

insanity on admission are arranged according to Skae's classification.

Sussex (East).—Dr. Saunders, as usual, gives a valuable little table in the body of his report showing his prognosis of cases on admission. Of the 243 admissions 65 had good, 52 fair, and 125 bad or hopeless prospects, the latter being in striking contrast with the analogous proportion at Sunderland. More than a quarter of the admissions were actively suicidal.

A large number of senile cases are sent here—let us hope it adds to their *euthanasia*—but sometimes the thought springs to mind that, for a mere senile breakdown, a person might be spared the association of a lunatic asylum with their life's history. In this connection it may be mentioned that the combined ages of four out of nine females admitted in the month of February amounted to no less than 302 years.

This report always contains a table (which might well appear in all other reports) showing the exact disposition of every pauper lunatic of the county, whether in the asylum, workhouse, with friends, &c. On comparing this year with last year we are struck with a great diminution in workhouse patients. A foot-note accounts for this as follows:

Some re-classification of the infirm in mind has been made in the Brighton Workhouse, and these figures show a decrease of 94 persons now certified as compared with last year's return.

It is cheering to hear of another way of reducing the total amount of insanity in the country.

Worcester.—The present report of the superintendent is made by Dr. Braine-Hartnell, who has succeeded to the office vacated by Dr. Cooke on his appointment to a commissionership in lunacy. The latter event is recorded by the Visiting Committee in terms of congratulation, regret, and warm appreciation of the work which Dr. Cooke has done for the county.

GERMAN RETROSPECT.

By William W. Ireland, M.D.

The Significance of Deficiency of the Corpus Callosum.—It might appear that it would be easy to find out the function of the corpus callosum (trabs cerebri), of which the situation is so suggestive and the anatomical relations so clear and definite, yet neither dissections nor vivisections nor the study of degeneration nor development have solved the *Balkenfrage*. Dr. H. Zingerle has a long paper on this subject in the *Archiv für Psychiatrie*, Band xxx, Heft 2. He describes the case of a little boy three and a half years old in whose brain only the genu of the trabs was remaining; there was hydrocephalus internus sufficient to mask any possible symptoms following the destruction of the corpus callosum. Dr. Zingerle has made a diligent study not only of his

own case, but of the recent literature of the subject. The reader may be grateful for the following notes. He confirms the observations of Onufrowicz, who described a band of fibres under the corpus callosum connecting the occipital and frontal lesions, the fronto-occipital association bundle or tapetum. It appears from the observations of Flechsig that we have no want of association bundles connecting parts of the same hemisphere together, and Dr. Zingerle traces the bundles of fibres connecting the basal portions of the cerebral lobes which come into prominence in the absence of the trabs. What we should like to know is how the trabs work in connecting the two hemispheres, and how or why deficiency or section of this structure is not attended with any apparent derangement of mental function. Dr. Zingerle starts the interesting question whether in such cases there is not at least a partial substitution of functional connection of both hemispheres; but he fails to follow out this obscure indication. The development of the corpus callosum begins at the fourth month of foetal life, a little after both the transverse fibres and those of the tapetum get their axis-band. He remarks that a knowledge of the course of the fibres in the anterior part of the corpus callosum is still too much a matter of conjecture. Rossi, however, assumes that the fibres of the corpus callosum are connected with the pyramidal cells of the cortex. Kölliker was able to trace the fibres in part into the great pyramidal cells, and partly to the polymorphic cells. The fibres of the trabs are also believed to take part in the formation of the superficial nerve-fibres of the cortex. Through the normal trabs the fibres of the occipital lobe are connected with the temporal lobes of the other hemisphere. Dr. Zingerle gives us the result of his anatomical examinations in the following terms:

1. Through the failure of the trabs fibres there comes into prominence a long connecting system between the frontal, parietal, and occipital lobes (fronto-occipital association-bundle of Onufrowicz, F. subcallosus of Muratoff) and between the temporal and parietal lobes.

2. The fibres along the walls of the middle ventricle have axis-cylinders in spite of the deficiency of the trabs. The posterior horn is mainly formed by the prolongation of the fronto-occipital bundle.

3. The cingulum gives some of its fibres to the middle wall of the posterior cornu.

4. The long association bundles go to constitute a middle association layer, which also comprises the cingulum.

5. The shorter association systems form an outer association tract, the layers of which can only be artificially separated from one another.

6. A layer of the basal frontal bundle runs through the anterior limb of the internal capsule to the ganglia of the middle brain.

Flechsig observes that the projection and association fibres

mostly end in defined regions of the brain, and serve to keep up the association of the different sensory spheres. He distinguishes different brain areas in which only association centres are represented; especially he describes a frontal, a middle, a parietal, occipital, or posterior association centre. There are thus no long conducting paths by which the different lobes of the brain are connected, and the sphere of bodily sensation in the middle of the cortex appears to connect the frontal and occipital parts of the cortex. Dr. Zingerle puts the question how far the results of these minute dissections agree with those of Flechsig. It cannot, he thinks, be denied that there are projection centres in the brain which throw off a large number of fibres, and that these portions are richer in such fibres. Clinical and experimental observations also combine in showing that lesions in certain portions of the cortex are followed by no recognisable symptoms in the sensory or motor functions, that there are dumb portions of the brain which when injured only entail defects that may be brought out by a fine psychological investigation. Dr. Zingerle did not succeed in tracing the fibres of the corona radiata into the areas of the association centres. In the cortex the nerve-fibres lose themselves in a maze, through which the histologist can trace neither their beginnings nor their endings. Our author observes that Flechsig has brought no convincing proof of his assumption that the different sensory areas are separated by neutral areas of cortical substance. If Flechsig, for example, assigns the basal long bundle of fibres of the association system to the corona radiata, this has not been confirmed by clinical studies. Our case, Zingerle observes, does not chime in with Flechsig's views. We saw in the first place a long connection between the frontal and parietal lobes on the one side and the occipital on the other, through which it could be ascertained that some of the fibres had become atrophied along with the deficiency in the visual sphere.

It appears that the sensory spheres indicated by Flechsig contain richer association fibres, and not only short ones which are the means of a direct connection with the adjacent parts of the cortex, but also some fibres which run through the areas of the presumed association centres without interrupting their course. Anatomical observations have shown that there is also a direct connection of the different sensory spheres through the trabs,—for example, the visual sphere of one hemisphere is connected with the auditory sphere of the opposite one. In the relations of the two hemispheres we do not find the principle carried out that the utilisation of sensory impressions does take place in separate association centres.

Not only does the fronto-occipital association bundle serve to maintain a connection with the frontal and occipital lobes, but also with the parietal, as Muratoff has already pointed out. By this path there is an opening for the direct transmission of im-

pressions from the visual sphere to the motor centres of the parietal and frontal lobes; perhaps this has something to do with the co-ordinated action of the muscles of the eyes. Wernicke regards the lower portion of the parietal lobe as the optic motor field. Flechsig, on the other hand, describes a cortifugal path to the visual sphere, the fibres of which path do not get their axis-cylinders at the same time as the fibres of the visual sphere. This path allows excitations to reach the nuclei of the nerves of the muscles of the eye. Dr. Zingerle concludes his long paper with the following observations:

In order to understand the functions of the fronto-temporal bundle we must wait for further researches. Flechsig observes that in the first month the nerve-fibres of the path from the third frontal have been found to have axis-cylinders. This tract goes backwards to the outer capsule and thence to the anterior substantia perforata. At the same time there is a band of fibres also with axis-cylinders which goes from first parietal gyrus to the lenticular ganglion, and loses itself in the substantia innominata, where the first-mentioned tract from the third frontal seems to end. Flechsig does not say whether these two systems of nerve-fibres communicate with one another. This may turn out to be the case.

Innervation of the Vessels of the Brain.—Obersteiner describes a preparation in his museum ("Arbeiten aus dem Institut für Anatomie und Physiologie des Centralnervensystems," herausgegeben von Prof. Obersteiner, Heft v, 1897, quoted in *Centralblatt für Nervenheilkunde*, November, 1897) which shows a net of very fine branching nerves clinging to a small artery of the pia. The nerves had been coloured with chloride of gold. The intra-cranial arteries have a distinct muscular coat, of which the contractions and dilatations are no doubt regulated by these nerve twigs. The distinguished pathologist believes that the variations observed in the calibre of the minute arteries of the brain are dependent upon irregular innervation of the walls of the vessels.

Amusia.—Knauer describes this disorder in a patient with exophthalmic goitre (*Deutsche med. Wochenschrift*, No. 46, 1897, reported in *Neurologisches Centralblatt*, No. 5, 1898). She took a great interest in music, for which she had a high capacity, and had received good training. She suddenly lost in one night her ear for tones and musical sounds, although she had practised her music as usual the day before. At the same time the patient was troubled with noises in the ears, giddiness, sense of choking, headache, attacks of unconsciousness without any previous aura, dullness of hearing, and sleeplessness. There were also ringing sounds in the ear, generally excited by the hearing of melodies. If one person alone spoke to her she could understand, but when several spoke she only heard a confused noise. It was found by careful examination that she had lost the perception of tones, the under-

standing of musical notation, the power of singing after another person, the capacity of writing musical notes after hearing them, and of singing from notes, but she still retained the power of copying music and of spontaneous singing. Knauer treats this as a pure case of sensory amusia, or tone deafness, analogous to cases of aphasia, in which the power of using words or writing are more or less lost. He holds that there are analogous centres and conducting paths for the musical functions as for those of speech. The injury to hearing resembles those attending Menière's disease. He regards the affection as the result of intoxication on the brain following upon deranged function of the thymus gland.

Retrograde Amnesia after Hanging.—In the Hospital Tidende of Copenhagen (reported by Berger in the *Neurologisches Centralblatt*, No. 2, 1898) Dr. Knud Pontoppidan describes the following case. A man aged sixty-five, with a neuropathic heredity, had, under the pressure of care and sadness, long entertained thoughts of suicide. One morning he got up early and tied a thin cord round his neck; between the noose and the skin he put some pieces of cloth, and suspended himself by bending his knees. He hung for about two minutes before he was cut down. Carried to the hospital, he lay for twenty-four hours without consciousness. During this time the head was livid above the ring in the neck. This was succeeded by restlessness and agitation, which lasted two hours, after which the patient fell asleep. He awoke with full consciousness, but his recollection only reached back to the evening before the attempt at suicide. He remembered going to bed, but after that till he awoke in the hospital his memory was a blank. This remained the case a year after the event. With this patient there were all the marks of great hyperæmia, brought on by the asphyxia and the compression of the carotids. There was also a partial paralysis of the nervus accessorius, and of the branches of the cervical plexus, as a result of the pressure of the noose.

Dr. Pontoppidan mentions another patient who had also retrograde amnesia following fracture of the skull, and recalls other instances of the same derangement after epileptic attacks, poisonings, infectious diseases, and hysteria.

Tattooing.—Dr. Buschan has sent in a reprint of a short paper on this custom communicated to the *Handwörterbuch der Zoologie*, Band vii, and there is another paper on the subject in the *Centralblatt für Nervenheilkunde* for April, 1898, by Dr. Otto Snell. Tattooing is practised over the whole world, and has apparently been practised in primeval times. In the palæolithic deposits of France and Germany there have been found pins of bone with lumps of oxide of iron and bits of pottery similar to the utensils still employed for tattooing amongst savage tribes. The historians of antiquity have recorded many peoples addicted to this practice, the Assyrians, Phœnicians, the Hebrews, the Geloni, the Britons, and the Picts. To-day we find tattooing not

only amongst wild tribes, but amongst persons in the most civilised countries. Buschan tells us that it is most common with sailors, soldiers, shepherds, and labourers. I know that most fishermen in Scotland are tattooed, sometimes under the idea that it may serve to get their bodies identified should they be drowned. I believe Buschan is right in saying that in Great Britain even some members of the aristocracy are tattooed. This holds especially with naval officers. Lombroso found it very frequent with criminals, and treated this as a convincing proof of atavism, but we may regard it as the remains of a custom which has descended from ancient times rather than a sudden revival of a forgotten custom. Daguilhen, amongst 501 insane persons in the Asylum of Ville Evrad, found 62 tattooed. Snell tells us it is commoner with the lower class of prostitutes, especially in seaports: about ten per cent. were found tattooed in Copenhagen. Tattooing is much commoner with men than with women. It is difficult to understand why this method of disfiguring the skin should be so common with human beings. As practised by soldiers, sailors, and fishermen, the tattooed figures are often very simple and inartistic,—arms, swords, guns, anchors, names; a heart pierced by an arrow is a common device, or initials of sweethearts, often succeeded by others, are the most frequent. We have also seen figures beautifully executed in various colours. There are artists in Japan who are skilful in tattooing. The sites most frequently chosen for tattooing are the arms and breast.

Visual Disturbance with Dwarfism and Giant Growth.—Uthhoff (*Berl. klin. Wochenschrift*, No. 29, 1897, reported in *Centralblatt für Nervenheilkunde*, April, 1898) describes a case of stunted growth with injury to the sight. This was a child who remained quite sound both in body and mind till the ninth year. From this time, apparently after inflammation of the lungs, her bodily growth ceased. The girl is now fourteen, but presents the appearance of a child of about nine years of age. The thyroid gland has almost disappeared, the skin has a peculiar unhealthy appearance, is rather thinner than usual, and not baggy as in myxœdema. The intelligence seems unaffected. The injury to sight consists in a temporal hemiopia with descending atrophy of the optic nerve and hemiopic pupil reaction. The cause of the disease must lie in the neighbourhood of the chiasma. It probably consists in some anomaly of the pituitary body. Uthhoff also describes two cases of megalakria which were accompanied by loss of sight, anomalies of the field of vision, and disturbance of the muscles of the eye.

Isolated Hallucinations.—Traugott describes a patient who was treated in the Polyclinique for nervous disorders at Breslau (*Allgemeine Zeitschrift*, Band liv, Literatur Heft). She was a woman 75 years old, who had dimness of the lens in both eyes. She also complained of headache, giddiness, sleeplessness, and sounds in the ears. A singular symptom was hallucinations of sight. They

began with an appearance like a brightened cloud, which was succeeded by a procession of lively coloured images across the field of vision, generally from left to right, such as a ship and a company of men, which passed along and then disappeared. The woman fully recognised that these apparitions were the result of disease.

Artificial Production of Illusions in Delirium Tremens.— Professor Bechterew (*Centralblatt für Nervenheilkunde*, October, 1897) calls attention to Liepmann's experiments showing that in some cases of delirium following upon drinking, pressure upon the eyeball was sufficient to induce spectra of various kinds (see our German Retrospect for April, 1896). The apparitions were seldom those of beasts, rats, or mice, as is common in delirium tremens, but rather of inanimate objects or of men, and they were rarely of a threatening character. Professor Bechterew recalls the old observations of Jolly, who found that he could induce illusions of hearing by excitation of the ear through the continued current, as well as those of Köppe, who found that he could arouse illusions of hearing by the use of the ear speculum and similar manipulations; and Näcke found that visual illusions could be produced by irritations applied to the eyeball, causing flashes of light, which in the diseased brain were transmuted into apparitions. Alzeimer showed that by pressure upon the eyeball illusions might also be induced in paranoiacs, hysterical patients, epileptics, and paralytics, so that this was not a symptom peculiar to alcoholic delirium. Bechterew goes on to say, "In my old observations of the alcoholic form of mental derangement I have for many years given much attention to the artificial production of illusions of the senses, though not with the same methods. To produce illusions of hearing I made use of the monotonous of a hammer of the induction apparatus, to which the patient's attention was directed. To produce optic illusions the patient was made to gaze at a glittering object held near the eye, as is practised in hypnotising. In this and similar ways I found that I could easily induce illusions of the senses, not only during the period of delusional delirium, but also for some time after it had quieted down. I have had patients in whom no symptom of the delirium was left, and nevertheless it was enough for the patient to hear the sound of the induction apparatus when he heard a voice which uttered words. In the same manner were produced visions of objects and faces. In some cases these illusions could be brought back months after the subsidence of the delirium. A striking example of a similar condition was afforded by a patient who had an attack of acute alcoholic insanity, with hallucinations of hearing almost confined to the left ear. Years after the subsidence of this attack, on fixing his gaze upon a glittering object there appeared to him first the vision of a double watch, a little after that of a man gesticulating, then of a man with children. In this patient, hearing the sound of an induced

current battery excites illusions of hearing. These deceptions of the senses have little unpleasant or threatening.

Bechterew observes that it is not a sufficient explanation to assign these illusions to the heightened excitability of the sensory organs; they are much more owing to the suggestions of strained attention. These stimuli only succeed when the patients direct their attention upon them. When this is not the case they are followed by no such illusions. There is no doubt that whatever significance we may assign to peripheral irritation as a cause of illusions, the great excitability of the psychological centres plays an important part. Bechterew observes in conclusion that such illusions are common in alcoholic insanity, although they may appear in other forms of mental derangement.

In a succeeding paper, "On the Suggestive Influence of Hallucinations of Hearing," Bechterew comments upon the mixture of acuteness in argument and unreason in a patient who heard a male voice in the left ear. Though the impressions of all his other senses were correct, this hallucination commanded his complete faith. There are cases, observes the Professor, in which the hallucinations of the senses are so lively that they seem more convincing than the representations of another person. In this case, however, the voice was confined to one ear, which was generally the seat of a subjective noise, and the hallucination was accompanied by an abnormal sensation in the outer ear and the parts around the ear muscles. Under these circumstances the Professor feels much surprise that the patient would not admit the force of his arguments as to the falsity of the hallucination, and defended his own belief by fanciful remarks and ingenious questions.

The Influence of Alcohol on Muscular Activity.—Professor Destrée of Brussels has made some experiments on this question (*Monatschrift für Psychiatrie und Neurologie*, Band iii, Heft 1). There are two views of the action of alcohol; one that it is exciting, the other that it is paralysing to muscular action. Using Mosso's ergograph, Frey reached the conclusion that alcohol has an injurious action upon an unwearied muscle, and a favourable action upon a wearied muscle. Destrée finds that alcohol has a favourable influence both on an exhausted and upon a fresh muscle, but that this influence passes so quickly away that if one waits above fifteen minutes this stimulus has disappeared, to be replaced by the paralysing effects of alcohol.

From his experiments with the kilogrammeter Destrée concludes that the favourable influence of alcohol follows almost immediately after its enjoyment, but is only of momentary duration. After this the paralysing effect of alcohol comes into play. The muscular capacity sinks about half an hour after the use of alcohol to a minimum, and it is difficult again to raise it by new doses. The paralysing influence of alcohol much surpasses the short

exciting effect, so that the total muscular capacity is actually lessened by its use. Such depressing effects are not observed after the use of tea, coffee, and kola.

Cardiac Deficiency as a Cause of Insanity.—Dr. Jacob Fischer has a paper in the *Allgemeine Zeitschrift für Psychiatrie*, Band liv, Heft 6, upon the “Influence of Heart diseases in producing Insanity.” After quoting the views of a number of authors on this question, amongst whom are Dr. Mickle and Dr. Farquharson, and describing some cases which he himself has observed, Dr. Fischer states the following conclusions:

1. Diseases of the heart may become the exciting cause of insanity in predisposed persons. The different symptoms which accompany such disorders, such as pain in the precordial region, palpitation, exaggerated heart-sounds, feelings of constriction, difficulty of breathing, headache, and giddiness, may all, by causing derangements of sensation and illusions of the senses, become the starting-points of insanity.

2. Deficiencies of the heart's action may lead to mental affections in persons not predisposed, partly by deranging the circulation of blood in the brain, and partly by altering the chemical action of the blood. The mental disorders thus caused generally take the form of mania hallucinatoria, confusional insanity with hallucinations. The hallucinations take their colour from the abnormal organic feelings.

3. If the heart disease goes on without alleviation or betterment, the hallucinatory derangement may pass into dementia.

The Etiology of General Paralysis.—Dr. Heiberg of Copenhagen observes that almost all the cases of general paralysis in that city find their way into St. Hans Hospital. It is therefore interesting to compare what is known of the prevalence of syphilis with the deaths from dementia paralytica. The mean time from luetic infection to the outbreak of general paralysis is estimated at twelve years; the mean duration of the latter disease at three years. In fact, there was observed a maximum of syphilitic cases in the year 1869, and a maximum of deaths from this and paralytics in the year 1884. There was another rise in the frequency of syphilis in Copenhagen in the year 1886, and so we may expect a corresponding rise in the mortality from general paralysis at the beginning of the next century.

In this connection it may be mentioned that Dr. Müller, in a contribution to the statistics of general paralysis in the *Allgemeine Zeitschrift für Psychiatrie*, Band liv, Heft 6, 1898, informs us that out of 96 cases of general paralysis (65 male and 31 female) which he examined in the Asylum of Gabersee, in Upper Bavaria, he only found lues in 14·6 per cent., *i. e.* in 17·7 per cent. of the men and 6·4 per cent. of the women. This, Dr. Müller observes, agrees with statistics obtained from the asylums at Munich and Deggen-dorf. Kundt found for the latter place syphilis certain in 8·4 per

cent. for the men and 7 per cent. for the women. Heilbronner for Munich found it certain in 16.26 per cent. of the men and in 6.3 per cent. of the women, and that it was very probable in 9.4 of all cases, in 6.2 per cent. of the men and 16.1 per cent. of the women.

Dr. Müller is somewhat apologetic at not making out such a large percentage as is done in circles of the better and more intelligent class of society, which amount to 50 and more per cent. He treats his own lower percentage as owing to the difficulty of gaining information of the past history of his patients.

The Differential Diagnosis between Lues Cerebri and Dementia Paralytica.—Dr. Wickel has given the results of his studies in the Psychiatric Clinique of Professor Tuczek of Marburg in the *Archiv für Psychiatrie*, Band xxx, Heft 2. The paper occupies 78 pages, and is illustrated with a wide lithographic plate and twelve woodcuts of handwritings. Dr. Wickel begins by stating that there are two ways in which syphilis acts injuriously upon the nervous system, by well-known anatomical changes of a specific character, and through a chemical poison engendered by the luetic process causing post-syphilitic degeneration. To the last of these lesions belong *tabes dorsalis* and general paralysis. This assumed poison acts first upon the nerve-fibres, and then causes infiltration of the nerve-cells much in the same way as diseased maize, ergot of rye, alcohol, lead, opium, bromide of potassium, and atropine, all which intoxicants may be the cause of a pseudo-paralysis resembling dementia paralytica. Dr. Wickel cites some statistics to show that syphilis holds the first place as a cause of general paralysis. It is known that there are cases of insanity following on syphilitic infection which bear a close resemblance to general paralysis. There is a like alteration in the reaction of the pupils, mental weakness, excitement, depression, and finally an apathetic state—symptoms common to both. The difference is that in dementia paralytica the mental degeneration is more progressive; in pseudo-paralysis syphilitica the disturbances of the muscular apparatus of the eyes are of a shifting character, there are fleeting and chronic aphasic symptoms, passing pauses, and mental weakness not advancing. The decisive test is recovery under treatment with iodide of potassium and the repeated inunction of mercury. Dr. Wickel describes six cases at great length. In all the evidence of luetic infection was decisive. Four of these patients recovered through antisiphilitic treatment. One of them died, a man forty-two years old, who had lues thirteen years before. The insanity lasted about three years. Attempts at treatment were of no avail; the disease seemed to take on more and more the typical character of general paralysis. The post-mortem appearances are described at great length. There were endarteritis and arterial changes, and meningitis visible to the naked eye, and thickening of the membranes, discoloration of the arachnoid, with adhesions of

the pia mater. It might be advanced that when the cause is identical and the symptoms are so much alike, it is a mere matter of literary arrangement to call the one false and the other true general paralysis, because in the latter case the malady is so virulent that it will yield to no treatment. It seems, however, certain that there are instances of general paralysis which do not arise from syphilis either hereditary or acquired, and that in ordinary cases antisyphilitic treatment is of no avail.

The Mental Derangements of Old Age.—Die Geistesstörungen des Greisenalters, von Dr. Hermann Schmidt, of Dalldorf. Sonder-Abdruck aus *Deutsche Medizinal-Zeitung*, 1898, Nos. 9—15.

Neuere Arbeiten über die Dementia Senilis und die Atheromatöser Gefässerkrankung basierenden Gehirnkrankheiten.—Referiert von A. Alzheimer, *Monatsschrift für Psychiatrie und Neurologie*, Band iii, Heft 1.

Ueber Miliare Sklerose der Hirnrinde bei seniler Atrophie. Von Dr. Emil Redlich, *Jahrbücher für Psychiatrie und Neurologie*, Band xvii, Hefte 1 and 2.

Of late years there have been several studies of senile dementia, some of which have opened new points of view, while others have deepened our knowledge of the symptoms and histology of this form of alienation. It is not to be wondered that senile insanity should have some well-marked features. It is difficult to understand how the periods of pubescence or adolescence should have any causal connection with mental derangement, as these are times of healthful growth; but old age as a period of decline seems liable to loss of and perversion of function. Such studies are somewhat dismal. A man is not bound to have epilepsy or general paralysis; but all men not prematurely cut off become old, and in describing the degenerative changes of that period pathologists can hardly forget that they are recording their own future. It is some consolation to bear in mind that in the natural progress of life the blunting of the faculties is gradual and almost insensible, and that some old men retain their intellectual power, their acquired knowledge, and acquired skill almost to the last. Indeed, old age may have certain advantages and compensations, as shown by Cicero in his treatise *De Senectute*. Passing over the examples of Fabius, Cato the Censor, Masinissa, and other heroes of antiquity, we have proofs in our own day of what old men can do in von Moltke, Radetzky, and Lord Clyde. It is needless to mention their powers in deliberative assemblies and in writing history, which seem the most natural occupations for men who have led long lives distinguished by action and ripe studies.

The following observations are less cheerful, giving the pathological side of natural decline. It is not easy to fix an average time when old age may be said to commence. In some men, indeed, it begins twenty years after others, nor does it equally affect every function of the body. As the two powers of assimila-

tion and absorption slacken, the vital processes are less active on the surface of the body than in the central organs, and thus the nervous system retains its capacity for some years longer.

In old age there has been noted a diminution in the volume and weight of the brain. It has been found, Dr. Schmidt tells us, quoting Demange, that at the thirtieth year a man reaches the weight of 587 grammes for each hemisphere, after which there is a diminution of about 10 grammes for every five years. It is remarkable that the brain should keep about the same weight from the fiftieth to the seventieth year. After that age the weight rapidly diminishes, so at the age of eighty-five the total brain loss is about 207, of which the larger half, 106 grammes, is borne by the physiologically higher left hemisphere.

In women the brain attains its highest weight about the twenty-fifth year. From this time till thirty-five there is a loss of weight. From sixty to eighty-five the diminution is about 90 grammes. Such a loss can only be accounted for by a decrease in the mass of the brain. Alzheimer observes that we are indebted to Noetzli for a fresh statement of brain weights in senile dementia taken with exactness, and after a method free from objection. Of especial interest are the forty cases of senile dementia without any inflammatory deposits. The mean brain weight was for men 1195, for women 1099 grammes. The brain weight of a healthy man is taken as 1400 grammes, of a healthy woman as 1300 grammes. Thus in senile dementia there was noted a decrease of about 200 grammes. The atrophy of the cortex was found to be greater than that in the cerebellum and pons and medulla. Dr. Alfred W. Campbell has observed that in senile insanity there is almost invariably a decrease in the diameter of the spinal cord, and a diminution in its weight. It may be here noticed that both Schmidt and Alzheimer frequently quote from Dr. Campbell's valuable paper upon "The Morbid Changes of the Aged Insane," which was published in the *Journal of Mental Science* for October, 1894. It is not my business to reproduce the information given by Dr. Campbell, which is generally confirmed by the German pathologists.

All observers are agreed that the most noteworthy degeneration of old age is in the arterial system. Demange states that in 500 examinations of the bodies of old men there was not a single case in which there was no atheroma. Alterations visible to the naked eye are found in the aorta, the coronary arteries of the heart, and the basilar arteries of the brain. The occurrence of atheromatous degeneration in the larger vessels is an indication that such changes are also to be found in the smaller ones, but their absence in the aorta or radial artery is no proof that the brain of a senile dement is exempt from them.

The degeneration of the larger vessels seems to begin with diminution or closure of the calibre of the vasa privata. These

changes implicate more or less the other internal organs of the body, especially the kidneys and liver; but we shall confine our attention to the lesions observed in the spinal cord and the brain, which are of the same character. Kostjurin found in his examination of twelve brains of old persons between sixty-five and eighty-eight a strong deposit of pigment in the ganglion-cells, whilst in the young the cells are free from pigment. In two of these brains there was observed a decrease in the number of the nerve-fibres, sclerosis of the vessels, atheromatous degeneration of their walls, with calcareous deposits, a slight increase of pigment in the adventitia, a great increase of the neuroglia, thickening of the neuroglia layer of the cortex, and a greater or less number of corpora amylacea in the same situation. These bodies are also observed in the spinal cord, especially in the anterior fissure. In the cord the increase of the neuroglia is sometimes very marked. The nuclei in the ganglion-cells of the spinal cord do not colour with osmic acid. They are affected by dyes more like the protoplasm. The cell nucleus of the aged is shrivelled in an irregular way; the nucleus of the wearied cell is also shrivelled, but colours more readily. Alzheimer confirms the observations of Bevan-Lewis and Campbell as to the increased number of spider-cells in the brain of persons affected with senile dementia. They are especially numerous in the furrows between the gyri.

The changes noticed in senile dementia are of the same character as those in extreme old age, though more marked.

Alzheimer remarks that there is a doubt whether the arterial sclerosis of the brain vessels be the sole cause of the degeneration of the brain in senile dementia. It may be preceded by primary atrophy of the nerve-cells. There are other forms of disease in which the atheromatous degeneration stands in the middle of the degenerative process. In arterio-sclerotic disease of the kidneys the result is much the same whether the whole parenchyma is attacked at once or whether this is the result of divers morbid processes. In the kidney one cell has the same function as another, but in the brain, owing to the diversified function of its different anatomical elements, the order and succession in which the different tissues or localities are invaded by morbid action must produce different clinical symptoms. In like manner Redlich puts the question, Is the disappearance of the ganglion-cells the primary lesion, the changes in the neuroglia the secondary, or the reverse? These are problems still to be worked out.

After noticing the distinction traced by Dr. Campbell between the enlarged soft spider-cells met with in paralytic and alcoholic insanity, and the increase of spider-cells in senile dementia, Alzheimer thus goes on:—"The first layer of cells of the cortex is generally diminished in depth. An extensive degeneration of the ganglion-cells is always observed. One finds cells in all states of decay. The typical change is the pigmentary degeneration, which

affects cells of all sizes. One notices cells whose protoplasm is wholly replaced by pigment. There is an increase of pericellular nuclei and of the nuclei of the neuroglia. The blood-vessels of the cortex are in some places not easy to distinguish. The perivascular spaces are mostly dilated and contain pigment, some leucocytes, and detritus. The tissues around are full of fibres, and contain spider-cells. The basal ganglia show still more marked changes in the vessels and their vicinity. The perivascular spaces, through the destruction of the surrounding tissues, widen into irregular cysts, which contain remains of fibres and cells, blood-globules and detritus. One often finds a squeezed blood-vessel on the wall of such hollows. The tissue which surrounds the cyst appears brown, infiltrated with crystals of hæmatoidin, and there are also heaps of spider-cells. Some sections show the evolution of these cysts from small extravasations of blood produced by the decay of the surrounding tissues." The description of the changes in the spinal cord are taken from Campbell's paper. Well-marked and important changes are also observed in the peripheral nerves in senile dementia; also acute parenchymatous degeneration of single fibres, a notable diminution in the number of the large nerve-fibres, which are replaced by connective tissue. There are also bundles of fine nerve-fibres, which have only a thin sheath thickening of the peri- and epineurium, which are infiltrated with fatty cells, and great thickening of the vessels with proliferation of the intima. Nissl has pointed out the dividing of the nuclei of the neuroglia of the cortex in senile dementia.

Alzheimer observes that in some cases the peri-vascular sclerotic process is confined to some parts of the cortex. To this form he gives the name of perivascular gliosis of the cortex cerebri, on account of the remarkable degeneration of the neuroglia with which it is associated. He has met with perivascular sclerosis of the cortex in persons from fifty to seventy years old. In such cases the clinical symptoms vary with the site of the lesion. There may be aphasia, paralysis, word-deafness, or word-blindness. The decline in senile dementia is often not general, but there are breakdowns at some weak points in the organism.

Dr. Redlich describes at length a case of advanced senile dementia in which there was much atrophy of the whole brain, especially marked in the frontal and parietal lobes. Redlich's microscopical observations coincide with those of Campbell and others, that the alterations in the ganglion-cells and nerve-fibres, and the appearance of pigmented spider-cells, are characteristic of senile atrophy.

Peculiar to the case described by Redlich was the appearance of very small patches of miliary sclerosis. They were rare in the molecular layer, and most diffused in the pyramidal layer, to become again scarcer in the deeper parts of the cortex. This microscopist is uncertain whether the miliary patches, which he carefully

describes and figures, are the result of the degeneration of glia cells and fibres. The fibres in the patches are sometimes observed to pass into glia fibres; but they do not take on dyes in the same way, and the miliary degeneration is most frequent in the localities of the ganglion nerve-cells.

Dr. Schmidt calls attention to *senium præcox*, or *dementia senilis præcox*, which sometimes attacks adolescents after infection of malaria, intoxications and long illnesses. Charpentier describes this form as sometimes resulting from purely mental causes, such as a change in the surroundings of the patient. The most usual symptoms are sleeplessness, want of appetite, listlessness, melancholy, and loss of memory. Alzheimer thus describes dementia apoplectica:—"It is sometimes observed that even in young persons apoplexies, which need not be in the cortex or hemispheres, are followed by a slowly progressing dementia which closely resembles that of old age."

Alzheimer found that the anatomical substratum of this declining mental power consisted in alterations in the cortex, even in the hemispheres unaffected by the hæmorrhage, changes which bore a close resemblance to those of *dementia senilis*. Beyer has lately described the mental condition in *dementia apoplectica*. He finds it characterised by listlessness and apathy, indifference to what is going on in the outer world, dislike of moving about, tendency to tell stories, weakness of the memory for recent occurrences, with a good recollection for events long passed. The speech is often slow, drawling, and varying in tone. Often there are tremors and difference in the facial muscles and contraction of the pupils on one side. The reflexes are normal or increased.

We have not space for the clinical descriptions of the symptoms of senile dementia, which are of a diversified character. Indeed, those who make a special study of the affections of senility sometimes trace their lines too exclusively. Old people generally die of the same diseases as adolescents. The difference is that their vital powers of resistance are lower. Dr. Clouston has lately shown that diseases of the nervous system become more frequent in advanced life; and no wonder, since most people who have lived long in this age have their nervous system most severely tried.