The Bradshaw Lecture ON NERVOUS AFFECTIONS OF THE SIXTH AND SEVENTH DECADES OF LIFE.*

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THE sixth and seventh decades of life constitute a period which has certain marked characteristics. The age of 45, which Dante fixed as the end of the period of youth, might have been taken as the lower limit, but that would involve in most women the inclusion of the climacteric, which I thought it better to avoid.

Many nervous diseases run a very long course, and we should therefore expect to find that the nervous affections of this period will be made up of some which began at an earlier age, and of others, fewer in number, whose incidence is entirely contained within it. I do not propose to include mental affections.

SPINAL CORD.

The diseases of the spinal cord between 50 and 70 years of age are both numerous and important. Tumours of the cord present no especial features at this age; secondary metastases in the cord itself to cancer elsewhere are very rare. I have seen two examples of secondary growths in the cauda equina; the primary growths were in the breast and prostate respectively.

Myelitis is not a common disease after 50. In 156 cases reported as myelitis, acute or subacute, excluding pressure myelitis, 18 per cent. occurred after this age. The age given in hospital reports probably represents very nearly that of onset, as chronic cases with secondary degenerations would come under other designations, for example, spastic paraplegia. This relative infrequency after 50 might be expected, as the common causes of myelitis are chiefly some acute infection or intoxication, in which the myelitis may be either primary or secondary, and syphilis. Taylor and Buzzard¹ state that syphilis is responsible for the great majority of cases, probably 80 per cent. of cases of myelitis. The term "myelomalacia" is more accurate than "myelitis" for many cases. One might, perhaps, have anticipated an influx of cases of myelitis, or rather myelomalacia, in later life, due to vascular occlusion from arterial degeneration, but large patches of softening in the cord seem rarely to result from this cause; the contrast with the frequency of areas of softening in the brain is remarkable. Arterio-sclerosis in the cord seems to affect the smaller vessels and to produce small sclerotic foci or diffuse areas of degeneration.

The diseases of the spinal cord which are especially characteristic of this age are diffuse lesions of the posterior or lateral columns; mostly degenerative—cases formerly grouped together as the "combined sclerosis." In some, symptoms due to disease of the lateral columns predominate, and the clinical picture is that of spastic paraplegia, a very definite clinical syndrome, but due to various pathological states. In other cases the posterior columns are chiefly affected, and many are of pathological rather than of clinical interest, as the changes in the cord either give rise to no symptoms, or else these are overshadowed by more urgent ones due to the general disease in the course of which they occur. Such are the degenerations of the posterior columns found in cachectic states, in carcinoma, in glycosuria or diabetes, the slighter forms of the cord degenerations of pernicious anaemia, and also those found in some cases of chronic cystitis and enlarged prostate. In all the lower part of the cord is solely or chiefly affected, and the predominant symptom is paraplegia, or paraplegic weakness with ataxy, with or without some, generally not profound, sensory affection.

Cases of paraplegia of this kind are found recorded under the names of spastic, ataxic, or senile paraplegia, combined sclerosis, or subacute combined degeneration.

* In preparing this lecture for publication here it has been necessary, owing to considerations of space, to omit some passages.

Unfortunately these terms are not always used in the same sense; whilst cases of one group shade by degrees into those of another, and, except in the case of subacute combined degeneration, convey no very clear idea of the pathological changes. For instance, under such a name as "ataxic paraplegia" will be found included quite distinct diseases, whilst "spastic paraplegia" merely indicates the predominant clinical feature irrespective of its pathological cause. An important step forward in differentiation was the separation of subacute combined degeneration, both clinically and pathologically, from among these various conditions by the work of Russell, Batten, and Collier.²

With the proviso that the above designations as given in reports of cases are not mutually exclusive, and only afford a rough idea of the age incidence, I find that of 114 cases of spastic and ataxic paraplegia, combined sclerosis and subacute combined degeneration, 38 per cent. occurred between 50 and 70 years of age. If spastic paraplegia is excluded for the reason that it will comprise many old-standing cases of lateral sclerosis secondary to myelitis and other causes, the proportion between these ages is higher—49 per cent.—and reaches its highest point in subacute combined degeneration.

Dr. Collier,³ in his excellent account of this disease, states as to the age of onset that the extremes are between 30 and 65 years, and that the highest incidence is reached between 55 and 60. Of 11 cases under my observation, in most of which the diagnosis was confirmed *post mortem*, the age in 9 was between 53 and 64. There was no definite cause for the disease in any; in 2 cases it appeared after severe diarrhoea and vomiting, and 1 patient had had syphilis; 3 of the patients suffered from pernicious anaemia, 3 from anaemia distinctly of the secondary type, and 4 were not anaemic.

None of these varieties of combined sclerosis of the cord can be regarded as true system degenerations, which appear earlier in life and are often hereditary or familial.

Haematomyelia of spontaneous and non-traumatic origin is rare at any age. Of v. Pfungen's⁴ 10 cases 4 were between 50 and 65.

Weakness in the legs or paraparesis is occasionally a symptom of chronic uraemia in elderly persons. This may be the first sign of kidney disease for which the patient seeks relief. In three cases under my care the symptoms, of gradual onset, consisted of weakness in the legs, with a feeble, tottering, or uncertain gait. There was no affection of sensation; the deep reflexes were exaggerated, the superficial normal; there was constipation and difficulty of micturition. The affection lasted from three to six months before severe general symptoms of uraemia appeared.

Senile paraplegia is a name used for paraplegic weakness due to diverse pathological changes. For the most part the sufferers are beyond the age we are considering. A variety has, however, been described by Oppenheim⁵ which he attributes to arterio-sclerosis of the cord, and to perivascular sclerotic changes, especially in the white matter. According to Purves Stewart⁶ the cases so affected can hardly be called senile. The ages of Hirsch's cases varied from 44 to 65. The symptoms are those of a slowly progressing spastic paraparesis, ultimately leading to contraction of the limbs, with increase of deep reflexes. Sir William Gowers also described under the name of "simple senile paraplegia" a condition occurring especially in persons over 50 characterized by simple weakness of the legs with slowness of movements, but without wasting, sensory disorder, or alteration of reflexes, and resembling paralysis agitans without tremor.

Spastic paraparesis or even paraplegia may in later life be due to cerebral affections, for instance, small patches of softening on each side of the pons, or bilateral lesions of the cortical leg centres, causing degeneration of the pyramidal tracts.

Pressure Paraplegia.

Caries of the spine, hypertrophic cervical pachymeningitis and internal pachymeningitis involving a great extent of the cord, and probably of syphilitic origin,⁷ are very seldom met with after 50. The most important cause of compression paraplegia in later life is cancer of the vertebrae; the cases are almost all over 50, and the growth is nearly always secondary. The primary tumour is most frequently in the breast, but may be in the prostate, stomach, uterus, or other organ.

On account of the agonizing pain which often attends it this is one of the most terrible of diseases. The typical feature of the pain is that it is brought out or increased by movement, is in abeyance during rest, and is localized. Sometimes early, but more often later, in the course of the disease, pains from pressure on posterior nerve roots may occur, these are not so much affected by movement, are lancinating, and pass down the course of the nerves.

The diagnosis in the early stages is often difficult. The symptoms may be vague, but x-ray examination may clear up the diagnosis in a doubtful case. Late in the disease, when the patient is cachectic, wasted, has deformity of the spine, or the characteristic shortening of the trunk due to involvement of several vertebrae, and pressure paraplegia, the diagnosis is obvious. The onset of paraplegia may be almost sudden from the development of a patch of softening in the cord at the site of compression. In one case of a small scirrhous tumour of the breast the primary tumour was not noticed before paraplegia occurred. A history of a long interval between the discovery and the removal of the growth is important. Many years may pass between operation for the primary growth and the development of metastases in bone.

There may be no wasting, and patients may even become fat from enforced inactivity; tenderness or pain to percussion over the spines may be absent, even when the patient complains of intense pain on movement; and deformity of the spinal column may not occur until late in the illness. The early pains may be set down to rheumatism or hysteria. In some cases both the pains and the difficulty of carrying out certain movements may entirely disappear for a time.

A rare cause of pressure paraplegia in later life is limited osteo-arthritis of the vertebra. I refer only to those cases in which paraplegia, generally painful, is caused by an osteo-arthritic lesion limited to a few vertebrae. Such a case is described by Bailey and Casamajor,⁸ in which the existence of an extra-medullary tumour seemed probable as the cause of the paraplegia, but at the operation the laminae and spinous processes of the twelfth dorsal were found thickened, abnormally soft, and greyish in colour, and were removed. Pathological investigation showed chronic osteo-chondritis with new bone formation. The patient completely recovered. In a man of 65 whom I saw there was paraplegia of subacute onset, apparently due to a transverse myelitis at the level of the eleventh dorsal roots. At operation it was seen that the eighth, ninth, and tenth dorsal laminae had undergone some form of sclerosing osteitis, with great thickening, that of the ninth being fully one inch thick.

Tabes Dorsalis.

Tabes dorsalis fairly maintains its frequency in the sixth decade of life. Of 700 cases, the proportion living over 50 was 24 per cent. In Byrom Bramwell's⁹ statistics of 263 cases the onset occurred in 9.6 per cent. over 50, and 1.9 per cent. over 60 years.

Cases in which the onset occurs after 45 as a rule run a more favourable course. The longer the interval after infection before symptoms of tabes appear the less acute the course of the disease. In some cases the symptoms are slight, and do not advance; in another group the disease is more pronounced, but the average duration before the patient is incapacitated is fifteen years.

Tabes shows a decided falling off after 50 as compared with the period 30-50, and a very marked fall after 60. Arthropathies seem to be present in a larger proportion of cases than in younger patients; in several cases the character of the work as involving the special use of certain joints seemed to determine the site of the arthropathy. Aortic disease is more frequent in elderly tabetics, and other complications are hemiplegia or recurrent paralysis, either monoplegic or hemiplegic, due to syphilitic disease of the cerebral arteries. In some of these patients the signs of tabes may be first discovered when the patient seeks advice for one of these complications.

Cases following an acute course with severe ataxy are rarely met with after 50. The prognosis as to life is not bad, except when there is aortic or vascular disease, or cystitis following old-standing difficulties of micturition.

The Muscular Atrophies.

The myopathic forms of muscular atrophy do not arise in the period of life under consideration, but the myelo-

pathic forms—progressive muscular atrophy, bulbar paralysis, and amyotrophic lateral sclerosis—are relatively frequent after 50. There is good evidence that syphilis may be the cause of myelopathic muscular atrophy in some cases. In several cases of progressive muscular atrophy in elderly patients I noticed that the atrophy started in muscles or groups of muscles which were chiefly used in the occupation, and may presumably have become exhausted. The rate of progress of the atrophy was rapid in these cases; the disease steadily spread beyond the muscles first affected, so that there was no question of a mistake in diagnosis for a limited atrophy of muscles due to occupation. Is it possible that a muscular atrophy from occupation starting from over-fatigue of special muscles tends in an elderly person to spread widely, whilst in those younger it remains limited to the muscles involved in the particular action concerned? The occurrence of these forms of atrophy after 50 is not obviously connected with arterial disease, which was not more evident than in normal persons of the same age.

Some rare cases of progressive muscular atrophy run a subacute course, and are especially met with in the elderly. Oppenheim¹⁰ classes them apart as subacute and chronic anterior poliomyelitis, and suggests a toxic cause. Other writers assign the cause to traumatism. Of two well-marked cases of this affection, both in men in good circumstances and of previous good health, one was aged 67. Three weeks after a heavy fall weakness of the left hand and arm began and steadily increased; two months later he had very little use of the upper extremity, and its muscles generally showed atrophy with fibrillary tremor. Five months after the accident the muscular atrophy had greatly increased, both upper extremities and the neck being now involved. The disease shortly afterwards spread to the bulb, and he died quite suddenly. The other patient was aged 66. He had been overworked for some time before the onset of the disease. The distribution of the atrophy, as in the other case, was practically confined to the upper extremities. The course of the illness was four months, and he also died suddenly.

Disseminated Sclerosis.

Disseminated sclerosis generally begins much earlier than the period of life under consideration, but as it may run a long course there are a certain number of survivors after 50. Moreover, it is well known that remissions, sometimes of very many years' duration, may occur, and the final outbreak may exceptionally be deferred to quite late in life. The remissions may be of such duration as almost to amount to recovery from the disease; possibly such remissions may very occasionally be permanent.¹¹ Allowing for a source of error from the fact that in common diseases only exceptional cases are recorded, instances of the onset of the disease in patients over 50 are very uncommon. In 536 cases from various sources irrespective of age of onset, the number over 50 years of age was from 4 to 5 per cent.

The few cases in which the onset occurs late seem often to present exceptional features, and are therefore of importance from the point of view of diagnosis. The rare form in which disseminated sclerosis runs its course with muscular atrophy, and may resemble amyotrophic lateral sclerosis, is considered by Schnitzler¹² to affect older patients and to run a more rapid course. There are also cases such as those reported by Bornstein,¹³ in two women aged 60 and 62 respectively. The clinical signs were those of subacute transverse myelitis, and pathological examination showed areas of multiple sclerosis, together with marked changes in the vessels.

Syringomyelia.

The large majority of cases of syringomyelia occur between 20 and 45 years of age. The disease, however, is met with at all ages, and considering that it is one of the rarer nervous diseases, fairly often over 50. Out of 135 cases 23 per cent. were between 50 and 70. Hospital statistics give a rather lower percentage (about 17 per cent.) than reports of special cases. On the view now generally held that syringomyelia is due to a gliosis of the cord, it is interesting to compare the age incidence with that of glioma elsewhere. Dr. Tooth,¹⁴ in 127 cases of glioma of the brain, gives 11 per cent. with onset between 50 and 70. Syringomyelia may run a very long course,

and such cases form a certain proportion of those over 50; on the other hand the onset may be after that age: this happened in 13 out of 79 cases. Sometimes the disease suddenly takes on an acute phase, or progresses afresh in later life after quiescence for long periods. Although there is still a difference of opinion on the point, the evidence that the cause of this activity is often an injury is strong.¹⁵

Pathologically syringomyelia in later life is characterized (1) by the replacing of gliosis tissue by connective tissue, which originates from the adventitia of diseased vessels, and (2) by the formation of cavities in the lateral columns of the cord not connected with the central canal and due to patches of softening.¹⁶ The first appearance of syringomyelia in later life, or the sudden aggravation of symptoms, may be due, at any rate in part, to secondary vascular changes in the cord and to hæmorrhages.¹⁷ Hæmorrhage from diseased vessels may easily occur into the cavities, and has been actually found as the cause of a sudden aggravation of the disease in elderly people.

In other cases the symptoms are clinically those of syringomyelia, but are due to the formation of cavities in the cord, as a direct result of hæmorrhage from vessels with degenerated walls. When syringomyelia originates or starts into fresh activity late in life it is generally progressive.

Destructive disease of the joints in atypical syringomyelia is probably more frequent than is generally recognized. A remarkable case came under my notice. A woman, aged 62, had her left leg amputated above the knee five and a half years previously because it was so extremely contracted as to cause great pain, and the heel was forcibly pressed against the anus and hindered defæcation. Subsequently the right leg became contracted and flexed across the abdomen. When I saw her this leg had been straightened by osteotomy. At the operation the femur and tibia were found to be remarkably brittle and atrophic.

Neuritis.

In 250 cases of multiple neuritis from various sources only 10 per cent. occurred over the age of 50, and 75 per cent. of the cases were between the ages of 30 to 50.

In 45 cases under my care 24, of whom 18 were women, were between the ages of 40 and 53 years. There seems to be a special incidence of alcoholic neuritis during the climacteric. The mental depression and the feelings of nervous exhaustion or lassitude which are such common features of the climacteric tend to induce the less strong-minded to seek relief in alcohol. The nervous changes of the climacteric may possibly impair the nutrition of the lower neurones, and render them more susceptible to the poisonous action of alcohol. As to symptoms, I think that the characteristic mental symptoms of Korsakov's syndrome are more frequent and pronounced in this group than in cases occurring at an earlier age, and also that there is, very constantly, affection of the heart muscle.

Of the less common forms of multiple neuritis, the glycosuric is perhaps relatively the most frequent after 50. The etiology is often mixed—gout, glycosuria, and alcohol. A rare but grave form is acute or subacute toxic polyneuritis. Instances of this disease may occur at any age, though the majority fall between 20 and 45. Of 13 cases under my care, 4 occurred at the ages of 72, 68, 50, and 49 respectively.¹⁸ A widespread paralysis of acute or subacute onset due to toxic polyneuritis may follow an ascending course and constitutes one group of the cases classed as Landry's paralysis. In the majority the presence of decided sensory changes, "glove" and "stocking" anaesthesia, pains, and muscular tenderness are distinctive of polyneuritis, but there is one form which affects the lower motor neurones almost exclusively; early diagnosis from the spinal form of ascending paralysis may then be difficult.

It remains to mention the cachectic forms of neuritis, and especially that which develops in connexion with carcinoma, for the majority of such cases fall between the ages of 50 and 70. The symptoms as a rule are of slight intensity. Towards the end of this period the senile form of multiple neuritis, which in some instances is referable to arterio-sclerosis or atheroma, appears. Brachial neuritis is in my experience relatively not infrequent between 50 and 60, and this also applies to anterior crural neuritis, which often seems to be started by slight traumatism or by muscular effort.

Of 50 cases of sciatic neuritis, many very severe and of long standing, and all of them sufficiently bad to compel the patients to seek treatment in hospital or to confine them to bed, 27 occurred between 30 and 50, and 23 cases between 50 and 70 years of age, 16 of the latter falling between 50 and 60. Rheumatism and gout, with exposure to cold and wet, and excessive muscular exertion are the chief causes. In my experience the prognosis is not distinctly worse, nor treatment less successful, in patients over 50. The treatment adopted in nearly all the cases was immobilization by means of the long splint.

BRAIN.

I do not propose to deal with meningitis except briefly with the tuberculous variety, and that on account of the peculiarity of its symptoms in adults. Meningitis due to pus-producing organisms becomes uncommon after 50: when it occurs as a primary infection the diagnosis is now greatly facilitated by lumbar puncture. Perhaps the most frequent form is the pneumococcal, which may either be primary, or a complication of pneumonia, or one feature of a general pneumococcal infection.

Tuberculous meningitis in persons over 50 is very exceptional. Of 560 cases of tuberculous meningitis, 4 had passed this age. There were also 8 cases between 40 and 50. In adults it occurs chiefly as the termination of chronic pulmonary tuberculosis. The early symptoms may be deceptive and mistaken for early mental disease, hysteria, or delirium tremens.

Cerebral Hæmorrhage and Thrombosis.

The most common of all nervous affections between 50 and 70 years of age are those due to disease of the cerebral vessels, and the causes and methods of prevention therefore belong to diseases of the vascular rather than of the nervous system. The subject is too extensive to be considered here. Of 500 cases of cerebral hæmorrhage, the onset was between the ages of 50 and 70 in 321, or 64 per cent., and, of 110 cases of cerebral thrombosis, in 67, or 60.9 per cent.

Cerebral Tumours.

With regard to the age incidence of intracranial tumours there are available the valuable statistics compiled by Dr. H. H. Tooth.¹⁹ The first symptoms in his 500 cases occurred between the ages of 50 and 70 in 7.2 per cent. In 238 of these the nature of the growth was verified by operation or *post mortem*: of these the age at onset was between 50 and 70 in 9.6 per cent. Gliomata constituted 49.2 per cent. of the total, and of these 10.2 per cent. occurred at from 50 to 60, and 0.7 per cent. at 60 to 70 years of age. Carcinomata were few in number, but the percentage between 50 and 70 was nearly 40. In a further number of 485 cases which I have collected from various sources, similarly verified or not, the proportion between 50 and 70 is rather higher—13 per cent. In 18 cases of intracranial tumour observed by myself in persons over 50, in 12 of which the diagnosis was verified *post mortem* or at operation, in 1 the tumour was cerebellar, in 2 the tumour was in the cerebello-pontine angle, and in the remainder in various parts of the cerebrum. Three patients were over 60 years of age. In several of the cases the sudden onset of symptoms suggested some intracranial circulatory disturbance. Optic neuritis was well marked in these cases, attacks of vertigo especially frequent, and, apart from the situation of the growth, mental changes were prominent. In 2 the intracranial growth was secondary to cancer of the breast. Affection of the nervous system by cancer is generally through secondary metastatic growths. The order of frequency of metastases is (1) vertebrae, (2) bones of skull, (3) brain, and (4)—very rarely—spinal cord. The secondary growths may occur in any part of the brain, and are often multiple, and may be diffuse or localized. The symptoms they cause may be pronounced or, on the other hand, absent or overshadowed by those due to growths in other organs, and the intracranial metastases only discovered *post mortem*.

The diagnosis of a cerebral tumour in a person over 50 is often difficult. In the case of a primary tumour the symptoms may be attributed to other diseases of the brain more frequent at this period of life. Thus for the mental disturbance produced by a growth other causes may easily

be assigned; headache and vertigo are common complaints in persons over 50, and of various origin; and hemiplegia or monoplegia would rather suggest vascular disease, though the gradual onset of hemiplegia is always suggestive of a tumour.

To sum up, an intracranial tumour is rarely met with in persons over 50, and still more rarely in those over 60; when it occurs diagnosis may be more difficult than in younger persons.

Cerebro-spinal Syphilis.

Of 261 cases of cerebral syphilis, 9 per cent. were over 50 and only 3 cases over 60 years of age; these include 60 personal cases, of which the number over 50 was 8. The interval between infection and onset of nervous symptoms is in the majority within ten years, often, of course, much earlier. The statement that has been made, that the older the patient the shorter the interval between infection and appearance of cerebral symptoms, seems not to be correct.²⁰ In cases over 50 a certain number are due to late syphilitic infection; in 3 of my cases the age of infection was 35, 44, and 46 respectively, and signs of cerebral syphilis appeared from twelve to fifteen years later. In the remainder the late onset of cerebral disease is due to a long interval after infection.

The symptoms do not seem to differ greatly from those in younger patients. In two of my cases in which the interval between onset and infection was very long, affection of the cranial nerves was the chief feature; many cranial nerves and also some spinal roots may be affected. Vertigo is often a prominent symptom. The question as to the part played by previous syphilitic infection in the production of disease of the cerebral vessels, that is, as to the proportion of cases of apoplexy or hemiplegia occurring after 50 which are due to vascular disease as the direct result of a previous syphilitic infection, is very important, but I am not able to give exact figures.

It is now generally recognized that fits indistinguishable from those of idiopathic epilepsy may occur as a result of cerebral syphilis. So far as I have been able to ascertain the age of onset as a rule is before 50. I have seen two cases over 50; in one man aged 60, who had syphilis at 46, the attacks resembled *petit mal*, and the other was first affected by repeated severe epileptic seizures at 54.

Syphilitic affections of the spinal cord are relatively still more uncommon after 50 than those of the brain. Though Head²¹ states that "there is no period after infection when the patient may not be attacked by a paraplegia," yet in most the symptoms of spinal syphilis follow somewhat early after infection. This is especially the case in syphilitic meningo-myelitis, which may occur within six months of infection.

In 3 out of 35 cases of various forms of spinal syphilis the patients were over 50. The first was a man of 53 who contracted syphilis at 22, with onset of spinal symptoms at 40. Affection of spinal roots gave rise to the chief symptoms. The disease was probably a chronic meningitis, and was remarkable for its long duration. The second case was clinically a transverse myelitis in the lower dorsal region of the cord, and syphilitic infection occurred at 37. The onset was subacute at the age of 56. The third was one of spastic paraplegia in a woman of 62, whose husband had tabes.

To sum up, the onset of cerebral syphilis after 50 is not common, of spinal syphilis rare, and after 60 still more rare in both.

THE NEUROSES.

The commonly received opinion is that sufferers from migraine either lose their attacks in later life or that they become mitigated, and that in women this relief is to be expected after the climacteric. Speaking generally, this opinion seems to be correct, and migraine is uncommon, at any rate in a severe form, after 50. A confident prognosis can, however, only be given on general grounds; it is impossible to say in an individual case that lapse of years will give relief. Some patients suffer from more frequent attacks during the climacteric, and in a certain number an increase in the frequency and severity of the attacks dates from this epoch. I have seen two cases in which premonitory hemiopia has been a constant feature of the paroxysm, and permanent hemiopia resulted—one instance

in a woman aged 35, and another in a man aged 54; but he had also arterio-sclerosis, high blood pressure, and glycosuria. There are also instances on record of permanent paralysis following migraine, but these are mostly in persons under 50. Most of the patients showed disease of the vessels, but others were young with presumably healthy arteries. Such consequences of migraine seem to be so rare as to be of little practical importance, and do not especially occur after 50.

Headache in connexion with contracted granular kidney may closely simulate migraine. Thus a patient with well-marked signs of contracted kidney of some years' duration first began to suffer at the age of 55 from attacks of headache exactly resembling migraine, with ocular prodromata in the left eye, in which there was commencing albuminuric retinitis. As migraine never begins late in life, no mistake in diagnosis should be possible, for though in some patients there may be an intermission lasting years, careful inquiry will elicit a history of former attacks. On the other hand, I have come across several instances in which lifelong sufferers from migraine developed granular kidney after 50, the headaches becoming more severe but retaining their original form.

An important question is whether migraine leads to epilepsy in later life. It is a matter of common observation that migraine and epilepsy not unfrequently occur in different members of the same family, either in collaterals or in previous generations. The similarity of some features of the two diseases is also remarkable. The further assumption of anything like identity between them is, however, not justified. Occasionally a patient is subject to both affections.²²

Epilepsy.

It is well known that the frequency of epilepsy diminishes as life goes on, but it is also true that epilepsy may begin at any age. I cannot give extensive statistics, but of 100 consecutive out-patient cases 6 per cent. had their first fit after 50, and in 100 consecutive private patients 9 per cent. Especial care is necessary in the diagnosis of idiopathic epilepsy in later life to be sure that the case is not one of an epileptiform attack, symptomatic of some underlying disease. This especially applies to Jacksonian epilepsy, for, after 50, localized epileptiform attacks from the partial closure of a diseased cerebral artery are not uncommon. As to direct heredity in epilepsy of late onset, Gowers gives it as 26 per cent. in those which begin after 40, and Turner 10 per cent. in cases arising between 41 and 70. Finckh, however, puts the proportion as high as 66 per cent. In 8 personal cases in which the onset was between 52 and 64 years there was an hereditary history in 2 only. In late epilepsy men are more frequently affected than women. Idiopathic epilepsy between the ages of 50 and 70 comprises: (1) Cases in which the disease persists throughout life; (2) cases in which the patient suffered from fits in childhood or early life, and then was free for a number of years, with a subsequent reappearance late in life; and (3) those in which the onset is after 50.

The occurrence of epileptiform fits after 50 years of age may be connected with the presence of arterio-sclerosis and high blood pressure. These cases cannot be brought into the category of idiopathic epilepsy. Whether the fits are due directly to the high blood pressure or to the toxæmia which produces it is a moot point, but as cases of hypertension are common after 50, and epileptic attacks rare, there is probably some other factor in the causation. The attacks may be severe general epileptiform ones or those of minor epilepsy (*petit mal*). Some of these cases are undoubtedly due to contracted granular kidney, but in others the kidney is not involved, and they cannot therefore be regarded as uræmic.

In late epilepsy, supervening at an age when the wear and tear of life has often produced changes in the blood vessels, it would be anticipated that the strain on the cerebral circulation produced by a fit should sometimes lead to hæmorrhage. Of this I have seen two instances; one was in a lifelong epileptic who at the age of 70 died of hæmorrhage from a cerebral artery which ruptured in the course of a fit. In the other case the first fit took place at 60, others occurred between that age and 70, when he was left aphasic and hemiplegic after a fit.

Vertigo.

Vertigo is occasionally the chief symptom in an attack of late epilepsy, when the differential diagnosis from other possible causes is sometimes difficult and especially so when epileptic attacks and aural vertigo co-exist in the same patient. Thus a man of 47 had a sudden attack of severe vertigo which left him deaf in the left ear, and liable to attacks of vertigo with tinnitus; at 53 he began to suffer from fits in which he felt an indescribable feeling rising from the stomach, lost consciousness, and fell, hurting himself in falling. There was no memory of the attacks. Gowers gives several instances of this coincidence of aural vertigo and epilepsy.²² It may be difficult to determine the nature of a single attack.

Vertigo is one of the common, and certainly one of the most distressing, nervous affections of later life. By far the most frequent form is aural vertigo. Next in frequency come the cases due to increased intracranial pressure. It is also met with over 50 as a symptom of atheroma of the cerebral vessels, in stenosis of the aortic valves, in granular kidney, in cerebral tumours, and in neurasthenia. In a few instances an association with migraine, probably accidental, was present. The patients were between 50 and 60, they had suffered from typical attacks of migraine with ocular symptoms which ceased at or before the age of 50, and then at about 55 began to be affected with severe aural vertigo. Vertigo is a rare premonitory symptom of migraine.

The form of vertigo associated with hypertension, sometimes an early symptom of contracted granular kidney, is worse on movement, and especially apt to occur on getting up in the morning; the attacks are often attended by severe vomiting, which may persist for some time after the vertigo has gone. Consciousness is not affected. In one case with frequent attacks of vertigo and vomiting during two years, often lasting for two days at a time, haemorrhage into the pons Varolii with paralysis of the third, fifth, sixth, and seventh nerves subsequently occurred.

Hysteria.

The more severe hysterical affections are undoubtedly uncommon after 50. They may occasionally appear in persons who have not suffered from hysteria previously. Because severe hysteria is uncommon in later life, errors of diagnosis may be made, and if the patient is a male the true nature of his complaint is the more likely to be mistaken. Hysterical mental disorders and fits are most uncommon after 55, and in the presence of a presumed case it is necessary to bear in mind Dr. Ormerod's warning to exclude alcoholism. I have once seen a severe hysterical fit in a woman over 55, which was followed by hysterical hemiplegia, and due to the shock of her mother's sudden death.

Hysterical paralysis and contractures occur rather more frequently. I can recall two cases of typical hysterical paraplegia in men, both aged 64. Under appropriate treatment they recovered completely. Two instances of hysterical contracture of the leg in women, aged 53 and 51 respectively, are of interest, because in each case there was a possible source of autosuggestion; for one patient was a nurse, who had chiefly to do with paralytic cases, and the other lived with a sister whose knee was permanently contracted after an accident. Both recovered after removal to hospital.

Neurasthenia.

The large majority of cases of neurasthenia occur between the ages of 25 and 50. Many neurasthenics, as they reach later life, though perhaps never becoming robust, yet arrive at a measure of health and freedom from morbid anxieties. At the same time neurasthenia, though not frequent, may occur after 50 up to old age. The symptoms present no special feature, except perhaps that vertigo is relatively more frequent and troublesome, that loss of memory may be a pronounced symptom, and morbid fears, if present, often take the form either of fear of paralysis or of sudden death. The diagnosis of neurasthenia, always one of exclusion, requires especial care in later life, because in cases over 50 with symptoms resembling those of ordinary neurasthenia, it is often found that the patient has arterio-sclerosis with abnormally high blood pressure, or early signs of a granular kidney, or that the symptoms are due to changes in the nutrition of the brain from disease of its vessels.

The traumatic neuroses are apt to affect persons after 50 very severely as the result of an accident, and to take the form of neurasthenia rather than of some more strictly hysterical manifestation. Here again the matter is confused by the frequent pre-existence of chronic disease of the vessels, heart, or kidney, so that it may be difficult after an accident to apportion correctly the share of the illness due to nervous shock and that due to antecedent disease. The difficulty is increased by the common experience that the patient, from the gradual onset of these infirmities of advancing age, was unconscious of them before the accident. In medico-legal cases of elderly workmen claiming compensation after an accident—and it is only human nature for them to attribute all their trouble to it—a just decision is often extremely hard. Working men over 60, after a life of toil, generally show signs of vascular or cardio-vascular degenerative changes; they may go on working so long as no accident or acute illness occurs, but they are in an unstable equilibrium, and if unfortunate enough to meet with a bad accident, they are likely to be permanently incapacitated. The prognosis as to return to work in traumatic neurasthenia in persons over 55 is in my experience not good.

Neuralgia.

Between 50 and 70 true neuralgia is not an infrequent affliction. Gout, arterio-sclerosis, various cachexias, and presenile disturbances of nutrition are the chief causes. The senile and arterio-sclerotic forms chiefly affect the fifth nerve. Neuralgia may be a complication of a granular kidney, and in my experience this often affects the occipital nerve. Occipital pain, not definite neuralgia, is sometimes a symptom of uraemia. Lapinsky has traced the neuralgia of nephritis to disease of the vessels of the nerves.

A most severe form of neuralgia in the elderly is that which follows herpes zoster. A sufferer from herpes in later life rarely escapes without subsequent neuralgia, often lasting for months. Evans²⁴ thinks that a large majority of cases of herpes zoster are microbic in origin, and regards this as the essential form of the disease, to which he attributes most cases occurring in children, whilst those which occur after 40 are due to causes yet undetermined. He states that half his cases were under 14 years of age, and one-sixth over the age of 40. Head says that of 378 cases, 29 were over 40 years of age.

Paralysis Agitans.

Though not a very common disease, paralysis agitans is pre-eminently one of the period of life between 50 and 70 years. Its main incidence is narrower and lies between 50 and 65. Sir W. Gowers²⁵ states that in 51 out of 236 cases the onset was between 40 and 49, in 100 from 50 to 59, and in 60 from 60 to 69—altogether 211 cases. After 70 there were 10 cases. Stuart Hart²⁶ in 219 cases found the age of onset to be between 40 and 50 in 54, between 50 and 60 in 88, between 60 and 70 in 42, and none after that age. Onset over 65 is thus uncommon. The disease is therefore one of the presenile period. Its cause remains mysterious and it is not especially associated with vascular degeneration or other bodily changes incidental to this age.

CONCLUSION.

If from the foregoing considerations we try to get a general view of the nervous affections of the sixth and seventh decades, it is clear that many nervous diseases do not occur at all, others are modified in their symptoms and course, and a few especially affect this time of life. Except for one important group of diseases, it comes out more favourably in comparison with other ages than one would perhaps have expected.

It is hardly necessary to say that the lesions of the brain due to vascular disease form the exception, and although, strictly speaking, these are not primarily nervous diseases, yet from the practical point of view they are by far the most important of the nervous affections of this period, because of the great frequency of cerebral haemorrhage and thrombosis after 50, and of their disastrous effects both as to life itself and, if that is preserved, as to future usefulness. The frequency alone of such serious diseases marks them as first in importance. Cerebral haemorrhage, thrombosis, and hemiplegia afford a very large proportion of the sufferers between 50 and 70 from all the diseases considered in this

lecture. Further, it has been shown that disease of the arteries materially affects the course of most nervous affections at this period. Since nervous tissue, once destroyed, cannot be restored, the prevention of vascular disease becomes of paramount importance. How this is to be accomplished I cannot consider at length. Often the tendency to vascular disease is hereditary, and beyond our powers to remedy, but apart from such cases it is certain that the chief measures to prevent degenerative changes in the circulatory system are abstemiousness in eating and drinking, care to keep efficient the organs of digestion and excretion, and regular physical exercise. The simple life may prevent, and certainly mitigates, the progress of vascular decay.

Again, granular kidney, a disease for which unfortunately our treatment is merely palliative and not preventive, is the cause of a large proportion of cases of cerebral haemorrhage. Whilst on the one hand over-feeding has to be avoided, on the other excessive work with insufficient nutrition is also a danger. Exhaustion, over-fatigue, or overstrain are doubtless causes of such diseases as the muscular atrophies in later life. The need for moderation of former activities, both mental and physical, is a lesson that many learn too late. Defect of nutrition, again, may be local in the nervous system from defective supply of blood, due to localized arterial disease.

Turning from the vascular degenerations to those affections more purely of nervous origin, the period from 50 to 70 compares favourably with that of either childhood and adolescence or the age from 25 to 50. In both the latter periods falls the incidence of the nervous diseases due to infections and intoxications, from which the age after 50 is mostly exempt. The main period of onset of the hereditary and familial diseases, those included under Gowers's designation of "abiotrophy," occurs in childhood or adolescence; whilst from 25 to 50, together with some abiotrophic diseases whose onset is late, the numerous nervous affections due to syphilis and alcohol are rife.

We have seen that, with regard to syphilis after 50, the chances of the occurrence of cerebro-spinal syphilis are comparatively slight.

Lastly, the purely nervous diseases which are especially characteristic of this period of life are paralysis agitans, some of the combined scleroses of the spinal cord, and certain muscular atrophies of central origin. It is possible that some of these affections owe their origin to that process of premature senescence or defective vital endurance of certain neuronic systems known as abiotrophy, and that this pathological process may occur at any age. Paralysis agitans especially, in its narrow age incidence, uniformity of symptoms, steadily progressive character, and occasional familial tendency, suggests this mode of origin.

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THE *Weekly Bulletin* of the U.S. Health Department quotes from the summary of the investigation concerning the physiological aspects of the liquor problem, by Dr. John S. Billings, junr., which was prepared for a special committee, showing that the common idea that a large part of the injury to health from the use of alcoholic drinks is caused by injurious substances in the liquor, such as fusel oil and furfurol which have not been properly removed, is erroneous, as is also the notion that cheap liquors contain larger quantities of such ingredients than others. The injurious effects of the fusel oil are trifling in comparison with those of ethyl alcohol. The general conclusion is that fine old brandies and whiskies are nearly as likely to produce ill effects as the cheaper varieties if taken in the same quantities, and the injurious effect is in proportion to the ethyl alcohol contained.

A Lecture

ON

WOUND INFECTIONS AND THEIR TREATMENT.

DELIVERED (WITH DEMONSTRATIONS) AT THE OPENING OF AN EXHIBITION OF SURGICAL APPLIANCES FOR THE TREATMENT OF THE WOUNDED HELD AT THE ROYAL SOCIETY OF MEDICINE FROM OCTOBER 8TH TO 14TH.

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PART II.

FROM the introductory studies which have up to this occupied our attention I pass to the subject-matter proper of this lecture,

THE TREATMENT OF MICROBIAL INFECTIONS OF WOUNDS.

I would propose, despite the fact that this will sometimes carry me over ground traversed in my last lecture, to discuss with you, one by one, the various therapeutic procedures which have been employed or suggested for use. And then at the end it will perhaps be possible to draw up something in the nature of a general programme for the treatment of infected wounds in their different stages.

Let me tell you—for you will then see our road ahead—what are the therapeutic procedures we shall be dealing with. These are—and I enumerate them in the order which I shall follow—*treatment by antiseptics; treatment by surgical procedures; treatment by "physiological," or, as I would now for the sake of clearer definition wish to call them, "phylacagogic" methods; and, lastly, treatment by vaccines.*

TREATMENT BY ANTISEPTICS.

That one ought, where the organism is unable to deal effectually with an infection, to resort to the use of antiseptics seems to many minds to be perfectly clear *a priori*. Now when a proposition of this sort is said to be evident *a priori*, what this really means is, not that the proposition has been established by clinical experience, but that it has been demonstrated by laboratory experiments; and that we may confidently take those laboratory experiments as our guide.

But, of course, everything will here hinge upon the question whether the laboratory experiments which we trust accurately reproduce the conditions in the wound. Now the earlier experiments on antiseptics—and it is always upon antiquated experiments that the current doctrine of the day rests—did not even aim at reproducing the conditions in the wound. The antiseptics came into application, not as in the wound upon microbes enveloped in albuminous fluids, but upon microbes simply suspended in water. And again it passed as an axiom that if *in vitro* all the microbes were destroyed, then also all the microbes *in vivo* would be destroyed; and there was no thought that the microbes in the cavity and the recesses of the wound, and, above all, the microbes in the infiltrated or granulating wall, might escape destruction.

We have now in the matter of theoretical requirements made satisfactory advance. We now ask of laboratory experiments with antiseptics that they shall conform more closely to the conditions in the wound; and we ask in particular that it shall be kept in view that we have to deal in the wound with microbes enveloped in albuminous fluids; and that antiseptic solutions cannot come into direct contact with all the microbes which we wish to destroy. In other words, we now ask in connexion with every antiseptic for a testimonial of bactericidal efficacy in albuminous fluids, and for a testimonial of penetrating power. And in accordance with this we find in the prospectus of every new-hatched antiseptic this double certificate of character. It would plainly be beyond the scope of this lecture to look into all these certificates; but I think it will, perhaps, be useful to explain in a general way what sort of an attitude one ought to take up when traffic is made with such credentials.