Dr. Wood observed that they had had a large and long meeting, and much trouble had been entailed on their respected President, to whom, on behalf of the meeting, he begged to tender their best thanks.

The proposition was carried by acclamation.

The President replied: He accepted the compliment which had been paid him. It was with satisfaction to himself, pride, and pleasure, that he had had to preside over so large and influential a body of gentlemen connected with the treatment of the insane.

Dr. Robertson, on the part of the Committee, gave notice that they would, at the next annual meeting, propose certain alterations in Rule II., and also in the designation of the Association.

The meeting then adjourned.

In the evening, the members dined together in the hotel, and were joined by Dr. Copland, and Mr. Gaskell, one of the Commissioners in Lunacy, [an honorary member.] The arrangements of the hotel, the dinner, wines, &c., gave the utmost satisfaction.

THE PRESIDENT'S *CONVERSAZIONE.*

On the evening of the 1st July, the President (Dr. Forbes Winslow,) received the members of the Association at a brilliant *conversazione*, at his residence, in Cavendish Square, which was attended by 400 persons, including the leading members of both branches of the profession in London.

The Pathology of Insanity, by John Charles Bucknill, M.D.

(Continued from Page 334, Vol. III.)

It has been unfortunate for the cause of cerebral pathology, that those writers who have devoted much care and attention to the observation of cerebral changes presented in *post-mortem* examinations, have either lacked the desire or the opportunity to make themselves acquainted with the mental phenomena which had preceded death. The careful and minute detail of appearances observed in the brains of persons supposed to have died insane, disconnected from any account of the symptoms which existed during life, are of

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comparatively little value in the present imperfect state of pathological science. A few fossil teeth and bones enable Professor Owen to reconstruct the probable similitude of an extinct animal; but the science of pathological anatomy has attained far less certitude than that of comparative anatomy; and even the able descriptions of the *post-mortem* examinations made in Bethlem by Dr. Webster, have their practical value diminished from the want of some account of the symptoms which in each case preceded death. The descriptions of the older anatomists, Morgagni, Bonetus, and others, have the same defect; a defect, indeed, of which Morgagni was fully sensible, and of which he offers an explanation, or rather an excuse, in the fact that the medical men who had observed the cases during life frequently did not know whether to call the patients melancholics or maniacs; and that, indeed, "melancholia is so nearly allied to mania that the diseases frequently alternate, and pass into one another, so that you frequently see physicians in doubt whether they should call a patient a melancholic or a maniac, taciturnity and fear alternating with audacity in the same patient; on which account, when I have asked under what kind of delirium the insane people have laboured whose heads I was about to dissect, I have had the more patience in receiving answers which were frequently ambiguous, and sometimes antagonistic to each other, yet which were, perhaps, true in the long course of the insanity." *(De Sedibus et Causis Morborum,* Epist. VIII.)

Of the thirteen examinations recorded, Morgagni himself made eleven; his pupils made one; and the other one was made by Valsalva. The appearances noted by them in this small number of dissections, include a large part of the morbid appearances which extended observation, and the advantages derived by later anatomists from the instructions of those preceding them, have been able to distinguish. In one or other of the cases, the dura-mater was found thickened and adherent to the cranium—the vessels of the meninges distended with dark blood; serum was found between the meshes of the pia-mater, sometimes in large quantity; there were also air bubbles in the vessels of the pia-mater; the consistence of the brain altered, sometimes soft, sometimes more or less hard; discoloration of the medullary substance, from distension of its blood-vessels; serum in the ventricles, sometimes clear, sometimes turbid; the choroid plexus sometimes injected, in others containing cysts; the vessels of the brain sometimes distended with black and fluid blood; in one

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instance the coats of the arteries were unusually firm (query atheromatous). In one instance a fibrinous clot occupied the whole of the longitudinal sinus. This occurred in a young woman who died with general prostration of the vital powers. It is probably the earliest instance recorded of this appearance, and is interesting in connection with Dr. C. B. Williams' views on the formation of fibrinous clots in the cerebral sinuses of asthenic subjects.

Of the thirteen insane persons dissected by Morgagni, it is remarkable that no less than four came to an untimely end. One threw himself out of a window in the night, and was killed. One was tied by the throat by his keeper so that he was strangled. One was starved to death during severe weather; and one, after recovery from insanity, died from inflammation of the intestines, occasioned by a finishing dose of black hellebore.

Morgagni concluded that the cause of insanity existed in many cases in the morbid changes of the pineal gland, and in many others in an induration of the brain. We are informed, that in his examinations he was in the habit of removing the head from the trunk, for the sake of convenience, before he examined the brain. This indicates forcibly the difference between the accuracy and delicacy of the examinations made by the greatest of the old pathologists and those of the present day. An examination conducted after this fashion would be little likely to offer evidence of moderate serous effusions, or the less obvious conditions of hyperæmia. The pathological records of insanity made by other anatomists of the last century are still less marked by exact observation than those of Morgagni, and are, perhaps, more interesting to the medical antiquary than to the modern pathologist.

A brief reference to them may, however, be instructive, as shewing that the changes which still most readily catch the attention of observers were noted.

Bonetus observed hypertrophy of the brain; obliteration of the sutures; the dura-mater adherent to the cranium and turgid with blood; the pia-mater turgid with blood, and not insinuated between the convolutions; water in the ventricles and other parts of the brain, in large quantity; the substance of the brain marked with a black spot, and sometimes with an infinite number of bloody spots, especially on pressing it—in one case, dry, hard, and friable.

Boerhaave mentions, that the brain of maniacs has been found dry, hard, and friable, and of a yellow color.

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Haller classified the observations made by others upon the brains of insane and phrenitic persons, and concludes thus: "From these few observations, for which we are chiefly indebted to Morgagni, but little certainly can be derived; since it not only frequently happens that we can discover no disorder in the bodies of maniacs, or even of such as have been totally insensible; but where we do, we are as far from being able to perceive a uniform connection between any one disorder of the mind and some corresponding preternatural state of the contents of the skull, that the very same appearances are exhibited after those most opposite disorders, idiotism and phrenzy; which last seeming inconsistency may possibly appear less extraordinary if we consider the symptoms of drunkenness and phrenzy, in which we may observe that the very same cause produces at first delirium, and afterwards, as the disorder advances, drowsiness and insensible stupor. This, however, seems evident, that in the disorders of the mind the brain and its connections are usually affected; and *when, in some rare instances, we can discover no disease of these parts, we may conclude, either that it is seated in their very elementary particles, or has not been sought for with sufficient patience and attention.* (Elements of Physiology.)

Greding, in 216 cases, found the skull unusually thick in 167 cases; the dura-mater adherent to the cranium in 107 cases; the pia-mater thickened and opaque in 86 out of 100 cases of mania; and beset with small spongy bodies in 92 out of 100 cases. He observed effusions of serum between the dura and pia-mater in 120 out of 216 cases of insanity, and in 58 out of 100 maniacal cases; the lateral ventricles were distended in 52 cases. The choroid plexus was found healthy in only 16 out of 216 cases of insanity; and it was thickened and full of hydatids in 96 out of 100 maniacs.

These records will convey strongly the impression, that however exact the observations of this pathologist might have been, he did not interpret the morbid appearances as we are accustomed to do at the present day. Effusions of serum between the dura-mater and the pia-mater, and diseased conditions of the choroid plexus, are certainly not so common as he represents them.

Meckel remarked the increased density of the cerebral substance in the bodies of the insane.

Sœmmering and *Arnold* confirmed this observation; and the latter expressed his conviction that insanity was occa-

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sioned by the increased density of the cerebral substance, and of those parts of the brain by means of which the soul is connected with the body.

Portal declared that all mental diseases were the effects of morbid alterations in the brain or spinal chord. He enumerates a great number of alterations, but with so much looseness that little reliance can be placed upon them. He enunciates, however, on this subject, the following sound and philosophical doctrine, which to the present day may well serve as a text for works in this difficult and obscure department of pathology. "Morbid alteration in the brain or spinal marrow has been so constantly observed, that I should greatly prefer to doubt the sufficiency of my senses, if I should not at any time discover any morbid change in the brain, than to believe that mental disease could exist without any physical disorder in this viscus, or in one or other of its appurtenances."

Pinel had no confidence in the revelations of pathological anatomy. In the preface to his excellent work on "Mental Alienation," referring to the labours of Greding, he remarks, "But although one must eulogize his efforts to throw new light upon the organic affections of the insane, is it possible to establish any relation between the physical appearances manifested after death and the lesions of intellectual function which have been observed during life? What analogous varieties does one not find in the skull and brain of persons who have never shewn any sign of aberration of mind! And therefore, how can we succeed in fixing the limits which separate that which is normal from that which must be held to be the result of disease?" (p. xx.)

In the body of his work (p. 142,) he refers the primitive seat of mania "to the region of the stomach and intestines, from whence, as from a centre, the disorder of the understanding is propagated by a species of irradiation. A feeling of constriction, &c., manifests itself in these parts, soon followed by a disorder and trouble of ideas."

Well might Gall exclaim, in reference to these opinions of the great reformer of the treatment of insanity, and to other opinions, scarcely more philosophical, on the same point, of Pinel's eminent pupil and successor, Esquirol: "It is a sad business that in writing for men who ought to have the clearest ideas upon mental disease, it should be necessary to commence by establishing the true seat of mania" (tome ii., p. 223); and he adds that M. Foderé actually undertakes to

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prove that the brain is neither the seat of inclination, instinct, or mental power, much less of mania or delirium.

In justice to Pinel it should be remarked, that however mistaken his views upon the pathology of insanity may have been, they at least had the merit of referring a bodily disease to a bodily origin. In the preface to the second edition of his work, he thus wisely expresses an emphatic condemnation of metaphysical theories on this point: "The most difficult part of natural history is, without doubt, the art of well observing internal diseases, and of distinguishing them by their proper characters. But mental alienation presents new and diverse difficulties and obstacles to surmount, either in the unusual gestures and tumultuous agitations which it occasions, or in a kind of disordered and incoherent chatter, or in a repulsive or savage exterior. If one desires to account for the phenomena observed, one has to fear another rock—that of intermingling metaphysical discussions and divagations of ideology with a science of facts."

Esquirol, the pupil of Pinel, adhered with affectionate pertinacity to the opinions of his great master.

M. Esquirol states in the *Dictionaire de Sciences Medicallès*, that the principal changes observed in the brains of insane persons are—"The cranium frequently thick, sometimes eburnated, sometimes with thickness of the diplöe, very frequently injected, more rarely thin, its thickness variable in different regions; the dura-mater adherent either to the vault or to the base of the cranium, sometimes thickened, frequently its vessels developed and injected; the internal face of the dura-mater clothed with a membraniform layer, as if the fibrine of effused blood had extended itself in the form of a membrane. Almost always between the arachnoid and pia-mater serous or albuminous effusions are found, which cover, and almost efface the circumvolutions. Effusions at the base of the brain are common; they exist almost always in the ventricles."

In M. Esquirol's great work *Des Maladies Mentáles*, published so recently as 1838, his opinions on pathology are considerably modified. Referring to the case of a recent maniac, who was killed by one of her companions, and in whose body he and his pupils were surprised to find no lesions of the brain or its meninges, he says, "Hence it happens that the brain and its meninges are without lesion, although the maniac may have been so many years. The nature, the extent, and the seat of lesions, have no relation with the violence or extent of the delirium. When authors

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have met with lesions of the brain or its membranes, they have but established the existence of disordered movements during life, of paralysis or convulsions. If one follows with attention the progress of the malady, one may be able, by the symptoms of complication which are added to the insanity, to assign the period when the lesion commences. On the other hand, what organic lesions of the brain or its meninges have not escaped the most attentive observation? When mania persists a long time, does not general enfeeblement during the last days of the patients dispose them to local inflammations? Do not the symptoms of meningitis, of sanguineous congestion, of cephalitis, the cephalic lesions which one observes in *post-mortem* examinations—do not these belong to the epiphenomena which precede death. Have people taken the care to distinguish simple from complicated mania? It is certain that it is in maniacal cases where one does not find cerebral lesions. Maniacs are the patients who are cured suddenly. There are others who live twenty or thirty years, in spite of the organic lesion of an organ whose influence makes itself felt by all the organs most essential to life. The accessions of intermittent mania cease spontaneously. What is the conclusion to be drawn from all this? That pathological anatomy, in spite of the very important labours of MM. Foville, Calmeil, Bayle, Guislain, has not been able to make us acquainted with the organic cause of mania. Thirty years ago I would willingly have written upon the pathological cause of madness. At the present day I would not attempt a labour so difficult—so much of incertitude and contradiction is there in the results of the necroscopy of the insane made up to this time. But I may add that modern researches permit us to hope for ideas more positive, more clear, and more satisfactory."

M. Foville describes in acute cases injection of the pia-mater existing in a greater or less extent, according to the degree of inflammatory action in the cortical substance. In chronic cases he describes opacity and thickness of the membranes, adhesion of the membranes to each other, granulations of the pia-mater, and false membranes. The grey substance, he asserts, is in acute cases intensely red on its surface and in its substance. This redness is most vivid in the frontal and vertical region. The redness is not uniform, but mottled and diversified with spots of a violet hue, and with minute extravasations of blood. He describes the consistence of the cortical layer underneath its surface to be diminished, the surface itself being somewhat indu-

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rated. In acute cases, the pia-mater, he says, is not adherent to the cortical substance, while in chronic cases it frequently is so; and in this fact he sees an important distinction, capable of explaining the incurability of chronic mental disease. In chronic cases, the superficial or outer layer of the cortical substance becomes indurated, and capable of being separated from the inner layer, which is softened and mammillated; the outer layer is harder, the inner layer is softer; the outer layer browner and frequently paler, the inner layer redder than natural. Atrophy of the convolutions he also describes as frequent; and this may be confined to the cortical substance, the surface of which is marked with irregular depressions filled with serum. The grey substance is sometimes softened throughout its thickness, and changed to a brownish colour; the softening of the grey matter is sometimes so great that it may be washed off the white matter (which is sometimes harder than usual,) by pouring water upon it.

The medullary substance is frequently injected, shewing numerous bloody points when divided; sometimes it is more uniformly discoloured, and has a purplish hue; sometimes it becomes exceedingly white and indurated; sometimes, however, when indurated it has a yellowish or grey tinge. Induration of the medullary substance is attributed by M. Foville to the adhesion with each other of the planes of the several fibres, of which he believes the mass of the white substance to be composed, and which are united to each other by fine cellular tissues.

These observations of M. Foville, made partly at the Salpetriere and partly at St. Yon, are highly important and instructive. They agree in many respects, as we shall hereafter see, with the precise and admirable researches of M. Parchappe; and although in some respects it may be difficult to verify their correctness, in the *post-mortem* rooms of institutions where but a few cases are examined, it is certain that the leading features of pathological change in the substance of the brain, which were first indicated by M. Foville, are to a greater or less extent recognizable in a great number of bodies, and amply deserve full and patient investigation, in order to establish their nature and their connexion with the various forms of insanity.

The researches of *Bayle* and of *Calmeil* have reference rather to a particular form of insanity, namely, general paralysis, than to the pathology of mental disease at large M. Bayle attributes insanity to inflammatory irritation of the

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membranes of the brain, and paralysis accompanied by loss of mental power (dementia,) to pressure exerted upon the brain by effusions resulting from this inflammatory state.

M. Calmeil attributes insanity in general to a chronic inflammation of the brain, and general paralysis in particular to chronic inflammation, followed by induration of the fibrous substance.

M. Lèlut, who published in 1836 his work upon *The Value of Cerebral Alterations in Acute Delirium and Insanity*, came to conclusions opposed to those of the author last mentioned. He sums up the result of his researches in the following words :

" 1st. Numerous alterations of the brain and its envelopes are met with in delirium and insanity, especially in extreme forms of the latter ; but these alterations are neither constant or exclusive.

2ndly. Hence it must be allowed that the more or less local and coarse alterations in the skull, the brain and its membranes, cannot be held to be the proximate causes of insanity. They are, doubtless, capable of existing with a delirious or insane condition, but they do not constitute this condition, and frequently they are only the exaggeration, the effect, or the transformation of it.

3rdly. That which may be given as the nearest approach to the proximate cause of delirium, and to the most acute form of insanity, is inflammatory lesion of the brain and its tunics. But this alteration neither does nor can constitute the state which is anterior to it, and may even destroy life without producing it.

4thly. The conditions of the brain which approach the most closely to the proximate cause of the chronic forms of mental alienation, with or without impairment of motion, are without doubt chronic inflammation of the substance and of the membranes of the brain, its atrophy and induration, which may be accompanied by variations in its specific gravity. But yet these alterations are not the proximate cause of these forms of insanity, because they are neither constant nor exclusive, and they do not make themselves apparent except in an advanced period of the disease."

The logic by which M. Lèlut arrives at these conclusions appears scarcely more reliable and consistent than the organic lesions which are, and are not, according to to him, the cause or the condition of insanity. Inflammatory lesions of the brain are, according to him, very near being the cause of acute insanity, but they are not the cause, because

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insanity may destroy life without producing them. Chronic inflammations also are very near being the cause of chronic insanity, (les conditions du cerveau qui si rapproche le plus de leur cause prochaine), but yet they are not the proximate cause because they only make themselves obvious after a while.

Some years subsequently to the publication of M. Lèlut's book, another eminent French physician, *M. Lèuret*, published a work on the same subject. The title of this work, *The Moral Treatment of Insanity*, would lead us to expect views adverse to the somatic origin of mental disease, and such, in fact, is the case. Physicians who treat insanity with moral and penal remedies are not likely to regard its cause as a pathological condition of the organism; and, on the other hand, physicians who refuse to regard insanity as a bodily disease, and who interpret its phenomena as manifestations of a fermentation in the spiritual essence, easily and logically persuade themselves that sharp penal remedies are useful and justifiable in its treatment.

M. Lèuret certainly combats the somatic theory, and the the pathological facts upon which it rests, with a logical acumen, contrasting very strongly with the manner of the author last mentioned, and even of M. Esquirol. While we entirely dissent from his conclusions, we are glad to avail ourselves of his assistance to ascertain the weak points of that doctrine which attributes insanity to cerebral change alone; a doctrine of the truth of which we are convinced, but the proofs of which it would be vain to deny require to be multiplied, confirmed, and arranged, with a care and precision which they have not yet received. M. Lèuret believes that he has established the following positions:

1st. That the authors who believe it possible to establish an anatomical change as the cause of insanity differ greatly among themselves; thus Greding asserted that thickness of the bones of the cranium occurs in 77 out of 100 patients; while Haslam found this condition in 10 only out of 100 patients. Hyperæmia of the brain is recorded by Parchappe in 43 cases out of 100; and by Bertoleni only in 14 out of 100.

2ndly. That some of the cerebral alterations (to which insanity is attributed,) are by no means well established. Thus, in the cases which are cited of hypertrophy in the brain, it ought to have been established that this was not owing to fulness of its vessels, or to the presence of a serosity in its tissue. These observations have not been made. Again,

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that which is called a dense brain, or a soft brain, expresses nothing distinctly except in extreme cases.

3rdly. That the value attributed to certain alterations is deduced from a number of observations by far too small, so that one result frequently invalidates another; thus M. Parchappe has deduced the average normal weight of the healthy brain from thirteen observations on men, and nine upon women, and upon this average he establishes the rule for atrophy of the brain. This average is evidently too small, and indeed M. Parchappe gives different averages elsewhere.

4thly. That the pathological alterations referred to insanity, are met with in patients who have never been insane.

5thly. That all authors confess that there are insane persons in whose brains no pathological changes are found.

6thly. That the lesions which are frequently met with among the insane, to which any value can be attached, are only met with in cases in which insanity has been complicated with paralysis; and that, in order to decide if any lesion is the cause of insanity, it is at least necessary to find it in a case of simple mental aberration in which there has been no affection of motion or sensibility.

That so able an opponent of the somatic theory as M. Lèuret undoubtedly is, should have been compelled to rest his argument upon no better foundations than those above named, appears to afford strong presumptive evidence of the truth of that theory. I shall make some brief comments upon each of his objections.

1st. That authors should differ so greatly in their numerical estimates, as M. Lèuret has shewn them to have done, can prove no more than that authors have been inexact in their observations, or careless and untrustworthy in recording them. The objection may to some extent be valid against the value of statistics in pathological science. It may shew that one author counted slight appearances of change, while another only recorded extreme instances; but it can in no way diminish from the value of the fact, that all the authors cited did observe the pathological changes they record, in a certain number of cases.

2ndly. That pathological changes of the brain need to be observed with greater exactness than heretofore is undoubtedly true. They have, however, been observed with greater exactitude than M. Lèuret admits; for instance, in the case he cites, hypertrophy, it is well established that in this rare condition the brain is paler and drier than usual, and that the increase in its

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volume cannot be attributed to fulness of the vessels or serous infiltration.

3rdly. This objection again applies to the statistical method of proof, as it is too frequently used. It applies, however, to to the abuse of this method, in all departments of pathological science. Doubtless, those who count observations without estimating them as recommended by Morgagni, misuse the numerical method in their deductions upon all diseases, insanity included.

4thly. If M. Lèuret can shew that serious pathological change in the cortical substance of the convolutions has existed in persons whose mental functions have never been affected, he will go far to upset the pathological nature of insanity, but this he has not done, nor in my opinion is he likely to do. That some pathological changes which are observed in insane persons, but which are non-essential to insanity, should occur also in persons who have always been sane, is a fact of no value in the present discussion.

5thly. That in the brains of some insane persons no pathological changes are observed, is undeniable; but would it not in these cases be more philosophical to doubt with M. Portal, the sufficiency of our powers of observation, than to use it as an argument against the existence of all pathological change of an organ whose functions are perverted, but whose structure is not obviously injured. Is M. Lèuret able to point out the pathological changes which cause neuralgia, tetanus, chorea, or hysteria, or that by which life is destroyed from a blow on the epigastrium, or concussion of the brain? Deficient information should lead us to seek for more light, and should by no means induce us to veil that which we possess.

6thly. M. Lèuret certainly mistakes the fact, when he affirms that cerebral lesions are only found in those who are paralysed. The lesions peculiar to the different forms of ordinary paralysis are by no means well ascertained, and yet no one doubts that paralysis is always occasioned by lesion of the nervous system, while the conditions of the brain which are found in general paralysis, are not as yet better understood than those which occur in simple mania or acute delirium. Moreover, whatever doubt may hang over the primary pathological changes which attend the earlier stages of simple mental aberration, there can be no doubt whatever that the secondary conditions which attend the chronic stages of simple insanity, uncomplicated with paralysis, are obvious and undeniable in degraded nutrition and atrophy of the cerebral organ.

I have stated M. Lèuret's objections, and have answered

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them at some length, for I must pay him the compliment of considering him the most formidable antagonist of the pathological view of insanity. He has stated his reasons for the opinions he entertains, with precision and candour, and he has thus afforded an opportunity of answering them, an opportunity which would be sought in vain in the crude opinions upon this point expressed by Pinel, and even by Esquirol, and Georget.

M. Guislain, the able leader of psychology in Belgium, reduces the lesions of the brain found in insanity under nine heads: 1st, a state of sanguineous congestion of the meninges, the brain, or the two together; 2ndly, a state of serous congestion of the above; 3rdly, cerebral softening; 4thly, opacity and thickness of the arachnoid; 5thly, adhesions of the membranes to each other, or to the brain; 6thly, cerebral induration; 7thly, cerebral hypertrophy; 8thly, cerebral atrophy; 9thly, vices of conformation of the brain and of the skull.

These conditions are, he thinks, in a practical point of view, capable of being reduced to four fundamental alterations: sanguineous congestion, serous congestion, softening, and induration. It is open to doubt, however, whether the three latter of these alterations can be considered fundamental; and it is certain that the four do not include all the conditions which may be considered fundamental. He does not include those aberrations of nutrition known under the names of inflammatory, atrophic, and anemic.

That M. Guislain admits the existence of such conditions is abundantly evident from the pages that follow. At page 367, *Leçons Orales, tomi.*, he attributes to the state of congestion, not only eecyhmoses of the arachnoid and pia-mater, but false membranes, and a red appearance of the arachnoid, "having the aspect of an inflamed conjunctiva."

Such an appearance, and especially the existence of false membranes, cannot be attributed to a state of congestion, and should have induced this able physician to have admitted the inflammatory, at least, as one of the fundamental states of the brain in insanity.

He estimates that in one-fourth of the bodies of persons dying insane, there is a congestionary state of the encephalic mass; but he declares his opinion that this proportion is far from that which obtains among the living insane, and that the majority of those who are cured have never had congestion of the head in a notable degree.

M. Guislain says, "The brain and its membranes may have

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been congested without the existence of a state which can be called inflammatory. If inflammation was always a condition of congestion, would one see the numerous cures which take place among sanguine and robust maniacs, who offer in the course of their disease those symptoms, which one often considers to be inflammatory, and which are really only a vascular orgasm, and not a state of phlegmasia. Broussais himself felt this in giving to this condition the name of sub-inflammatory. It is an afflux of blood, which may in a manner be compared to that injection of the cheeks which accompanies shame and modesty; that injection which makes itself evident in the eyes, over the whole of the face, the neck, and even over the breast of a man agitated by violent anger."

It is evident, however, that a much more profound and serious change exists in the blood-vessels of the insane brain, than in the transitory blush of modesty or suffusion of passion. These states are physiological, and leave behind them no tendency to destructive change. The state of the congested brain in insanity is pathological, and tends to pass into a state of structural change, respecting the wide deviation of which from a state of health there can be no doubt.

M. Guislain has himself gone further than most writers on this point, in representing by means of woodcuts the microscopic appearances of change in the congestionary state of mania, in the fatty degeneration following mania, and in congestion with and without softening.

I have been unable to verify the accuracy of these representations, but I firmly believe, that my want of success in recognizing the microscopic character of the cerebral changes which result from hyperæmic conditions of the brain, has for ite sole cause the limits which bound our powers of observation, arising from the want of power in the organs of sense and their mechanical aids. If the congestion of insanity were of the character which M. Guislan attempts to attribute to it, insanity might be as transient as passion, or passion would be as dangerous as insanity.

The most careful and elaborate investigations into the pathological anatomy of insanity, made in France, are, without doubt, those made by *M. Parchappe*, the present Inspector General of Asylums in that country. His first work on the different alterations of the brain in insanity, was published in 1838. M. Parchappe commences by admitting fully, "That there is no single pathological alteration which can be proved to exist in all cases of insanity; but there are three which have been found in the majority of cases. This is a result which

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might have been expected. The pathologists who have searched for one essential characteristic pathological change, might have saved themselves a deception. . . . The point which one may reasonably hope to obtain, is to be able to distinguish among cases of mental disease those kinds which are characterised both by the constancy of the symptoms, and by that of pathological change." The uncertain existence of pathological alterations in insanity, and the occasional absence of all change disprove indeed, the theories of those who attribute insanity to some exclusive pathological condition of the brain, for instance, to chronic meningitis, or to induration of the brain, but they do not prove that these alterations are, as asserted by Esquirol, Lèuret, and others, mere complications or consequences of the malady. The alterations which exist in simple inflammation of the brain and its membranes, are not those which are found in insanity. Those which are found in insanity may be distinguished into, 1st, those which may be considered accidental; 2nd, those which existing in other maladies, yet appear to play a part in the production of insanity, and, 3rd, those which are believed to be essential to mental alienation. Among the first may be enumerated cerebral hemorrhages, partial softening of the white substance, diesase of the cerebral arteries; and among the second, thickening and opacity of the arachnoid, hyperæmia of the pia-mater and of the brain, serous infiltration of the pia-mater, dropsy of the arachnoid cavity. In the important last division, M. Parchappe includes the following changes, sub-arachnoid ecchymosis, and partial punctiform injection of the cortical surface with or without softening, extended softening of the middle portion of the cortical substance, adherence of the pia-mater to the surface of the brain; rose, lilac, and violet coloured, discolorations of the cortical substance, loss of colour of the cortical substance, atrophy of the convolutions, induration of the brain. M. Parchappe believes, that he is able to establish the following classification of mental disease upon the pathological changes which he has observed. 1st. Monomania; in this form of insanity, no pathological change is found to exist in the brain, and the probable cause is to be sought in the organic predominence of some portion of the brain in consequence of its size or activity. 2nd. Acute Mania and acute Melancholia; in these forms of insanity, the alterations found in the brain, to a certain extent resemble those of inflammatory affections of the organ. They are hyperæmia of the pia-mater and of the cortical substance, partial injections of the sub-arachnoid tissue,

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punctiform injection, and occasional softening of the cortical substance; it is rare that the meninges are found extensively thick and opaque. The above alterations are usually more decided in acute melancholia than in acute mania. In sympathetic mania, that is, in mania occasioned by the irritation of some part of the distal nervous system, no anatomical changes may be discovered if the examination is made during the early period of the disease, but after a while, the brain passes from the state of physiological excitement into that of pathological change, and then the above alterations may be expected to be found on examination. 3rd. Simple chronic mania; in this form of insanity, the aspects of the brain are altogether different from those which prevail in the acute paralytic forms of insanity; they are, atrophy of the convolutions, with loss of colour and induration of the cortical substance, or of the medullary substance, or of both; serous infiltration of the pia-mater, and dropsy of the ventricles, connected with and consequent upon general atrophy of the brain. 4th. Paralytic insanity, (general paralysis.) In this the essential alteration consists in softening of the middle layer of the cortical substance; very frequently also the pia-mater is thickened, adherent and infiltrated; in the acute form the cortical substance is hyperæmic and deepened in color, and the pathological appearances of acute mania are present. In the chronic form, the cortical substance has lost colour and become thin; atrophy of the convolutions, and the appearances of chronic mania are present. 5th. Epileptic insanity. In this the alterations resemble those of simple chronic mania.

In 1841, *M. Parchappe* published his *Theoretical and Practical Treatise upon Insanity*, a work more fully devoted to necroscopic record than *Andral's Clinique* or *Lallemand's Letters*. M. Parchappe attempts to establish his deductions by the numerical method; and in this we think he has fallen into an error: first, because the number of cases upon which he founds his averages are, under some heads, insufficient to establish a trustworthy average; and secondly, because he has in several instances adopted methods of comparison, which are much open to objection. The manner in which he arrives at an estimate of cerebral atrophy is objectionable on account of both of the reasons above given. He founds his estimate upon a comparison between the weight of the brain examined and the average weight of healthy brains. Now it is evident that if the diseased brain was originally heavier than the average, a considerable atrophy might not be shewn by a com-

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parison of this kind. An atrophied brain of large size may still be heavier than the average of healthy brains.

Indeed, an excellent English pathologist, Dr. Boyd, has inferred from averages much larger than those of M. Parchappe, that the average weight of the insane is actually greater than that of the sane brain. Dr. Boyd's result, however, is open to the same objection as that which I have made to M. Parchappe's. He appears to have compared the healthy brain of metropolitan paupers with the insane brain of lunatics who have resided in the country. Now it is possible, nay probable, that the cerebral average of healthy brains in Somersetshire and in Marylebone Workhouse may differ to a greater extent than the average weight of the sane brain differs from that of the insane organ. The stunted growth of metropolitan paupers may have a greater influence upon the average weight of the cerebral mass than the influences of disease.

M. Parchappe's average weight of the sane brain may have been deduced from average individuals; but he could make no selection of this kind for the other side of the comparison. The insane person whose brain has to be examined and compared, may have been a well developed man, with all the organs above the average size, or with a brain originally large or small in comparison with the rest of his body. So true is the addition which Morgagni made to the dogma of Hoffman, "*Ars medica to tain observationibus.*" Morgagni wrote, "*sed perpendendæ sunt non numerandæ observationes.*"

Moreover, the number of observations upon which M. Parchappe has founded his average of the weight of healthy brains is clearly insufficient for the purpose, being only thirteen for men and nine for women. From numbers so small it is impossible to avoid accidental errors and disturbances.

The comparison of an atrophied brain with a supposed standard of weight, was the best method which suggested itself to M. Parchappe for the purpose of establishing the fact of atrophy. Since, however, I have devised a method by means of which the actual bulk of the diseased organ can be compared with that of the sane individual organ when it was in a state of healthy nutrition, all methods of estimating its loss of substance by means of weight which take no cognizance of specific gravity, or by comparison with averages, must be superseded.

In the *resumé* upon 38 autopsies of persons dying in the acute stage of mania and melancholia, M. Parchappe (p. 45,) affirms the same principles which he has enunciated in his former work, especially the absence of any essential and ex-

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clusive encephalic alteration. He affirms, moreover, that the defections prove the existence of an analogy as strong as possible, if not perfect, between the cerebral alterations found after acute mania and those of acute melancholia; and therefore he concludes that the distinction between these two states is not justified upon pathological grounds.

The 38 examinations afford the following *resumé:* In 36 the brain was the seat of hyperæmia, either in the periphery, its membranes, or its substance; in 7 instances the hyperæmia was simple; in 29 it assumed the form of subarachnoid ecchymoses; in 23 instances there were subarachnoid ecchymoses, with punctiform injection of the cerebral surface; and in 17 of the latter there was also softening of this surface. Sixteen times the cortical substance was reddened in colour. In one case there was no apparent encephalic alteration whatever, and in several the alterations were inconsiderable. It is needful, therefore, to admit that the pathological condition of acute insanity is of such a nature that it is possible for it to leave no *post-mortem* appearance. Taken single, none of the alterations described can be held to express a pathological state of the brain, which corresponds to the abnormal psychical manifestations; but examined collectively, these alterations afford an idea of the pathological character which must be attributed to that state, namely, that of hyperæmia. This condition was only absent in two cases out of the whole thirty-eight, and it is very probable that hyperæmia also existed during life, even in the two cases in which there was no trace of it after death. The thickening of the meninges and the superficial softening of the cortical substance, which are so frequently found, indicate that this hyperæmia is not that of simple congestion, but that of active congestion.

"A legitimate induction may therefore be derived from the facts, to the effect that there is in general during life an active sanguineous congestion of the brain co-existing with the symptomatic phenomena of acute insanity." "One may even recognise, up to a certain point, a relation between the intensity of the symptoms during life, and the extent of the alterations after death."

Of chronic insanity M. Parchappe details the appearances of one hundred and twenty-two cases, which may be summoned up as follows. In seven instances there were no alterations, or almost none; in eleven instances the alterations were simply hyperæmic; in five the two substances were softened; twice there was induration of the cortical substance alone; eight times there was induration of the white substance

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alone; twenty times there was induration of the two substances; sixty-one times there was atrophy of the cerebral convolutions; sixty-four times there was hyperæmia, which was simple in forty-six cases, and in eighteen combined with ecchymoses, and in two cases with injection and softening of the cortical substance. This substance was coloured red five times. It was deprived of its [normal?] color fifty-nine times.

It is evident, says M. Parchappe, from these facts, that there is no essential and characteristic pathological appearance in chronic insanity. There may be no trace of pathological change after death, or only an unimportant one of simple hyperæmia. But the alterations are remarkably different from those which belong to acute insanity. In the latter, the predominant alterations are hyperæmic conditions, with arachnoid ecchymoses, injection and softening of the cortical substance. In chronic insanity the predominant alterations are atrophy of the convolutions, and induration of the two substances. "The symptomatic differences in the two forms of insanity correspond generally with the pathological differences in the organ of intelligence." In chronic insanity the predominant state is pathologically opposed to the hyperæmic condition of acute insanity, and the atrophy of the convolutions especially expresses a movement of the plastic force opposed to that which represents active hyperæmia. "The predominant alterations in chronic insanity express in general, a state of diminution of the plastic activity; a state diametically opposed to that expressed by the predominant alteration in acute insanity, which has been shown to be active sanguineous conjestion, representing the physiological principle at the highest point of plastic activity. And these conditions of the organism coincide with the psychical symptoms peculiar to the two forms of disease which present two "opposed dynamical states, the one in which the psychical activity is in a plus, and the other in which it is in a minus condition."

M. Parchappe concludes his valuable treatise with a chapter upon the appearances of the healthy brain. From an early period of his investigations, he had instituted comparative examinations of sane and insane brains, having both before his eyes at the same moment.

"I have thus been able to assure myself how inexact is the assertion frequently made, that between two brains of this kind, it is absolutely impossible to distinguish that which belongs to insanity. The contrary assertion would be much nearer to the truth, especially if one did not make it without some restriction. In regard to paralytic insanity at least, it

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may be said, that the difference strikes the eye, and can only be mistaken by prejudice or inattention."

He sums up the characteristic appearances of the sane brain as follows: "Extreme tenuity and perfect transparence of the arachnoid, and of the pia-mater. Absence of subarachnoid serous infiltration. The membranes may be detatched from the convolutions without producing decortication. When the cortical substance is soft, and the membranes begin to become dry, it may happen, that in circumscribed points they detach with themselves floculi, and even small plates of the cortical substance. The cortical substance is of a grey color, of which the shade varies a little in different individuals, and in the same individual in different parts of the thickness of the substance. To the naked eye, the shade of the surface does not appear paler than that of the deeper parts. The internal portion is, perhaps, a little deeper in color, and between the two we can sometimes distinguish an intermediate shading, paler than either. The medullary substance is of a pure and striking whiteness. The consistence of both substances is considerable when the death has been recent and the temperature moderate. The white substance is rather more firm than the grey. The surface of the ventricular membrane is smooth and brilliant, sometimes offering very fine granulations. The cut surface of the white substance is sometimes dotted with a small number of red points. Under the influence of the air, the blood in the vessels becomes more brilliantly red, and the cortical substance takes on a rosy tint, which gradually becomes deeper, but which never attains the intensity which characterizes pathological alteration of color of this substance. The influence of time and a high temperature, produces softening and commencing putrefaction, and causes the detachment of floculi with the membranes, like that produced by drying of the membranes from contact with air. The convolutions are pressed together, only offering space for imbedding of the pia-mater. When the membranes are removed they still toutch, and if separated, they return to their apposition on account of their elasticity, and the anfractuosities efface themselves. The thickness of the cortical substance varied in the anterior lobes from two to three millimeters, and on the convexity, and at the base, from two and a half millimeters to five."

The eminent author I have here freely quoted, has done excellent service in the cause of a rational pathology of mental disease. He has excluded all speculative hypothesis upon the nature of mind and its aberrations, and has set a worthy

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example to his successors, in the careful and laborious manner in which he has observed and recorded the facts upon which alone any trustworthy knowledge in this, as in all other departments of science can be founded. I am far from agreeing with all the conclusions at which M. Parchappe has arrived, but to the spirit of his enquiries, and to his general results I give my hearty adherence. These results however, require to be accepted with large limitations and exceptions; and, as I hope hereafter to prove, large additions to them must also be made to present a correct general idea of mental pathology. It is, however, no small praise to an author to affirm, as may with truth be done of M. Parchappe, that no candid investigation, even into his errors and deficiencies, can be made without advancing the science of which he treats.

The principal error into which M. Parchappe has fallen, is that of having made so abrupt a classification of insanity, into acute, and chronic. The phenomena of the disease by no means justify a distinction of this kind so sharp as to lead to M. Parchappe's assertion, that the two forms of the disease present pathological conditions essentially opposed to each other. Doubtless the pathological appearances presented in a typical case of each form, will sometimes contrast with each other as remarkably as he insists; but a large proportion of cases of mania and melancholia are chronic from the first, and a large proportion of cases which are unquestionably chronic in point of duration, present at intervals, all the symptoms of acute disease, and after death present an intermixture of those pathological conditions which M. Parchappe has described as opposed to each other from their very nature. Nothing is more common than for an atrophied brain to suffer from temporary hyperæmia. It is a pathological law, that injured and ill-nourished organisms are liable to sudden congestions, almost in proportion to the amount of deficiency in their nutrition. Hyperæmia is moreover peculiarly liable to take place in the atrophied brain in consequence of the loss of external support which the organ has sustained by shrinking away from the cranium. The lengthened, tortuous, and dilated vessels of the pia-mater in atrophied brains, indicate the frequency with which they have been in a hyperæmic state.

It is not often that persons suffering from simple recent mania or melancholia, die from the effects of the disease. The form of mental disease which destroys life in the early period of its course is comparatively rare, and has been thought by many modern writers to be a distinct form. The French alienists of the present day, call it *Délire aigu*, and distinguish

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it from recent mania and recent melancholia. In the brains of persons who have died while suffering from this form of insanity, the strongly marked characteristics of hyperæmia of the substance, and the membranes, even to the sub-arachnoid ecchymosis described by M. Parchappe, undoubtedly exist. But it is by no means so certain that in the recent cases of mania and melancholia of most frequent occurrence, if death were to occnr from some accidental cause or intercurrent disease, which did not interfere with the state of the cerebral circulation, it is by no means so certain that strongly marked signs of hyperæmia would be found to exist. In many cases of recent mania indeed, a condition of the brain the very opposite of hyperæmia is known to be the condition of disease both by the nature of the cause, the effects of remedies, and the post-mortem appearances when chance has afforded an opportunity for their observation. The fact, that all the symptoms of acute mania frequently arise, and continue throughout the course of an exhausting bodily disease, which leaves every individual organ, the brain included, in an ill-nourished and anemic state, affords irresistible evidence that the phenomena of acute insanity must in many cases co-exist with a state of the cerebral organ, the very reverse of hyperæmic. The rapid formation of ideas is so remarkable a symptom in acute insanity, that M. Parchappe, in common with M. Falret and others, considers it a proof that the psychical activity is in a state of exaltation; and he logically enough infers that the plastic activity of the organ of which psychical activity is the function, must also be in a state of exaltation, or, as he expresses it, in a plus state. This, however, is not unconditionally true. Doubtless in some cases, and for a short time, active hyperæmia of the brain, producing a rapid nutrition and decomposition of its substance, and accompanied by quick-flowing ideas and fancies, may be the condition of acute mania, as it is the condition of cerebral excitement in the early stage of intoxication. But it is an error to suppose that a rapid flow of ideas is always a sign of that psychical activity which depends upon an exalted state of cerebral nutrition. There is an ideal activity which resembles palpitation of the heart from weakness; and ideas frequently flow through a debilitated brain in rapid succession, because the mental impression made by each of them is feeble and unsuggestive. Doubtless they follow a certain train, but this is of the most desultory kind, because the organ answers to the faintest touch. The Germans have a curious term for this impressive and remarkable symptom. They call

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it *ideenjagd*, idea-hunt. It is a hunt in which there is nothing hunted; or, like the chase of the ocean billows, where the old are ever vanishing and the new arising, without evident purpose or end.

" Ac veluti ventis agitantibus æquora, non est
Æqualis rabies continuusque furor.
Sed modò subsidunt, intermissique silescunt;
Vimque putes illos deposuisse suam."

Dementia, moreover, is oftentimes acute as regards its duration. No disease is so various, and so fruitful in exceptions and apparent anomalies to all rule as insanity; no other organ being exposed to such a variety of influences, combining and interfering with each other in every possible degree, as the brain. Pathologically, however, two states of the brain, and two classes of phenomena dependant upon those states, may in many instances be distinguished, namely, in the first place, the pathological state, upon which the early phenomena of the disease depend, whether this be hyperæmia, mania, toxæmia, or some other state; and in the second place, those conditions of the brain which are consecutive upon and the results of the former conditions, secondary conditions which, in some cases, may be those of shrinking or atrophy—in others, those of hardening, sclerosis—in others, softening—in all, some degree or kind of nutritive degeneration, expressed by tissue-change into fat, or the deposition of serum. Pathologically, this distinction is, in a considerable number of instances, as well founded as the distinction of congestive kidney from the atrophied kidney which follows, or the sub-inflammatory cogdition of the liver from the atrophic cirrhosis. The passage from the primary to the secondary state cannot, indeed, be proved to have taken place in the brain as in other organs, because the primary state is often of a nature to escape our observation. That, however, a primary pathological state did exist even in those instances where no appearances thereof could be discovered by *post-mortem* examination, is in the highest degree probable, from the circumstance that in instances in which the early manifestations of the disease have been of a similar kind, the chronic appearances of the brain have afforded unquestionable testimony of profound pathological lesion. Monomania has been supposed to be unattended by changes in the brain appreciable by our senses. This is generally true, in the early parts of the disease; but the brains of persons who have been monomaniacal for many years frequently present unmistakeable evidence of degraded nutrition. It may, indeed, be said that some allowance must be made for

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the disuse of the cerebral functions, which takes place in many instances of partial insanity, the mind becoming, as a whole, completely inactive, in consequence of the predominance of some delusions. The influence of a fixed idea upon the mental activity is certainly a curious and important question. In some instances a fixed idea petrifies the mind, and it is then no wonder that its organ is badly nourished, like the disused arm of a self-tormenting fakir. But the possibility of an idea arresting mental activity to the extent of producing cerebral atrophy, could only exist in a diseased organ. No amount of healthy pre-occupation, or of mental indolence in a physiological condition of the organ, ever produced such a result.

Much has been written upon the urgent necessity of distinguishing with care and exactness, those appearances in the brain which have been the cause of, and those which have been caused by the mental disease. "It is particulary necessary here that the *post*, the *cum*, and the *propter*, should be carefully distinguished," says Feuchtersleben; and many authors have not hesitated to repudiate the evidence of their own senses, that mental disease was occasioned by cerebral change, under the shallow and absurd plea, that the changes they saw in the brains of the dead insane, were not the causes, but the consequences of the insanity.

The objection that cerebral change is not the cause of insanity may be true, but in a sense very different from that used by these writers. Organic change is not the cause, but the condition of disease. The real causative agent is the event which induces the organic change. All that we know of causation is an invariable linking together of consecutive events. This chain in the production of insanity stands thus: a blow on the head, followed contemporaneously by an organic change in the brain and the phenomena of perverted mental function. The first link used to be called the remote cause—the second, the proximate cause of disease. It is now agreed, however, to designate the first agencies only as causes, and the organic changes resulting from them as the conditions of disease.

It is true that in the course of brain disease the philosophical figment of the *vis medicatrix* finds little support, and that the progress of events too frequently leads in the direction of increasing injury and progressive decay. A morbid condition of the organ gives rise to the phenomena of mental excitement. These phenomena are themselves the occasion of an increased waste of tissue, and of vascular congestion, and other morbid conditions of the organ. This, however, is

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only what occurs in many other diseases. In bronchitis, for instance, the difficulty of breathing and the cough increase the bronchial inflammation; and it would be as correct to affirm that the morbid changes found after death in this disease are caused by difficulty of breathing and cough, as to affirm that the morbid changes found in the brains of lunatics are occasioned by passion, excitement, and other phenomena of mental disease. The simple facts, as they relate not only to the brain, but also to all the organs of the body, are that, from some cause or other, a morbid condition of the organism is occasioned. This condition is attended by abnormal states of the functions of the organ, which in some instances afford facility to the organ for the recovery of its healthy state; for instance, when the stomach is deranged by noxious ingesta to a degree which impairs the appetite, repose of function is afforded, which restores its power and tone. Such instances are referred to under the euphonious title of the *vis medicatrix naturæ*. But in other instances injury to the organism does not give rise to phenomena of function having this curative tendency. On the contrary, it occasions abnormal states of function, which perpetuate and increase the morbid conditions of the organism. This ought to be called the *vis exitialis naturæ*, were not physicians too complimentary to nature, to admit in explicit terms that she is capable of exercising an influence in any way pernicious.

In diseases of the brain affecting the mind, the functional phenomena are rarely of the conservative, and frequently of the injurious and destructive character here referred to. Morbid conditions of the brain occasion abnormal states of the mental functions, excitement of emotion and instinct, accompanied by loss of rest, increase of degenerative change, and diminished repair, which result in an exaggeration of the diseased conditions of the organ, which conditions may to this extent, and to this only, be considered as occasioned by them. The exact view is, that disease of the brain is not a stationary, but an ever-changing condition; that the actual state of the organ at any one moment is the result of its state in the previous moment, and the occasion of its state in the following moment; and that the morbid appearances which are finally observed are in no instances immediately produced by the cause which set these changes in motion, but are the visible expression of the last change which took place in the diseased organism. So that, in fact, the actual condition of diseased brain at any moment, is unlike its condition at any other moment; and inasmuch as insanity is a disease rarely fatal in

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its early stages, it would, *a priori*, be probable that the appearances observed in the brains of deceased lunatics should widely differ from those occasioned by the immediate application of the remote cause, which would be seen, were it possible to observe the state of the organ at an early period after the application of the cause. There is no doubt, in fact, that the morbid conditions observed in the brains of lunatics differ as greatly from those which result immediately from the agency of the causes of mental disease, as hobnail liver differs from hepatic congestion.

I shall now sketch the most frequent anomalies of appearance and organization which I have myself found in the dissection of the bodies of the insane.

On making the examination, it is well to note the size of the bony frame, measured by the length of the body and its breath across the shoulders and hips. This affords a much better standard with which to compare the size of the head, and the weight of the brain, than that afforded by the weight of the body which has been adopted for this purpose by some pathologists. The weight varies so greatly between the obesity of dementia and the emaciation of mania and melancholia, that the standard it affords is most untrustworthy.

Careful observation however should be made of the state of emaciation or obesity; also of any bruises or bruise-like marks; any bed sores, or deformities. The features after death generally lose all expression characteristic of mental disease. The examiner is frequently surprised at the regularity of feature and placidity of expression, in countenances which, to the last hours of life had been disfigured by the peculiarities of insane physiognomy, Even the heavy and relaxed features of general paralysis are braced up after death, and return to their normal expression. Often have I felt that I have never seen the sane expression of a patient's face until after his death.

The dimensions and form of the head should be noted. Although, I believe that the average dimensions of the head are below those of the sane, when the comparison is obtained by the examination of large numbers, still in a great number of instances they will be found to be good, and, indeed, the head is frequently not only large, but phrenologically well-shaped.

I am not aware in what proportion of the sane the shape of the head is peculiar, since it is rare that opportunities occur for making the observation among them; but among the insane a considerable proportion present decided peculiarities in the shape of the cranium. The most frequent peculiarity

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is a want of symmetry in the two sides. One side is rather smaller or flatter than the other; or the whole cranium is pushed over a little to one side; or one side of it is a little more forward than the other; or the two anomalies co-exist, giving the cranium a sort of twisted appearance. These things will not be seen unless they are carefully looked for, with accurate and careful eyes, upon the shaven scalp.

Sometimes the skull is high and dome-like—more frequently it is as if it had been compressed laterally, and elongated from before backwards, keel-shaped, in fact, like the skulls figured by Dr. Minchin, in which the centres of ossification of the parietal bones are increased in number. Sometimes the forehead is preternaturally flat, narrow, or receding, or very large and bulging, or the occipital region is deficient, and the back of the head rises in a straight line with the nape of the neck. Sometimes the skull has a remarkably square configuration. The square and carinated form of skull I have seen most frequently in connection with mania. The dome-like and high vertical skull, and also the unsymmetrical skull, most frequently in melancholia. In mania the anterior cranium is more frequently of good shape and size than in melancholia. In the latter the forehead is often small and mean, but sometimes it is disproportionately large and globose. The shape of the head indicated by the rules of phrenologists, can only fairly be expected to coincide with the mental symptoms in those somewhat rare instances in which insanity is the mere development in excess of natural character; and in some such instances I have found the shape of the head tally in its general outline with the indications of phrenology.

Occasionally depressions are found in the outer skull, which sometimes do and sometimes do not correspond with the bulging of the inner table of cranium. When they do not so correspond, I have found that they indicate a local absorption of the diploe.

It is an interesting question, how far the shape of the skull alters in insanity. If the forehead expands, even in mature age, under the influence of intellectual development, it is likely that it will contract under the influence of intellectual decay. Some writers have asserted that the shrinking of the brain in atrophy is commonly, and to a considerable extent, followed, and the cranium filled, by a flattening and shrinking of the cranial bones; (see Paget's *Lectures on Pathology*.)

Rökitansky also affirms that atrophy of the brain frequently gives rise to deposit of bone on the inner table of the skull, especially about the anterior convolutions.

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I have not satisfied myself that the increased thickness of the cranium which is frequently met with in the insane, is in any way connected with atrophy of the brain. Some of the thickest and heaviest craniums which I have met with have occurred in instances in which there was little or no cerebral atrophy; and the condition of the cranium where there is undoubted atrophy of the brain, is as frequently one of abnormal tenuity as one of abnormal thickness.

In pursuing the examination, the state of the ears and of the scalp should not be forgotten. The sanguineous tumour of the ears peculiar to the insane, and the shrinking of this appendage consequent upon such tumour, are noteworthy objects of attention. These tumours, for the most part, occur in the worst and most hopeless cases; but it is an error to suppose, as some authors have done, that they occur in such cases only. I have not only seen patients recover after the ear has been shrivelled up by the contraction after sanguineous tumour, but I have seen several patients labouring under quite recent insanity, in whom a shrivelled ear led to the information that a curable attack had been undergone many years previously, an attack which had been followed by perfect mental sanity of considerable duration.

The scalp is sometimes full of blood, sometimes marked with scars or contusions, telling of blows and falls. In old cases of mania it is sometimes remarkably loose upon the cranium.

The cranium itself is frequently altered from its normal condition. When thicker and heavier than usual, it is also soft and full of blood. The eburnated cranium, which is at the same time thick, dense, and devoid of blood, is not found in the bodies of those dying insane. In recent cases the only abnormal condition to be expected in the cranium is its discolouration from excess of blood. This is often evident, not only at the margin where it has been separated by the saw, but also through the whole extent of its inner surface, after the dura-mater has been separated. It presents a mottled, but decided discoloration, from sanguineous congestion.

In chronic cases the skull cap is sometimes thicker than usual, congested with blood, and soft in its texture; sometimes thinner than usual throughout, or partially. In the latter case the thin portion usually occurs in the parietal region, in which the diploe frequently disappears to such an extent that the skull becomes diaphanous. The thin diaphanous skull is met with in all stages, but most frequently in cases of very chronic mania and of dementia, in which the patient has not been subjected to temporary attacks of cerebral

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hyperæmia. On the other hand, the thick and heavy cranium is mostly met with in cases of chronic insanity, which have been subject to attacks of congestion or hyperæmia e vacuo. The cranium is often strongly marked by indentations produced by the pacchionian bodies. Not unfrequently, also, the christa galli is elongated and enlarged; and in epilepsy the protuberances of the sella turcica are enlarged, and the marks of the gyri of the convolutions are more strongly impressed, especially in the middle fossæ.

Exostoses or spiculæ of bone, growing either from the vault or the base of the cranium, are exceedingly rare. In 400 examinations of persons dying insane, including a large proportion of epileptics, I have only found a cranial exostosis in *one* instance—that of an epileptic man subject to violent attacks of mania. The dura-mater is frequently found adherent to the cranium. In old cases, indeed, it is rare to find that this membrane separates from the cranium with its usual facility in adults. The degree of adhesion which exists in chronic insanity varies from that which can scarcely be called abnormal to such a close and intimate union, that on the application of force the membrane splits into layers, rather than part from the bone, from which its fibres cannot be separated except by hard scraping. In acute cases the dura-mater is sometimes discoloured by sanguineous congestion.

Recent anatomists discard the old view, that the inner polished surface of the dura-mater is a reflection of the arachnoid. It certainly cannot be demonstrated by the scalpel that any serous membrane lines the dura-mater; and the idea of a parietal arachnoid appears to have been due to the exigencies of systematical anatomy, rather than to the evidence of demonstration. I adopt the view that there is no parietal arachnoid, and that the polished surface is actually part of the dura-mater. This polished surface is not unfrequently the seat of exudative processes in the insane, although it is rare to find in this locality exudations of a true fibrinous character the results of undoubted inflammation, notwithstanding the assertion of Rökitansky, that the surface of the brain and the scull bound together by a series of successive normal and false membranes is a "termination of meningitis frequently found in mental disease, especially in cases of secondary imbecility." Notwithstanding this high authority to the contrary, I must assert, that adhesions between the cerebral arachnoid and the dura-mater are extremely rare in the bodies of persons dying insane. On

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the upper part of the brain I have never met with this state of things referred to by this author. The nearest approach to it that I have met with in this region, has been the connexion of the dura-mater with the thickened arachnoid and pia-mater by means of several ligamentous bands, the condensed and organized remains of very moderate fibrinous exudation. In two instances, I have met with adhesion of the substance of the brain and its intervening membranes to the dura-mater along the petrous portion of the temporal bone, and in one instance, by the ridge formed by the ala of the sphenoid. It is an occurrence of much greater frequency for the polished surface of the dura-mater to be the source of an exudation not fibrinous, and not tending to contract adhesions. These exudations are very remarkable, and by different authors have been hitherto generally regarded either when much coloured with blood pigment, as instances of sanguineous effusion into what was considered the sac of the arachnoid, or as false membranes arising from arachnoidal inflammation. That instances of these latter conditions are not very unfrequent, renders it the more needful to distinguish the peculiar exudation to which I refer. It resembles a layer of red currant jelly spread over the surface of the dura-mater. On examination there appears to be an extremely fine cellular network, containing in its meshes an albuminous semi-fluid substance colored with blood pigment. Sometimes the exudation extends to the temporo-sphenoidal fossæ. Sometimes it is confined to this locality. Virchow has quite recently announced its nature to be that of a colloid tumor, flattened into the resemblance of a false membrane by its position. I adhere to the belief that it is an albuminous exudation, containing a small proportion of fibrine, and coloured with blood pigment. Sometimes, true hæmorrhage is found on the inner surface of the dura-mater. On the appearance of this as a layer, Rökitansky observes, "those extravasations which have been supposed to be collections of blood between the serous and fibrous state of the membrane, with the exception of a few cases in which a small effusion has raised its innermost layer, must have been extravasations into the sac of the arachnoid, which, after acquiring an adhesion to the dura-mater, have become encysted;" (Vol. III, p. 323, *Sydenham Society's Translation.*)

In many instances of chronic insanity, and of recent insanity in which there had been a previous attack, I have found the dura-mater in the temporo-sphenoidal fossæ

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changed to an orange yellow colour, not uniformly, but as if freckled. Doubtless this discolouration was due to the blood pigment of re-absorbed exudates; and it points, like the other changes so frequent in this membrane, to the frequent existence in insanity of one period during which the appendages of the brain are in an hyperæmic state prone to hæmorrhages, and to albuminous or albumino-serous exudations, coloured with dissolved blood pigment. The coloured exudations above referred to seem to me to bear a close resemblance to the exudations of blood-coloured serum which take place between the cartilages of the ear, and to be owing to the same crasis.

Sometimes the structure of the dura-mater is found to have undergone osseous metamorphosis. I have never found this in the tentorium where the comparative anatomy of the felines would lead one most to expect it. I have, however, found it in the falx cerebri. Exostoses of the inner table of the skull probably have their origin in the dura-mater. I have only once found a true tumour of the dura-mater. This was as large as a filbert, pressed upon the pons, and was accompanied by epilepsy. Its structure was fibro-cellular, and it contained an abundant quantity of cholesterine in large plates.

The Arachnoid.—I have never found a state of undoubted inflammation presenting the appearance described by Guislain of the inflamed conjunctiva. In a few cases of acute mania and melancholia, I have observed the appearances of ramiform congestion; but it may be doubted whether this was not due to the underlying vessels of the pia-mater. Doubtless, in some cases the hyperæmia in its capillaries amounts to actual stasis, otherwise the fibrinous false membranes, and the adhesions which are sometimes observed in it, would scarcely exist. A frequent pathological change of this membrane found in persons dying insane is thickening and opacity. "The arachnoid tissue is opaque, dull like whey or milk, tumid and white, and it has the appearance and density of tendon." Often this change is limited to the arachnoid covering the convolutions of the vertex; sometimes it is restricted to that part of it which corresponds to the sulci, leaving the part which covers the convolutions thin and transparent. Patches, however, of very decided thickening and opacity, are occasionally found on the anterior convolutions of one or other hemisphere; the changes observed in the vertical region being rarely one-sided, or even greater on one side than on the other.

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What does opacity and thickening of the arachnoid indicate? According to Rökitansky, the "changes frequently discoverable in this membrane can be attributed only to congestion, or to slight and passing attacks of inflammation." "Opacity and thickening of the arachnoid are very common *post-mortem* appearances. After middle life a moderate degree of them is almost constantly found, and their absence is the exception; for at that period every one must have been exposed to repeated congestions of the brain and its inner membranes;" (op. cit. p. 329.) The change here referred to as being so common is, although the same in nature, greatly less in degree than that commonly found in the bodies of persons dying insane. It is merely an opalescence as compared with decided thickening and opacity like a thin slice of the boiled white of egg. The frequently repeated congestions to which Rökitansky refers this change in the sane, exist in much greater force and frequency in the insane, and give rise to a corresponding intensity of this pathological change. It appears not to be the result of inflammation, even "of slight and passing attacks," so much as that of congestion. In nature it closely resembles those opaque patches so frequently found upon the visceral pericardium. Its character is that of albumino-fibrous deposit, which forms one link in the chain of degenerative change, which passes, according to its locality, into atheroma or into fat.

In connection with the arachnoid are the pacchionian bodies, absurdly called glands. These Rökitansky regards as granulations of the arachnoid, rarely indeed altogether absent, but depending for their development upon the same repeated congestions which render the arachnoid itself thick and opaque.

Luschka, however, has recently shewn that these bodies are normal as to their existence, and pathological only as to their hypertrophy. He calls them *arachnoidal villi*, and refers the genetic cause of their growth to "the disturbances of the circulation which attend the natural involution of the organism in old age. In consequence of the impeded motion of the blood, a modified transudation must take place which—in our ignorance, it must be confessed, of its precise nature—we regard as the principle cause of the increased amount of nutritive material with which the arachnoid is supplied;" (*Weld. Sydenham Soc. Trans.* p. 352.)

Now in the insane of all ages, the pacchionian bodies are frequently found to be greatly enlarged, so as not only deeply to indent the dura-mater, but even to perforate it, and form

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for themselves reception cavities in the parietal bones alongside the sagittal suture. Before the circulation has become impeded by the advance of age, they are prematurely produced in the insane by the impeded circulation of cerebral congestion, the frequent condition of mental disease.

I am not aware whether the minute anatomists of the German school make any distinction between that which they call the *ependyma* of the lateral ventricles and the arachnoid membrane in this locality. This ependyma, which is the seat of those puzzling bodies, the amylaceous corpuscules, is described by Virchow as the uppermost layer of the fine connective tissue which binds together the foundation masses of the brain. Be this and the arachnoid of the ventricles synonymous or not, it is certain that the walls of the lateral ventricles present in chronic insanity, and especially in general paralysis, a peculiar and frequent change. They appear to be covered with fine sand, or rather to be converted into the resemblance of fine shagreen, a change due to a nodulated deposit of fibro-albumen.

The arachnoid of the ventricles also becomes more thick, dense, and tough; a change which is most obvious in the eptum lucidum, which in the early stages of general, and the later ones of chronic mania, instead of the exquisite delicacy which renders its demonstration so difficult in health, becomes a toughish and resistant membrane.

The Pia-mater—tender mother of the brain, and its wondrous offspring of thought and passion, is far more closely and intimately related both in health and disease with the organ to whose more noble parts it supplies nutriment than either of the other meningeal wrappings. The pia-mater is more than a mere investing membrane; it is more than a subserous connective tissue of vascularity greater than is common to such parts. It is a vascular plexus, admirably arranged to supply the grey matter of the convulutions with an abundant supply of the nutritive fluid, so loose and large in its ramifications as obviously to suggest the idea, that its construction is also subservient to rapid and great changes in the quantity of blood in the organ it supplies. What the submucous vascular layer of the stomach is to the function of digestion, that the pia-mater appears to be to the higher functions of the brain; and it is more than probable, that active thought or intense emotion cause in it hyperæmia as sudden, frequent, and transitory as the function of digestion gives rise to in the vascular layer of the stomach. One part of this plexus, or

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rather an appendage to it, the choroid-fold within the lateral ventricles, has a structure analogous to, if not identical with erectile tissue. Upon this resemblance an ingenious writer in the *Dublin Quarterly Journal of Medicine,* has based the theory, that sleep in the normal state, and epilepsy in the abnormal state, are dependent upon a turgid or erectile condition of this apparatus, by means of which, a gentle but general pressure is exercised from within upon the whole substance of the brain. With regard to epilepsy, there are unsurmountable objections to this theory, but the very existence of such a structure in connection with the pia-mater increases the probability that frequent turgescence of this membrane is a physiological state. "There is no question," says Rökitansky, "that congestion of the pia-mater is a very frequent occurrence." "Yet, if we except the *post-mortem* congestion of the pia-mater covering the posterior lobes of the cerebrum, any considerable degree of congestion is far less commonly met with in the dead subject than is usually supposed; and there is, perhaps, no respect in which moderation in estimating appearances needs so much to be impressed upon the unpractised observer, as in regard to the quantity of blood contained in the vessels of the pia-mater. As a general rule, a very moderate injection of these vessels is erroneously looked upon as congestion." "The terminations and consequences of these congestions vary, according to the frequency and duration of their cause. They consist of thickening and condensation (increase of volume,) of the pia-mater and arachnoid, of permanent infiltration of the former, and a varicose condition of its vessels. Such a state of the inner membrane is well marked after the congestions which are produced by continued and forced exertion of the mind, or by repeated intoxication, especially by alcoholic drinks;" (op. cit. pp. 339 and 340.)

Thus we learn from this great pathologist the frequency of congestions of the pia-mater; their causation by two of the common causes of insanity, mental overstrain and drunkenness; and lastly, the difficulty which exists in recognising, after death, the existence of a pathological degree of this frequent congestion. The same difficulty exists in the tissue to which I have compared its functions, namely, the submucous vascular layer of the stomach. In both these instances this difficulty of *post-mortem* recognition arises from the same cause. A moderate degree of congestion is in neither instance pathological. It becomes so only when the degree or frequency of the congestion tends to produce struc-

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tural change. The last moments of life are commonly passed in a state adverse to the continuance of congestion, unless they are attended by such difficulty in the respiratory movements as to impede the return of the venous blood to the heart, and hence a state of congestion which may have existed in the pia-mater, even to a short time before death, may have left no traces discernible after that event.

Rökitansky does not appear to have paid particular attention to the pathology of insanity. Wide and profound as his pathological knowledge undoubtedly is, he here and there hazards statements which indicate that persons dying insane did not frequently come under the investigation of his scalpel. Thus he says, that "terminations of meningitis, by which the surface of the brain and the skull are bound together by a series of successive, normal, and false membranes, are frequently found in mental disease, especially in cases of secondary imbecility;" (op. cit. p. 343.) It is very certain, however, that such gross and palpable results of meningitis as adherent false membranes, are of extremely rare occurrence in any form of mental disease. Congestions of the pia-mater, whether recognizable or not after death, are undoubtedly most common, but they rarely pass the boundary line (if there is such a limit,) of phlogosis. The exudations of the pia-mater in mental disease are not of the organizable fibro-albuminous kind. They are rarely even distinctly albuminous. It is rare to find them even opaque, either from partially coagulated albumen or from fat. Even when the arachnoid is thickened and opaque from exudations of this kind, those of the pia-mater are remarkably limpid and serous. The adherent false membranes above referred to are not found once in a hundred cases of persons dying insane; and even in these rare instances their occurrence is traceable to a pre-existent inflammation, and is not to be considered as a condition proper of insanity. According to Vogel, fibrinous exudations result mainly from the minute capillaries, whilst serous or hydropic effusions derive their source from the small veins. The plexus of vessels which forms the pia-mater is decidedly venous in its anatomical character, and the serous nature of its ordinary exudates may fairly be thus accounted for.

Although fibro-albuminous exudates in the pia-mater, and the false membranes and adhesions therefrom resulting, are so uncommon in insanity, there is one form of adhesion of frequent occurrence in this membrane, namely, the slight but important adhesion between it and the grey substance of

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the convolutions. The plexus of vessels more or less infiltrated with serous effusion, is sometimes very readily separable from the grey substance which it invests. But in many instances it is not so. What are called adhesions more or less intimate and extended are found to have formed, so that sometimes over the whole extent of the convolutions, sometimes only in isolated parts, the convolutions cannot be divested of their vascular envelope, without small portions of the grey substance remaining adherent to it. In these instances there is no appearance of fibro-albuminous exudation in the pia-mater; but it is probable that the cytoblastema of the grey substance has received an addition of fibro-albumen from the minute arteries and arterial capillaries in connection with the pia-mater, and ramifying in the grey substance; an addition which prevents the small vessels from being withdrawn from the soft substance of the grey matter with the same facility as in the normal state. Something, also, may be attributed to an increased toughness in the coats of the minute blood-vessels preventing their facile rupture.

Congestion of the pia-mater, and consequent serous effusion into its meshes, is the constant result of atrophy of the brain. "When an empty space is formed within the skull by a reduction of the volume of the brain, it is filled up by an increase of the volume of the inner membranes of the brain, and especially by an extraordinary exhalation of serum into the tissue of the pia-mater, the sac of the arachnoid, and the internal cavities of the brain, more particularly the lateral ventricles. These changes result from the congestion of the vessels which the vacuum produces;" (op. cit. antea p. 364.)

Thus arises the *hyperæmia e vacuo*, the pathological condition of the very frequent cases of spurious apoplexy which occur among old and chronic lunatics—every attack of which renders the vessels of the pia-mater more dilated and tortuous, and more disposed to the recurrence of the congestion. This may, and frequently does, concur with an anemic, as well as an atrophic condition of the substance of the brain. In the healthy organ, congestion of the pia-mater cannot occur without accompanying congestion of, at least, the grey matter of the convolutions; but under the pathological conditions which attend atrophy of the organ, a sudden congestion of the loose and water-logged membrane frequently occurs, without affecting the anemic and atrophic brain otherwise than by adding a temporary impediment to its functions from the sudden pressure.

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To recapitulate. The pia-mater in rare instances is found to be the seat of fibro-albuminous exudation, and consequent adhesion. It is the very frequent seat of congestion, which may or may not be obvious after death. Frequent congestions enlarge and render its vessels more tortuous. They also result in a thin hydropic effusion; more rarely in a turbid albuminous one. Not unfrequently the membrane contracts adhesions to the grey matter of the convolutions, but without visible exudation of albumino-fibrine or false membrane. In cases of acute mania and melancholia, thin extravasations of blood, not larger than a finger-nail, occur in its tissue. Diffuse inflammation of the pia-mater, and tuberculous inflammation and deposit, are extremely rare among the insane.

The pathological conditions of the choroid plexus are as obscure as its physiological purpose. It is not found hypertrophied in epilepsy, which it should be, were the theory true which attributes the production of that disease to its turgescence. It often contains cysts analogous to those observed in Bright's disease, in the malphigean bodies; but whether the frequency of these cysts is greater among the insane than the sane there are no data to determine.

The Cerebral Substance.—The condition of the cerebral membranes, and indeed of all other parts, is, of course, in the pathology of insanity very secondary and subservient to the state of the substance of the brain itself. The condition of the cerebral substance is the prime question in the pathology of mental disease. Frequently this condition can only be judged of by the state of its blood-vessels, or can only be guessed at by that of its membranes, or some still more remote indication. Not unfrequently in partial and sympathetic insanity, it appears to be perfectly sound in structure, although the deductions of science assure us that this soundness is in appearance only, and is solely attributable to the imperfection of our means of observing and investigating.

To the pathologist the substance of the brain is as yet practically structureless. Although the microscope reveals cells and tubes and intervening stroma, up to the present time it is unable to indicate when these are in a normal or abnormal state; and although it may prove that in some cases the smaller arteries are diseased—that in a few others there are exudation corpuscules, or an increase of fatty particles in the substance itself—it has not yet been able to distinguish between states of the whole organ which must be diametrically opposite, for instance, between the states of hypertrophy and atrophy.

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Practical observations, therefore, must be made upon the bulk, colour, density, and specific gravity of the brain-substance, and upon the condition of its blood-vessels.

The bulk of the brain varies from a state of atrophy, in which it has been known to lose nearly a third of its volume, to one of hypertrophy, in which, but for the restraining pressure of the unyielding cerebral walls, there is little doubt that its bulk would be not less augmented. Cerebral atrophy, as the most frequent, is the most important of all changes in chronic conditions of mental disease. I have already written so fully on this subject that my limits only permit a few further remarks.

A considerable degree of cerebral atrophy is rarely unattended by changes in the colour and consistence of the brain-substance, sufficiently obvious to the eye of the experienced observer. It is frequently both anemic and discoloured: the grey substance contains less red and more brown, and its colouration, also in depth of tint, varies greatly; sometimes its tint is deeper than is usual in health, but far more frequently it is paler, and occasionally it is of little more than a darkish buff.

On this point Mr. Solly remarks, that having many opportunities of examining the brains of the insane at Hanwell, he made coloured drawings of the cortical substance of all patients indiscriminately; and he adds, "The general result of my observations was, that a pale condition of this ganglion was almost invariably found in patients who had sunk into a state of imbecility, and was generally associated with some serous effusion and thickening of the arachnoid and pia-mater;" (*Solly on the Brain*, p. 398.) Its uniformity of colour also is lost. The grey layer of the convolutions consists of six planes, in which white and grey substance alternately preponderate. M. Baillarger, in his memoir on this subject, (*Mem. de l'Acad. de Med.* tome viii.,) states that it consists of six of these alternate layers. There can be no doubt that three such layers exist, but whether these can again be subdivided is a question which I have not for myself been able to determine. In the normal state this triple division is very obvious to the naked eye in the posterior convolutions of the cerebrum; but in a state of atrophy it becomes still more obvious throughout all the convolutions where it was previously not observable. This appearance arises from diminution in the quantity of the pigment coloured cells in the whole of the cineritious layer. This diminution in the bands where the white matter exists

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in largest quantity, renders the colour of the latter very apparent. According to M. Baillarger, the external layer of the convolutions is white, and not grey. It would, I think, be more correct to say that the external layer contains a less proportion of vesicular neurine to the tubular substance with which it is intermixed, than the layer next but one to the surface, and again, than the layer next but one to that. The consistence of the grey matter of the convolutions is very generally lessened when the organ is atrophied. Sometimes the superficial layer is obviously softened, but more frequently the grey layer immediately under it is the seat of the greatest amount of softening. The colour and consistence of the tubular neurine is notably altered. Unlike the grey matter, its depth of colour is generally increased. From the clear white of health, almost imperceptibly tinged with pink, it assumes a dirty brownish hue, very faint indeed, but quite unmistakeable.

The consistence and density of the white substance varies greatly. In the *Atrophia cerebri senium*, the consistence of the white matter is generally a little increased. In the *Atrophia cerebri præcox*, the consistence is increased whenever the primary condition of disease has been an hyperæmia verging on phlogosis, and tending to the addition of albuminofibrine in the substance of the brain. This is particularly the case in the atrophy which attends the later stages of epilepsy, an atrophy which is preceded by a period of congestive hypertrophy, and meriting the name which has been applied to it, of concentric hypertrophy of the brain, if such a term is not in all instances somewhat absurd. In atrophy not consecutive upon a congestive condition of long-standing, but either primary or secondary only to a state of general debility or dyscrasia, the consistence of the tubular neurine is diminished; sometimes to the extent of making it appear that the whole brain is infiltrated with serum. Rökitansky asserts that atrophy is accompanied by increased consistence and tenacity, or sclerosis, as it has been called. "The surface of a section of the hemisphere shrinks and becomes concave, and here and there certain portions offer more resistance than others, and wrinkle and lie in folds." This, however, is an appearance which I have not been able to verify.

When induration exists, it is greatest in degree in the neighbourhood of the lateral ventricles. The latter are generally enlarged and distended, with a very limpid effusion; and thus the bulk of cerebral substance is diminished, both from within and without. Sometimes the lateral ventricles

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are greatly contracted; sometimes they are of normal size. Andral states, that unless each lateral ventricle contains more than an ounce of fluid, it cannot be reckoned abnormally large.

It is unnecessary to refer in this place to the shrunken and pinched appearance of the convolutions, and the widely-opened sulci. In not very unfrequent instances, however, the remarkable appearance of circumscribed atrophy affecting three or four convolutions, generally about the vertex, is presented. In such instances the loss of bulk is replaced by a partial ædema of the pia-mater, presenting the appearance under the arachnoid of a gelatinous bag. This partial atrophy of the brain has not hitherto been connected with any peculiar loss of mental function calculated to add an additional proof to the arguments of phrenology.

Atrophy of the brain rarely exists in any considerable degree, without a notable diminution of the breadth of the grey substance of the convolutions. The normal breadth of this substance I have ascertained by numerous measurements to be eight hundredths of an inch. In atrophied brains it is reduced to seven, and frequently to six hundredths.

It is a remarkable fact, first noticed by Cazauvielh, that atrophy of the brain is confined to the cerebrum. Even in extreme age, when the cerebrum is much wasted, the cerebellum retains its full size.

The usual condition of atrophic brains, with reference to the state of the blood-vessels, is a degree of anemia; but sometimes, owing to the circumstances of death, this condition is replaced by one of congestion, and the dirtyish white of the tubular neurine becomes mottled with a faint violet discoloration. This is especially the case when death occurs soon after severe convulsive attacks, or during the course of congestive apoplexy.

Hypertrophy of the brain is an interesting, but rare form of pathological change. But for the pressure exercised by the unyielding walls of the cranium, the brain would doubtless undergo enlargement with every considerable degree of congestion which it suffered. As it is, congestion of the brain constitutes one form of hypertrophy, of common occurrence contrasted with the true hypertrophy of the cerebral substance, in which the brain is anemic, the vessels being emptied by the ever-increasing pressure.

In the bodies of persons who have died during the early period of epileptic disease, and of some who have died in the first stages of mania, the brain appears too large for its case;

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the convolutions are flattened; the sulci cease to exist as indentations between the convolutions, lines only can be perceived into which processes of the pia-mater dip. The vessels of the pia-mater itself are distended with blood; the grey matter is deepened in colour; the white matter pinkish or mottled with pale violet; and the cut ends of the vessels in it effuse an abundant quantity of *puncta sanguinea*. This is false or congestive hypertrophy.

In true hypertrophy, the brain swells up when the cranium is removed, so that the latter cannot be replaced; the convolutions are flattened, the sulci obliterated; the arachnoid is transparent, thin, and dry; the pia-mater is exsanguine, the grey substance very pale, the white substance pure white, with few traces of blood-vessels, dense and tenacious. As the change progresses, the mental functions, and especially the memory, become more and more feeble; but dementia, to the extent which follows atrophy of the brain, rarely, if ever, supervenes. Epileptiform convulsions appear towards the close of the case, and usually supply the means of death. In a marked case which came under my own notice, epileptiform convulsions existed at intervals for more than six months before disease. The *post-mortem* examination displayed all the above appearances, with the addition of the remains of a sanguineous effusion, thin, old, and yellow, surrounding the crista galli of the ethmoid.

There have been many differences of opinion respecting the nature of this pathological change. Dr. Handfield Jones, in an excellent paper on "Fibroid and Allied Degenerations," in the 27th No. of the *Medico-Chirurgical Review*, maintains that it is not a true hypertrophy. "It can hardly be thought," he says, "that a true hypertrophy existed, otherwise surely there would have been some apparent superiority of intellect. The truth probably was, that there was just the ordinary amount of nervous matter, *plus* a certain quantity of interstitial exudation. Doubtless it is not a true hypertrophy in this strict sense of the term, *i.e.*, the abnormal increase of normal structure;" and although Rokitansky declares it to be "a genuine hypertrophy," he explains the meaning he attaches to this term; so that, according to the acceptance thereof in this country, it would be excluded from the category. He says, "It consists as such (*i.e.*, as a genuine hypertrophy,) not in an increase in the number of nerve-tubes in the brain, from new ones being formed, nor in an increase in the dimensions of those which already exist, either as thickening of their sheaths or as augmenta-

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tion of their contents, by either of which the nerve-tubes would become more bulky. It is an excessive accumulation of the intervening and connecting nucleated substance." He attributes its occurrence to an excessive development of the lymphatic system, although he admits that its immediate cause may be congestion.

Dr. Handfield Jones' test of a genuine hypertrophy appears to me fallacious, inasmuch as an increase of normal tissue may fail to confer increased power of function, if the new tissue is in a condition unfavourable to its activity,—if, for example, it is subjected to pressure. Nor does it seem more probable that it is a genuine hypertrophy, upon Rokitansky's shewing. The substance normally intervening between the cells and tubes of the brain is a semi-fluid stroma, and any considerable increase in it would give rise, not to a great density and tenacity of the organ, but to a kind of softening. It is, I think, far more probable that the addition to the brain-substance consists in a slowly-formed exudate of an albuminous or fibro-albuminous character, gradually pervading the whole of the cerebral substance. This originates in some obscure vice of nutrition; and is, I believe, a pathological change far more common than is generally supposed. In rare instances the exudate goes on increasing until death from convulsions takes place, and the peculiar characteristics of cerebral hypertrophy are found. More frequently, however, the process undergoes an arrest and an inversion. The exudate pressing upon the normal tissue, and upon the blood-vessels, impedes the nutrition; the exudate arrests its own further accumulation, and a reverse movement takes place, tending to cerebral atrophy with induration. Such I believe to be the true pathology of a large class of epileptic cases, namely, of those in which the nutritive powers are at first in excess, the muscular system highly developed, the functions vigorous and the health robust, and in which there is an early tendency to maniacal excitement, gradually passing into the opposite one of dementia. The cure of these cases is hopeless, but the relief afforded by early antiplogistic treatment, moderate and prolonged, supports my view of their pathological character.

Inflammation, Congestion and Anemia of the Cerebral Substance. Inflammation of the grey substance of the convolutions is, undoubtedly an occasional cause of insanity, although it cannot be admitted as one of its conditions. According to the limitations of that most artificial of sciences, nosology, phrenitis is not insanity, and does not

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belong to the specialty of the psychologists. The same may be said of cerebral hemorrhage. The appearances and symptoms which primarily attend these forms of pathological change, are, therefore excluded from the present notice. But a brief reference cannot be avoided to the conditions which they frequently undergo, attended by symptoms of undoubted mental disorder. One of the reliquiæ of inflammation of the grey substance of the convolutions is a chronic induration of the superficial layer; another is the adhesion of the same to the pia-mater, which has been found by M. Parchappe so frequent in the insane; others are a softened condition of the middle layer of the grey substance; induration or atrophy of the whole of this substance; in some rare instances entire loss of portions of it by ulceration and absorption. When the functions of the grey substance have been deteriorated by these changes, the whole substance wastes as the optic nerve wastes in cerebral amaurosis, and thus atrophy of the whole cerebrum finally results.

Inflammation of the whole substance of the brain usually extends over a far less surface than that of the grey substance. It is also a more chronic affection, destroying life when fatal, by convulsions, low fever, gangrenous sores, and pulmonary congestions. Although, during its progress the mind is always more or less disturbed, and actual delirium is frequent, yet, it is a less frequent cause of insanity in any of the acknowledged forms of the latter than inflammation of the grey substance. Parts of the brain which do not participate in the inflammatory action become ædematous, and others anemic from the pressure of those parts whose bulk is augmented. This disturbance of pressure and of blood supply consequent thereupon, are necessarily accompanied by disturbance of the functions of the organ, often to a greater extent than the post-mortem appearances explain; since the pressure of the different parts equalizes itself after the process of inflammation has been arrested by death.

The relation which *Cerebral Hemorrhage* bears to insanity, is of the same nature but less intimate than that which inflammation holds. Numerous instances of cerebral hemorrhage occur without giving rise to any mental disorder, but on the other hand the processes of irritation and exudation set up by a clot in the brain, not unfrequently give rise to mania, rapidly running into dementia. In such cases the brain is found to be atrophied, and to contain clots or cysts, or cicatrices in the various stages of change.

When cerebral hemorrhage is subsequent to atrophy, a

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remarkable modification of the usual symptoms of apoplexy may result. An enormous amount of blood may be slowly effused arround the cerebral hemispheres, not only without the immediately fatal result which would occur if the hemorrhage took place in a brain not atrophied, but without giving rise to urgent symptoms of cerebral pressure. Instead of exerting a fatal pressure upon the substance of the brain, the effused blood only displaces an equivalent quantity of serous fluid which finds its way from the cavity of the arachnoid and the meshes of the pia-mater to the spinal bag. In the 29th Vol. of the *Medico Chirurgical Review*, I have given the details of a case remarkably illustrating this proposition. In this case a demented patient had an attack of apoplexy on the 29th of September, 1853, and he lived until 7th of July, 1854. The post-mortem examination shewed the remains of a sanguineous effusion, fibrinous and tough, which completely enveloped the cerebrum. It was situate in the cavity of the arachnoid, and over the vertex and sides of the brain was half an inch thick, and was the colour of venous blood. In the petrous fossa it was also thick but had become yellow. It did not extend over the cerebellum, but the effusion from which it was formed, had found its way into the lateral ventricles, as these contained masses of dark red fibrine, and a thin layer extended two inches down the spinal canal. Between the visceral arachnoid and the brain there was a large amount of serous effusion. The cranial cavity required 52½ ounces of water to fill it. The brain displaced only 37½ ounces, so that the atrophy of the organ was equivalent to 15 ounces, or nearly one third of its normal bulk. Subsequent to the occurrence of the apoplexy, the patient lived a kind of vegetative existence, with the smallest amount of mental and animal function I ever saw in the possession of a living human being during so long a period.

The small extravasations of blood often found on the surface of the convolutions in many cases of acute mania and melancholia, result from congestion of the pia-mater. In some instances the condition of the blood may aid in the production of these effusions, as it does in the extravasations, which, in the insane take place under the conjunctiva and between the cartilages of the ear.

One of the most important conditions of the Brain substance is *Congestion*, but of its appearance little can be said. Congestion of the grey matter is indicated by various shades of deeper red and brown, of which, the practised eye

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becomes cognizant. In recent and acute mania, a deeper red tinge prevails. In cases of longer standing, and where atrophy of the organ also exists, the deeper tinge is of a brown caste. The same distinction is true in congested states of the whole substance. In acute mania and melancholia the whole surface of the centrum ovale in some instances presents a uniform pinkish hue; in others, this hue is mottled with the normal white. In other instances not in any way distinguishable from the last by the previous symptoms, the cut surface of the centrum ovale is mottled with a light violet hue. This hue is never uniform except after death, from long-continued epileptic convulsions. In acute mania and melancholia it is mottled either with white or with pinkish white. The above appearances of cerebral congestion are commonly accompanied by a great abundance of bloody points due to blood issuing from the cut orifices of the small vessels. This appearance it not constant even in brains obviously discoloured by congestion. Its absence may be due to the loss of contractility in the small vessels, or to the blood they contain not being fluid.

Anemia of the Brain-Substance, made evident by paleness both of the grey and white matter, and by the small number of blood-vessels which are visible, is observed in a few cases with symptoms of acute mania; sometimes also, but more rarely, in melancholia. In many chronic cases with cerebral atrophy, anemia is the ordinary condition of the brain-substance, although it frequently alternates with transient states of severe congestion. The state of the pulse, and the aspect of the skin of the face, the conjunctiva, and the lips, may indicate whether congestion or anemia is present in the brain; but these conditions cannot always be diagnosed from the mental symptoms. Andral has well pointed out this common result from diverse causes: "It is a law in pathology, that in every organ, the diminution of the quantity of blood which normally it should contain, produces functional disturbances, as well as the presence of an excessive quantity of blood. We have found more than once, the brain and its membranes completely bloodless in children who died in the midst of convulsions. We have also seen the state of coma, in which many of their diseases terminate, coincide with remarkable paleness of the nervous centres. Sometimes, also, in adults we have been struck with the complete absence of colour in the brain, perceptible principally in the grey substance, in cases wherein during life cerebral phenomena had taken place, such as delirium, convulsive movements, coma.

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Do not animals also, who are bled to death, exhibit symptoms of this description?" "But when we have referred the symptoms to hyperæmia in one case, and to anemia in another, are we come to the bottom of the subject? By no means; for this hyperæmia and this anemia are themselves mere effects which, a thing very remarkable, the same influence can very often produce. Thus, by an emotion of the mind, the skin of the face becomes red in one person and pale in another;" (*Clinique Medicale, Spillan's Ed.*, pp. 91 and 92.)

This enlightened view must be applied to explain the uniformity of symptoms which attend many other deviations from the normal condition of the brain-substance. Thus induration and ædema are both found in atrophic brains, in chronic mania and dementia. Either of them may be attended by a congested or anemic condition, anemia being the usual condition, and hyperæmia a frequent but transient state.

With regard to induration of the brain-substance in the bodies of persons dying insane, I have never met with that "leather-like and fibro-cartilaginous hardness and resistance" to which sclerosis of the brain is described to attain. The slighter degrees of induration dependent upon diminution of water in the brain, and perhaps also to the existence of some amount of albuminous exudation is common in cerebral atrophy. The slighter degrees of induration may be general, but the higher degrees must be partial, since the organ could not perform its functions were it universally changed into a tough substance, like leather or caoutchouc. Callous cicatrices, marking the locality of old apoplectic rents, have offered the only examples of leather-like induration which I have met with among the insane.

Ædema of the Brain, a state in which the tissue of the organ is permeated by water or serosity, is a not unfrequent condition with persons who, with atrophy of the brain, have great general debility or cachexia of the body. The brain appears unusually moist, and its cut surface is of a brilliant white. In extreme instances, this condition is exaggerated until parts of the organ are almost broken down into a pulp, and the appearance of remollissement is produced. It is not, however, to be considered one form of this affection.

Neither the space at my command, nor the occasional occurrence of the two forms of remollissement in the insane, render it advisable to describe or comment upon these pathological states. They are not found more frequently in the brains of persons dying insane than in those of others. The

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same may be said of the cellular infiltration described by M. Durand Fardel. In four hundred autopses of the insane, I have only met with it in two instances. In both instances it occurred in aged persons suffering from chronic mania, in whom it gave rise to a series of convulsive attacks, which terminated in death. The brains of the insane appear to be certainly not more liable than those of others to various incidental affections. Thus in four hundred autopses of the insane, I have only once met with an hydatid, only once with tubercular deposit in the substance and meninges, only once with a fibro-cellular tumour, and not once with malignant disease. The arteries at the base do not appear to be more frequently or extensively affected with atheromatous change, than those of sane persons of the same age. And in the bodies of the insane I have never yet met with that cretaceous deposit in the coats of the small arteries, which makes them feel like pieces of fine wire imbedded in the brain-substance.

A large number of brains of the insane I have diligently investigated with a first-rate microscope. The results appear to me to have afforded no distinction between the sane and the insane brain. I have found exudation corpuscules, but only in instances where the existence of inflammatory action was apparent without the use of the microscope; and therefore this miscroscopic test of cerebral inflammation proposed by Dr. Hughes Bennett, appears to be of little value. In inflammatory and softened parts of the brain-substance, I have found fatty degeneration of the coats of the small arteries; but it remains to be seen whether this change is not as frequent in the brains of the sane. I have not been able to discover fatty degeneration of the arteries where the pathological changes more peculiar to insanity alone existed. The same may be said of fatty degeneration of the brain-substance, consisting in the abundant dissemination of amorphous fat particles, which is found in some specimens of cerebral softening.

It seemed reasonable to expect that, by the aid of the microscope, one would be able to ascertain whether any exudation or addition to the stroma of the brain, or any change in size, shape, or proportionate number of its cells, took place; and in the indurated brain of chronic insanity, whether that finely fibrillated exudate which has been described by some writers actually existed; also, whether in extreme atrophy of the brain, any proportion existed in the diminution or degeneration in the form of the cells or tubes. In none of these points of inquiry have I been able to attain the slightest success.

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The atrophied brains of the insane frequently contain a large quantity of those bodies which bear so close a resemblance both in form and chemical reaction to starch corpuscules. I have found them most abundantly immediately under the lining membrane of the lateral ventricles, but they are to be met with in all parts of the organ. Small plates of cholesterine are not uncommon in degenerated brain tissue, and I have frequently observed peculiar bodies which I have seen nowhere described. They are in shape like the blade of a lancet pointed at both ends, and about three or four times the width of a nerve tube. They remind me of the raphides of some plants.

My present limits do not permit in this place any reference sufficiently detailed to be satisfactory to my investigations upon the specific gravity of cerebral substance. These I have already published in the *Lancet* for December 25th, 1852, and the *Medico-Chirurgical Review* for January, 1855, to which I must refer those of my readers who desire to know more of this subject.

A may state briefly, that in the thirty cases tabulated in the *Lancet*, the average specific gravity of the cerebrum was 1040, the range being from 1036 to 1046; while the average specific gravity of the cerebellum was 1043, the range being from 1039 to 1046. It was also observed that the specific gravity was higher "when life had terminated in coma or asphyxia, than when it had ended in syncope or asthenia." In my annual report for 1851, I published some investigations on the same subject, from which it resulted that the average specific gravity of the cerebrum was 1039½, and that of the cerebellum 1042. In the sixty-three cases tabulated in the *Medico-Chirurgical Review*, the average of the white substance of the cerebrum was 1039, and that of the grey substance 1037, that of the cerebellum grey and white substance conjoined 1040. The lowest specific gravity of white cerebral substance was 1033, the highest was 1046; of the grey substance the highest was 1048, the lowest 1030; of the cerebellum the highest was 1040, the lowest 1030. The lowest specific gravities were generally connected with a watery or ædematous condition of the brain, which led me to adopt the term "relative atrophy," in contradistinction to that of "positive atrophy," where the organ has actually shrunk. The two conditions, however, may coexist, as I remarked in the *Lancet*, "The additional fluid which makes the brain light goes to make up for interstitial atrophy, but it does not wholly make up for it, and the brain shrinks from its bone case." "A low specific gravity

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does not necessarily indicate a diminution of cohesion, or the commencement of ramollissement, although it points in that direction. A brain may acquire a low specific gravity from an increased quantity of fat globules in its tissue, while retaining its normal consistence. I believe, however, that fat tends to accumulate only in softened brain, so that possibly this source of error may not exist; but it is, nevertheless, a point of the utmost importance to determine how much of diminished specific gravity in brain tissue is to be attributed to the effusion of serum, and how much to the accumulation of fatty matter. This question may be resolved by treating the substance with ether and by evaporation. I am convinced that in circumscribed softening of the brain (true ramollissement,) the low specific gravity is to a great extent owing to the amount of fatty matter deposited. In the last case of the appended table, the specific gravity of the cerebrum generally was 1041; while that of the softened part was 1035; and on examination this pultaceous substance was found pervaded with an immense quantity of fatty matter." The conditions which favour a high specific gravity are congestion and induration—those which favour a low one are ædema and fatty degeneration. A watery or ædematous condition of the brain is frequently met with in dementia and chronic insanity generally, and in such cases the specific gravity is low. It is low in the softened condition of circumscribed parts, which the microscope shows to be one form of fatty degeneration; and in other cases in which it is low, it is probable that there is much diffused but unrecognisable fat; finely granular amorphous fat diffused in the stroma, or contained in the cells any tubes, it being highly probable that morbid degeneration of brain-substance, like that of muscular tissue, takes place by the running together of the organic elements into forms of hydro-carbon.

The pectoral and abdominal viscera present in the insane some pathological peculiarities which require notice.

Disease of the heart is very common among the insane. Obstructive valvular disease is often seen in connexion with simple and with hypochondriacal melancholia. Dilatation of the heart with great irritability of the organ, and frequent attacks of palpitation is frequent in chronic mania, and I have observed that this condition of the heart appears to impress its character of excessive excitability upon the mental disease, and that those who thus suffer are suseeptible, irritable, impulsive, and subject to gusts of passionate excitement, but that they are neither malevolent nor refractory. In dementia the heart is very liable to undergo fatty degeneration;

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and in three instances I have satisfied myself by microscopic examination, that death was occasioned by this change.

Disease of the Lungs occurs in the insane in all its varieties. It is frequently latent from the absence of cough, and the patient's absorption of mind preventing complaint. The absence of cough in serious pulmonary disease is very peculiar. In dementia it arises partly from torpor of the excito motory system, partly from loss of attention, from the same cause in fact as the frequent dirty habits of the insane. In mania it arises from the attention being intensely preoccupied by the vivid ideas and delusions which absorb the mind. I have seen many patients in advanced stages of phthisis who never were heard to cough so long as they were under the influence of maniacal excitement. When this underwent a temporary diminution, they were greatly troubled with cough, which was again arrested by the recurrence of excitement. The continuance of colliquative diarrhœa and perspiration, and of emaciation, proved that there was no halt in the progress of the lung disease, as the absence of cough has led authors erroneously to suppose. The torpor of the nervous system in dementia leads to another peculiarity in the lung and some other bodily diseases of the insane, namely, the absence of irritative or symptomatic fever; and hence it happens, that in a demented person whose strength is unimpaired, and whose constitution is tolerably good, diseases will obtain a degree of development, with symptoms so few or obscure as to be incredible to the general physician. It is on this account that the numerous sloughing sores to which general paralytics are liable, produce so little suffering or constitutional irritation. I have known the stomach disorganised by cancer without the patient complaining of any pain until a few days before death, when perforation took place. The only case of carditis I ever saw, occurred in an insane person who complained of no pain, and in whome heart disease was only suspected twenty-four hours before death in consequence of failure of the pulse. This peculiarity in the intercurrent diseases of the insane should teach the physician to observe with watchful anxiety every physical indication from which he can derive knowledge of the attack of disease, before it is so advanced as to be beyond control. Pulmonary gangrene is more common among the insane than the sane, but not to the same extent here as at Vienna, where it contributes largely to asylum mortality.

Diseases of the Stomach bear to insanity a relation of the highest importance. In acute melancholia attended by refusal of food, its mucous membrane is frequently found to be in-

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flamed and softened, or ulcerated, and it often requires all the skill of the most experienced physician to determine whether an inflammatory condition of the stomach is the cause or the result of the abstinence. Softening of the coats of the stomach is sometimes an effect or a concomitant of advanced cerebral degeneration. Whether the different forms of stomach disease classed under the term dyspepsia, are efficient causes in the production of insanity, by impeding the due nutrition of the body in general, and of the brain in particular, there are no reliable statistical data to determine. The probability is in the affirmative. This, however, is certain, that dyspepsia is common among the insane, and that its removal by therapeutic and dietetic agencies is an important and efficient means of promoting the cure of mental disease. There is nothing remarkable among the insane in the pathology of the small intestines; but the large gut suffers in chronic insanity frequent and extraordinary displacements, which I am quite at a loss to explain. The most common of these displacements is that of the transverse arch of the colon to the lower part of the abdomen, from whence it again ascends to take its proper position as the descending portion. But the most extraordinary anomaly I ever met with, was the formation of a cul de sac rising in the middle part of the rectum, and ascending in front of the other intestines until it reached the ensiform cartilage, the cul de sac being nearly two feet in length. Its walls were thicker than those of the colon, and it contained all the intestinal coats. The patient in whom it occurred had ascites, and prepartions were made for tapping; but percussion and palpation revealed the existence of something strange, and the operation was not performed. Had it been performed in the usual manner, the trocar would have passed into the rectum. My friend Dr. Parsey, of the Warwickshire County Asylum, assisted me in this case, and made the *post-mortem* examination.

The Liver is not more frequently congested or otherwise diseased in the bodies of the insane than in others. The old Greek theory, that madness depends upon black bile, has no foundation in pathological fact. The only noteworthy peculiarity in the liver which I have observed, has been an apparent loss of its structure occurring in melancholia and dementia of very long-standing, and in which great emaciation and prostration of vital power has long preceded death. In seven instances of this kind, I have found the liver shrunk and flabby, and its structure converted into an appearance closely resembling that of the healthy spleen. Dr. Budd describes

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an analogous change occurring in persons not insane, but with acute and recognizable symptoms.

The Spleen is usually small in chronic insanity.

The Kidneys are remarkably free from disease in all the forms of insanity, and the changes which give rise to albuminous urine are especially rare in them. In the whole course of my practice I have never met with an instance of decided Bright's disease among the insane; and, upon inquiry in other asylums, I have found that the same observation has been made by others. The only case I ever saw was in the Rainhill Asylum, but the patient, an old drunkard, was not then insane. Prior to observation, we should have expected Bright's disease and insanity to have been frequently concomitant, on account of the common influence of intemperance in the production of the two disorders, or even that the former might be the occasion of insanity through the influence of its accompanying anemia, and the unsecreted urea upon the brain. Renal and vesical calculi are equally rare in the insane. I have not once met with either, and only once with prostatic calculi. In this case the bladder and kidneys had become diseased from irritation, communicated from the diseased prostrate.

The Reproductive Organs are frequently the seat of disease or abnormal function. Among male idiots and imbeciles, instances of deficient or excessive development of these organs are common; and the female population of every large asylum contains several instances of that masculine development of frame and constitution which indicates an abnormal formation of the sexual organs. There can be little doubt, from the number of such instances, that the androgynous character is frequently accompanied by mental imbecility.

Amenorrhœa is a frequent cause or consequence of, or concurrent phenomenon with mental disease, and its removal not unfrequently leads to recovery of sanity. Extreme congestion of the ovaries and uterus, with false *corpora lutea* in the former, I have found in two instances of young women who died during the excitement of acute nymphomania. Ovarian tumours are not uncommon; and at the present time I have two insane patients suffering from ovarian dropsy. One has been tapped several times to ward off the imminent danger of death from the upward pressure of the fluid on the stomach and lungs. The other, an epileptic, I, with the assistance of Dr. Parsey, tapped for the same reason nine years ago, drawing off five gallons of porter-coloured fluid, and, strange to say, the cyst has only refilled to a slight extent.

(To be continued.)

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