eaten as *májune*. The smoking of *chunus* and the eating of *májune* are not very common.

2. Among healthy persons *gánja* smoked alone, with tobacco, or with a very small addition of *datura* (two or three seeds) produces a condition varying from mild exhilaration to marked intoxication. The violent intoxicating effects are less marked, or not seen at all, in persons having a regular and wholesome supply of food (Ext. 21). Much the same may be said of *bhang*, etc.

3. Among persons of weak mind, or with a marked neurotic tendency, even a moderate quantity, or only a slight excess of hemp drugs, may so increase the insanity, evident or latent, as to make such persons violent, morose, or melancholy, according to the neuropathy with which we start. The presence of adulterations such as *datura* will increase these effects.

4. Abuse of hemp drugs, especially when adulterated with *datura*, will produce even in healthy persons a very violent intoxication simulating mania, or may lead to a morose melancholic condition, or to dementia. These conditions are generally of short duration, and the patient ultimately recovers. So common is absolute recovery that I think when a patient confined in an asylum for the treatment of insanity said to be due to the abuse of hemp drugs does not recover within 10 months these drugs were possibly only the *exciting cause*, and that we are dealing with an individual who was either insane previous to his use of intoxicating drugs, or with one in whom latent insanity has been roused into activity by the vitiating effects of excess of *gánja*, *bhang*, etc.

CLINICAL NOTES AND CASES.

Developmental General Paralysis. By JAMES MIDDLEMASS, M.A., M.B., B.Sc., Assistant Physician, Royal Edinburgh Asylum.*

General paralysis is, without doubt, one of the most interesting as it is one of the commonest of mental diseases. Even by those who are not specialists in that department of medicine, the picture of a typical case of the disease is one which can be brought up with little difficulty. To make up

* Paper read before the Psychology Section of the British Medical Association Meeting at Newcastle.

https://doi.org/10.1192/bjp.40.168.36 Published online by Cambridge University Press

this picture various factors are necessary, and amongst these the one of age is naturally of some importance. Almost all writers are agreed that the majority of cases occur between the ages of twenty-five and fifty. Many, however, have met with instances in which the disease occurred outside these limits, and lately at Morningside there has been quite a series in which the age of the patients was included in the period of puberty or adolescence. A number of such cases had already been observed and put on record, but it was only in 1890 in the Morison Lectures that Dr. Clouston drew special attention to this particular form and named it "Developmental General Paralysis."* Since that date five additional cases have been admitted, and I propose in this paper to give the clinical history of these and an account of the pathological changes in the case of those in which an examination has been made. It seemed best to keep the two separate, so I shall give first the clinical features of all the cases, and follow with the morbid changes found after death.

The first case, that of Margaret C., was in the asylum twice. On the first occasion she was admitted at the age of 17, but owing to the fact that she had no relatives from whom an exact account of her illness could be got, and because she was stated to have been congenitally weak-minded, she was not then regarded as a case of general paralysis. She was, however, stated to have been insane for at least three years, but nothing could be ascertained about her hereditary history or other matters of importance. When admitted she was undersized, badly developed, and suffered from considerable mental enfeeblement. Her emotional condition was one of mild exaltation. When spoken to she usually smiled foolishly, and if asked how she was, said she felt fine. Her memory was much impaired, and she had no special delusions. Apparently there were no motor symptoms observable, and, owing to the misleading history given, she was, as already stated, regarded as a case of congenital imbecility. During her stay in the asylum she picked up a little. She is noted to have been slow in her movements, weak-minded in behaviour, occasionally quarrelsome and liable to fits of rage or slight excitement, but generally her emotional condition was one of mild happiness. After a residence of sixteen months, she was so far well as to allow of her being transferred to the lunatic wards of the poor-house, where she remained for some months, and was then boarded out in the country.

She was readmitted into the asylum in September, 1891, about

* See "The Neuroses of Development," by T. S. Clouston, M.D., p. 74.

three years after her first discharge. Of her condition during that period almost nothing could be ascertained. She seems to have remained fairly quiet and manageable, but the mental enfeeblement had steadily progressed. She had also become exceedingly weak in body, so that she required to be carried in. She could not stand; there was some paresis of the right side, and she had also considerable difficulty in swallowing. Her mind was almost a complete blank. She seldom spoke, but when she did so her voice was monotonous and tremulous. Tremors were also present in the lips and hands. It will thus be seen that the disease had by that time reached a very advanced stage, and it was not surprising that ten days after admission she died of pneumonia, which attacked an already phthisical lung. Several times during these days, however, it had been remarked how like a general paralytic many of her symptoms were, but the absence of full information and the view taken of her case on her previous admission misled one, and it was only at the post-mortem examination that the brain was discovered to be undoubtedly that of a general paralytic.

The second case is that of Jane F. Part of her history has already been put on record by Dr. Clouston in "The Neuroses of Development,"* but since that was published she has died, and the diagnosis then made has been confirmed by post-mortem examination. The facts already given need not be repeated, but it will be sufficient to say that she was admitted to Morningside at the age of 16, the first symptoms of the disease having been manifested about a year before. On admission she showed great mental enfeeblement, with some delusions of a grandiose character. Weakness of both body and mind progressed steadily and almost uninterruptedly, and she became bedridden. Like the case of A. K., also described by Dr. Clouston,† failure of trophic power was very manifest, and some time before her death she developed gangrene of the extremities of both feet. This slowly spread upwards, and she died of exhaustion sixteen months after admission and about two-and-a-half years from the beginning of the disease.

The next case was that of Marjory C. She was admitted in February, 1892, at the age of 18. As regards her hereditary history, the following facts were obtained:—She was the third of a family of seven. The two eldest are living and healthy. The third was the patient. The fourth was still-born. The fifth is alive and well. The two youngest were twins, and one of them died soon after birth of convulsions. The father denied ever having had syphilis, but he admitted to a pretty regular consumption of spirits, though he said he was seldom drunk. His appearance quite confirmed his confession. The patient's illness was

* *Loc. cit.*, p. 75. † *Ibid.*, p. 80.

stated by her parents to have commenced four years before, as the result of a fall on the head, which seems to have been rather severe. She fell over a stair the height of one storey, and when picked up she was unconscious and blood was oozing from her left ear. This soon stopped, but shortly after pus formed, and came away at intervals. Three days after the fall, while sitting quietly at the fire, she suddenly became aphasic, and the left side of the face was seen to twitch. She did not lose consciousness, and the attack passed off in ten minutes, when she seemed to be all right again. She remained apparently well for three years subsequently. About a year before she was sent to the asylum it was noticed that her manner and mental capacity were undergoing a gradual change. She became more and more weak-minded, and could not keep her situation as a servant, as she forgot what she was told and did not do her work properly. Also, when walking along the street, she would pick up crumbs of bread and eat them, though she got plenty of food at home, and could give no reason why she did so. About two months before admission, as she was going out to the street, she fell and was picked up unconscious. The fall was not a severe one, and it is improbable that it caused the unconsciousness. More likely both were the result of a congestive attack. She soon recovered consciousness, and it was then noticed that her mouth was drawn to the left side. After that she developed various delusions, one of which was that she was the mother of a large family. She also became suspicious of her relatives.

When she was admitted into the asylum the disease had evidently reached a pretty advanced stage. She walked with considerable difficulty, and her gait was very unsteady, and altogether her muscular power was very much impaired. Mentally she was markedly deficient. She seldom spoke, and only at times did she seem to comprehend even simple questions. Her memory was not very good, especially for recent events, but she could repeat the simpler parts of the multiplication table with a fair degree of accuracy. Emotionally she was rather depressed than exalted, but this was inferred more from her expression of face than from anything she said. As regards motor symptoms these were also very pronounced. Her tongue and lips had the characteristic tremors, and her voice was quavering. Her pupils were unequal and did not react well to light, and hardly at all to accommodation. Her knee-jerks and superficial reflexes were very slightly increased. In her general appearance she was undersized and undeveloped, and she had never menstruated. She presented no very evident marks of hereditary syphilis. Her teeth were suspicious, but so far as could be seen there were no syphilitic retinal changes nor interstitial keratitis. There was, however, slight thickening of the tibiæ. The progress of the disease after her admission to the asylum was very rapid. She became more

and more mentally enfeebled, she gradually spoke less, until she ceased to do so altogether, and the muscular weakness got so pronounced that she soon became confined to bed. She lost flesh rapidly in spite of extra feeding, and notwithstanding the most careful nursing she died of exhaustion three months after being admitted.

The next case was that of Martha C., who came to Morningside in October, 1892, at the age of 20. She was the youngest of eight children. The second and third were dead-born at the seventh month. The fourth was born with a deformity of the spine, and died five months after. The fifth was a seventh month child, and lived only two days. The others were at that time living, and except the patient were said to be healthy.

The patient developed normally in body and mind up to the age of 15, five years before her admission to the asylum, but at that time she seems to have come to a standstill; there was no further advance, and before long a decided retrogression became manifest. It appears to have come on gradually without any injury or any violent physical or mental cause. The first symptoms noticed were an alteration in speech, which became thick and slow, and a simultaneous stupidness and want of mental alertness. As in the other cases these mental and motor symptoms slowly grew more pronounced. During these five years she remained at home, and was free from any congestive attack or fit of unconsciousness; she never got excited nor expressed any definite delusions. It was only her increasing weakness of body and mind that necessitated her being sent to the asylum at all.

On admission she was physically fairly well developed, more so indeed than any of the other cases. But it could at once be seen that she was mentally affected. She had generally a blank expression of face, but occasionally it would assume a nervous, frightened look, which is not uncommon in many general paralytics. She was very emotional, laughing or crying on slight provocation. Her memory was much impaired, but she had no grandiose delusions. Motor symptoms were also very evident. Her gait was unsteady, her tongue and lips were tremulous, and her speech was distinctly slurring. The pupils were slightly dilated, the left larger than the right, and both irregular and reacting slowly to light. There was occasional nystagmus, and her knee-jerks were exaggerated. Although she was twenty years old menstruation had never become established. Her chest was deformed, and had a rachitic appearance. Her teeth were decidedly syphilitic, and the angles of the mouth were puckered as if from old ulceration.

Her progress during her residence in the asylum resembled in almost all particulars that of the other cases already described. She became weaker in body, the muscular tremulousness and inco-ordination increased, and before long she had to be kept in

bed. The mental dissolution also advanced steadily, and resulted in almost complete dementia. There was no outstanding event in the course of the illness. She was transferred after a time to Rosewell Asylum, but Dr. Mitchell, the medical superintendent, informs me that there was no change in the character of her symptoms. She died less than six months after being admitted to Morningside, the disease having taken about 5½ years to run its course.

Annie H. was the fifth case. She was admitted on the 27th March last, and she is still in Morningside. She is the youngest of a family of four, which consisted of a girl, who is still alive and well; then there was a miscarriage, then a boy, who is living and healthy, and last of all the patient. She was apparently a normal child up to the age of eight. She had been to school and was getting on well, but at that age a very bad stammer appeared, so bad indeed that she required to be taken from school on account of it. After that she stayed at home and did work about the house, but the stammer got worse. She was never able to do any other work, and when about sixteen years old it was noticed that she was more stupid than she used to be. She forgot things readily, and did not do her work so well. These changes increased gradually, so that she had to be looked after at home more and more. This, latterly, became impossible, and four years ago she had to be sent to the poorhouse, where she remained until she was brought to the asylum. During her stay there her symptoms became gradually more and more marked. She got more stupid and weak-minded, and required nearly constant attention. She never had any attacks of excitement nor any delusions, in fact she spoke less and less, and when she did attempt to do so, the stammer seemed to be worse.

On admission to the asylum she was 23 years of age, and fairly well developed. She had an absence of expression in her face and eyes, and her movements were slow and lethargic. There was considerable difficulty in rousing her attention, as she often seemed to take no note of questions that were asked her, and when she did grasp the fact that an answer was wanted she took a long time to give it. This was partly due to her stammer, but seemed to be quite as much caused by slowness in her mental processes. Occasionally she would smile in a meaningless way, and quite apart from anything that had been said to cause it. What emotional feeling she had, appeared, on the whole, to be pleasurable rather than the reverse. As regards motor symptoms, there was considerable muscular weakness, but there was, in addition, some inco-ordination, and there were slight tremors of her upper lip. Her knee-jerks and other reflexes, both superficial and deep, were much exaggerated. Her pupils were unequal, slightly irregular, and did not react to accommodation. Her speech, as already mentioned, was much impaired, but it was difficult to say whether

there was anything more than a stammer. In her general condition there was nothing of special importance, except the fact that she had menstruated only once or twice when she was about sixteen. Her teeth were not well-shaped, and there was some irregular thickening of the tibial bones, presumably of a syphilitic character.

Since she came to the asylum the patient has lost flesh and strength to a considerable degree, in spite of extra attention. She is now confined to bed, and is very helpless. All the mental and motor symptoms are now more pronounced than ever, and show signs of further advance. On more than one occasion there have been slight rises of temperature with increased mental obscuration, though it has never reached the stage of unconsciousness. From the absence of other discoverable causes, these were regarded as slight congestive attacks. It may be mentioned that during them there have been no convulsive movements, though she occasionally complains of headache. Even apart from intercurrent troubles which might carry her off, it does not look as if she would live many months more.

The last case is that of Christina T. She was admitted on 1st May of this year, at the age of sixteen. She is the only one of the family living, the two previous children having been stillborn. Her father is at present suffering from locomotor ataxia. As an infant, the patient was weakly, and a blotchy eruption came out on her skin. In course of time this disappeared, and she grew stronger. She has, however, never been robust, and was always small for her age. At school she did moderately well, and passed the standard examinations. After leaving it at the age of thirteen she became a bookfolder, and remained at this for some little time; but latterly it was noticed that she was easily annoyed and irritated, and she then began to have hallucinations of hearing and consequent delusions. A few days before admission she became excited and confused, and she could not answer questions quite coherently. When admitted she was still slightly excited, but the most prominent mental symptom was confusion with loss of memory. There were, besides, pronounced motor symptoms. Her gait was slow and unsteady, and she said she felt weak on her legs. There was a little tremulousness of her tongue and upper lip, and her speech was, to a slight extent, trembling and staccato. Her pupils were irregular and sluggish in their reaction to light. As the first symptoms of brain disease had been present for only a few months there was some hesitation in diagnosing this case as one of developmental general paralysis, but the combination of mental and motor changes, and the general resemblance of the case to those already described, ultimately led us to the conclusion that it was such.

Her history since admission has been comparatively uneventful. The excitement soon completely passed off, her memory improved,

and her bodily health as well. Nevertheless, there still remains a considerable amount of sluggishness in comprehending and answering questions, and the characteristic motor symptoms seen on admission are still quite discernible. The case is an interesting one, and her further progress will naturally be watched with attention.

Such, then, were the clinical features of the six cases which I have endeavoured to present. We shall now turn to the pathological appearances seen on examination of the first four of these.

Margaret C. died in September, 1891. The inner table of the skull was much thickened, and the dura was adherent to it along the line of the coronal suture. The dura was of normal appearance and thickness, and there were about 2oz. of cerebro-spinal fluid. The whole brain weighed only 32½oz., the cerebrum being 25¼oz., cerebellum and pons 5½oz., and fluid under the pia and in the ventricles 1¾oz. The pia-arachnoid was much thickened, and had a milky appearance. It was more or less adherent to the cortex all over. The brain as a whole was small, and the convolutions, especially those of the frontal lobe, much atrophied. The two hemispheres were strongly adherent to each other. On section the grey matter was seen to be much atrophied, and the different layers usually to be made out were all merged into one another. There were very marked granulations of the lateral and fourth ventricles. Microscopic examination of fresh sections showed the pia mater to be much thickened, being infiltrated with a large number of small cells, and containing numerous pigment granules. In the outer layer of the cortex, as well as in the deepest layer next the white matter, there were a few prominent spider-cells. The nerve-cells almost throughout had undergone granular and pigmentary change. The most apparent character, however, was the large number of nuclei in the adventitial sheath of the vessels. These accordingly stood out prominently. There was a slight increase in the small rounded neuroglia cells, and there were some masses of pigment in the perivascular spaces. These changes were most evident in sections taken from the frontal region, and became less marked as one passed backward. Regarding the other organs, nothing of importance was found except in the uterus and ovaries, which were quite undeveloped and retained their infantile characters.

The second case, Jane F., died in November, 1891. The body was in an extremely emaciated condition, and there was gangrene of both feet. There was nothing abnormal about the skull except an unusual distinctness of the sutures. The dura mater was slightly thickened, and the vessels a little congested and tortuous. On incising the dura there was found to be on the left side a recent hæmorrhagic effusion, irregularly oval in shape, about three inches long and two inches broad from above downwards. In the centre it was about a quarter of an inch in thickness, and consisted of

almost pure blood-clot, covered on the inner surface with a thin transparent membrane. At the margins there was no hæmorrhage, only the colourless membrane. On the right side, in the parietal region, there was a similar thin, colourless, subdural membrane. The encephalon weighed 35oz., the cerebrum being 27oz., the cerebellum, pons, and medulla 5½oz., and there were 2½oz. of fluid. The sulci were very well marked, and there was considerable atrophy, especially of those of the frontal lobes on both sides. The pia-arachnoid was slightly milky, and was adherent over the whole upper surface of the brain, except posteriorly. There was also considerable adhesion between the two hemispheres. On cutting into it the grey matter was found to be pale, soft, and atrophied. The ependyma of the ventricles presented many granulations. On microscopic examination there was found considerable thickening of the pia, with matting of the superficial layer of the cortex. In this position there was a considerable number of spider-cells, but they were faintly stained, and showed signs of fatty degeneration. There were also spider-cells visible in the deepest layer, and these were more deeply stained. The nerve-cells in all the layers showed slight granular degeneration, and nearly all their nuclei showed a less deeply stained point about the centre. The adventitial nuclei of the larger vessels were increased in number, but the smallest capillary loops in many places seemed nearly healthy. In the anterior convolutions these changes were more advanced than elsewhere. As in the other case, the uterus was infantile in size, and the ovaries were small and smooth on the surface.

Marjory C., died April, 1892. There was considerable emaciation. The skull-cap was thickened, but not dense, and the inner table was pale. The dura was slightly thickened, and there was rusty staining on its inner surface in both temporo-sphenoidal fossæ. The encephalon weighed 36¾oz., the cerebrum 29¼oz., the cerebellum and pons 5¾oz., and the fluid in the lateral ventricles and under the arachnoid 1¾oz. There were in addition 4oz. of cerebro-spinal fluid. The pia-arachnoid was markedly milky, especially over the vertex, where it was tough and thick. It was adherent to the cortex to a slight degree over the lower frontal convolutions only, but it did not strip off so readily as in a normal brain over nearly the whole surface. The two hemispheres were not adherent; the cerebral vessels showed slight thickening, the convolutions were very markedly atrophied, most of them being flattened instead of rounded on the top. In addition there was a localized softening of the middle of the second and third left temporo-sphenoidal convolutions for about two inches of their length. It had an opaque, dirty brown colour, and on section it was found to be confined to the grey matter. Elsewhere the grey matter appeared pale, and was soft and much atrophied. The basal ganglia were pale and mottled in appearance. The

ependyma of the ventricles was covered with numerous fine granulations. Fresh sections of various convolutions were made, and the following appearances were found. There was thickening of the pia mater, and an increase of small cells in it. The superficial part of the cortex was sclerosed, and contained a number of faintly-stained spider-cells. These cells were also present, more or less, throughout the various layers of the grey matter, but were most numerous in the outermost and deepest. The adventitial nuclei of the vessels were proliferated, and there were collections of pigment-granules in many of the perivascular spaces. The nerve-cells were in various chiefly advanced stages of granular degeneration. In most of them the nucleus was angular in shape and irregularly stained, many showing the same faintly-stained point seen in the previous case. These changes were most marked in sections from the frontal region, but even in the occipital convolutions they were evident enough. The uterus and ovaries in this case also were in an infantile state of development.

The fourth case, Martha C., died in May, 1893, and I have to thank Dr. Mitchell, of Rosewell Asylum, for permission to make the post-mortem examination and obtain sections of the brain.

The body was much emaciated. The skull-cap showed great thickening of both inner and outer tables. The dura mater was not adherent to it, but it showed considerable general thickening, and the smaller vessels were dilated. Over both sides there was a delicate fibrinous sub-dural membrane, more evident on the left side, on which side also there were a few spots of hæmorrhage in the temporo-sphenoidal fossa. On the right side it was quite transparent and colourless. On opening the dura there escaped more than 6oz. of cerebro-spinal fluid. The encephalon weighed 35½oz., the cerebral hemispheres 28¾oz., the cerebellum, pons, and medulla 5¼oz., and there were 1½oz. of fluid in the ventricles. The pia-arachnoid was very milky, especially over the vertex, and it was adherent to the cortex along the top of nearly all the convolutions. The hemispheres were strongly adherent. The brain was small and the convolutions simple but well-marked, owing to their great atrophy and the distinctness of the sulci. The atrophy was most marked in the frontal and parietal lobes. On section the grey matter was pale, soft, and much atrophied. The basal ganglia had a mottled appearance. The ependyma of the ventricles was thickened and showed the usual granular surface. The pia mater of the cerebellum was also thickened and slightly adherent to the subjacent grey matter. The cerebral vessels were evidently thickened. Microscopic examination of the cortex showed the usual thickening of the pia mater with matting from interlacing of the spider-cell processes in the outer layer of the cortex. Spider cells were also present in the deepest layer. The adventitial nuclei of the vessels were increased in number. The nerve cells of the second and third layers had undergone marked

pigmentary degeneration, those of the deeper layers had a granular appearance. As before, the uterus and ovaries had retained their infantile characters.

Having now completed the description of the cases, the next step is to draw from them what general conclusions seem warrantable. Foremost amongst these there naturally stands the question of *causation*. Dr. Clouston, in discussing this point in connection with the two cases already referred to, concludes that in them hereditary syphilis played a most important, if not the most important, part. These additional cases have only strengthened this view, for in four of them there were very strong evidences of its existence both from the hereditary history and from the examination of the patients themselves. In the other case it was not possible to get any history, and the existence of symptoms in the patient herself was doubtful.

Dr. Shuttleworth* and others have already drawn attention to the influence of hereditary syphilis in the production of brain disease, but the cases described have been mostly of idiocy and imbecility. Dr. Shuttleworth has lately, however, admitted that some may have been developmental general paralytics.† In this connection an interesting paper by Prof. Homén appeared in the "Archiv für Psychiatrie," Vol. xxiv., pt. 1, p. 191 (1892). In it he gives an account of three cases of paralytic dementia occurring in one family. Two were boys and one a girl. In them the mental symptoms were practically identical with those in the cases I have described, but he does not mention any motor symptoms. After death there were found a few adhesions of the pia mater to the cortex, but some other changes found in general paralysis were absent. The chief positive change was a syphilitic disease of the blood-vessels. In the cases I have seen this was looked for, but was not found, so it may be that the difference between the two series of cases lies in the presence or absence of this vascular disease.‡

Of the other causes contributing to the production of the disease little can be said. In one case traumatism, according to the parents, was the exciting cause, but it was some

* "On Idiocy and Imbecility due to Inherited Syphilis," "American Journal of Insanity," 1888.

† Wiglesworth. "General Paralysis occurring about the Period of Puberty," "Journal of Mental Science," July, 1893.

‡ *Cf.* Dr. Drummond's Address in Medicine, at British Medical Association Meeting at Newcastle, "B. M. J.," Aug. 5, 1893, p. 298.

time after the accident before symptoms were observed. In three cases there was a direct heredity towards nervous disease—two of actual insanity, one of locomotor ataxia. In another case there was a history of alcoholism. As a contributory cause, mentioned by Dr. Wiglesworth in his recent paper, parental neglect was present in at least one case, possibly two.

The next point is the question of *age*. In all the six cases described, the onset of the disease was between the ages of 14 and 16, the average being a little under 15. This is just about the age when sexual development begins to be matured, and it is noteworthy that in all the cases examined the uterus and ovaries had not developed beyond the so-called infantile stage, and the menstrual function either had not appeared at all, or had done so on only one or two occasions. This seems to be more than a mere coincidence, and further justifies Dr. Clouston's nomenclature of the disease.

It is remarkable that the above cases should all have been *females*. Only five cases are recorded of its occurrence in boys, whereas twelve have been girls. The cause of this difference is still obscure, and we are not even in a position to suggest what the reason is, or whether it is merely accidental.

The duration of the disease is generally considerably longer than in adults. In the four fatal cases the average duration was a little under five years. In some cases where the duration was short it is possible that the gradual onset of symptoms may have led the relatives to date the commencement later than it really was.

The *clinical characters* of the cases were remarkably uniform, and coincided entirely with previous experience. Mental enfeeblement, beginning insidiously and progressing steadily, was the outstanding feature in every one. The emotional condition in the initial stages was generally one of mild happiness, but it was not strongly marked. The usual motor symptoms of general paralysis were always present, though in a less degree than in most adult cases.

As for the accompanying *pathological changes* in the brain there is a no less remarkable agreement. In all there was very marked atrophy. The weight of the cerebrum, in which the effects of the disease were most apparent, was in all cases below 30oz., the average being 27¼oz. The healthy cerebrum at a corresponding age is on an average about 38oz.,

so that the extent of the disease is at once apparent. The degree of adhesion of the membranes varied much, in some being slight, in others marked. The microscopic characters were fairly uniform, the chief changes being degeneration of the nerve-cells, increase in the lymphatic elements or spider-cells, and of the adventitial nuclei of the blood-vessels. They were, in short, such as one would expect to find in a slowly advancing case of general paralysis without much mental excitement.

Since the above was written another case has been admitted into Morningside:—

She was sent by Dr. J. Thomson, of Edinburgh, and I have to thank him for notes of the previous history. She—a girl, A. McB.—was only 11½ when the first symptoms of the disease began. There is no definite syphilitic heredity, but it is an open question. A maternal grand-uncle was insane. The onset of the disease was very gradual, and was noticed first about twelve months before her admission to Morningside, on October 7th, 1893. There was no apparent exciting cause, and the first symptoms noted were, loss of memory and intelligence, "nervousness" and stuttering in her speech. The impairment of mind gradually became worse, and motor symptoms then became apparent, viz., tremors of the tongue, lips and fingers, altered gait, and tremulous, deliberate speech, also inequality and irregularity of the pupils. On admission these were all very evident, and there was little doubt about the case being one of Developmental General Paralysis. Emotionally she was, as a rule, contented, frequently smiling in a vacant way. At times, however, she became angry and screamed loudly without apparent cause. There were no unmistakable evidences of hereditary syphilis in the patient, but she was decidedly under-sized and ill-developed. She remained in the asylum little more than a month, and was then removed by her parents as she was not getting better. During her short stay under observation there was not much change in her condition, and I have heard that since she left she has become much worse, and there is not much likelihood that she will live long.

REFERENCES TO CASES.

See summary given in Dr. Wiglesworth's paper, "Journal of Mental Science," July, 1893. Bristowe, "Clinical Journal," March 29, 1893, p. 350.

Régis, "Encéphale," 1883, iii., 433; and "Encéphale," 1885, v., 578.

Bristowe, "Brit. Med. Journ.," Nov. 18th, 1893, p. 1099.