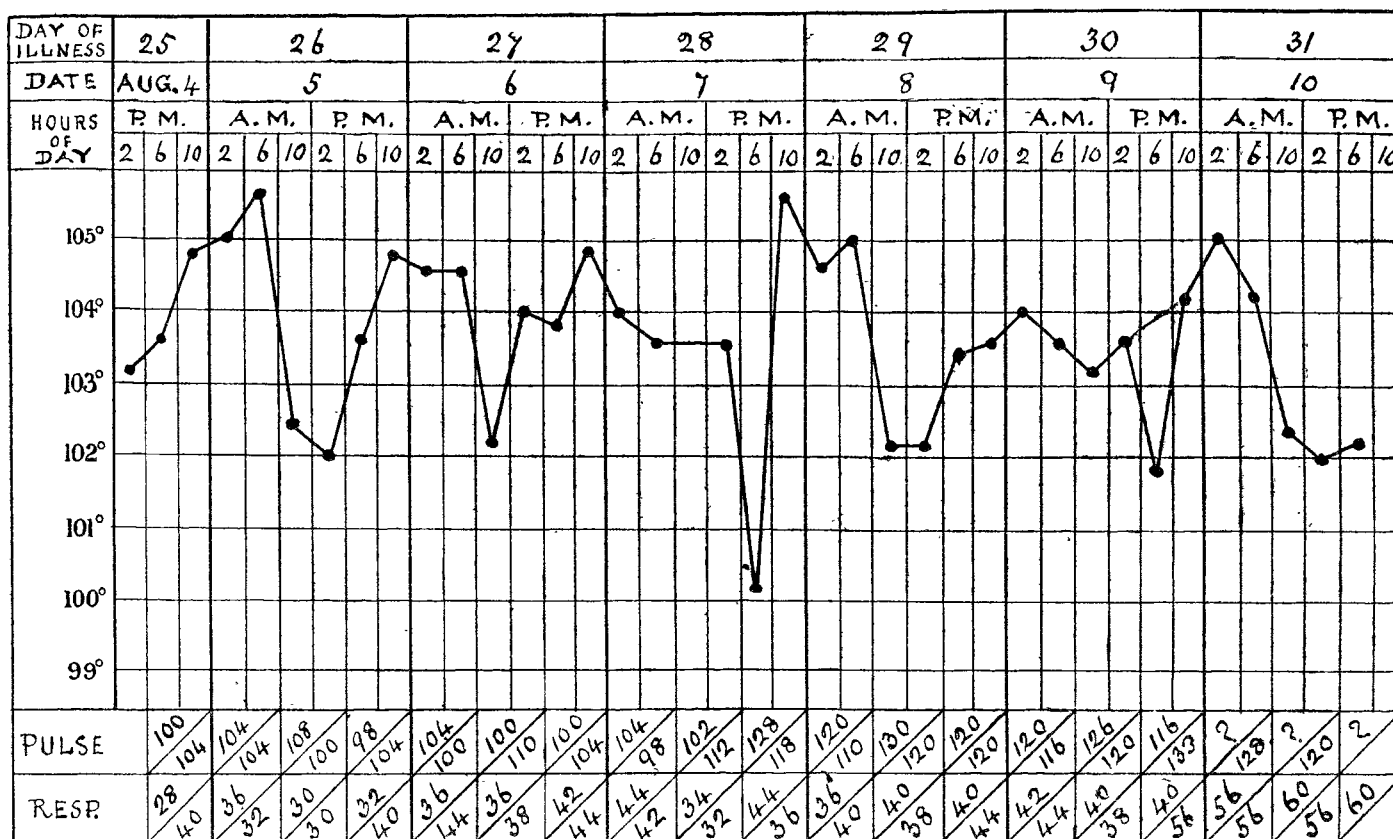


became distinctly worse and had recurrent attacks of difficulty in breathing, saying "he was sure he would be choked." On the 8th a crop of small papules, which became pustular, appeared on the back. On the 9th there were a few fresh papules on the right thigh. The left knee-joint was found to contain some fluid. During this day and the next the attacks of difficulty in breathing became more marked and the patient, becoming gradually worse, died on the

after 48 hours its testicles were distinctly enlarged and inflamed. It was killed after four days and pus containing bacillus mallei was found inside the tunica vaginalis and small abscesses in the body of the testicle which on section were seen to contain characteristic bacilli. There can be no doubt, therefore, that the case was one of glanders. It was suspected before death that the bacilli which had been found were really glanders bacilli, but owing to the contamination



10th. The course of the temperature and pulse is shown on the accompanying chart. Cultivations were made from the furuncles, but up to the time of death no positive result had been obtained.

Necropsy.—The lungs were oedematous, but there were no nodules or any pneumonic areas to be seen. All the other viscera appeared normal to the naked eye and no foci of inflammation or suppuration were present anywhere in, or among, the viscera. The left knee-joint contained a thin, yellowish, glairy fluid and over the right elbow the tissues were infiltrated with a similar oily fluid. Cultivations were made from the heart blood, the spleen, and from the fluid in the region of the elbow and from the left knee-joint.

Remarks.—The case was one of subacute glanders of a month's duration. During life, although the history and some of the signs and symptoms suggested the possibility of glanders, yet the clinical evidence, in the absence of bacteriological proof, was not sufficiently clear to allow of a positive diagnosis of glanders being arrived at. Although the patient was very ill the local manifestations of the disease were slight and might have been those of a subacute pyæmia of other origin. They were (1) subcutaneous swellings, (2) a few small furuncles, (3) a small abscess in the left forearm, and (4) the presence of fluid in the left knee-joint. There were no typical ulcers of the skin, no well-marked bullous or pustular eruptions, no rhinorrhœa, and no intra-muscular abscesses, the presence of any of which would have helped to distinguish the case with more certainty as one of glanders.

Bacteriology.—The small furuncle upon the buttock was examined microscopically and culturally. Bacilli were seen in the pus which resembled the bacillus mallei, but the cultures were full of staphylococci and no bacillus mallei was found upon them. The heart blood, the spleen, and the fluid from the knee-joint were examined and mixed cultures containing a glanders-like bacillus were obtained. These were plated and pure cultures of the bacillus were obtained. The bacillus had all the typical morphological appearances and gave the staining and cultural reactions of the bacillus mallei. A small quantity of a glycerine-agar culture was inoculated into the peritoneum of a male guinea-pig and

with other bacteria it was not proved. There would appear to be little doubt that had the abscess upon the forearm been examined bacteriologically the bacillus mallei would have been found. There seems also to be little doubt that had it not been for the bacteriological examination the case would not have been certainly diagnosed as one of glanders.

POSTERIOR BASIC MENINGITIS.

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THE disease which is known in this country by the name of "posterior basic meningitis" has always attracted much attention at the Hospital for Sick Children, where the names of Dr. S. J. Gee, Sir Thomas Barlow, Dr. D. B. Lees, and more recently of Dr. Still, are always associated with it. The last-named, while holding the post of registrar and pathologist, described a diplococcus which he had found constantly present in the meningeal exudations—a diplococcus which in most respects resembles the diplococcus intracellularis of Weichselbaum, the chief differences being the greater vitality of the organism found by Still and the fact that it grew well in broth media, whereas Weichselbaum's diplococcus did not grow at all or very slightly in such media. In the period, July, 1899, to August, 1900, there have been 17 cases of this disease in the medical wards at Great Ormond-street, or at least diagnosed as such, in 12 of which the diagnosis was verified by post-mortem examination. Of the remaining five patients two recovered; in two leave to make an examination was refused, and the fifth contracted diphtheria while in the ward and was transferred, owing to pressure upon our available beds, to the fever hospital. These cases, as will be seen later, do not all of them correspond to the

ordinary type of the disease, four of them being children much older than the average age, which Barlow and Lees state as 11 months.

List of Cases.

No. of case.	Age.	Result.	Remarks.
1	2 years.	Death; necropsy.	No bacteriological examination made.
2	5 months.	" "	No bacteriological examination made.
3	4 "	" "	Diplococci in exudate; no cultivations.
4	9 "	" "	Diplococci in exudate and in cultivations.
5	4 years.	" "	Diplococci in exudate and in cultivations.
6	11 months.	" "	Nothing found in exudate; cultures sterile.
7	4 years.	" "	Diplococci in exudate and in cultivations.
8	4 "	Recovery.	—
9	4 months.	Death; necropsy.	Diplococci in exudate; no cultivations.
10	8 "	" "	No bacteriological examination made.
11	6 "	" "	Diplococci in exudate and in cultivations.
12	8 "	Death; no necropsy.	—
13	9 "	Discharged in statu quo.	—
14	3 years, 6 months.	Recovery.	—
15	4 months.	Death; necropsy.	Diplococci in exudate; no cultivations.
16	1 year, 4 months.	" "	Diplococci in exudate and in cultivations.
17	8 months.	Death; no necropsy.	—

Bacteriology.—Of the 12 cases in which a post-mortem examination took place three were not examined bacteriologically; in two cases the post-mortem examination was performed in my absence, and in the third the brain was hardened and preserved. In the remaining nine cases the meningeal exudation was examined by means of films of lymph taken from the collection at the base of the brain and from the lateral ventricles. An intracellular diplococcus was discovered in eight of these cases; in the ninth no organism of any description could be found. In all cases the diplococcus appeared to be the only organism present; no streptococci or pneumococci were discovered. In six cases cultivations were made on agar-agar and glycerine-agar media. Five of these proved successful, the diplococcus growing, however, scantily in all cases. The unsuccessful case was that in which microscopical examination had shown an absence of organisms; in this instance nothing grew upon the culture media. In Case 4 a lumbar puncture was performed during life, and the fluid was inoculated upon agar-agar. This gave a fairly typical growth of the diplococcus. Thus out of the nine cases examined in eight the diplococcus intracellularis was demonstrated in the exudate, and in five of these it was found in cultivations, being present in pure culture in four; the fifth was, I believe, accidentally contaminated, for it contained, besides typical colonies of the diplococcus, large growths of *staphylococcus pyogenes aureus* and *streptococcus pyogenes*.

Vitality—The vitality of the organism in the meningeal exudation would seem to be very variable. Thus in one patient dying on the forty-second day of the disease it was found very scantily in the coverslips examined and grew in the culture-tubes in very few colonies, while in two other patients dying respectively about three months and eight months after the onset of the disease it was found in considerable profusion; in the second of these, however, it is possible that the patient died in a second attack, or a recrudescence of the original infection. In cultivations the organism did not live; in one case sub-cultures made from a 48-hours growth proved quite sterile, and in no case did there appear to be any vitality left in the colonies at the end of a week. Looking at Dr. Still's results I feel sure that mine are not trustworthy in this point, probably because the inoculations were not made with sufficient freedom; further, I have not

employed a blood-agar medium, on which he found the organism to persist longest. In Case 4 the fluid obtained by lumbar puncture during life gave a fair growth of the organisms, but at death 15 days later there were very few colonies indeed in the cultivations, and I had to hunt through several films before discovering typical diplococci, so that the organism had apparently lost much of its vitality between the twelfth and the twenty-eighth days of the disease.

This question of the vitality of the organism is, of course, one of great importance, for Weichselbaum's diplococcus isolated from epidemic cerebro-spinal cases was stated by its discoverer to be possessed of extremely limited powers of endurance. While Dr. Still found that the diplococcus of posterior basic meningitis lived an average of three weeks, and, as he remarks, this difference is by far the most striking. In other points the two observers for the most part agreed. It is therefore interesting to note my failure in these cases to obtain a prolonged vitality and also Netter's statement, quoted from Dr. Osler's Cavendish Lecture of 1899, that Weichselbaum's diplococcus has been found living at the end of 60 days. On the whole it seems most probable that the organisms are practically identical, though apparently with slightly different qualities according as they occur in epidemics or sporadic cases.¹ I have had no opportunity of seeing any epidemic of the disease, though one of the series of cases in its clinical aspect approached more nearly to the epidemic type, as described by Osler, than to the chronic disease with which I am familiar.

Clinical features.—In this series 10 of the cases occurred in males and seven in females. Of the age at which the disease made its appearance it is noticeable that four of the 17 patients were in their fourth year and over, a much larger proportion than Sir Thomas Barlow and Dr. Lees found. In their series of 110 cases seven only were as old. It may also be observed here that these four cases all gave rise to considerable difficulty in diagnosis, and that two of them were cases that recovered, so that absolute proof of the correctness of the diagnosis is wanting. Excluding these four the average age of the patients attacked was nine months, the youngest being just three months old. The previous history and the family history of these cases bear out the statement of Barlow and Lees that there is no other affection which bears any constant relation to this disease. In the majority of cases it appears without any previous ill-health either in the patient or in those who surround him.

As regards the first symptom of the disease this series corresponds exactly with the analysis given by Sir Thomas Barlow and Dr. Lees. Vomiting occurred first in nine cases, convulsions in four, and head retraction in three. Bulging of the fontanelle is noted early in the course of the illness in six cases. Retraction of the head is one of the cardinal signs of the disease, and sooner or later appears in all cases. It occasionally, however, appears too late to be of much service in diagnosis and in two of these cases, Cases 1 and 5, it was not noted at any time. Further, there has been in the hospital during the period of time covered by this series a boy, aged 10 months, in whom retraction of the head to an extreme degree was constant, though at the necropsy there was no trace whatever of meningitis. It is also worthy of remark that this symptom was well marked in only one of the four older cases, whereas it was obvious in all but one of the remainder.

Ocular symptoms.—Strabismus was a fairly frequent and early symptom, as also was nystagmus, occurring in about half the cases; but the chief ocular symptoms, with one exception to be mentioned later, are to be sought by means of the ophthalmoscope, for 13 of these 17 cases showed definite changes in the fundus. In five cases there was pronounced swelling of the optic discs, which was very easily recognised and indeed could not be overlooked; in one of these there were in addition several flame-shaped retinal hæmorrhages. In four cases there was a peculiar grey discolouration of the optic disc, which appears to me to be peculiar to this disease. At any rate, I have never met with anything similar in any other illness. It is not atrophy, I venture to think, for the retinal vessels retain their normal size, and the disc does not appear hollowed, but it has an unusual opaque grey appearance quite unlike a normal disc. In the remaining four cases the changes were

¹ Since the above was written I have been successful in maintaining the vitality of the diplococcus up to the thirty-eighth day, at which period subcultures proved sterile.

such that I have not ventured to call them papillitis, yet they are of that nature. In looking at these eyes with the ophthalmoscope regularly week by week, the optic discs which were at first absolutely normal became slowly more and more obscure, and in focussing accurately one could see that at the edge the finer vessels took a sharp curve, so that there was obviously some swelling, rarely more than 1 D, of the papilla, though the edge of the disc still remained distinct. This change, I believe, might easily have been overlooked if the discs had not been frequently examined.

Amaurosis was noted in seven cases and was probably present in several others, but it is a symptom which is extremely difficult to ascertain with precision in young infants. The other important ocular symptom mentioned previously is retraction of the upper eyelid which occurred in seven of these cases. It is extremely characteristic of posterior basic meningitis, and, so far as I have been able to observe, extremely rare in any other form of meningitis. It is certainly very uncommon in tuberculous meningitis, for I can neither recollect nor find any record of its occurrence in the 26 cases of that disease which have occurred in the given period. Indeed, one might venture on an antithesis: in tuberculous meningitis there is photophobia and closure of the eyes, while in posterior basic meningitis the eyes are widely open with retracted upper lids as if seeking the light.

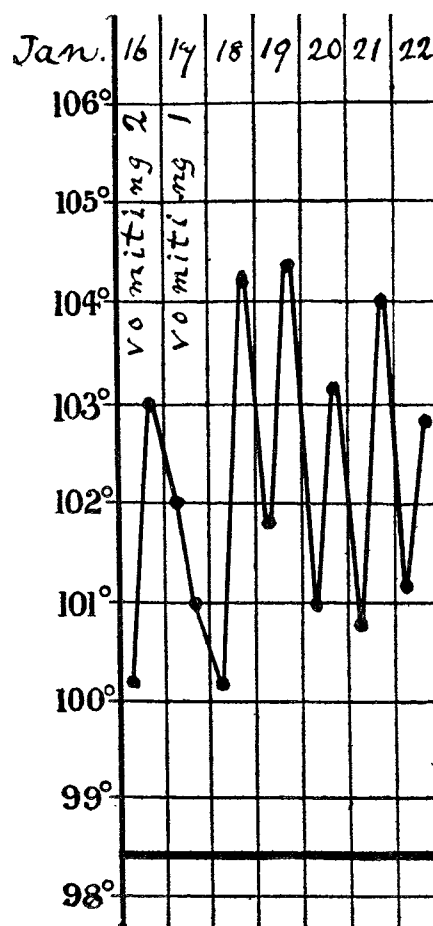
The other chief features of the disease—vomiting and progressive emaciation—were present in all cases, though in six cases the vomiting was slight. The emaciation was always pronounced and rapid even in the two patients who recovered, and apparently it is largely independent of any vomiting or diarrhoea that may be present, for in cases where these are absent the emaciation still progresses steadily. One month's duration will reduce the patient to mere skin and bone, in striking contrast to cases of tuberculous meningitis, which are not infrequently found possessed of considerable quantities of subcutaneous fat at the necropsy. The remaining features of the disease are with one or two possible exceptions those which are common to nearly all forms of meningitis; and though in nearly all of them there is some special point, which I believe to be to a certain extent indicative of the special form, yet these points are too uncertain to permit of any stress being laid on them. Thus there are the "champing" movements of the lips and jaws described by Sir Thomas Barlow and Dr. Lees, which are certainly more commonly seen in this form of meningitis than in any other, and yet are sufficiently often observed in tuberculous meningitis to render them devoid of any diagnostic significance. Hyperæsthesia of the skin, on the other hand, is distinctly more common in the tuberculous than in the posterior basic form. There are, however, two phenomena observed in the latter which do not, I believe, occur in the former. These are hydrocephalus and a joint affection. Hydrocephalus, of course, in a pathological sense is present in most cases of meningitis of whatever form, but in a few cases of posterior basic meningitis the head enlarges progressively and post mortem there is a very considerable excess of fluid. In only one, however, of the present series was there a clinical hydrocephalus. Careful measurements of the size of the head from time to time failed to show any enlargement. The joint affection has been fully investigated by Dr. Still who cultivated from the pus in the joints the same diplococcus which he found in the brain. None of the present series have had any joints involved.

It will be obvious from the foregoing brief summary of the symptoms that the diagnosis in the majority of cases is easy. The sudden onset, the characteristic head retraction, the chronic course, and the progressive emaciation render the disease, as a rule, easily recognisable. Yet of the present series seven of the cases presented difficulties more or less serious. The patient in Case 1 was supposed at one time to have a cerebral tumour, a diagnosis supported by the extensive optic neuritis and retinal hæmorrhages, combined with the absence of any head retraction. The necropsy showed the typical lesions of posterior basic meningitis and no trace of tumour formation. Case 5 was diagnosed confidently as a case of tuberculous meningitis, and the discovery of the true condition at the post-mortem examination was a surprise. Typhoid fever was suspected in Case 7 and Case 12, and in Case 4, Case 8, and Case 14 the diagnosis was delayed for some time. Three of these cases are worthy of a little further consideration.

CASE 7.—A girl, aged four years, previously in good health,

was taken suddenly ill with headache and a "fit" on Jan. 8th, 1900. On the 9th she had a smart epistaxis. On admission on the 16th she was feverish, irritable, and decidedly ill, but apart from a slight stiffness in the cervical muscles had no sign of disease. Her temperature chart (Chart 1) was

CHART 1.



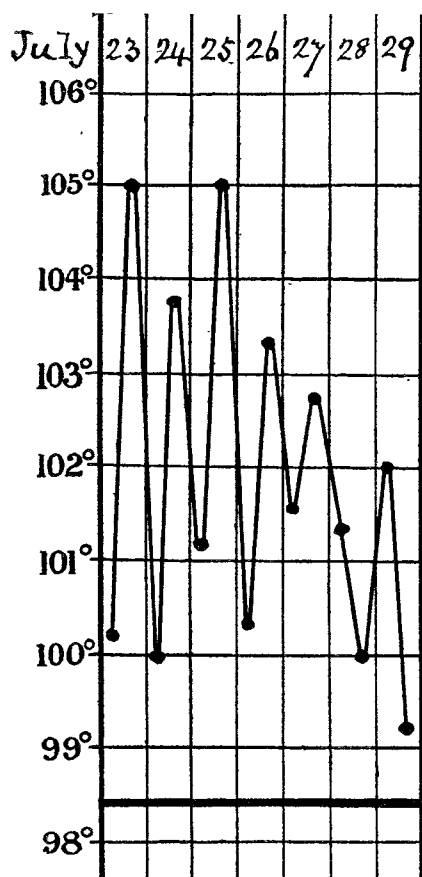
remarkably unlike that usually associated with posterior basic meningitis, in which disease, as a general rule, the temperature remains below 100° F., with occasional rises at very irregular intervals. It was not till two days before her death that the diagnosis was made with any certainty, though retraction of the eyelids had been noted on Feb. 2nd, a fortnight earlier. In this case typhoid fever was suspected, but repeated trials of Widal's serum reaction all proved negative. The course of the fever, the absence of any positive physical signs of disease, and the age of the patient all, I venture to think, combined to make earlier diagnosis impossible.

With this case Case 4 is comparable. This was a girl, aged nine months, who was brought to the hospital for diarrhoea and vomiting which began on July 16th, 1900. She was admitted on the 23rd and the only objective sign of disease was a slight stiffness of the neck and some retraction of the head, which had completely disappeared three days later. In this case the results of a cultivation made from the fluid obtained by lumbar puncture established the diagnosis at the end of the first week; but without this aid it would not have been possible to be sure of one's ground until the middle of the following week when the clinical picture was characteristic. The temperature chart (Chart 2) has at least a family resemblance to that of the preceding case.

The third case was, if possible, still more puzzling. A boy, aged eight months, was taken suddenly ill with "convulsions" on Dec. 31st, 1899. These were repeated on Jan. 1st and 2nd. He was admitted on Jan. 3rd and no diagnosis was made till near the end of the third week. Typhoid fever was again suggested and several other diagnoses were discussed. The child had no objective signs of disease except the fever and a slight rigidity of the cervical muscles. At the end of the third week, however, he presented the typical retraction of the head, and the subsequent course of the illness confirmed the diagnosis then made. His temperature chart (Chart 3) again illustrates a wide departure from the ordinary course of the disease.

As regards the temperature in these cases it is significant that they were all three admitted before the end of the first week of the illness. The majority of the cases come to the hospital much later, and it is possible that if they could be seen at an earlier period such charts would be far more common than they are at present. It is particularly interesting to compare the first two of these charts with that given by Dr. Osler in his Cavendish lecture, numbered Chart 4. That was obtained from one of the cases occurring in an outbreak of epidemic cerebro-spinal meningitis and the resemblance to the type here illustrated is extraordinarily close.

CHART 2.

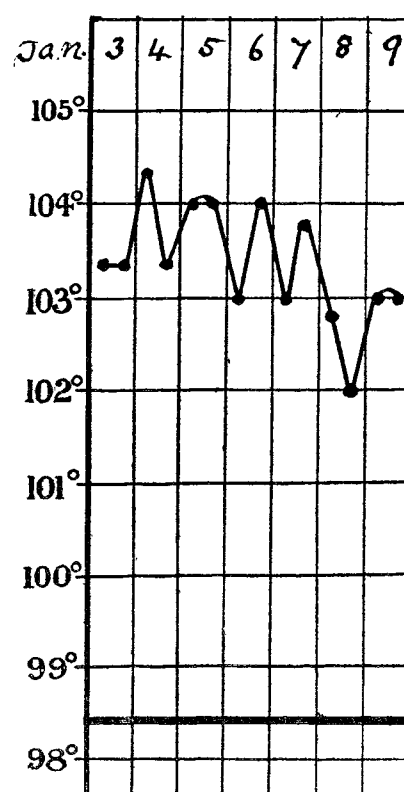


CASE 8.—This case was that of a boy, aged four years, and ended in recovery. He was admitted with a history of a sudden onset of vomiting and head retraction nearly a month previously. He had slight retraction of the head, well-marked optic neuritis, hyperæsthesia of the skin, and retracted abdomen with a well-marked tache. He was quite conscious and even intelligent. His temperature was intermittent with a range of from four to five degrees for a week and then became very unsteady. Towards the end of the third week it became normal and he went out a few days later quite well. I have seen this patient three months later; he is very healthy and his intelligence seems in no way impaired. He still has a slight blurring of the optic discs, but there is no swelling, no loss of vision, and no evidence of atrophy.

The patient in Case 14, the other patient who recovered, has, I am afraid, left the country. He came over with his father from South Africa soon after the outbreak of the war, was suddenly taken ill with "convulsions" about Jan. 30th, 1900, and was admitted three weeks later. This case corresponded almost exactly in its clinical symptoms to the description given of epidemic cerebro-spinal meningitis, but was, so far as we were able to learn, quite an isolated case. He had irregular pyrexia, marked head-retraction, slight strabismus, marked hyperæsthesia, great irritability, and much tremor. He was never wholly unconscious, but he always knew his relations and even made efforts to speak to them. He had marked optic neuritis also and was the only patient in any one of these cases who had any skin eruption, having herpes covering both legs, portions of the thighs, and the lower part of the abdomen. His temperature came down rather suddenly to normal in the sixth week of his illness and remained there. The boy was discharged quite well at the end of the ninth week.

Before leaving the question of the diagnosis of the disease there are a few negative points to be mentioned. Blood-counts were made in several of the cases and in the early stages of the disease there was always a considerable leucocytosis; in the more chronic forms the white corpuscles have regained their normal standard. Of the different forms of meningitis the posterior basic form certainly in its active stage gives rise to a higher leucocytosis than tuberculous, but I have not yet had an opportunity of comparing it with pure pneumococcic meningitis. Kernig's sign, the rigid contraction of the flexors of the thigh, is, I believe, present in nearly all cases of posterior basic meningitis. It is, however, present also in cases in which there is no cerebro-spinal meningitis. I have recently found it well marked in two cases of lateral sinus thrombosis in which post mortem there was no meningitis at all. Lumbar puncture was used only once and then as a diagnostic measure. It is, to judge from the reports of our American and Canadian visitors, largely employed as a therapeutic measure in the United States and Canada, and with success. Osler, however, found that his epidemic cerebro-spinal cases derived no benefit from the procedure, and his experience seems to coincide with that of others. It is obviously quite useless late in the disease, and the only time at which removal of the cerebro-spinal fluid would appear to have any possible benefit is during the first week. It is possible that if tried only in cases which have not yet passed the seventh day from the onset the results may be more encouraging, and at any rate in such a disease any means of benefit is worthy of trial. All treatment of other kinds seems quite inefficacious, and pending the discovery of an antitoxin, lumbar puncture in a selected class of cases seems to hold out some faint promise. At the same time, it must be admitted that the pathological lesions found at the post-mortem examination are usually of such a character and in such situations that drainage by the spinal canal seems a wholly futile measure.

CHART 3.



In conclusion, it will be obvious from the foregoing account that posterior basic meningitis presents a considerable variety of clinical characters. In the majority of the cases which occur in children of under 12 months it is a very distinct and easily recognisable disease, but this rule does not hold invariably. On the other hand, a disease occurring in older children with many of the same symptoms and possessing the same pathological and bacteriological features, yet has certain characteristics which make it resemble very closely epidemic cerebro-spinal meningitis. Are the two identical, and are the special features of the epidemic disease

due merely to an exaltation of virulence in the organism? On the whole, and judging from the cases which I have seen, which unfortunately include no epidemic cases, I think the answer must be in the affirmative. The clinical symptoms obviously differ considerably without any corresponding alteration in the pathological or bacteriological features, and the main differences between the organism of Weichselbaum and the organism found in these cases in England seem to be quite insufficient to establish them as distinct species. If this view is accepted we shall henceforth look upon posterior basic meningitis as a disease comparable in certain points to pneumonia, which, while as a rule a sporadic disease, occasionally presents itself in epidemic form. The causes which determine this variation are in both cases still to be discovered. I have to thank Dr. Lees, Dr. Penrose, and Dr. Garrod for permission to make use of the cases which have occurred in their respective wards; and I also owe thanks to Dr. Still for much help and many suggestions.

Bentlnck-street, W.

PRIMARY SARCOMA OF THE STOMACH.

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DURING the last few years the opinion has been steadily gaining ground that many of the morbid growths of the stomach which have hitherto been regarded as carcinomata are really sarcomatous in character and that the clinical description of malignant disease of the viscus requires to be revised from a new pathological standpoint. This opinion is founded partly upon the discovery that many specimens which are described in museum catalogues as examples of carcinomatous or fibroid tumours present the characteristic features of round-cell or spindle-cell sarcoma when examined with the microscope, and partly upon the large number of cases of sarcoma of the stomach which have been published since special attention was directed to the subject. Thus, Perry and Shaw found four instances of sarcoma among 50 specimens of malignant disease of the stomach, while in the course of 23 consecutive necropsies upon persons who had died from primary neoplasms of the organ I observed two well-marked examples of round-cell sarcoma. It may also be noticed that whereas Schlesinger in 1897 was only able to collect 30 cases of the disease, in November, 1900, the number of published cases exceeded 60, of which 53 possessed sufficient details to permit of analysis. Although it is impossible to make any absolute statement as to the relative frequency of the disease it is probable the sarcomata constitute from 5 to 8 per cent. of all primary neoplasms of the stomach.

Gastric sarcoma may appear either as a primary growth or as a secondary deposit. The former is by far the most common if exception be made of those not infrequent cases where the organ is involved by a lympho-sarcoma. Six varieties of the primary affection have been described up to the present time—namely, round-cell sarcoma, spindle-cell sarcoma, fibro-sarcoma, myo-sarcoma, myxo-sarcoma, and angio-sarcoma. Of these the spindle-cell and the fibro-sarcomata are probably identical, while the single example of myxo-sarcoma appears to have been originally a case of the round-cell type which had undergone degeneration.

MORBID ANATOMY.

1. *Round-cell sarcoma*.—Round-cell sarcoma, or as it is often termed "lympho-sarcoma," is the variety most usually met with and was observed in 33 out of 53 cases, or in about 62 per cent. of the entire number. As a rule it presents itself in the form of a dense infiltration of the pyloric third of the stomach, which transforms the coats of this portion of the viscus into a homogeneous, yellowish-white mass of rigid consistence and considerable thickness. The peritoneal aspect is often covered with recent lymph, while the inner surface may be slightly uneven or distinctly nodular and is occasionally superficially ulcerated. If the pylorus is greatly thickened its orifice may be partially stenosed, as in cases of spheroidal-cell carcinoma, but as a rule the rigidity of its tissues renders it patent and the valve incompetent rather than contracted. The growth gradually shades off as it approaches the centre of the organ, but it

is often prolonged for some distance along the curvatures in the form of thick striæ or bands. In almost every instance, whether the pylorus is stenosed or not, the cardiac portion of the stomach is dilated and its mucous membrane shows signs of chronic inflammation. In about one-sixth of the cases the entire organ was infiltrated by the new growth, which also tended to invade the first part of the duodenum and the lower end of the œsophagus. The walls of the viscus were greatly thickened and its cavity contracted, and its inner surface was sometimes extensively ulcerated. In only two instances out of the entire number did the disease appear as a circumscribed tumour in the wall of the viscus, with secondary nodules in the surrounding mucous membrane. On microscopical examination the disease is found to commence as a round-cell infiltration of the sub-mucosa, which subsequently spreads into the muscular coat through its interstitial connective tissue and finally destroys and replaces the contractile fibres. At first the mucous membrane is merely stretched by the subjacent growth and atrophies from pressure, but at a later stage it is often invaded by the disease and may undergo ulceration. Schlagenhauser and Redtenbacher have shown that a diffuse infiltration of round cells in the mucous membrane may extend far beyond the apparent confines of the disease. Like the other forms of sarcomata, this variety is prone to undergo softening and degeneration, with the formation of small cavities in its substance or perforation of the wall of the stomach.

2. *Spindle-cell or fibro-sarcoma*.—This comes next in frequency of occurrence and constituted 12 out of the 53 cases, or 22 per cent. It presents itself as a round or oval circumscribed tumour of the wall of the stomach and it is usually situated near the great curvature. As it grows it projects more and more beneath the serous coat and exerts so much traction upon its point of origin that it not only drags the whole stomach downwards but often acquires a pedunculated appearance. These tumours sometimes grow to an enormous size (12 lb., Cantwell), and may fill the greater part of the abdominal cavity. When small they are smooth and firm on section, but as their bulk increases they often become knotty and irregular in shape, and their tissue undergoes cystic degeneration. These latter changes are seldom accompanied by the formation of adhesions, but occasionally give rise to perforation of the stomach (Ewald).

3. *Myo-sarcomata*.—These are much rarer than either of the preceding, only five examples having been recorded up to the present time. They form smooth or slightly nodular masses in the substance of the gastric wall near the great curvature and frequently show signs of cystic degeneration. Like the fibro-sarcomata, they may attain enormous dimensions, Brodowski having met with one which weighed 12 lb.

4. *Angio-sarcoma*.—This has been recorded twice (Bruch and Kosinski). In one case it formed a tumour of the size of an infant's head with many cysts due to interstitial hæmorrhages scattered through its substance.

Each variety is apt to give rise to secondary growths in organs more or less remote from the primary disease, but the round cell is by far the most malignant. Thus out of 23 cases of the latter in which full details are given, 16 or 70 per cent. are stated to have exhibited metastases. In almost every instance the lymphatic glands immediately connected with the stomach were enlarged and in nearly 50 per cent. they were sarcomatous; while in a few cases the retro-peritoneal, mesenteric, and even the mediastinal, cervical, and supra clavicular glands were affected. One or both kidneys presented secondary deposits in 28 per cent.; the liver, ovaries, pancreas, adrenals, and omentum each in 14 per cent.; and the lungs, diaphragm, pleuræ, œsophagus, intestines, and mesentery in about 7 per cent. of the cases. It is also important to notice that nodules of growth were present in the skin of the abdomen, thorax, or back in about 12 per cent. of the entire number. The spindle-cell variety was accompanied by metastases in the perigastric glands in 37 per cent. of the cases, and in the skin, liver, and diaphragm in about 12 per cent. of the cases, while in two out of the five cases of myo-sarcoma secondary growths were found in the liver.

A further study of the morbid phenomena of gastric sarcomata brings to light several other points of distinction between them and the carcinomata which may prove of service in their clinical differentiation. Owing to the infrequent infection of the peritoneum there is usually a notable