, and he sank into a state of coma. In a fourth, a female, aged 11,² the meningitis set in on erysipelas, which had returned and disappeared suddenly on the second day. Mathey³ mentions a similar instance. In a sixth case, a female, aged 18 months,⁴ it occurred on the disappearance of some patches of erysipelas, which had appeared during cow-pock; in a seventh, an infant, 14 days old,⁵ during erratic erysipelas.

XVI. *Influence of Diseases of the Scalp and Skin.*—Meningitis seems liable to occur during disease of the scalp—1st, From the application of irritants; 2dly, From the sudden suppression of the eruption spontaneously, or by applications. It is not uncommon to find that the children had either had, some time or another, or are suffering from, disease of the scalp, when meningitis sets in. Khernius⁶ mentions a case in which it occurred from the application of an ointment composed of sulphur and arsenic to ringworm; Aurivilius,⁷ from sprinkling an eruption on the head and face with rotten worm-eaten wood. Meningitis has been observed to follow, either spontaneously or from applications, the suppression of eruptions of the scalp, by Signario;⁸ Bonet cites 2 instances; by Rush, Goelis, Seidellot,⁹ Piory,¹⁰ Charpentier, and Gerhard. The disease has been observed, in a few instances, to occur during the existence of sores or eruptions, generally of a scrofulous character, on the body.

XVII. *Influence of Blows or Falls on the Head.*—*Concussion and Diseases of the Brain, &c.*—Meningitis seems very liable to occur after blows or falls on the head. In some cases the disease is developed in the course of a few hours; in others, not for several days, weeks, or months. They may act—1st, As excitants, without there being any previous disposition. 2dly, As excitants, when a predisposition exists. In these cases a very slight injury is apt to induce it. And, 3dly, As predisposants, some other cause exciting the disease.

Of 28 cases, in one a male, aged 8 months,¹¹ it set in 48 hours after a fall on the head; in a second, age and sex not stated,¹² soon after; in a third, a female, aged 22 months;¹³ in a fourth, a female, aged 12,¹⁴ the same; in a fifth, a female, aged 3,¹⁵ a convulsion followed the fall. The meningitis set in on the third day. In a sixth, age and sex not stated,¹⁶ the same. Headache had existed for several days. In a seventh, a male, aged 4,¹⁷ on the 5th; in

¹ Parent-Duchatelet et Martinet.

² Rufz.

³ Cited by Rufz.

⁴ Myself.

⁵ Ibid.

⁶ *Emphemer. Nat. Cur.*

⁷ *Dissert.*

⁸ *Raccolto Opusculo*, xl.

⁹ *Jour. Gén. de Méd.*, tome i.

¹⁰ *De l'Irritat. Enceph.*, 1823.

¹¹ Goelis.

¹² Cheyne.

¹³ Billard, *Arch. Gén. de Méd.*, tome xxv.

¹⁴ Berton.

¹⁵ Myself.

¹⁶ Piet.

¹⁷ Myself.

an eighth, a female, aged 7,¹ within 7 days; in a ninth, age and sex not stated,² on the 8th; in a tenth, a male, aged 6,³ on the 14th. He had been subject to convulsions. In an eleventh, a male, aged $4\frac{3}{4}$,⁴ on the 14th; in a twelfth, a male aged $14\frac{1}{2}$,⁵ on the 15th; in a thirteenth, a female,⁶ the same; in a 14th, a female, aged 18 months,⁷ between 2nd and 3rd week; in a fifteenth, a male, aged $2\frac{1}{2}$.⁸ At the end of a month it was preceded by slight fever. In a sixteenth, a male, aged 4,⁹ the same; in a seventeenth, a female, aged 15 months,¹⁰ 5 weeks. The child was fretful, and lost flesh after the fall. The disease was preceded by diarrhoea. In an eighteenth, a female, aged 4,¹¹ 6 weeks; in a nineteenth, a female, aged 6,¹² the same; in a twentieth, a female, aged 4,¹³ 7 weeks; in a twenty-first, a female, aged 5,¹⁴ 2 months. In 2 other cases the disease set in at the end of 2 months;¹⁵ in 3, at the end of 10 weeks,¹⁶ in a twenty-sixth, a female, aged 6,¹⁷ several weeks after a fall on the head. Convulsions set in. They continued to occur at irregular intervals for about 6 months. Then pneumonia set in, and to it, in the course of a week, meningitis was added. In a twenty-seventh, a male, aged 4,¹⁸ the disposition and one of the eyes were altered after the fall. At the end of 18 months croup set in, and then meningitis. In a twenty-eighth, the patient, a female, aged 7,¹⁹ the head became painful after the fall. The meningitis was developed during dentition.

Wolfius,²⁰ Lamotte,²¹ and Ford,²² have also seen the disease excited by blows or falls on the head; Bourgouver²³ and Bonet, by wounds of the scalp; Rush, by falling into a cellar on the feet. The disease has been excited by exposure of the head to the sun. Albertini²⁴ saw it excite the disease in a priest and in a peasant; Pinel,²⁵ in a male, aged 40; Parent-Duchatelet and Martinet, in a male, aged 17; Charpentier, in a girl; Guersent, in an infant, 6 months old; and Maunthner, in a male, aged 3 years. Rush and Coindet also saw the disease excited by the same cause.

Meningitis occasionally follows concussion. I have seen one case. The patient, a male, aged 25, was thrown out of a gig. He remained insensible for 16 hours. On the second day of the recovery of his senses he complained of severe headache, and on the third symptoms of meningitis existed. Goelis and Lecat have each recorded an instance. It may also occur from fracture of the skull, and from effusion of blood on the surface of the brain.

Diseases of the Brain.—Tubercles and Tumors, both in the

¹ Dawson, cited by Yeats.

² Piet.

³ Gerhard.

⁴ Thibeaud, Thèse de Paris, 1837.

⁵ Piet.

⁶ Dawson.

⁷ Ransford, Edin. Med. and Surg. Journal, vol. xxxviii.

⁸ Myself.

⁹ Rush.

¹⁰ Myself.

¹¹ Goelis.

¹² Ibid.

¹³ Rush.

¹⁴ Goelis.

¹⁵ Cheyne.

¹⁶ Ibid.

¹⁷ Myself.

¹⁸ Goelis.

¹⁹ Confervion, Thèse de Paris, 1827.

²⁰ Opera Med., Obs. xiv.

²¹ Lieutaud.

²² Yeats.

²³ Wepfer.

²⁴ Morgagni Epist. v., art. 13, and Epist. vi., art. 5.

²⁵ Nosologie.

membranes and substance of the brain, may excite meningitis. When the tumours or tubercles exist in the brain, the disease seems generally to occur as a terminative affection. The same seems also to be generally the case when the tubercles are seated in the membranes, but in some cases the meningitis and the tubercular formations seem to be developed nearly simultaneously.

Whytt found tubercles in the brain in 2 cases. Coindet, Laennec,¹ Giraud,² Rouchoux,³ Maxwell,⁴ Duroseul,⁵ Mitrich,⁶ and Piet, have also observed them exist in connection with the disease. Valsalva⁷ and Greeding⁸ have each seen the disease occur in a person liable to epilepsy. Several other cases have been recorded. Two instances have fallen under my observation—one a female, aged 21; the other a male, aged 14. Children who have had convulsions seem more susceptible to the disease than those who have not, and it is not uncommon to find it preceded by convulsions. The disease has been observed to occur in connection with apoplexy, by Greeding, Parent-Duchatelet and Martinet, Rouchoux and Piet, and also with chronic softening and chronic hydrocephalus or meningitis.

XVIII. *Influence of Diseases of the Ear, Eye, and adjacent parts.*—Meningitis sometimes supervenes on purulent discharge from the ear of long standing. There is generally inflammation of the internal ear, purulent collections, or caries of the bones, in these cases. I am acquainted with an instance where a practitioner injected a solution of sulphate of zinc into the ear of a female advanced in years, who had been for some years liable to an offensive discharge. Severe headache followed, and in the course of a few hours meningitis, which proved fatal. In a case observed by Coindet, and in 2 others by Goelis, the discharge disappeared before the meningitis set in. In one of the cases observed by the latter, the cessation of the discharge from the ear was preceded by fever and pain in the side; in the other, the patient had had concussion of the brain, fever, and swelling of the parotids, followed by discharge from the right ear. The occurrence of the disease in connection with diseases of the ear has also been observed by Powel,⁹ Bourse,¹⁰ Burn,¹¹ Berton, Maunthner, and myself.

It is not uncommon to find that the patients have suffered, at one time or other, from scrofulous diseases of the eye. The disease has been observed to occur during the existence of diseases

¹ Jour. de Méd. de Corvisart, tome ii.

² Thèse de Paris, 1818.

³ Harris, *ibid.*, 1826.

⁴ Edin. Medical and Surgical Journal, vol. xx.

⁵ Urbe.

⁶ Piet.

⁷ Morgagni.

⁸ De Effus. in Cereb., Lips., 1763.

Medical Transactions, vol. v.

¹⁰ Thèse de Paris, 1821.

¹¹ Edinburgh Medical and Surgical Journal, vol. xlii.

of the eye by Senn, Charpentier, Maunthner, and Hirrich. The disease has been observed to occur during *inflammation of the parotid glands*, by Stoll¹ and Miners;² and in inflammation of the right parotid, with abscess of the adjacent cellular tissue, by myself. It has also been known to occur from syphilitic and scrofulous caries of the bones of the nose.

XIX. *Influence of Mental Emotion.*—The influence of this cause, acting through the mother on the child, and inducing the disease, has been noticed by Marcus Donatus, Hildanus, and Goelis. The last states that most of the children born after the bombardment of Vienna died from it. The too early and over culture of the brain, particularly in children of precocious mental powers and feeble constitutions, seems to strongly predispose to the disease. It sometimes occurs in adults from excessive application, particularly to subjects not before studied, or from their brains being brought too suddenly into severe work. It has been observed to follow fright alone, or with suppression of the menses, grief, long-continued or severe mental anxiety, and fits of passion, by Rhumlerus,³ Coiter,⁴ Mangetus, Chardell,⁵ Bard,⁶ Goelis, Abercrombie, Chomel,⁷ Cayol,⁷ Villeray,⁷ Moulin,⁷ Parent-Duchatelet and Martinet, Cloquet,⁸ Gupper,⁹ Berton, Piet, Alison,¹⁰ and myself.

XX. *Of the Irritation of Teething.*—This may either act as an excitant or as a predisposant. In the former case, there is often a tendency to the disease,¹¹ or it excites convulsions, and on these the meningitis occurs; in the latter, cold or wet, pneumonia, bronchitis, hooping-cough, or disorder of the stomach or bowels, seem to act as the excitants.

XXI. *Of Diseases of the Chest.*—All diseases of the lungs seem to have a strong tendency either to excite or predispose to the disease. It seems much more liable to occur in inflammations, whether of the substance of the lungs or of the bronchial membrane, attended by tubercular deposits, than in the simple forms.

Of 18 cases of meningitis in which I have had an opportunity of examining all the organs after death, in 11 tubercles existed in the lungs; in 5 of the number, in the bronchial and cervical glands; and in 3, with tubercles in other organs—liver, spleen, mesentery, pleura, and peritoneum. In 5, out of 28 cases, were tubercles formed in the brain or its membranes. Pneumonia, bronchitis, and hooping-cough, are the diseases of the lungs in which the disease

¹ Ratio Medenda.

² Kinder Krankheit.

³ Lieutaud.

⁴ Obs. Anatomica.

⁵ Thèse de Paris, an viii.

⁶ Jour. Gén. de Méd., tome xxxii.

⁷ Parent-Duchatelet et Martinet.

⁸ Jour. de Méd., 1818.

⁹ Medical and Physical Journal, vol. vi.

¹⁰ British and Foreign Review, 1837, cited by Dr. Bennett.

¹¹ In a case of chronic hydrocephalus, which has just fallen under my notice, it excited the acute form.

is most liable to occur. It may set in in all of them very early, particularly if a predisposition exists, or not for some time. In 2 cases in which it appeared after hooping-cough had existed for some time, there was considerable emaciation, and a strong tendency to tuberculosis. The disease sometimes appears during phthisis. Coindet and Goelis saw it occur during croup. In the case observed by the latter, the croup disappeared on the occurrence of the meningitis. Bouillaud¹ considers that hypertrophy of the left ventricle is liable to excite the disease.

XXII. *Of Diseases of the Organs of the Abdomen.*—The disease is often preceded and accompanied—particularly until coma becomes pronounced—by vomiting or retching. In the former case, the vomiting depends either on improper food, excesses, or upon acute or chronic inflammation or softening of the mucous membrane of the stomach; in the latter, on nervous sympathy, depending on the existence of inflammation or irritation at the base of the brain. Cerebral disease seems to be somewhat liable to occur in chronic or subacute softening of the stomach in children. Diarrhœa, like vomiting, sometimes precedes the meningitis. In some cases the patients have had an attack of diarrhœa, which has reduced them considerably, and during this the meningitis has set in; in others, diarrhœa has existed at the time the disease has appeared, from ulceration or inflammation of the mucous membrane; in others it appears during it, depending on sympathy between the brain and intestines or liver, the latter pouring out a larger quantity of bile than usual into the intestines, or upon the exhibition of calomel. Diseases of the kidneys may either excite or predispose to the disease. In the cases in which the disease has been excited by the suppression of the perspiration, marked congestion of the kidneys existed at the commencement of the disease; in another, the disease occurred during suppression of the urine. In one of the cases, as well as in the last, urea was found in the blood. In 3 cases, the diseases set in during albumenurina.

XXIII. *Of Rheumatism, Syphilis, Fatigue, Excesses, &c.*—Stoll, Rush, Goelis, Coindet, Abercrombie, and Hennen, have seen the disease set in during acute rheumatism. In the case observed by Hennen, pneumonia also existed. Foville has seen it occur during acute general articular inflammation, which had followed the injection of a stimulating lotion into the scrotum, to cure hydrocele. Parent-Duchatelet and Martinet state, that in one of the cases observed by them, it occurred during metastatic rheumatism or gout; and Bailly, soon after rheumatism. It has been observed to occur in connection with or after syphilis, by Lieutaud, Deslands, Mazet,² and Parent-Duchatelet and Martinet;

¹ Leçons.

² Parent-Duchatelet and Martinet.

after excessive fatigue, by Morgagni, Mitivie, Parent-Duchatelet and Martinet (with great mental anxiety), Charpentier, Biett, Maunthner, and myself (with exposure to cold and wet). It has been observed to follow drinking to excess by Bourgouver, in a soldier, suffering from a wound of one of the temporal muscles; by Pinel, from the same cause, after a blow on the head. Hildanus, Morgagni, Chomel, Laennec¹ (the patient had presented indications of mental alienation for 3 months), Parent-Duchatelet and Martinet, Martin,² Carmichael,³ Hughes⁴ (9 months before had received a blow on the head), Charpentier, Cless,⁵ Hirrich, and myself, have seen it follow excesses either in drinking or eating.

CHANGES FOUND AFTER DEATH.

I. IN THE SKULL.—1. *Dura Mater*.—This membrane is seldom affected. When alterations are found in it, they generally occur in connection with caries of the bones of the skull. They consist of congestion, thickening from the deposit of lymph, pus, or ulceration. With these alterations, serum, more or less copious, is found in the arachnoid cavity, its existence depending on the amount of irritation or congestion excited in the fold of the arachnoid lining it. Sometimes, from inflammation being set up, the serum is mixed with pus, or the arachnoid is covered with a layer of pus, and occasionally of false membranes, by which it adheres to the cerebral fold of the arachnoid. In ulceration of the dura mater, the brain in its immediate vicinity is sometimes softened, ulcerated more or less deeply, or the seat of abscess, varying in size from a pea to a hazel nut, or large chestnut; and in caries of the skull, communicating by a sinus, varying in length from a few lines to $\frac{1}{2}$ or $\frac{3}{4}$ of an inch, with the internal ear or surface of the skull. Alterations in the brain are much more frequently observed in disease of the dura mater of the base and lower third of the skull, than in the upper two-thirds. The sinuses of the dura are generally loaded with blood, fluid or coagulated. Sometimes they contain long clots of fibrine. In a few cases they are found nearly or quite empty. They have been observed, and also the veins on the surface of the brain, to contain air. Two or three observers have found pus in the sinuses. Their internal surfaces, when they are distended with blood, are dark-coloured, but, except in cases which have fallen under my notice, it disappeared on washing; the lining membrane of the

¹ Auscult. Mediate, tome i, p. 168.

² Cruveilhier, 8 livraison.

³ Dublin Medical Journal, vol. iv.

⁴ Guy's Hospital Reports, 1844.

⁵ Schmidt's Jahrbücher, 1837.

large vessels and cavities of the heart presented a similar and equally permanent alteration.

2. *In the Arachnoid.*—Injection of the *fold lining the dura mater*, varying in intensity from a slight blush of redness to bright red or deep venous, with serum in the arachnoid cavity, varying in quantity from 2 to 8 or 10 ounces, or sero-purulent fluid; or covered with a layer of pus or false membranes, sometimes adhering by the latter to the cerebral fold. Serum, either pale, citron-coloured, or red, is most frequently observed, sero-purulent fluid or pus but seldom, and false membranes still less seldom. When the last are found, they are generally the result of chronic or subacute inflammation. Tubercles are very rarely found in this membrane. In only one case, out of 28, which I have examined, did they exist. In this case they were very minute, and consisted of two or three circular patches near the apex of the skull.

The *cerebral fold* of this membrane is sometimes found opaque and thickened, and adherent to the pia mater by false membranes or tubercular deposits. These alterations are much more frequently observed at the base than at any other part.

3. *In the Pia Mater.*—It is in the pia mater, and the space between it and the arachnoid, that changes are most frequently found. In the membrane they consist of injection, more or less intense, opacity and thickening, with adhesions with the brain—between itself, in the convolutions and fissures of silvius, and between it and the arachnoid; in the space between it and the arachnoid, of serum, or seropurulent fluid, varying in quantity from 2 to 6 or 8 drams; and of false membranes or pus. The last generally follows the course of the large vessels. This is particularly the case when it is thick, and the walls of the vessels are more or less opaque and thickened.

4. *In the Brain.*—The cortical substance is sometimes congested and softened, particularly when the pia mater is similarly affected; softened when the latter is opaque and adherent; ulcerated, rarely however extensively, when the dura mater and other membranes are ulcerated, and the skull carious. The softening in the first case is non-inflammatory; in the two last inflammatory, non-inflammatory softening sometimes existing. The medullary substance is sometimes congested, sometimes pale, œdematous, and softened. The fornix and septum lucidum are frequently softened, the latter often diffuent; and occasionally the corpora striata, the commissura major, and the optic thalami; and the cerebellum, with the spinal cord, is also frequently softened, particularly in some cases in which death has ensued from convulsions. In only one case out of 28 was the brain denser than usual. The lateral ventricles were frequently largely distended, containing from 2 to 3 or 4, and occasionally 6 ounces of clear serum. In a few cases the serum was mixed with purulent fluid, or shreds of false membranes. The walls of the ventricles,

in the latter cases, were covered with false membranes, and the brain softened to the depth of a few lines or more. In one case, the fourth ventricle was distended with sero-purulent fluid, its walls covered with a thin layer of false membrane, and softened to a very slight depth. The lateral and fifth ventricles were empty. The nerves at the base of the skull rarely presented any alterations; in some cases they appeared redder than usual, and in a few instances the optic commissure, or one or both of the optic nerves, were softened.

5. *In other Organs.*—Tubercles were frequently found in the lungs—sometimes cavities; enlargement of, or tubercles in, the bronchial and cervical glands, and occasionally in the mesenteric; tubercles in or on the liver, spleen, peritoneum, and pleura. The mucous membrane of the stomach was sometimes found congested, easily separated or softened; that of the intestines congested or ulcerated. In a few cases the liver and spleen were congested; the kidneys frequently. In the cases in which the disease occurred in connection with dropsy, fluid was found in the cellular tissue, the peritoneal and pleural cavities, and sometimes in the pericardium. Fluid was sometimes found in the last, when none existed in other parts of the body, except the skull. Tubercles did not always exist in the brain when they were found in other parts of the body, although in no case were they found in the brain, or its membranes, without existing in the lungs.

GENERAL SYMPTOMS.

The disease may occur, 1st, In the dura mater, or the fold of the arachnoid lining it. 2dly, In the cerebral fold of the arachnoid, the pia mater being generally affected. 3dly, In the pia mater, *a*, on the hemispheres, *b*, at the base, and *c*, generally. It is in the 2nd and 3rd, that the cerebral fold of the arachnoid is most frequently implicated. 4thly, In the ventricles. 5thly, In the cerebellic membranes. And, 6thly, In the membranes of the brain and cord.

The disease will be best considered by tracing the symptoms present when it affects the different membranes or parts of the brain, and comparing them with the changes found after death.

1st, *As it affects the dura matral fold of the Arachnoid.*—This form was observed in 3 of the 28 cases which proved fatal. The result either of congestion of this portion of the arachnoid, or inflammation, was effusion of serum, sero-purulent fluid, or pus, into the arachnoid cavity. In one of the cases (No. 1), the patient was suffering from general dropsy, with fever. The cerebral symptoms set in with vomiting; later, stupor was added. It increased gradually, and the patient became comatose and died. In the second (No. 2), the patient was suffering from disease of the ear,

the discharge from which had stopped. Severe pain in the side of the head set in, with fever and vomiting, followed by stupor, which passed into coma. Delirium existed at times, but it seemed to depend on the severity of the pain. In the third case (No. 3), the patient was suffering from erysipelas. The occurrence of the cerebral symptoms was indicated by severe headache, fever, alteration in the speech, feebleness of the extremities, and somnolence, which passed into coma. The following table will show the chief symptoms observed, and the changes found after death:—

I. General dropsy existed, the face, upper extremities, and chest, being affected. Before the stupor became marked, the patient had vomited frequently, and had had diarrhoea.

When seen on second day, stupor existed. Pulse quick and feeble; pupils dilated. Motions and urine passed unconsciously. Could be roused slightly. Enveloped in hot wet blanket. Counter-irritation to head; diuretics.

3rd—Rather more conscious. Skin and kidneys had acted freely. Breathing difficult from fluid in the chest.

6th day—Death.

Sinuses gorged with blood. Large quantity of fluid in the arachnoid cavity. Dura mater arachnoid red. Brain pale and œdematous. A little fluid in the ventricles and spinal canal. Fluid in all the cavities. Kidneys patches of congestion. Spleen rather large.

II. Scrofulous discharge from ear, and deafness for some time. Cessation of discharge, followed by pain in ear, increasing in severity.

4th day seen—Pulse 98; fever; face flushed, and eyes brilliant. Leeches, warm bath, salines.

5th—Pulse less quick. Face dull. In night delirium.

Evening—Access of fever; vomiting. Pain severe, affecting side of head. Leeches and opiate.

6th—Dullness increased. Pupils rather large, not active; pulse 86.

Evening—Access of fever and pain.

7th, Morning—Slight access of fever; increase of stupor; pulse laboured. Less pain.

Evening—An access of fever. Discharge from ear.

8th—Answered questions with difficulty; breathing laboured. Discharge from ear scanty.

10th—Death.

Dura mater on petrosal bone deep red. Arachnoid on side of skull, and superior surface of tentorium, covered with pus. Pus had gravitated to base of skull: No alteration of nerves. Brain rather congested. Lateral ventricles, a little serum. Ear carious, and filled with pus. Lungs contained tubercles and tubercular excavations; they adhered to the pleura.

III. Suffering from erysipelas, which was desquamating, when headache set in, and pulse rose to 110, with fever.

2nd day—Utterance rather difficult; face dull. Pulse 96. Leeches repeatedly applied.

4th day—Coma.

5th—Death.

Sinuses distended with blood. A large quantity of red serum, 6 to 8 ounces, in arachnoid cavity. The dura matral fold of arachnoid highly congested. Brain congested.

2nd, *As it affects the Ventricles.*—Effusion into the ventricles, or inflammation of their lining membrane, seems to occur but seldom, as an isolated or acute affection. One or the other is frequently met with in connection with inflammation of the membranes of the base of the brain; occasionally with inflammation of the pia mater, on the superior aspect of the hemispheres, or effusion into the arachnoid cavity. The disease occurred in the ventricles in 3 out of the 28 cases. In one of the number (case 4), there was slight induration of the brain; in another (case 5), slight deposit of false membranes at the base of the brain. In two of the cases, the disease occurred after falls on the head; in the third, in connection with hooping-cough. In one case (No. 4), the chief symptoms were, alteration of temper, emaciation, insensibility, with frequent cries occurring in accesses, and rolling of the head; involuntary escape of the contents of the bladder (from over-distension) and rectum, and convulsions. Immediately after the fall convulsions occurred, and they continued to occur at times throughout. In the second and third cases (Nos. 5 and 6), the symptoms bore a close resemblance to those observed in the first. In the second case, however, symptoms indicating the existence of inflammation of the membranes at the base of the brain existed.

IV. After fall on head, taken with convulsions, which continued to occur once or twice a week. The temper altered. Emaciation set in, but appetite continued good. In fifth week became gradually insensible; uttered loud shrieks at times.

5th day of insensibility seen. Cries frequent, as if from intense pain in head, which was rolled from side to side. Skin rather warm; pulse irregular, 120; respiration feeble, but regular. Pupils dilated, and insensible to the strongest light. Motions and urine passed involuntarily, the latter from over-distension of bladder. Leeches, calomel, mercurial frictions, blister to head.

6th—Convulsions, during which head thrown back, body rigid, eyes fixed, and corners of mouth drawn down.

There was but little alteration in the symptoms up to the twenty-fifth day, when death took place. The day before death patient presented the following state:—Emaciation extreme; insensibility complete; pupils dilated and insensible. Cries frequent, occurring in accesses. Eyes, face, and hands agitated from

time to time; limbs rather rigid, and when flexed, caused the cries to increase.

The longitudinal sinus contained fibrinous clots. A little clear serum escaped from the arachnoid cavity. There was slight thickening near the torcular herophili, as if from the deposit of lymph under the dura matral fold of arachnoid. The ventricles were distended with from 6 to 8 ounces of serum. The brain was whiter and rather denser than usual. Fluid existed in the spinal canal. Cord and membranes, no change. The organs of the chest and abdomen seemed paler than usual. The mucous membrane of the stomach was easily separated.

V. After fall on head, temper changed; emaciation set in, and appetite failed. Bowels confined, and slight fever towards night; then very fretful and passionate. Sleep disturbed.

In the fourth week, headache (frontal) passing, dimness of sight, and occasionally vomiting; confined bowels. Pulse 110; head hot; pupils natural. Warm bath; calomel and jalap and salines. Better, but was silent, inactive, and indifferent.

In night of eighth day from first appearance of headache, awoke with very severe headache, causing screams. Relieved by bathing head with cold vinegar and water.

9th day—Slight somnolence. Frequent cries of, "Oh my head!" and tossing about the bed. Answers obtained with some difficulty. Appetite ravenous, but vomited everything soon after taken. Pupils rather dilated and inactive. Pulse 110; during the accesses of headache, 130 and 140. Tincture of aconite, in large and frequent doses, with iced water to head, gave slight relief. Calomel and mercurial frictions.

10th—Early part of night, tempestuous. Relief to the pain, and a little troubled sleep, obtained by iced water to head, and frequent doses of sedative solution, with aconite.

11th—No pain, but feeble and exhausted. Respiration irregular. Pulse 140. Pupils dilated; right eye wide open; left lid falling.

Evening—Respiration noisy; pulse scarcely perceptible. Insensible. Death in morning of 12th.

Sinuses empty; convolutions flattened; ventricles distended with a large quantity of slightly turbid serum. There was a slight deposit of false membranes on the outer walls of the ventricles, in the right, of the size of a five-shilling piece; on the left, larger and irregular; the vessels ramifying on the ventricular walls enlarged. There was a slight irregular deposit of false membrane at the base of the brain, from the optic commissure, back as far as the medulla oblongata. A little serum existed in the spinal canal; cord—no change. The lungs and bronchial glands were tuberculous; heart small. Pericardium contained $1\frac{1}{2}$ ounce of serum.

VI. The disease had set in during hooping-cough. I had not an opportunity of watching the case. The chief symptoms were

insensibility, frequent cries, blindness, retention of urine, the bladder emptying itself by regorgement, and inability to retain the fæces. The former was ammoniacal, the latter yellow and fluid. There had been neither convulsions nor delirium.

The vessels ramifying on the brain were slightly injected; the convolutions flattened. The lateral and fourth ventricles largely distended with lactescent serum; their walls covered with a thin layer of false membrane. The brain pale and rather soft. The bronchia were distended with greenish mucus, and their lining membrane seemed rather thicker and more vascular than usual. Bronchial and cervical glands enlarged. Mucous membrane of stomach rather soft; that of the intestines vascular.

3rd. *As it affects the Pia Mater.*—*a. On Hemispheres.*—The disease was observed in this part of the brain in 5 of the 28 cases. In all the cases pus was found. In one case (No. 7), the disease occurred during an abscess near the angle of the jaw, and empyema, and commenced with irregular chills and heats, accesses of cerebral excitement, alternating with drowsiness, which at length passed into coma. Paralysis of one side of the body existed. In the second case (No. 8), the disease set in during erysipelas, with severe headache, quick pulse, delirium, cries and agitations occurring in accesses; stupor passing into coma, rigidity, and contraction of both arms and one leg. In the third case (No. 9), the patient had suffered for some time from obstinate tic-douloureux. Coma and rigidity, with contraction of the right arm and leg, were the chief symptoms, with an access of excitement, and an increase in the rapidity of the pulse and heat of the skin at night. In the fourth case (No. 10), the disease set in during erysipelas, with tremblings, followed by somnolence, delirium, and agitation. The somnolence passed into coma. In the fifth case (No. 11), the disease set in during measles, accompanied by pneumonia. The measles had been preceded by an attack of convulsions, followed by increasing feebleness of the left arm and leg. The chief symptoms were, frequent accesses of convulsions, cries, and agitations; increased sensitiveness of the skin; somnolence, passing gradually into coma. In this case the right corpus striatum was softened, the ventricular membrane inflamed, and walls of ventricles softened.

VII. Abscess near angle of left jaw for 9 days; for 3 days suffering with pain in the side and difficulty of breathing, and for 2 with frequent attacks of chills, followed by perspirations.

10th day—With the perspiration, great cerebral excitement; cries and agitation. Pulse 120. In the intervals slight tendency to drowsiness. Pulse 96; skin hot; no headache. Pupils natural and active. Leeches, calomel.

11th to 14th day—Increasing drowsiness; cries and agitations at times. Feebleness of the right side, passing into paralysis. Pupils dilated; breathing difficult.

14th—Coma.

15th—Death.

Arachnoid, lining dura mater on left side, deeply congested, and covered with pus, some of which had gravitated to base of skull. Vessels on surface of brain injected; pia mater in the convolutions injected, and serum existed in the subarachnoid space, and in the lateral ventricles (2 to 3 drachms). Brain injected. One pint of sero-purulent fluid existed in the pleural cavity; pleural membrane covered with false membranes. Liver and kidneys patches of congestion.

VIII. Suffering from erysipelas, when severe headache set in, and pulse rose from 90 to 110. The same night delirium, cries, and restlessness. Bled largely.

2nd day—Accesses of cries, &c., at times; in intervals muttering delirium. Questions answered sometimes to the purpose, sometimes not; sometimes obliged to seek for proper words. Bled.

3rd.—Severe access of delirium, and cries in the night. Face pale, but cheeks flushed; pupils dilated. Answers to questions obtained with difficulty. Pulse labouring. Urine and fæces passed unconsciously. Arms flexed and rigid; most marked in the right; the leg of this side also affected. Bled.

4th—Frequent accesses of delirium; no answers to questions. Increased flexion and rigidity of right arm and leg.

5th—Death.

Pus in the subarachnoid space, on sides of cerebral hemispheres, most marked on the left side. Pia mater injected. Cortical substance of brain dark and softened, non-inflammatory; cerebral substance injected. Ventricles, 3 drachms of serum.

IX. When seen, insensible and speechless; but at the request of wife, made an effort to open mouth. Right arm and leg rigidly flexed at right angles; pupils but little dilated. Pulse 86. Skin cool; bowels confined. He had been suffering for a long time with tic-douloureux of the left side of face. The insensibility set in rather suddenly. Croton oil, calomel, sinapisms.

In evening an access of excitement, during which his pulse became very quick and skin hot.

Death in morning.

Sinuses distended with blood. On the middle lobe of left hemisphere, a collection of pus (1½ ounce) bound in between the arachnoid and pia mater, in a space the size of the palm of the hand. The pia mater was red; the cortical substance the same, the latter softened, non-inflammatory. Brain congested; ventricles empty.

X. While suffering with erysipelas, taken with trembling, which continued for 30 minutes. No increase in the temperature of the skin followed. Great depression; questions answered with indifference. Pulse 80, labouring; head painful. Bled; purgative enema.

2nd day—Slight somnolence; delirium and agitations. Pulse 115, hard; inspirations 36. Arms and legs affected from time to time with tremblings. Urine scanty and high-coloured. Bled, blister to neck, and sinapisms to legs. The stupor increased; pupils dilated, and but little sensible to light. The delirium and agitations continued.

On 6th day, coma profound; death.

Sinuses distended; pus in the subarachnoid space, rather more marked on the right side than left, and thickest along the vessels. Pia mater on superior aspect of hemispheres red; brain dark-coloured and rather soft; lateral ventricles contained 2 drachms of serum.

XI. Liable to convulsions; before measles appeared, an attack, which was followed by increasing feebleness of the left arm and leg. The measles was accompanied by pneumonia. Convulsions set in suddenly, and continued for an hour; they left the patient agitated, and crying constantly. Skin hot; pulse 120; eyes closed. Leeches, calomel, and antimony.

2nd day—Eyes convulsed in different directions; pupils dilated, contracting slightly to light, and intolerant of it. Cries uttered when moved or touched.

Evening—An access of convulsions.

3rd—Cries frequent. Pulse 130; skin hot. Blister to scalp.

Evening—A slight access of convulsions.

4th—Insensible; pupils dilated; eyes directed upwards. Death.

Sinuses and vessels injected, the latter, on apices and sides of hemispheres, surrounded by pus. Lateral ventricles contained 3 ounces of lactescent serum; walls softened (inflammatory) superficially, and covered with false membranes. Right corpus striatum softened (inflammatory) to the depth of an eighth of an inch; the septum lucidum, fornix, and rest of the brain, rather soft. The apices of both lungs contained tubercles; the superior lobe of left lung, and superior and middle lobes of right, indurated. Heart distended with blood.

b. Of the Pia Mater alone (or with the Arachnoid) of the base.—The disease occurred in this part of the brain in 3 out of the 28 cases. In 2 of the number, the ventricles were distended with fluid; in one, their walls were covered with false membranes. In the third, the cortical substance was softened in the fissures of silvius. In one case (No. 12), the disease set in during scarlet-fever. The chief symptoms, when seen the day before death, were stupor—it had only existed a day; dilated pupils, frequent cries, quick pulse, respiration irregular; later noisy and quick; frequent convulsions. In the second case (No. 13), the disease set in during the premonitory stage of scarlet fever. The chief symptoms were, stupor, eyes fixed, pupils dilated, quick pulse, headache, cries, increased sensitiveness of the skin, noisy respiration, and towards the close of life, difficult deglutition. In the

third case (No. 14), the disease set in during measles. The most prominent symptoms were, vomiting, feeble and irregular respiration, somnolence, dilated pupils, quick, feeble pulse, and general relaxation of all the muscles. Death ensued during a slight convulsion.

XII. The disease set in during scarlet fever. Not seen until the day before death. Headache had existed 16 days, but stupor had not been noticed until the day before. Head hot; pupils dilated; cries frequent, as if from severe pain. Pulse 130; skin not very hot. Emaciation marked. Respiration irregular and quick. Appetite ravenous; motions green and frequent; abdomen tense. Warm bath; calomel and digitalis; blister to nape of neck.

2nd day—Same. Face pale; eyes and mouth surrounded by dark rings. Cries and great restlessness. Pulse 140; respiration noisy and quick. Mustard foot-bath. Severe convulsion; several occurred during the night. Death.

Sinuses and vessels of surface of brain injected; patch of tubercles on anterior right lobe, and in the fissures of sylvius. In the latter they were imbedded in recent false membranes, and the cortical substance was softened (inflammatory); the cerebrum was injected. Ventricles, 4 drachms of red serum; cerebellum softened (non-inflammatory), and cord, as far as examined, the same.

XIII. The disease had set in 10 days before seen, during the premonitory symptoms of scarlet fever. Stupor; answers indistinct, and obtained with difficulty; eyes fixed, pupils dilated, but sensible to light. Pulse 120; fever, headache; cries frequent and plaintive; delirium. Skin evidently sensitive, and moving the limbs caused cries to be uttered. Urine and motions passed in bed, rather from indifference than paralysis. Respiration noisy. Leeches, calomel, and digitalis; the former had been given. Socks saturated with mercurial ointment.

14th day—Sensible; mouth sore.

15th—Passed a restless night, delirious and agitated; more stupor.

16th—Stupor increased; no answer to questions. Breathing noisy, irregular. Pulse 140. Deglutition very difficult.

17th—Coma; death.

Sinuses and vessels on surface of brain injected; pia mater at base of brain injected. Here, from 6 to 8 drams of lactescent serum; lateral ventricles, 3 drachms of lactescent serum, and their walls covered with false membranes; septum lucidum softened; brain injected. Lungs contained tubercles. Bronchial mucous membranes injected; liver and kidneys the same.

XIV. The disease set in during measles. The eruption never fully developed itself. Seen about the fourth or fifth day. Vomited frequently; breathing feeble and irregular, slight somnolence, pupils dilated; face pale, sometimes flushed; pulse 120. No cries

uttered. Body and limbs seemed to be in a state of general relaxation. Wine had been given, under the idea that the infant was suffering from false meningitis. Croton-oil liniment to head, and tincture of cantharides internally. The latter caused a large quantity of urine to be passed. Coma less marked; at times it looked round, and recognized objects.

By eighth day better; features were, however, very pinched, eyes and mouth surrounded by dark rings. Pulse and respiration very feeble. Slight convulsion in night, in which it died.

The sinuses contained fibrinous clots. Minute tubercles existed on the surface of the middle lobes, in the fissures of sylvius, and on the walls of the lateral ventricles and choroid plexus; the lateral ventricles contained 2 drachms of serum. The pia mater at the base of the brain was injected, and a thin layer of false membrane existed. The right lobe of the cerebellum, immediately below the surface, contained a tubercle of the size of a pea. The brain and spinal cord were generally pale and œdematous.

c. General Inflammation of the Pia Mater.—The disease seems to be more liable to occur generally than partially, for it was observed in 8 out of the 28 cases. In 2 of the number, pus existed at the base of the brain; in 5, false membranes; and in 1, lactescent serum, with opacity of the arachnoid. In 6 of the 8 cases, the lateral ventricles were distended with serum; in the remaining 2 they were empty, but the fourth ventricle was distended. In 3 of the former cases, the septum lucidum and fornix were softened; in one of them, the great commissure was also softened; and in a second, both corpora striata; and in a third, one. In 4 of the 8 cases, the disease set in during remittent fever; in a fifth, during the premonitory stage of scarlet fever; in a sixth, during fever; in a seventh, during convalescence from fever; and in an eighth, after a fall on the head. In one of the cases (No. 15), in which the disease occurred during remittent fever, the chief symptoms were, headache, vomiting, fever, quick pulse, and respiration; stupor, cries and agitation. Remission of symptoms, followed by general convulsions; difficult deglutition and respiration; rigidity of arm, strabismus; convulsions of muscles of face, eyes, larynx, and arms; and later, of all the muscles. In two of the other cases (Nos. 16 and 17), the symptoms bore a close resemblance to the first; but there was—and also in the fourth case (No. 18)—a marked aggravation of the symptoms in the evening. In the last case (No. 18) no convulsions occurred. In the fifth case (No. 19), in which the disease set in during the premonitory stage of scarlet fever, the chief symptoms were, headache, aggravated at times; vomiting, delirium, slight stupor, and passing strabismus; later, convulsions, followed by feebleness, first of right side, then of left leg; convulsions of muscles of eyes and face; irregular pulse and respiration; and before death, general convulsions. In the sixth case (No. 20), in which the

disease set in during fever, the chief symptoms were, headache, vomiting, delirium, agitation, stupor, irregular respiration, strabismus, ptosis, rigidity of right arm and leg, convulsions of muscles of face and eyes, and coma. In the seventh case (No. 21), in which the disease set in during convalescence from fever, the chief symptoms were, headache, delirium, slight stupor, urine and fæces passed in bed, and agitation; later, vomiting, quickened respiration; convulsions of muscles of eyes, eyelids, and face; sores on nates and back of neck. In the eighth case (No. 22), in which the disease set in after a fall on the head, the most prominent symptoms were, headache, vomiting, fever, agitation, stupor, convulsions of muscles of eyes and eyelids, cries, convulsions of muscles of face, irregular pulse and respiration, general convulsions; remission, followed by convulsions, stupor, and strabismus; remission, followed by convulsions and noisy respiration.

XV. The disease set in during remittent fever. It commenced with headache, great fretfulness, and loss of sleep. The headache was aggravated by motion, and attempting to fix the attention. Frequent vomiting of greenish fluid.

When seen on the fifth or sixth day, face pale and anxious; head hot, skin dry, pupils contracted. Pulse varying from 110 to 120; respiration hurried; bowels very open; motions watery and green; urine scanty, turbid, and foetid. Warm bath, salines, with hydrocyanic acid and henbane.

2nd and 3rd days—Better.

4th—Had had a slight convulsive attack; sickness troublesome, headache severe, aggravated by accesses, during which uttered plaintive cries, and was agitated and delirious. Pulse quick and irregular; respiration the same; pupils rather dilated; slight stupor. Warm bath, calomel, and digitalis; iced water to head.

5th and 6th—Same state.

8th—Better. Had slept for 2 hours, and on awaking, sat up; demanded food, and took an interest in what was passing. This state lasted 4 hours; then became restless and agitated, followed by convulsions, which lasted several minutes.

Evening—Respiration and deglutition difficult; pulse variable; stupor more marked. Croton-oil liniment to scalp.

9th—Rather better, and for half an hour a return of consciousness.

10th—Stupor increased; pupils more dilated; cries frequent. Left arm retained across the chest, though it did not seem rigid; strabismus. Eyes half closed.

11th—Stupor increased; arm rather rigid; red flush on cheeks. When moved, uttered short cries.

In night, frequent short convulsive attacks, which were chiefly confined to the muscles of the larynx, face, eyes, and arms.

15th—Death, after a severe attack of general convulsions.

Sinuses and vessels on surface of the brain injected; pia mater the same. At the base, concrete pus existed, extending from the fissures of sylvius to the annular protuberance; minute tubercles existed in this part. The lateral ventricles contained about 3 ounces of serum; the septum lucidum, fornix, and great commissure, were softened, particularly the two first. The brain, both cortical and medullary parts, were deeper coloured than usual; the nerves at the base of the brain the same. Tubercles existed in the lungs, bronchial, cervical, and mesenteric glands; the mucous membrane of the stomach easily detached; that of the intestines congested, and in parts ulcerated.

XVI. The disease set in during remittent fever. For 3 or 4 days before seen had been suffering from headache and vomiting. When seen, was emaciated, disinclined to motion; bowels confined, abdomen tense. Pulse 100, skin rather harsh and hot, urine turbid.

In the evening there was an aggravation of these symptoms; the pulse rose to 130, and there was delirium. Warm bath, calomel and jalap, followed by henbane and hydrocyanic acid.

2nd day—Much better.

Seen again on evening of fifth day. Then there was marked fever, headache, cries, alternating with stupor and muttering, dilated pupils, and intolerance of light. Pulse 140. Warm bath, followed by relief; calomel and digitalis.

6th—Pulse 100, skin cooler; stupor and pupils the same. Leeches.

Evening—An access of fever as before. Warm bath.

7th—Stupor rather more pronounced; cries frequent. Left pupil more dilated than right, right lid falling; strabismus of this eye; right leg and arm seemed to be moved with difficulty.

Evening—An access of fever.

8th, Morning—An access of fever. Arm and leg motionless; face and eyes convulsed at times.

Death in evening, during the access of fever, from convulsions.

Sinuses and vessels of brain injected; pia mater injected. This was particularly the case around some irregular patches of minute tubercles on the anterior, middle, and posterior lobes of one hemisphere; the arachnoid adhered at the points where the tubercles existed. Tubercles existed in the fissures of sylvius and false membranes, and serum at the base. The lateral ventricles contained half an ounce of serum; the left corpus striatum was softened superficially; the septum lucidum, fornix, and cerebellum softened, particularly the last. Tubercles existed in the lungs; the cervical, bronchial, and mesenteric glands, were enlarged, and the mucous membrane of the stomach, ileum, and cœcum, injected.

XVII. The disease set in during remittent fever. When seen, there was frequent vomiting, fever, headache, thirst, clay-coloured,

slimy motions, and quick pulse. Warm bath, calomel and jalap, henbane, and hydrocyanic acid.

In evening, an access of fever, with restlessness and cries, and a convulsion. Leeches, calomel, and digitalis.

2nd day—Convulsions severe, in intervals insensible; lids half closed, pupils large, at times squinting in different directions, and convulsive twitchings of the muscles of the face and eye-brows. Pulse 130; respiration noisy and irregular. Iced water to head.

3rd—Same.

4th, 8 a.m.—Sat up, but was silent, and indifferent to what was passing. Pulse 125, feeble; breathing feeble, at times rather difficult, and the face affected with contractions.

3 p.m.—Stupor, pulse 136; respiration noisy. Croton-oil liniment to head.

7 p.m.—Skin hot, restlessness, cries, respiration at times arrested, face flushed; pulse very rapid.

8 p.m.—Convulsions, followed by coma.

Death at 11 p.m.

Sinuses clots of fibrine, pia mater between the convolutions injected, serum in the subarachnoid space and false membranes at the base, and in fissures of sylvius; the lateral ventricles contained 1 ounce of serum; fornix and septum lucidum softened, brain injected. Tubercles existed in the lungs, on the pleuræ, spleen, and liver; a little fluid in the pericardium. Heart small, mucous membrane of the stomach softened.

XVIII. In this case the disease set in during remittent fever. I did not see it until the day before death. Then it was in a state of coma; pupils dilated; face decomposed; the cornea of the right eye ulcerated, the left commencing to ulcerate; nates ulcerated. The chief symptoms, from what could be gleaned, had been severe headache, vomiting, cries, and agitations. Before the stupor set in, the last had been interrupted by fits of screaming, lasting from a few minutes to an hour. The disease lasted about 14 days. As in the other cases (Nos. 16 and 17), there was an aggravation of the symptoms at night. No convulsions occurred.

Fibrinous clots existed in the sinuses, the pia mater was injected, and a little serum existed in the subarachnoid space; concrete pus existed at the base. Both optic nerves were softened just at the point where they sprang from the commissure; the softening was inflammatory. A large quantity of serum escaped from the ventricles (3 to 4 ounces). Tubercles existed in the lungs and bronchial glands, liver, spleen, and kidneys; the mesenteric, cervical, and intestinal glands enlarged; the cæcum was ulcerated, and contained 3 lumbar worms.

XIX. The premonitory stage of scarlet fever was ushered in by severe headache, vomiting, and delirium. When seen on third day, slight efflorescence on abdomen and neck, skin burning and dry, face of a light-yellow hue; pulse 130. Severe frontal head-

ache, aggravated by accesses, and by the vomiting, which was frequent; breathing quick, bowels confined, tongue red; submaxillary glands swollen; face an expression of dullness; pupils natural; passing squinting had been observed several times. Warm bath, henbane and hydrocyanic acid, calomel, blister to neck.

4th—No sickness, headache seemed less severe; delirious; motions green and clay-coloured and offensive.

Up to 10th day improved. On this day some wine and cake given. The sickness returned, headache became severe, restlessness and agitation extreme; bowels relaxed, epigastrium and abdomen tender, blister to epigastrium.

12th—Same. While being placed in warm bath, convulsions, which lasted 5 or 7 minutes.

13th—Slight stupor, right side feeble, pupils dilated.

14th—Same. Left leg feeble; right arm and leg more feeble. Blister to scalp.

15th, 8 a.m.—Answered questions; had had some sleep; face anxious; muscles of eyes and face affected from time to time with slight convulsive shocks; pulse and respiration irregular.

10 p.m.—While dozing, was taken with convulsions, and expired in a short time.

Sinuses and vessels of membranes injected, pia mater the same, and adherent on the borders of the sulci, and with the cortical substance of brain, which was rather soft. False membranes existed at the base of the brain, extending from the optic commissure to the medulla oblongata. The lateral ventricles contained $1\frac{1}{2}$ ounce of red serum. Both corpora striata were dark-coloured and soft; the optic thalami were dark-coloured; the septum lucidum and anterior part of the fornix nearly diffuent. Chest and abdomen not examined.

XX. On tenth day of fever, which was progressing favourably, severe suborbital headache set in, with vomiting; and in night, delirium and agitation.

2nd day—Headache severe, frequent cries, head hot, vomiting severe, epigastrium tender; heat of skin not greatly increased; pulse 96; breathing oppressed, bowels open, urine scanty and high-coloured. Leeches, warm bath, calomel.

3rd—Same.

4th—Pulse 104; respiration variable, cries frequent, and hand carried to head; great restlessness, indifference to what was passing, no answers to questions, but protruded tongue when desired; strabismus, pupils natural, and contracting to light. Sickness ceased. Blister to neck and mercurial frictions.

5th to 8th day—Improved slightly.

9th—Cries and agitations at times, muttering delirium in intervals, and stupor; pupils dilated, left lid falling, and this pupil the largest; slight rigidity of right arm and leg; moving

them caused cries to be uttered. Pulse 120. Counter-irritation to head.

10th and 11th—But little alteration.

12th—Rigidity of arm and leg increased and contracted; face and eyes affected with convulsive shocks at times; urine and motions passed involuntarily; pulse feeble and irregular, respiration stertorous. Death in night.

Sinuses and vessels on surface of brain distended, pia mater injected, particularly at the base of the brain. Here false membranes existed; nerves, no apparent alteration, beyond being imbedded in false membranes. Ventricles, 3 ounces of serum; the left lateral ventricle contained more than 2 ounces. Brain injected and softened (non-inflammatory); the optic thalami and annular protuberance seemed softer than the other parts. Lungs contained tubercles in their apices; they were congested, as were the liver, spleen, kidneys, mucous membrane of stomach, and small intestines.

XXI. Disease set in during convalescence from fever, probably from exposure, with headache and delirium at night.

2nd day seen—Slight stupor, but easily roused, and answered questions to the purpose, and protruded tongue, which was coated with white; both urine and fæces passed in bed. No paralysis of limbs.

In night and to-day, delirious and agitated. Pulse 120, respiration quick, skin dry and harsh, temperature not greatly increased. Calomel and digitalis, blister to neck.

3rd—Five or six motions, colour natural; pulse 100; otherwise the same.

4th—Better. Passed a good night. Pulse 120, feeble. Beef tea.

Up to 10th, improved; but sores appeared on nates; fæces still passed in bed, but the urine not; it was very high-coloured and acid. Before the attack it was pale. Pulse 90.

10th—Was very much excited.

In night, delirious and agitated; trembling of limbs.

11th—Same. Somnolence rather marked; vomited several times; respiration and pulse very quick, skin hot; passing convulsions of muscles of eyes, eyelids, and face; pupils moderately dilated, and obedient to light. Blister to head.

12th—Had perspired copiously in the night; less somnolence; bed sores increased in size.

13th—Better. Demanded utensil to pass urine; it was turbid, offensive, and alkaline; fæces still passed in bed.

14th—Sores on back increased in size, and a sore on back of neck, where blister applied. Pulse quick and feeble, emaciation extreme.

15th—Night very restless; delirium and agitation severe; convulsions of muscles of face and eyes frequent; passed a black motion in bed.

At 8 a.m., body became rigid for some time.

1 p.m.—Agitation extreme; twitchings of tendons of feet and hands; speechless, pulse scarcely perceptible; respiration noisy.

17th—Death at 1 a.m.

The pia mater, both on hemispheres and at base of brain, was deeply injected. Serum existed under the cerebral arachnoid; at the base of the brain it was lactescent, and the arachnoid was rather opaque. The lateral ventricles were empty, but the fourth contained 3 drachms of lactescent serum, and its walls were covered with a thin layer of false membranes, and very superficially softened (inflammatory).

XXII. From fall on head became unconscious for a few minutes, and then vomited. The vomiting continued, and with it headache, up to third day, when, in the evening, there was fever, and a restless night was passed.

4th day seen—Both pupils contracted. Pulse 130, quick; skin and head hot; bowels confined. No urine had been passed for 12 hours, cries frequent, indifference in intervals; vomiting frequent. Enema, leeches, warm bath, henbane, and hydrocyanic acid.

5th—Urine and fæces had been passed in bath; sickness rather less; eyes and eye-lids convulsed at times, eyebrows contracted, pupils rather more dilated, intolerance of light; cries and agitations at times. Pulse same. Leeches, mercurial friction.

6th—Same.

7th—More stupor, muscles of face also convulsed, pupils more dilated. Pulse 90, irregular; respiration slow and irregular.

8th—An access of general convulsions in night.

9th—General remission for 3 hours.

Evening—Convulsions, cries, stupor; left eye directed upwards, right outwards.

10th—Slight tendency to a remission in the morning for a short time; several accesses of convulsions.

11th—Pulse imperceptible, respiration noisy, eyes flaccid and retracted; features pinched. Death.

Longitudinal sinus a fibrinous clot; the surface of brain rather flattened; pia mater in the convolutions injected. False membranes and tubercles existed at the base of the brain; the optic commissure was softened (non-inflammatory); the lateral ventricles contained about 4 drachms of serum, the vessels on their walls large and prominent. Brain rather more injected than usual; a patch of minute tubercles existed in the arachnoid lining the dura mater, at apex of hemisphere (right). The lungs contained tubercles, the heart and large vessels fibrinous clots.

5th, *As Inflammation of the Membranes of the Cerebellum alone, or with implication of those of the Cerebrum.*—The disease occurred in the membranes of the cerebellum alone, in 1 case out of the 28; and in the membranes of the cerebrum and cerebellum, in 3.

In one of the latter cases, the membranes of the cord in the cervical region were injected. In one case (No. 23), in which the disease was confined to the cerebellum, the disease occurred on caries of the skull. The chief symptoms were, insensibility and retraction of the head, with frequent attacks of general convulsions. In a second (No. 24), in which the disease set in during fever from exposure, the most prominent symptoms were, occipital headache, delirium, agitation, difficulty in moving the head; later, it was drawn backwards and fixed; urine and fæces passed in bed; exhaustion and coma. In the third case (No. 25), the disease set in during convalescence from fever, from exposure. The chief symptoms were, headache, fever, delirium, incessantly moving from one side of the bed to the other, somnolence, head retracted, rigidity of right arm and leg, and of neck, and difficult deglutition. In the fourth case (No. 26), the disease set in during dropsy, after scarlet fever, from exposure. The chief symptoms were, fever, headache, pains in the limbs, delirium, cries, and retraction of head.

XXIII. Highly scrofulous, suffering from discharge from ear, and sore behind the ear, the bone being carious. The disease set in suddenly, with convulsions, the head being drawn back, body rigid and convulsed, skin cool, pulse very quick and feeble. In the intervals of the convulsions, child insensible, head drawn back, the arms and legs flaccid. The convulsions continued to occur for 26 hours, at intervals of 1, 2, and 3 hours, when death ensued.

The cerebrum presented no alteration, beyond appearing to be pressed rather more forward than usual. On dividing the tentorium, 7 ounces of watery serum escaped from the back of skull and spinal canal. Immediately behind the tentorium, on the temporal bone, corresponding to the caries of the bone, the dura mater and arachnoid were, for a space the size of a shilling, of a deep red. The arachnoid, lining the dura mater, was injected; the cerebellic membranes the same. The cerebellum was of a bluish tinge, and nearly diffuent (the softening was non-inflammatory); the cord presented the same appearance. Tubercles existed in the lungs, bronchial and cervical glands; mesenteric glands enlarged; mucous membrane of the stomach easily detached.

XXIV. The disease set in on twelfth day of fever, with severe occipital headache, followed by delirium, agitation, and difficulty in turning the head. Pulse 120, skin hot, urine high coloured. Leeches, calomel, and digitalis.

3d day—Pulse 110; slight stupor, pupils dilated, but obedient to light. Urine and motions passed in bed to-day; no paralysis. Mercurial frictions.

Up to 9th day, same.

9th—Mouth sore. Every thing taken passed off by bowels; debility extreme; pulse 90, feeble. Delirium and agitation rather less, stupor rather marked; head drawn back, with difficulty brought forward. Beef tea and wine.

Death on thirteenth day.

Sinuses and vessels not very distended. The pia mater on the cerebrum was strongly injected, and fluid existed between it and the arachnoid; the cortical and medullary substances were injected. The lateral ventricles contained 3 ounces of serum; nearly 6 drachms of serum escaped from the posterior part of skull and spinal canal; the membranes covering the cerebellum were injected, and the fourth ventricle distended with serum. The cord and membranes in the cervical region presented no alteration.

XXV. From exposure during convalescence from fever; chills, followed by severe headache, fever, and furious delirium. Bled, ice to head, calomel, and mercurial frictions.

2nd day—Less delirium, answers uncertain, constantly moving about in bed. Pulse 96, full. Leeches.

3rd—Less delirium, but aggravated at times; agitation the same. Somnolence, head drawn back, and muscles of neck rigid. Pulse 120. Leeches.

4th—More stupor, right arm and leg rigid, skin sensitive; protruded tongue, but did not answer questions. Counter-irritation to scalp.

7th—Arm and leg more rigid and flexed; deglutition difficult. Pulse 130.

8th—Died suddenly at 6 a.m.

Dense pus on cerebrum; most on left side and cerebellum; thickest along the sides of the vessels; brain injected and softened (non-inflammatory); ventricles nearly empty; lactescent serum escaped from the spinal canal; the membranes in the cervical region were opaque, and cord rather injected.

XXVI. While suffering from dropsy after scarlet fever, from exposure, taken with chills. The heat of the body being restored with difficulty, the reaction was severe; the fever severe, breathing difficult. Headache and pains in the limbs, causing frequent cries to be uttered; vomiting of everything taken, and rolling of the head from side to side, and agitation of the limbs.

During the first 4 days, the child was treated homœopathically, and placed every 6 hours in a warm bath.

5th day—Cries and delirium, head thrown back and rigid, skin hot; pulse 130, inspirations from 40 to 46; urine passed in bed, bowels confined. Leeches, followed by ice to head, calomel and digitalis, and mercurial frictions.

6th—Pulse 110, inspirations from 30 to 36.

7th to 10th—Improved slightly, and fever diminished.

10th—Counter-irritation to scalp.

11th—Mouth sore; answers questions, feebleness extreme. Beef tea.

18th—Death ensued from exhaustion, from diarrhœa, which appeared on the thirteenth day.

Serum existed under the arachnoid, on the cerebrum, and a

thin layer of false membranes on the centre of the cerebellum, for a space the size of a seven-shilling piece. There was no injection; a little serum escaped from the spinal canal; the brain was rather soft and oedematous. The lateral and fourth ventricles contained a little serum.

6th, *As Inflammation of Membranes of Brain and Spinal Cord.*—The disease occurred in the membranes of both situations in 3 cases out of the 28. The membranes of the cervical portion of cord were affected in one of the cases (No. 25), in which the membranes of the cerebrum and cerebellum were inflamed. In one of the cases (No. 26), the disease followed sleeping on the ground when intoxicated. The patient was suffering from syphilis, but had taken no medicine for it. In the second (No. 27), from fright, followed by suppression of the menstrual discharge; and in the third, on suppression of urine. The chief symptoms in two of the cases (Nos. 26 and 27) were fever, headache, vomiting, delirium, stupor, increasing in intensity, retraction of head, and rigidity of the muscles of the neck, back, and extremities, and accesses of shocks in one, in the other of convulsions. The third case was not observed during life, but convulsions occurred in it, and they appear to have closely resembled those which occurred in case 27.

XXVII. From sleeping on the ground when intoxicated, fever, headache, and vomiting set in.

4th day seen—Answers uncertain, speech embarrassed; delirium, difficulty in swallowing and breathing. Pulse 110; head drawn back, and general rigidity; cries on being moved. Bled and calomel given.

5th—Delirium constant, frequent cries. Leeches, mercurial frictions, but they excited so much pain that they could not be persevered with.

6th.—Frequent general convulsive shocks, vomiting severe. Tincture aconite with relief.

7th—Strabismus of right eye, slight stupor, muscles of right side of face contracted and convulsed. Leeches.

8th—Stupor increased, motions passed involuntarily.

9th—Stupor increased, face flushed, pulse feeble and irregular, the convulsive shocks continued. Death.

Sinuses and vessels of brain injected; arachnoid thickened and opaque from deposit of false membranes between it and pia mater; the pia mater between the convolutions injected. Turbid serum existed at the base of brain and in the ventricles, the walls of latter covered with false membrane; septum lucidum softened; vessels of vertebral canal injected, and fluid in the canal; arachnoid covered with false membranes, pia mater with gelatinous exudation; the membranes generally injected. The heart distended with blood; lungs, liver, spleen, kidneys, and stomach congested.

XXVIII.—While menstruating, was frightened; an attack of

an hysterical character followed, and the menstrual discharge ceased.

For four days dull and heavy, complaining of severe pains in the head and loins.

4th day—In evening warm bath. Had chills after it; these were followed by fever, headache, vomiting, and dimness of sight; in the night she had an access of convulsions, during which the body was rigid and convulsed, and head thrown back.

5th—Headache severe, face flushed, muscles of neck rigid, moving the limbs and pinching the skin excited severe pain; pupils rather larger than natural, but obedient to light; vomiting frequent, cries, sight indistinct, urine passed before the access deep red and acid; pulse 120, inspirations 44, slight difficulty in swallowing. Warm bath, calomel and digitalis, leeches; socks and gloves saturated with mercurial ointment; enema. Better after bath; the enema brought away a large quantity of fæces.

6th—An access of convulsions in the nighttime, rigidity and stupor. The accesses of convulsions continued to occur at intervals of 2, 3, and 5 hours, up to 8th day.

8th day—Generally rigidity, stupor, dilated pupils, insensible to questions, frequent cries, aggravated by moving the limbs, motions and urine passed involuntarily, saliva flowing from mouth, pulse 140, very feeble. Death in evening, during an access of convulsions.

Sinuses and vessels injected, pia mater the same, fluid existed between it and the arachnoid, the commissure of the optic nerves was injected and rather soft; the lateral and 4th ventricles contained red serum, the vessels on their walls and the choroid flexus injected. Fluid existed in the spinal canal, and the membranes were generally injected. Brain and cord were injected. Heart distended with fluid blood, fluid in the pericardium, kidneys congested, lining membrane of the uterus injected, ovaries enlarged.

XXIX. I had no opportunity of observing this case during life. The patient, aged 50, was addicted to drinking. From suppression of urine, headache and vomiting set in; on the second day, delirium and convulsions; and on the third, coma and death.

The sinuses, vessels, and membranes of the brain were injected, fluid existed both in the arachnoid and subarachnoid spaces, the ventricles contained a little fluid, the cortical portion of the brain was injected; this white and unusually brilliant. Spinal membranes and cord injected; the pleural and peritoneal cavities and the pericardium contained serum; the kidneys congested, bladder empty, liver and spleen congested; the former "hobnailed," the latter softened.

TERMINATION AND DURATION.

1. *Termination.*—The disease terminated fatally in 39 out of 53 cases. In 20 of the number it ensued from coma, in 12 from convulsions, in 4 from coma and convulsions, in 1 from diarrhœa, in 1 from bed sores, in 1 from exhaustion, and in 1 from hydrothorax.

2. *Duration.*—It was not always possible, from the disease often existing for several days unsuspected, to determine with accuracy its duration. It seems more liable to prove fatal on the fifth, sixth, tenth, eleventh, and twelfth days than at any other period. Thus, of the 29 cases, in 3 it proved fatal in from 2 to 4 days inclusive; in 7, from 4 to 6 inclusive; in 4, from 6 to 8 inclusive; in 3, from 8 to 10 inclusive; in 9, from 10 to 12 inclusive; in 2, from 13 to 15 inclusive; in 4, from 16 to 18 inclusive; in two, from 19 to 21 inclusive; in 2, from 21 to 28; in 2 its duration could not be determined.

DIAGNOSIS OF THE VARIOUS FORMS AND SITUATIONS OF THE DISEASE.

1. *Of Inflammation of the Dural Matral fold of the Arachnoid.*—This membrane was found affected in 3 out of 28 cases which proved fatal. The result of inflammation of this membrane was effusion of pus or serum into the arachnoid cavity. Its most prominent symptoms were headache, occasionally vomiting, and stupor, passing into coma. Convulsions or delirium were never observed unless the brain was irritated. It was generally rapid in its progress, and occurred in connection with dropsical effusions, disease of the ear, and erysipelas of the scalp or face.

2. *Of the Ventricles.*—The disease was confined to the ventricles in only 3 out of the 28 cases which proved fatal; in one of these the brain was indurated, and in the other a slight deposit of false membranes was found at the base of the brain. Effusion into the ventricles, and inflammation of their lining membrane was constantly observed, particularly in connection with inflammation of the membranes of the base of the brain. The symptoms of simple ventricular effusion do not differ materially from those observed in effusion into the arachnoid cavity. The disease seemed generally to assume a subacute character, and was rather insidious in its progress. There was headache, generally very severe, increasing in severity, causing the patient to utter loud cries; stupor increasing in intensity, the patient being roused from time to time by accesses of pain. Delirium and convulsions were not observed in the two cases (Nos. 5 and 6), but in the third (No. 4), in which the brain was found indurated, the latter occurred.

3. *Of the Pia Mater. (a) Of the Hemispheres.*—The disease occurred in this part of the brain in 5 of the 28 cases which proved fatal. The disease was rapid in its progress. The most prominent symptoms were headache, delirium, more or less severe, followed, on the occurrence of effusion, by coma. In one of the cases (No. 7), in which there was effusion of pus on one hemisphere, there was paralysis of the opposite side; in another (No. 9), in which pus was also found, but in a larger quantity, rigidity and contraction of the opposite arm and leg; in a third (No. 8), in which pus existed on both hemispheres, there was rigidity of both arms and one leg; in a fourth (No. 11), there were accesses of convulsions and increased sensitiveness of the skin, but the central portions of the brain were diseased.

(b) *Of the Base.*—The disease was confined to this part of the brain in 3 out of the 28 cases which proved fatal. In 2 of the cases the ventricles were also implicated. The symptoms, when the disease existed here, were pronounced. There was headache; vomiting and diarrhoea frequently existed; the respiration was often interfered with, being often quick and irregular or noisy, sometimes croupy, and the muscles of the eyes, eyelids, and face, were often convulsed, contracted, or paralysed. Stupor, passing into coma, and general convulsions, frequently occurred.

(c) *Of the Hemispheres and Base.*—The disease occurred generally in 8 out of the 28 cases which proved fatal.

4. *Of the Membranes covering the Cerebellum.*—The membranes of this part of the brain were alone affected in only 1 case (No. 23) out of the 28, which proved fatal, and in 3 with inflammation of the cerebral membranes. In one of these (No. 25) the membranes of the cervical portion of the cord were also affected. The chief symptoms which marked the existence of inflammation of the membranes covering this part of the brain, were occipital headache, retraction of the head, stupor passing into coma. In one case (No. 23), in which the cerebellum was found softened, convulsions had existed.

5. *Of the Membranes of the Brain and Cord.*—The membranes of both were affected in 3 out of the 28 cases which proved fatal. The symptoms indicating the existence of inflammation of the spinal membranes, were rigidity and contraction of the muscles of the neck, back, and extremities, and sometimes of those of the pharynx and larynx; increased cutaneous sensibility; convulsive shocks, and sometimes general convulsions.

PROGNOSIS.

The prognosis in the disease must always be unfavourable, particularly when coma or paralysis or convulsions exist. The occurrence of the last symptom on either of the two first, must

be always looked upon as an almost certain indication of a fatal result. Cases, however, sometimes recover under the most unfavourable circumstances, and sink under the most favourable. It does not follow, because coma or paralysis exists, that the case is to prove fatal. The disease is very liable to prove fatal, 1st, when it occurs in a child of delicate constitution, particularly if there is a tendency to cerebral disease in the family; 2ndly, when the patient has been much reduced by previous disease, or it is attended by rapid emaciation; 3rdly, when it occurs during hooping-cough, pneumonia, bronchitis, congestion of the kidneys, scarlet-fever, erysipelas, or purulent deposits; 4thly, when seated at the base of the brain, with or without the hemispheres being affected, and when affecting the membranes of the brain and cord.

INFLUENCE OF TREATMENT.

1. *Prophylactic*.—When London lost, in 1851, 1 in 1388 of its population from this disease; Dublin, in 1842, 1 in 1158; and Glasgow, in 1852, 1 in 857, it becomes a subject of serious consideration how the mortality is to be diminished. The remedy consists in rendering the air of the towns as nearly like that of the country as possible by good drainage, good water, and preventing the over-crowding of the residences of the poor; for it must be observed that it is amongst the children of this class that it is most frequently met with. The improvements that have been made in the sanitary condition of London during the last few years, have been attended by a marked annual diminution in the mortality from the disease.

When a tendency to the disease exists in a family, the children should be removed to a dry and well-sheltered part of the country. I have seen this, combined with the use of tepid bay-salt and water-sponging of the body every morning, a nourishing diet (stimulants should be carefully avoided), and plenty of exercise in the open air to strengthen the muscular system, prevent the disease from appearing in the remaining children of families who had lost several from the disease. Their brains should not be overtaxed; if they only learn to read and write before the eleventh year no harm will ensue, for children who do not commence their studies until this period of life, generally know quite as much when they reach their fifteenth or sixteenth year, as those who have been toiling at books since they were able to speak.

2. *Of Remedies*.—When it is considered that 39 out of 53 cases terminated fatally—36 of the number from the disease—it does not speak much for the value of the remedies adopted. The remedies chiefly used were bleeding and calomel; the latter was given sometimes alone, sometimes with digitalis. Blood-letting alone, particularly if small quantities are extracted, seems to be

of little service. A large quantity should be removed, so as to make a decided impression on the disease; if it does not, it should not be repeated. Calomel was given in 3 cases, until salivation was induced, but without influencing the symptoms or checking the disease. In one case (No. 32), however, as soon as this effect was produced, a marked improvement ensued. I have used, in addition to bleeding, calomel and counter-irritation¹ to the scalp, the iodide of potassium.

In one successful case (No. 29) it was given in combination with tartarized antimony and nitrate of potash; in a second and third (Nos. 30 and 34), with tincture of cantharides; in a fourth (No. 31), with tincture of cantharides and tincture of digitalis; in a fifth (No. 33), with digitalis and nitrate of potash; and in a sixth (No. 35), with tartarized antimony, nitrate of potash, and tincture of cantharides. Of 10 cases treated in this manner, the result was favourable in 6; while of those treated with calomel alone 9 out of 10 died. I have treated during the last three months 7 cases of commencing hydrocephalus with this remedy with success.

XXX. *From Excesses in Eating and Drinking and Exposure—Meningitis.—Cure.*—M., aged 21, after excesses in eating and drinking and exposure to cold, was taken with chills, followed by flushes of heat and headache, and later with delirium, which was most marked at night. When seen on 3rd day there was a tendency to stupor, with muttering delirium at times, particularly at night, the latter was furious; pupils natural; face flushed; skin dry and hot; pulse 120, but without much power; urine and motions were sometimes passed in bed—the former was high-coloured and acid. Blister to head; tartarized antimony one-sixth of a grain, iodide of potassium 3 grains, and nitrate of potash 5 grains every four hours. Calomel 1 grain every four hours.

5th day, 8 a.m., same; 10 p.m., skin covered with perspiration; a large quantity of urine had been passed; it was still high-coloured and acid; pulse 110; several bilious motions had been passed.

6th day—Night had been more tranquil; stupor less marked; pulse 100; urine more natural.

9th—Stupor gone; still slight headache; pulse 86. The improvement from this time was slow but satisfactory.

On the 30th day he was able to walk out.

XXXI. *Meningitis.—Cure.*—M., aged 9, had been suffering for several days with slight fever, headache, loss of appetite, and sickness; bilious fluid being vomitted, and constipated bowels. When seen the headache was severe, causing him to cry out from

¹ I think croton-oil and acetum cantharides preferable to tartarized antimony. Form—croton-oil ʒ ss.; acetum cantharides ʒ ii.; olive oil ʒ x.: mix.

time to time; tongue coated; face flushed; pupils natural; pulse 120; and urine high-coloured. Eight leeches to temples; calomel and jalap; 2 grains of calomel every four hours; and salines, with tincture of digitalis.

2nd day—The headache was greatly relieved by the application of the leeches. To-day it is very severe; motions green and slimy; pulse 130. Warm bath; leeches to temples; relief for several hours followed the application of the leeches.

3rd—Headache severe; cries and delirium; pulse 130; pupils natural; no tendency to stupor; skin hot and moist; urine and motions passed in bed. Leeches to head, followed by iced water, with relief.

4th—Same. The right pupil contracted, the left dilated, but sensitive to light; slight stupor; and the right leg and arm seemed to be less freely moved than the left. Leeches.

5th and 6th—Rather better.

7th—Worse. Pulse 140, irregular; cries frequent; increasing delirium and restlessness; at times the right arm and leg affected with passing shocks; left pupil more dilated. Ten leeches.

8th—Skin cold; pulse 80; feeble and intermitting; great restlessness. Croton-oil liniment to scalp; iodide of potassium, with tincture of cantharides, internally.

9th—Morning: Stupor, alternating with restlessness; deglutition difficult; eyelids half closed; pulse 140, irregular. Evening: Pulse 130, irregular; head covered with eruption; stupor rather less marked; no convulsive shocks. It was thought that a large quantity of urine had been passed.

14th—There was a perceptible improvement. Pulse 120; deglutition free; head not complained of; face vacant; speech indistinct; left pupil dilated; large quantity of urine passed each day; the thirst from this severe.

20th—Slight improvement in the speech; pulse 100; able to take food. The convalescence was very slow, and some time elapsed before the speech and sight of left eye returned. He complained for some time, when he bent his head forward, of a "sudden rush to the forehead, with fullness and loss of sight." When he raised his head they ceased quite as suddenly.

XXXII. *Dropsy, followed by Effusion into the Arachnoid Cavity, and Symptoms of Meningitis.*—Cure.—Male aged four years. In this case, as in case I., stupor set in during ascites and anasarca from exposure to cold after scarlet fever. The stupor set in slowly, and was attended by subsidence of the swelling of the legs. The pulse was quick; frequent cries were uttered; the pupils were dilated, and but little sensible to light; the anterior fontanel prominent; scalp tense; and both urine and motions were passed unconsciously. The child was enveloped in hot wet blankets, the head rubbed with croton-oil liniment and iodide of potassium, with tincture of digitalis and tincture of cantharides

given internally. The 2nd and 3rd days were passed without any marked improvement. The croton-oil liniment had to be applied several times before an eruption could be produced. On the 4th day it had produced the desired effect. The symptoms from this time began to subside. A large quantity of urine was passed on the 2nd and 3rd days; but the skin did not become moist until the 5th. On the 6th it was covered with a copious papillary eruption. On the 10th day sensibility was completely restored. The convalescence was slow, and twice there was a tendency to relapse.

XXXIII. *Suppression of Menstrual Discharge, followed by Fever; Exposure to Wet followed by Aggravation of the Symptoms and Meningitis.—Cure.*—F., aged 17, from sudden suppression of the menstrual discharge was seized with slight fever, accompanied by pains in the back and limbs. In the evening of the 3rd day she went to the baths. In returning she got wet; chills followed. The heat of the body was restored with difficulty by placing her in bed, applying bottles filled with warm water to her feet, and giving her hot gin and water.

4th day—She had passed a very restless night. Fever marked; headache severe; delirium and agitation; answered questions; pupils natural; urine high-coloured and scanty; bowels open; pulse 110. Calomel every three hours; socks and gloves saturated with mercurial ointment.

5th—Same.

6th—Same; but answered questions with difficulty, as if she did not comprehend them; pupils dilated; pulse 120, rather hard; head hot; urine and motions passed in bed; 10 leeches to temples, followed by blister to the nape of the neck, which was dressed with mercurial ointment.

8th—Mouth was slightly affected. On the 10th it was very sore. From this time there was an improvement in the symptoms. On the 13th the delirium had ceased; she answered questions readily, but still complained of slight headache. On the 20th day she was able to get up.

XXXIV. *Fever followed by Symptoms of Cerebral Congestion, then Convulsions and Meningitis, with Paralysis of the Left Arm and Leg.—Cure.*—M., aged 4 years, was taken during teething with slight fever; the bowels were confined. On the 3rd and 4th days the child was sometimes dull, sometimes fretful and crying, and carried his hands over his head as if it was in pain; moving or touching him aggravated the cries. On the 5th day he was taken with convulsions, which lasted from 6 to 7 minutes, and several accesses occurred during the next 14 hours, but they were not so severe as the first. At 7 a.m. on the 6th day, he presented the following state:—Stupor; face alternately flushed and pallid; head thrown back; respiration and pulse irregular, the former varying from 26 to 36; sometimes croupy, the latter

from 120 to 140 ; the jaws were sometimes firmly clenched, sometimes the lower one was moved from right to left, sometimes from left to right ; deglutition was difficult, the fluids given sometimes descended into the stomach, sometimes regurgitated ; pupils natural ; the right one somewhat larger than the left ; urine and fæces passed unconsciously ; frequent cries ; hands carried to head ; the left leg and arm, particularly the latter, affected with shocks, and head drawn back ; 4 leeches to temples, blood flowed freely, and considerable relief followed ; the pulse remained at 120, but the respiration still continued irregular. Calomel, iodide of potassium, digitalis, and nitrate of potash. Croton-oil liniment to head.

7th day—Head covered with eruption ; coma less marked ; still does not answer questions ; eyes closed as if the light affected them ; the right pupil more dilated than the left ; respiration regular ; head seemed less thrown back ; the shocks had ceased in the left arm and leg, but they were colder than the right arm and leg ; the grinding of the teeth had ceased, but the deglutition still remained rather difficult.

10th—Scalp very sore ; sensible ; answered questions put by his mother, but in a rather uncertain manner ; face with a vacant expression ; the left arm and leg were paralysed. His recovery was rapid. The paralysis of the arm and leg disappeared at the end of 3 months.

XXXV. *Cerebral Congestion, then Convulsions, followed by Meningitis ; Convulsions followed by Paralysis of Arm and Leg.*—*Cure.*—F. aged $3\frac{1}{2}$ years. For several days (5 or 6) the child had been suffering from drowsiness, alternating with fretfulness, variable appetite, and when she eat largely, from vomiting and constipated bowels. She was taken at 10 a.m. on the 6th day with a convulsion. When seen half an hour afterwards she was insensible ; her face pale ; eyes closed ; pupils dilated ; pulse 140, scarcely perceptible ; warm mustard bath, followed by a dose of calomel and jalap. At 6 p.m. faced flushed ; skin hot ; pulse 130 ; both pupils dilated, the right more than the left ; both sensible to light ; the eyes were from time to time rolled from one side to the other ; the brows and muscles of the mouth contracted ; respiration variable, sometimes quick, sometimes slow ; frequent cries were uttered, and the head was rolled from side to side. Six leeches were applied to the head. The loss of blood was followed by marked relief. Warm bath, calomel, and digitalis.

2nd day—The symptoms as severe as the previous night. Two accesses of convulsions occurred during the day. After the second convulsion there was marked paralysis of the left arm and leg. Leeches.

3rd—No general convulsions ; the paralysis of arm and leg more marked. Iodide of potassium and tincture of cantharides were given. As in the other cases a large quantity of urine

was passed. The pupils on the 7th day were equal. The child ultimately recovered from the disease, but the arm and leg, particularly the former, remained paralysed.

XXXVI. *Convulsions, followed by Hydrocephalus and Paralysis of the Right Arm and Leg.—Cure.*—F., aged 18 months, was taken during teething with an access of convulsions, followed by all the symptoms of hydrocephalus, viz., rolling of the head, frequent screams, carrying the hands to the head, and increasing stupor. When seen on the 4th day there was marked stupor; quick pulse (130); dilated pupils, slightly affected by light, the left one more readily than the right; involuntary escape of the contents of the bowels and bladder; rolling of the head from side to side; sometimes rolling of the eyes, and frequent cries. The temperature of the skin was not greatly raised; in the right arm and leg it was diminished, and the cutaneous sensibility of these parts was evidently more obtuse than in the opposite extremities—the feet were slightly œdematous. The croton-oil liniment was applied to head, and 1 grain of iodide of potassium, with 2 of nitrate of potash, 1-8th of tartarized antimony, and 3 minims of tincture of cantharides, given every 4 hours. In the evening of the 2nd day there was a marked improvement, the stupor, cries, and rolling of the head were less marked, and the pulse had sunk to 120. A larger quantity of urine had evidently been passed; the œdema of the left foot had diminished; the head was covered with eruption.

The improvement from this time was marked. It was necessary to discontinue the tincture of cantharides on the 7th day, the day on which consciousness was fully restored. The convalescence was very slow, nearly 10 weeks elapsed before the patient was cured. The right arm and leg remained slightly paralysed.

