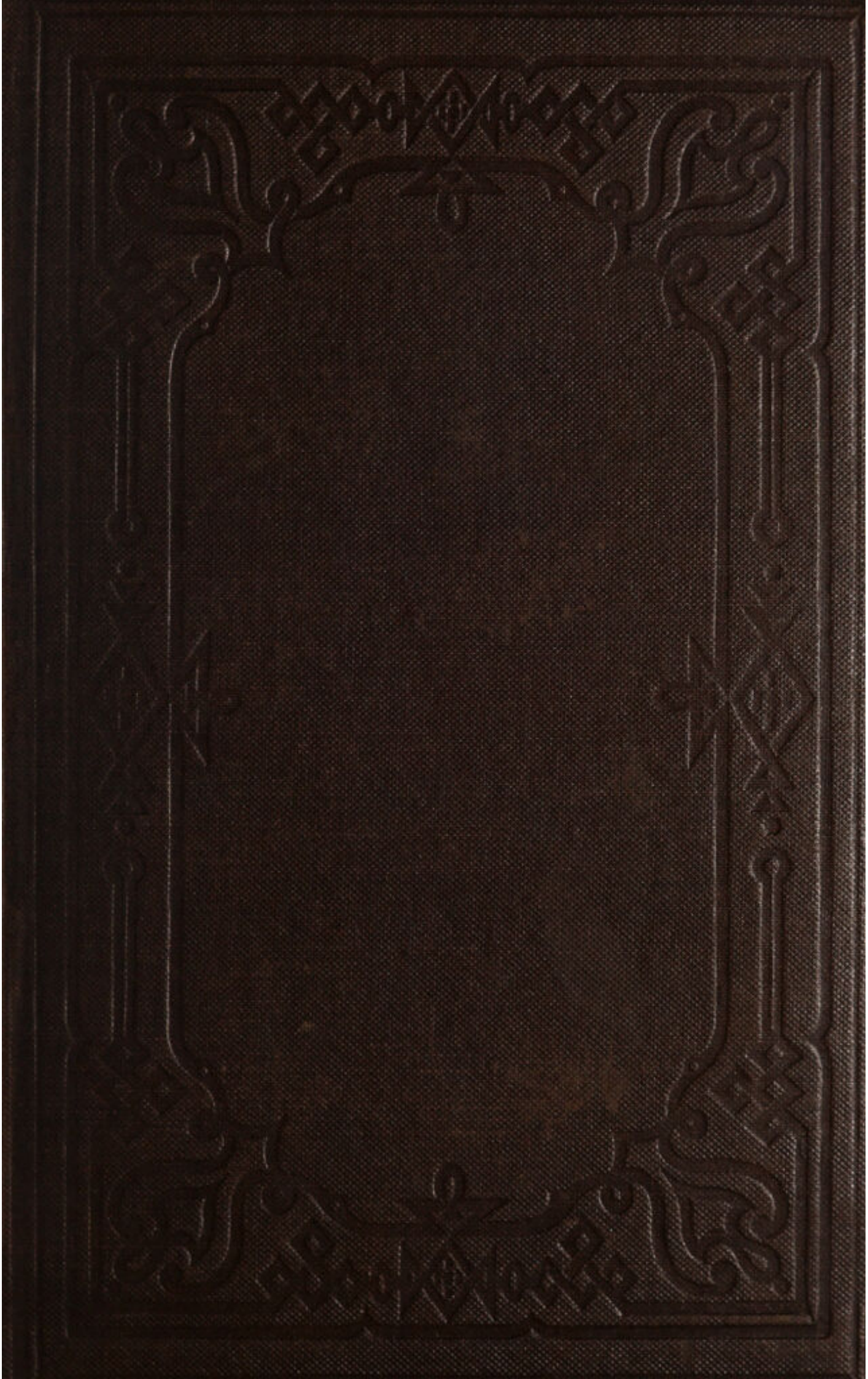
Insanity tested by science, and shown to be a disease rarely connected with permanent organic lesion of the brain. And on that account far more susceptible of cure than has hitherto been supposed / [Charles Mountford Burnett].



INSANITY

TESTED BY SCIENCE,

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WITH

PERMANENT ORGANIC LESION

OF

THE BRAIN.

AND ON THAT ACCOUNT FAR MORE SUSCEPTIBLE OF CURE
THAN HAS HITHERTO BEEN SUPPOSED.

BY

C. M. BURNETT, M.D.

LONDON:

SAMUEL HIGHLEY, 32, FLEET STREET.

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"But why talk to you on the melancholy effects of madness? Only to observe in general that temperance, exercise, philosophy, and true religion are the surest means to make men happy, and to preserve them from a contagious malady, to which the inhabitants of these kingdoms are unfortunately liable."

Lord Orrery.

PREFACE.

It has long been an impression upon our mind, that much more is yet to be done in the treatment and cure of Insanity, than has hitherto been attempted, either in this or in other countries. In saying this, we wish to avoid the imputation of having pointed to an acknowledged fact, without suggesting the means for lessening the evil: and with this view we have put together a few observations, which compose the following pages. We might, with little trouble, have expanded the subject to two or three times its length, and, in our desire to be as brief as possible, we fear that we may have omitted the details of several cases that would have excited interest. But our object was not so much to write a book as to put together in the shortest, and yet the most comprehensive manner, the ideas we entertain of the disease, and the difficulties which encompass its treatment. If the disease has really not the indelible organic character, which it has so long had the reputation for, and which we have endeavoured to prove is unfounded, there is the more hope that the time is not far distant when it will be subjugated by a more successful and appropriate means of cure.

This consummation cannot, however, reasonably be hoped for as long as matters remain as they are. A

disease that in its treatment calls so loudly upon the legislature for direction and assistance, can never be placed in a favorable position for cure till that legislature has had the humanity to investigate the causes which are keeping up the evils now so extensively operating upon the insane of this country; and to propose a remedy, as far as legislation is concerned, which shall strengthen the hands of the physician.

Of the reality and practical application of the assertions we have advanced, time and experience alone will discover. We have already been practically assured of their truth, and are confident that, as the remedies are carried out, and the evils removed, which we have laid down, the greater will be the number of recoveries from one of the most direful afflictions ever brought upon the human race.

Westbrook House, Alton;
April 24th, 1848.

INSANITY TESTED BY SCIENCE,

&c. &c.

CHAPTER I.

PRELIMINARY OBSERVATIONS.

Insanity supposed to be more common in England than elsewhere: an opinion not to be relied on.

It has long been a popular opinion, that Insanity is a more common disease in our own country than in any other; and this opinion has of late years been strengthened by the assertion of many, that the disease is upon the increase. Although it is obvious, for many reasons, that the public can never be in possession of any direct evidence that can be relied upon, for ascertaining the fact, as regards England, yet, when the observation is extended to the European nations generally, there is probably less reason to doubt its correctness. We thus bring the disease sufficiently near to us, to excite our interest, to embark our sympathy, and to induce us to bestow both our talents and our time in endeavouring to investigate the true causes, and, if possible, to discover the true remedies for so dreaded a malady.

More properly applied to the European nations generally.

Is dependent on causes too uncertain to be referred to one particular country.

Diversity in their modes of government, whether political, social, moral, or religious, must tend to confuse more or less the data furnished to the pathological inquirer in the several countries of Europe, when they

are made simply with a view to arriving at the numerical fact above stated; but when these data are placed by the side of those furnished from other parts of the globe, leaving the question, which country is most subject to the disease, we arrive at the fact of its being in a pre-eminent degree associated with the varied excitement and enervation, so inseparably mixed up with the political and commercial transactions of civilized countries.

Is dependent on the vicissitudes peculiar to civilized countries.

Many minds have been directed to the disease.

The direful nature, and too often the unhappy termination, of this malady, whether in premature death, or in protracted and unmitigated sorrow, has directed the minds of some of our ablest physicians and pathologists to trace the probable causes which give rise to the disease; and we are not a little indebted to many able and indefatigable men in this and other countries, who have devoted their whole lives to this great and philanthropic cause.

Little has been accomplished in a curative sense.

It is worthy of remark, in spite of the importunate character of the disease, how very little has been accomplished in a curative sense, by those who have given it their attention. Many circumstances at once explain this; and perhaps one of the most depressing is the popular idea that the disease is mental, and that it does not consequently admit of cure in the true sense of the word. This impression is not like one that has been recently formed in the public mind. It has the sanction and authority of long prescription. It is strengthened by the successive failures of science and of art, and is almost stereotyped, if we may so say, in their minds, by those memorable words of the immortal bard.

The reasons why:—

1. Popular idea that the disease, being mental, is incurable;

2. Conflicting evidence furnished by pathology;

Another circumstance which has not a little contributed to retard success, and to divert the attention from this great object, has been the very conflicting

evidence furnished by pathology, but especially by morbid anatomy. While one declares that the disease is inseparable from organic lesion of the brain, however local in its sphere, or microscopic in its character, another asserts that he has made autopsies without number upon the bodies of those who have died insane, not only in which no manifest alteration, either in character or consistence, could be detected in the brain, but in which he has found a great variety of morbid changes, present in other organs remote from the supposed seat of the affection.

3. Misunderstanding about the value and meaning of restraint.

To these we may add another circumstance which has operated no doubt, and is operating at the present time, to convey a partial and erroneous impression to the public mind of its utility, while it fails to effect a cure, simply because it is only one of the many means, the *proper use* of which is indispensably necessary, and it must be obvious, that when several means are required to enter into the computation of a cure, an undue attention to one is calculated not merely to effect no good, but actually to do much harm.

Restraint is only one of many means necessary for cure.

We allude to the subject of restraint. Whatever has been or may be attempted to be palmed upon the public about non-restraint, as it is called, in the cure of the insane, and without feeling it necessary to dwell here upon the falsehood and dishonesty of such expressions, we simply remark, that, as an agent judiciously used, it is actually indispensable for the cure of the insane; though, after all, it is only one of many remedies, whether therapeutic or hygienic, physical or moral, that must be employed, if we hope for eventual success. And the proof of this assertion is shown in the fact, that no more advance has been made in the real cure of the malady since the removal of those abominable abuses connected with restraint, which

alike reflected disgrace upon the government as upon the nation, than took place previously to those disclosures.

We might mention other circumstances which in a less degree are acting so as to retard the successful termination of insanity, but they will necessarily transpire in the few observations we are about to make.

Humoral pathology based upon sounder principles than the pathology of the solids.

All due allowance being made for the errors inseparable from the dark period of chemical, and indeed all other science, which characterised the first propagation of the humoral pathology, it is nevertheless very generally admitted in the present day, that its tenets were based upon much sounder principles than those of the school that succeeded. And had the scientific mind been as steadily attracted to the subject of late years as it was at first, the high probability is that much more real and practical progress would have been made, both in physiology and pathology, than we can now boast of, with all the accumulated advantages which we derive from improvements and discoveries in science even in this wonderful age.

Doctrine of insanity held from time of Hippocrates to that of Cullen.

From the time of Hippocrates to that of Hoffman and Cullen, physicians held the doctrine, more or less confused, that insanity owed itself to a morbid condition of the fluids of the body. Horace attributes the madness of Orestes to this cause :

"Vocando
Hanc furiam hunc aliud jussit quod splendida bilis."

Mead asserted that the blood of such persons who have been most liable to the malady was thick and sizy, and upon dissection the brain always appeared dry, and the vessels were filled with black sluggish blood.* We shall presently be able to show that this

* De Insania.

idea, much as it has been neglected of late years, is really not so far removed from probability as were the doctrines first propounded by Hoffman and Cullen, that diseases generally depended more upon a morbid condition of the solids than the fluids. He, however, referred this individual disease to the excitement of a subtile moveable fluid, included in every part of the medullary substance of brain and nerves.* Sir A. Crichton endeavours to prove that the cause of insanity is a morbid action of the vessels, by which not only the quantity but also the quality of this subtile nervous fluid is influenced.† Cullen adopted the opinion of Hoffman.‡ There is good ground for believing that the impressions formed of the incurable nature of insanity were strengthened by this doctrine, and that it has long continued to paralyse the exertions of the pathologist, and to distract the mind from the contemplation of the true seat of the affection.

Cullen's doctrine unfavorable to the cure of insanity.

We shall then at once proceed to show that both reason and science favour the idea that insanity is not and ought not in the first instance, and often to the very last, to be regarded as a disease of the brain, but as a disease floating in the blood, having no fixed or local character, but producing the morbid phenomena which are comprehended under the title of insanity; it arises from a derangement or mal-assimilation of those particular materials of the blood—carbon and phosphorus—which constitute the bulk of the elementary tissue of the brain and nervous system generally. When, therefore, we say we believe the disease to be in the blood, we consider it to exist there in the form of either deteriorated or wrongly constructed chemical components. In this sense it must be the *seat,* although

It is seated in the blood.

* Practice of Physic. † On Mental Derangement.
‡ Medicina Rationalis Systemat., tom. iii, c. 4.

Fletcher and Broussais consider it only in the light of the *vehicle* of disease.

The vital and mental principles are seated in the blood.

We presume it can be no longer a matter of doubt that the vital and mental principles are contained in and conveyed through the blood. When we say the vital principle is *contained* in the blood, we must not be understood to mean that it has any existence there as an entity of matter. It is only the phenomena of life, the inherent vitality of living bodies that we can speak of, and this we do in the adjective sense, since it would imply an absurdity to speak substantively of that which as a nonentity cannot form part of any thing that is material. Strictly speaking, we ought therefore to say the vital principle there existing is the true cause of all the wonderful phenomena peculiar to life. This is an old opinion, but we cannot discover that a more reasonable or a more philosophical one has yet been propounded, and though it is not the most recent, yet it was held by the immortal Harvey, by Hoffman, Huxham, John Hunter, and a multitude of others, and it is the more satisfactory, seeing that, in the most minute particulars, physiology has been enabled to prove what revelation had asserted nearly four thousand years before. We now know not only in general terms, as they are contained in the writings of Moses, that the "life of the flesh is the blood," or in those of Solomon, that "out of the heart are the issues of life," but, taking a more scientific view of the matter, and subjecting that fluid to almost every possible physiological test, we arrive at the conclusion, that not only is the blood in a general sense the recipient of the vital principle, but every individual red globule of its composition, after it has been aerated by the lungs, is, according to some physiologists, endowed with a separate vitality.

The doctrine of Harvey and Hunter.

Mentioned in the Scriptures 4000 years ago.

Blood contains the elements of every tissue.

Moreover, the blood is charged with the elementary materials of every tissue and organ of the body, so that the brain itself and the nerves which are composed of essentially the same elements, are built up by no other agency than the blood itself. No exception to this law can be taken in any animal. The blood of all the warm-blooded animals is charged with materials, and endued with vitality to enable it to form, amongst other organic parts, a brain and nervous system.

How supplied.

What are called the proximate elements of all the solid parts of the body, the fibrine, albumen, osmazome, lactic acid, and fatty matter, with the earthy and metallic compounds, are there found;* and these are supplied by the alimentary substances taken into the stomach. When it is considered that for this purpose several pounds of nutriment, liquid or solid, are daily received into the circulation to take the place of as many pounds of worn-out and decomposed matters which must in some way find their exit, whether by cutaneous transpiration or by respiration, or by renal or alvine secretion, otherwise more or less disturbance is the result, we must see that this fluid occupies no unimportant position in relation to health and disease.

Is exposed to constant changes.

Great proportion of blood sent to the brain.

The very great proportion of blood which is sent from the heart to the brain, stated by Haller to be one fifth of the entire current, bears a remarkable contrast to the relative size of the brain as compared with the whole weight of the body, which is only one fourteenth part. This assures us how much more nourishment

* Gelatine cannot be said to form an objection, for it is justly doubted by Weber, Berzelius, Prochaska, and others, whether it exists in the blood, and whether it is not formed by the decomposition of other matters in the process of boiling.

and vital energy the brain requires than other organs to enable it to execute its office.

Mental principle is dependent on the blood.

Without going into the question of identity between the vital and the mental principle, but supposing the manifestation of the mental principle to be dependent upon the normal condition of the brain, and the brain to be dependent upon the vital condition of the blood, we may with little difficulty trace the origin of much evil in the brain to the actual condition of that fluid.

Many facts go to prove that the mental principle, whether it be latent in the blood or not, cannot be manifested through any other organization in the body but the brain. Yet any arrest in the vital fluid conveyed to that organ, produces a loss of mental as well as corporeal power, as much as if the structure of the organ had been injured. Majendie's experiment on a dog, which he bled five times, at intervals of a day, injecting water after each bleeding into the vein, showed that it was to the blood the animal owed its instinct, and indeed its whole cerebral function.*

Also the bodily functions.

Majendie's experiment.

The brain is not only affected by the blood, but by other organs remote from it.

Moreover the healthy action of the brain is not only impeded by causes which affect its immediate organization through the blood, but it is also greatly influenced, accelerated, or impeded by the relative state of other organs. Pathology proves this in many ways. The balance, and even the action of the mind is often arrested, sometimes temporarily, and even permanently so, from the presence of disease in a distant organ. The intimate communion between the brain and the stomach is most remarkable. The function of digestion is often entirely suspended by the morbid action of the brain, so that, after violent grief and great fear, food has been known to have remained for days in the stomach unchanged. Sorrows of the mind act power-

* Physiology.

fully upon the process of digestion, and more or less in every form of insanity this function undergoes morbid changes which help to keep up the disease, and to encumber every means made use of for its cure.

In their ordinary operation, that part of the mind which we call the feelings and passions seems to act specifically, as it were, upon certain viscera of the body. In this way the heart becomes agitated, the breathing hurried, the stomach and the liver reject their contents, and the kidneys cease to perform their office of separating the salts from the blood. So grave are the depressing passions of anger, grief, and fear, that many fatal cases are recorded by Senac,* Corvisart,† Good,‡ and others, in which an actual lesion of the heart was discovered after death. Hence the feelings have not unfrequently been thought to reside in the various viscera of the body. Bichat and Nasse incline to this impression.

The feelings thought by some to be dependent on the viscera of the chest and abdomen.

Proved by dissection.

The supposition, therefore, that the mental principle pervades the entire mass of the vital fluid, though it can only manifest itself through an organization adapted for it, in the same manner as transparent bodies are fitted only for the transmission of light, is borne out by these facts, and pathology contributes not a little to its support. When we see the heart, the liver, the intestines, or the kidneys so frequently implicated in many affections of the mind, we are strongly tempted to refer the cause of the malady to some remote organ; and this idea is not the less strengthened by the evidence of numerous examinations of the bodies of the insane after death, where, instead of tracing the organic lesion, if any exist at all, to the brain, we are

Pathology sustains the idea that the mental principle is latent in the blood.

* Traité de la Structure du Cœur, &c.

† Sur les Maladies et les Lésions Organiques du Cœur.

‡ Study of Medicine.

Opinions of philosophers and physiologists on the subject.

compelled to seek it in some other viscus. Accordingly, we are not surprised to find that the opinion was very prevalent from the earliest times, that the passions and affections were dependent upon different viscera of the body, remote from the centre of the nervous system. Thus Hippocrates and Plato also placed the passions in the heart and diaphragm; Galen divided them between the heart and the liver; Bacon and Van Helmont, Lacaze, Bordeu, &c., placed them in the stomach or epigastric region; Richerand in the bowels; Lecat in the nervous plexuses of the abdomen; and Buffon, Bichat, Cabanis, Reil, and Broussais held various opinions as to their exact seat, but equally referred them to some organ in the chest or abdomen.

This is borne out by the Scriptures.

In connexion with this point it is worthy of remark that the kidneys or reins are much alluded to in the Scriptures, and, from several passages there, they

Peculiar emphasis there placed upon the kidneys.

seem to have been considered the emblems of truth, fidelity, or conscientiousness—moral powers hitherto exclusively referred to the operations of the brain. But are we sure that the kidneys are only emblems of these mental qualities? and do they not take a part, if not in manifesting, probably in regulating or influencing, such qualities of the mind? It is at least worthy of notice that the kidneys were required under the Mosaic law to be offered as a sacrifice, in the different burnt offerings appointed under that dispensation. But would they have been so appointed as it

Probable reason why the kidneys were alluded to in the Scriptures.

were without either real or typical meaning? Far more probable is it, that they were so dedicated to God as the organic part, and so the means appointed by Him, the Creator of every living being, for eliminating and extracting those corrupt and injurious substances from the blood, which, being the residuum or disintegrate parts of the body, if not withdrawn from

the system, would lead to the most unhappy and destructive consequences. How far this idea corresponds with the discoveries of physiology and pathology we leave others to determine. We know such is the office of the kidneys, and we know how these organs are affected by agents conveyed to them through the blood as well as the brain. When they fail entirely in their office, the consequences are incompatible with life. The brain becomes affected, and finally ceases to manifest its ordinary properties. Similar results follow their extirpation in animals. Death ensues in some instances in ten hours, in others between the fifth and ninth day, being preceded by tremblings and convulsions. Effusion of clear serum is formed in the brain, and other morbid changes take place. The blood becomes more watery, and is found to contain urea.*

The brain is affected by the failure of the action of the kidneys.

Consequence of their extirpation.

We may then presume, without supposing the feelings actually to reside in these organs, that the partial failure of their function, by crowding the vital fluid with an excess of nitrogen and carbon, must lead to consequences which are likely to interrupt the action of the brain.

These are a few of the arguments which would strengthen the idea that the vital and the mental principles, if separate, are nevertheless equally resident in the whole mass of the circulating fluid; that their phenomena must be dependent upon each other; and that the organs which act in obedience to them are mutually connected, and exert an influence as inseparable in their action, as complicated in their effects upon each other.

Mutual dependence of the vital and mental principles.

We shall have occasion to speak of the vital stimu-

* See the experiment of Meyer and others, in Müller's Physiol., translated by Baly, vol. i, 151.

The vital stimuli are unitedly engaged in the phenomena of life and mind, not individually.

lants of the blood when we go a little into detail on that important fluid in the next chapter. But we would here remark, that physiologists and psychologists have fallen into error heretofore, in contemplating some of these vital stimuli, by contending that the vital and mental principles are represented or conveyed by one or other of them, such as caloric or atmospheric air. Whereas, it is indisputable, that the phenomena of life and of mind are the result not of any one individual vital stimulant, but of the combined application of the whole of them, viz., air, caloric, food, and water, in such a manner as that they are singly and unitedly held in subservience to a still higher power.

The number of the insane that die without any marks of the disease in the brain.

It has been asserted by Esquirol, that nearly one half of the bodies of the insane, that is, three eighths, die of some affection of the viscera, without any corresponding changes in the brain itself, at least, which are perceptible as they are in other organs to the eye of sense. Pinel, his great instructor, whose anatomical pursuits were most extensive, held similar opinions.

Opinion of Esquirol, Pinel, Greding, Percival, &c.

So also did Georget, Bichat, Haslam, Greding, Percival, and many others, from a most extended field of observation, arrive at the same conclusion.

Relative numbers of insane dying of different organic diseases.

In a list of the morbid appearances of 259 dissections of lunatics, quoted by Burrows,* from the work of Scipion Pinel, in which he embraced the labours of Esquirol, Villermai, Beauvais, and Schwilgaé, we find 135 presented diseases in the thoracic and abdominal cavities, and 56 showed no morbid appearances whatever. This table gives, therefore, about one fourth of the whole to diseases of the brain generally, while in one fifth there was no structural disease anywhere. But what is still more remarkable, is the known fact, though we are not aware of its having been pointedly alluded to, that in the

* Commentaries on Insanity, p. 75.

whole catalogue of nervous diseases, in the course of many of which the functions of the mind become involved, there is an absence of all morbid appearances in the brain after death. Hysteria, catalepsy, chorea, hypochondriasis, epilepsy, idiocy, and similar affections terminating in insanity, and even mania and apoplexy* itself, are constantly occurring in individuals whose brains after death present no semblance of disease. We ask, could this be possible if the phenomena which so often end in insanity, and which even indicate what we call its worst forms, were the result of structural disease in the brain? We think it could not. We suspect there is as much argument even where disease is actually present, as in cases of ramollissement of the brain, to show that that condition of the organ is not the result of inflammatory action as that it is. What few morbid appearances of the brain which are found to accompany insanity are, nine out ten, to be referred to the venous system in that organ, thereby showing that even the mechanical detention of venous blood in the brain,—a cause that may be acting for a long period of time upon the structure of the brain, so far as to derange its function, is not attended with such *alterations* of structure, as we see so quickly follow inflammatory diseases. "Between insanity and morbid alterations of the brain," says Dr. M'Cormac, "there seems no necessary connexion. It is common to discover them after death, without any preceding mental disturbance, as well as to witness

Remarkable absence of morbid changes in the brain of those who die of many nervous affections.

Ramollissement not caused by inflammation.

What changes are found are mostly referable to the venous circulation.

No connexion between insanity and morbid alterations of the brain.

* As regards this last affection, which is so generally referred to disease in the brain, we have the testimony of Morgagni (De Sedibus et Causis Morborum), Cheyne (English Malady, &c.), Baillie (Med. Observ. and Enquiries), Abercrombie (On Disease of the Brain), &c., to show that no rupture of vessels or morbid appearances could be traced to that organ.

the brains of the insane without any appreciable lesion."*

The cause of the disease must be sought elsewhere.

There must surely, therefore, be some necessity, if we hope to be successful in the cure of this awful malady, that we trace the evil to causes which may be acting slowly but surely in the accomplishment of the melancholy result, long before they can be directly pointed to in the brain as actually existing in that organ.

It is a functional disease.

There is, then, much experience, and no slight argument, to induce us to direct our inquiry to the condition of the blood in mental diseases. And, from close observation, we are convinced that the disease called insanity, though unavoidably connected in some instances with organic lesion, and even destruction of the brain, as after many mechanical injuries, is in four cases out of five, in the first instance, a functional disease, quite unconnected with any morbid alteration or change of structure in the brain; and in many of those four cases it continues through a long series of years, still a functional disease, kept up by mal-assimilation. It is, in fact, according to strict pathology, a disease of the blood, but pre-eminently so, from its non-inflammatory character, preventing the morbid alteration of structure, more or less quickly consequent on inflammatory diseases. We believe that insanity in such cases is immediately caused by the deterioration of the fatty matter of the blood, by which the carbon and the phosphorus are unable to combine in healthy proportions, which substances, in a normal state, it is known form the elementary tissue of the brain and nerves, and which chief constituents fail to make that part of the organism of the body amenable to the operation of the vital and mental principles conveyed in the blood.

Depends upon an abnormal condition of the blood.

From mal-assimilation of the fatty matter.

* The Philosophy of Human Nature, p. 79.

Whether this may arise from causes immediately connected with the processes of primary and secondary assimilation, or whether it is consequent upon a particular state of the venous circulation in the head, is uncertain; but the fact made known by Braconnot and Chevreul, that the fatty matter united with phosphorus, which constitutes the essential substance of the brain and nerves, has been found by them in the blood, thus combined, favours the idea that the original fault is in the process of secondary assimilation, by which the carbon and the phosphorus unite with other matters to form new and abnormal compounds. We, however, incline more to the belief that the true separation of cerebral and nervous matter, however essentially dependent upon healthy secondary assimilation, is, nevertheless, only finally completed in the blood-vessels after they have entered those tissues.

Probably caused in the process of secondary assimilation.

This process is only finally completed in the blood-vessels after they enter the tissues.

We do not consider that this change can be pathologically or philosophically regarded as organic, because we believe the imperfectly assimilated fat-globules, after they have entered into the composition of the cerebral tissues, are capable of being removed after their deposition, and replaced by those more normally produced, which change is probably attended with an improved alteration in the manifestation of mind through its organ, the brain.

This change is not organic.

The process of deposition and absorption is certainly a natural, as it is a healthy, process, carried on in the brain in the same way as it is in all other organisms, such as the bones, the muscles, the parenchyma of viscera, &c., and it appears to be a law of the animal economy, which acts independently of the material acted upon, though probably not in the same ratio upon all materials. If, therefore, the materials carried to the part or organ in which they are about to be

The process of absorption and deposition applied to the fat-globules.

deposited, are not assimilated in those exact relative proportions which constitute health, this may influence the power which absorption may exercise over them; yet if they produce in the organ to which they are conveyed no permanent alteration of structure, no visible displacement of parts, no change of consistence, weight, or colour, we consider the mal-assimilation to be capable of effecting only a functional derangement in that organ to which such mal-assimilated globules are conveyed.

Illustrated by many diseases.

The diseases which follow the abstraction, or the redundance, or the morbid combinations of many, if not all the constituent elements of the blood, produce alike functional derangement in all the organic tissues, which, in many instances, are effectually removed by the process of absorption, and a healthy state of things is re-established. Still the functional disease will not remain such in all cases for any unlimited time, if the causes producing that functional disease are still kept up and allowed to operate. There is a period, I believe, when, from the long-continued supply of morbid or mal-assimilated particles, the structure of particular parts becomes changed, and then we have organic disease set up, which can no longer be susceptible of removal. The progressive way in which this change from functional to structural disease is produced, may be accelerated or retarded by those causes which originally produced the morbid action, being continued or discontinued either partially or entirely. It will be our object to show that the diseases essentially called nervous, that is, diseases implicating the healthy function of the brain and nerves, are almost universally and in a far higher degree than other organizations, from first to last, diseases resulting from mal-assimilation of the blood constituents; that the imperfect prepara-

Cause of structural disease.

In what nervous diseases chiefly consist.

tion of alimentary matter, by the stomach and other primary assimilating processes, renders them unable, when brought into the living current, to take up that position, and to form those metamorphous changes peculiar to vital chemistry, and which, being imperfectly fulfilled, leads to the building up of parenchymatous structures, which are chemically deficient, and consequently unable to perform with health and vigour the functions naturally assigned to them. A better example to illustrate this cannot be given than that which takes place in that particular condition of the nervous system which is termed cretinism. Here we have a deficient state of the brain, as regards its chemical component parts; the phosphorus has been shown to be deficient to a great extent, and imperfectly supplied, and the result has been, not a disorganization of the brain, but a morbid display of mental phenomena.

Example shown in cretinism.

The skull of the cretin, described by Dr. Reeve,* from one he saw in the Museum at Vienna, was not malformed; it was simply incomplete. The subject was thirty years of age, yet the fontanelle was not closed. The second set of teeth were not out of their sockets, and none of the bones, nor their processes, were completely formed. The practical conclusions which Dr. Guggenbuhl has lately arrived at are, that the disease of cretinism is not an organic defect of the material organ of the mind, but, in four cases out of five, the disease consists in a due want of bodily vigour, which renders the senses incapable of conveying external impressions to the mind, and not in the non-existence of the mental faculties.†

Showing the defect to consist, not in disorganization, but imperfect nutrition.

No cases show more unequivocally than these do, that they result from the application of deteriorated

Depending upon deteriorated air and food.

* Edin. Med. and Surg. Journal, vol. v, p. 35.

† See Twining on Cretinism.

air and food—two of the most important vital stimulants and that the removal of such cases from within the influence of such injurious causes is succeeded by a train of improved mental phenomena, more or less independent of the age of the individual, which entirely put to silence any hypothesis that assumes that the organization of the brain was malformed in the common sense of the word.

But as the subject of the true seat and cause of insanity is both important and cumulative, it is desirable to enter a little into the composition and use of the blood. We shall then be enabled to explain more satisfactorily some of the changes it undergoes in disease, and thence to draw such practical conclusions as the premises sanction. And we doubt not we shall succeed in showing that insanity is a disease not of the brain necessarily, but of the blood; and not an incurable disease, but one decidedly susceptible of cure in many instances, if treated correctly from the first appearance of the symptoms.

CHAPTER II.

THE COMPOSITION AND USE OF THE BLOOD, MORE PARTICULARLY IN RELATION TO THE BRAIN AND NERVES.

Great attention shown to investigate the composition of the blood.

AMONG the numerous substances which enter into the composition of organic bodies, there is no material that has excited so much attention, or instituted so many experiments as the great circulating medium of life, the blood.

Composed of many very remarkable substances.

This fluid—destined to be the vehicle of the vital and mental principle, which by Divine appointment is made the primary cause of all the wonderful phenomena incident to life—is composed of several of the most remarkable materials, which, when they have been resolved into their elementary principles, yield a still greater number of ponderable and imponderable substances.

Their mode of union more remarkable than their number.

Like all other animal substances, the blood is not so remarkable for the number of its elementary parts, as for the manner in which those parts are put together, the way in which they preserve their characteristic qualities, and the different relative changes they undergo from time to time. These points will call for our special attention, for they show that a power is here at work, which is superior to that which is found to regulate the ordinary physical phenomena of the inorganic world.

Difference of union in organic and inorganic bodies.

In inorganic bodies, the combinations are more permanently fixed, and they are moreover strictly confined to binary compounds, either the result of the union of two elements alone, or of two binary composed

bodies, or lastly of one binary compound with a simple elementary substance. But in organic bodies there are always three elementary substances mutually united to each other, without any previous binary combination, as we find in vegetables, which are mainly composed of ternary compounds; and in the higher department, the animal creation, the combination of four substances in many instances, and even five, unite to form quaternary and quinary unions, which, by their relative proportions being made to undergo every degree of variation, give rise to the innumerable animal products which are formed for building up that organism which is so admirably fitted for the display of the vital principle.

Mode of union in organic bodies.

This increased complexity in the formation of animal bodies, cannot be better proved than by the fact, that if submitted to analysis by the action of fire, their primary elements may be easily obtained, although no power yet in the possession of man can re-form them synthetically so as to assume their original character and appearance. We cannot do this with the more simple vegetable substances, and still less can we succeed with the more complicated liquid and animal substances.* Thus we may imitate most correctly the laws of inorganic bodies, but the laws of organic bodies are the laws of life, and these we have no power of imitating.

Their complexity shown by the law of synthesis.

Prout.

It is said that "the vital principle, in forming these

* This line is most clearly drawn in those animal concretions which disease sometimes throws out; for example, in the gouty deposits, vulgarly called chalk-stones. These are obviously not endowed with vitality, and they have accordingly no blood-vessels, or blood conveyed into their structure. Dr. Wollaston found, by a synthetic process, a crystalline substance was formed, having the same figure and properties of the original crystals, constituting similar concretions in the body.—*Phil. Trans.*, vol. lxxxviii.

substances, does not change the properties of the elements, but simply combines them in modes which we cannot imitate;" nevertheless, if the properties of the elements are not changed, their combinations are changed, and the material they go to form is changed by the vital principle into a substance perfectly different from that substance that would result from the simple chemical combination of the elements, without the aid of the vital principle.

Peculiar mode of union in organic bodies results from the vital principle.

To add to the complexity of organized bodies endued with life, we find them treating not only with ponderable and imponderable inorganic substances, but also with the more complicated organized structures deprived of life, which they combine together in an inimitable manner, in constructing the numerous organs and tissues of the body.

Cause of the complexity of organized bodies.

The chemical analysis of the blood is a subject that has excited the energies of physiologists and chemists from the time of Boyle and Malpighi, who first discovered the blood-globules, and Leuwenhoeck, down to the present day. Nevertheless, it is acknowledged by one of the first chemists of the day, Liebig, that, as regards the chemical constituents of this wonderful fluid, we know no more than we did forty years ago.* In many respects, it is impossible to compare it with any other body. It being endued with vitality, not only raises it above the control of ordinary physical laws, but gives it qualities and powers which admit of no comparison, and which must be examined with this disadvantage.

Chemical analysis of the blood.

Liebig's opinion.

Difficulties of investigation.

In strict language, it is the highest degree of presumption, put forth without the support either of merit or of truth, to speak of the chemical affinities, changes,

In what sense we are able to speak of the composition of the blood.

* On the Chemistry of Food. He might have extended this period, both retrospectively and prospectively, with little danger.

or decompositions of the *living* current, in the same sense as we speak of the elementary constituents of that fluid, after the vital principle has quitted it. On this point we grieve to see that many wise and justly to be esteemed philosophers have sacrificed the noblest powers of their mind, to a belief which more or less involves them in error, forcing upon them the obligation of making known to the world at large the certain fact, that they are unable to discover in Nature that principle which Revelation so unmistakably affirms comes out from God: "Thou sendest forth thy spirit, they are created. Thou takest away their breath, they die and return to their dust." And how certainly does science at every stage of her advancement confirm this statement. Every known law which regulates the inorganic matters by which we are surrounded, does the vital principle hold in the most complete submission to its command. It not only defies, as it were, the ordinary laws of nature, but also the many powerful substances which those laws govern. The hardest adamant it will dissolve, the most antagonistic substances it will unite. Heat, light, electricity, water, the gaseous elements, either of which are calculated to dissolve the very globe on which we stand, if submitted to the crucible of their powerful agency,—all stand, as it were, paralysed before the presence of the vital principle. How can this be more clearly exemplified than in the fact, that in the living body, both the agents and the proximate principles on which those agents operate in nature with such irresistible energy, are here kept side by side, in harmless and harmonious juxtaposition, waiting the commands of their Divine controller, to create or to destroy.

Supernatural power of the living principle in animals.

In speaking, therefore, as in ignorance we are forced to do, of the different substances which after death

we find the living current resolves itself into, such as fibrin, albumen, and the like, we must not lose sight of the important fact that, in this altered state of things, these substances possess new qualities which, while under the dominion of the vital principle, they never had; and as well might we take up the ashes of a house that has undergone destructive conflagration, and call them the elementary constituents of all that the house contained, as assert that the living blood is composed of cruorin, fibrin, and other matters into which it is resolved by death, or the withdrawal of the vital principle. The power of fibrin to undergo spontaneous coagulation when withdrawn from the living current is one to which that substance does not yield when endued with life. On this point Fletcher observes: "Organized matter is, on the one hand, possessed of properties which have no parallel in such as is inorganized, and, on the other, destitute of those by which the latter is characterised, must be regarded as quite distinct from it; and chemical analyses, accordingly must be considered as useful in showing us not what such matter was composed of while it possessed vitality, but what it is composed of afterwards."* The power of the vital principle to resist the common laws of chemistry, shown in so many ways, must convince all, that here is a power which, though it may be in some of its operations analogous to common chemical affinity, as it is to electricity, heat, &c., yet are its phenomena and results so different, that we are bound to receive with caution any theory, which regards secretion as merely a modification of chemical affinity. The very fact that the living principle avails itself of every agent in nature, ponderable or imponderable, and tramples, as it were,

Contrast of blood in the circulation and when withdrawn from it.

* Rudiments of Physiology, p. 135.

upon their turbulent natures, holding them at its will to do its pleasure, should convince us that nothing short of the Divine Being, breathing into man's nostrils the breath of life, and so making him a living soul, could make the living body what it is. Fletcher did not believe that the elements of the blood ever combined in the chemical sense of the word, but that they were merely associated together in an ever-varying form of existence.

The blood contains many substances which enter into the quaternary and quinary combinations, and these substances again unite with each other in a multitude of different proportions to form the different structures. When withdrawn from the circulation, it divides itself naturally into two distinct parts—the serum and the crassamentum; and the substances resulting from the separate investigation or analysis of these parts shows that not only is the blood compounded of what are called its immediate substances, which combine four or five elementary parts; but also, of still more simple substances, which are called its mediate or elementary principles. Thus the general mass of the blood is separated into serum and crassamentum; these again subdivide themselves into fibrin, cruorin, albumen,* lactic acid, and fatty matter. And by a further chemical analysis, these immediate principles are found to yield certain other principles called mediate, which are not susceptible of any further division or decomposition in the present state of chemistry. These are phosphorus, potassium, sodium,

Its division and subdivision.

Its immediate substances.

Its mediate substances.

* Some of these substances are thought to be isomeric; and in this fact originated the protein theory of Mulder. But isomerism brings us no nearer to ultimate analysis than we were before. It is the method of combination, not the relative constituents of bodies, that is so inscrutable —the mind that puts the matter together, not the matter itself.

magnesium, calcium, silenium, iron, manganese, &c.; and the non-metallic substances—oxygen, hydrogen, nitrogen, and carbon, which are called also the gaseous elements of the blood.

Changes effected by the nerves.

It is the union of these substances in varied proportions by a multitude of different arrangements, and in a manner, *sui generis*, which enables the blood, by the aid of the vital stimuli, to form the organic structures, and these changes are effected by the instrumentality of the nervous system, no change in the materials of this vital fluid taking place in any of the organic structures without the presence and concurrence of the nerves.

Changes depending on the vital principle.

The elaborate processes carried on by the combined operation of these compounds, under the direction of the living principle, leads to the building-up of the various tissues of organic bodies; and this process is more or less perfect, according to the degree of vital energy thrown into it. As this vital energy becomes weakened or impaired, so does the synthetical arrangement of the animal tissue also become weakened. Moreover, as the actual tendency of the vital principle engaged, is to put together these highly complex and heterogeneous substances, so the withdrawal in part of that principle, or of the agents supplying it, leads to the chemical destruction of those very tissues which it has built up. Those substances which formed in the organic structures, quaternary and quinary compounds, such as sodo-albumen, fibrin, hematosin, &c., are thus resolved into the less complicated ternary and binary compounds; and in this last state they are carried off after the process of destructive assimilation, through the grand channels of elimination, the lungs, the skin, and the kidneys. Everything, therefore, that has a tendency to impair the vigour of the vital principle, of necessity contributes

to weaken and impair, and finally to analyse or break up the living structures. And it is most remarkable, that the element oxygen, which is so largely engaged by the vital principle for the carrying on and completion of nearly all the operations so peculiar to it, is that very element which, when life has fled, most rapidly breaks up and decomposes the very structures it has been contributing to build up. Nay, even in those *living* organs, where the power of the vital principle has been diminished, whether by inflammatory action or a loss of the nervous energy of the part, we find this principle engaged in the destructive operation of breaking up the tissue.

Nothing is more remarkable than the manner in which some of the primary principles are found to be united in the blood. Thus it has been shown that iron is there combined with nitrogen, carbon, hydrogen, and oxygen, there being no other known or analogous instance of a quinary combination of a metal with these four gaseous elements.*

The materials of the brain and nerves.

It is by the union of the fatty matter of the blood, one of the immediate substances, with the non-metallic mediate substance, phosphorus, that that wonderful organization, the brain and nerves, is built up. Berzelius, in repeating the experiments of Vauquelin, on the chemical analysis of the brain, found that the phosphoric acid, so abundantly present as to arrest combustion, was in a fixed and not in a volatile state. This is a state quite unknown in the inorganic world.

Of all the mediate substances made use of in the

* Whether the idea of Mulder, Berzelius, and Müller is correct, that the iron here is in a metallic state, or whether it is an oxide of that metal, is still uncertain. Liebig seems more positive. He considers that, in affirming that the iron here is metallic, amounts to the same thing as saying, for example, that sugar contains carbon in the form of diamond.—*Chemistry of Food.*

Phosphorus enters into all substances.

construction of living animals, and which is so generally found in the blood, none appears to be so indispensable, or to enter into so many of the animal tissues, as that of phosphorus. It has been remarked that this substance appears to be the connecting link by which mineral matter is laid hold of and united to animal organization. Thus when united with lime it constitutes the substance we call bone-earth—a substance highly distinguished, by the organization and vitality associated with it in living bodies, from shell which is not organized, and therefore cannot be said to form a part of the living system. This is a point worthy of attention, for, in the vital fluid we think there is reason to suppose that it is by the agency of this substance that the mineral, earthy and alkaline bases there found, are made to unite chemically with the animal substances which are known to join them, and thus to form compounds, the vital properties of which are so inexplicable.

Its peculiar properties,

and agency in forming the different animal substances.

The vital stimuli of the blood.

The manner in which the blood is supported, so that its composition and movement may be regularly maintained, is by means of those agents which are termed vital stimuli. These are atmospheric air, caloric, water, and nutriment. *Atmospheric air* is received into the lungs, and there brought in immediate contact with the blood, previously to this fluid being conveyed to the different organic parts to enable them to perform their several offices. It supplies much of the oxygen of the blood, and is of great importance in converting the carbon there required for so many purposes, into carbonic acid, which gives rise to the animal heat necessary to carry on the different functions. The quantity of carbonic acid conveyed out of the body by the process of respiration, is nearly equal to the oxygen taken in. In twenty-four hours it amounts to 40,000

Atmospheric air.

cubic inches, which is equal to nearly twelve ounces of solid carbon. *Caloric* is thus formed by the partial combustion of the carbon so abundantly produced in the blood, with the oxygen taken into the lungs.

Caloric.

Water, which is said to constitute four fifths of the whole bulk of the blood, like the solid nutriment, is received into the stomach, and having furnished a vehicle for reducing the food into a liquid pabulum, is thence removed into the circulation, there to undergo a chemical change, and to aid in forming and combining the various materials about to be prepared.

Water.

And *food* is conveyed in the first instance into the stomach, there to undergo the process of primary assimilation, by which it is converted into a uniform and consistent substance fitted to enter the living current. Thus far prepared, the alimentary substance of the blood is found to contain four important alimentary principles, viz., the aqueous, the saccharine, the albuminous, and the oleaginous, all which must enter, more or less, into the composition of every tissue, and therefore must form the nourishment of all the higher animals. Carbon is the elementary mediate principle by which three of the alimentary principles are chiefly represented: for it is found that the saccharine principle contains, on an average, from forty to fifty per cent. of carbon; the albuminous, from fifty to seventy-five; and the oleaginous, about eighty per cent. of this principle.* These four alimentary principles are capable of undergoing changes of form and character almost *ad infinitum*. They readily unite with, or pass into each other, and they can be transformed into new principles according doubtless to fixed laws, although those laws may be interrupted or modified by disease. It is these laws which have hitherto baffled the

Food.

Alimentary substance of the blood.

Carbon enters largely into them.

Their union with each other, and transformation.

* Prout on Stomach and Renal Diseases.

researches and experiments of all who have attempted to unfold them. The changes they effect in living bodies, while they bear some resemblance to those effected by the agency of electricity, heat, attraction, or affinity upon inorganic bodies, are nevertheless in their results most remarkably different. And it is obvious that the power to take up either or all of these agents, and, *individually* or *collectively*, to bring them to bear upon the vital stimuli, is a power nowhere to be discovered in nature, different in character from all others, and superior in degree to the united powers of all others. On this account we have immense difficulty in reconciling what are called the chemical changes of the blood to the phenomena ordinarily resulting from chemical laws, and this is remarkably exemplified in the elements of carbon. Speaking of the elements of the blood, Dr. Fletcher observes, "The avenues by which all the oxygen and hydrogen which these compounds contain enter the organized system, are supposed to be sufficiently obvious: but with respect to carbon, it has been rendered probable, by ample experiments, that plants and animals in general excrete constantly from their respiratory organs alone, to say nothing of its consumption in other ways, much more of this principle than has any evident ingress into the system. That plants evolve in this way more carbon than can be satisfactorily accounted for, was proved long ago by Dr. Crell; and with respect to animals, of the forty-three ounces of carbonic acid lately mentioned as voided day by day from the lungs of man, about twelve ounces are pure carbon, the only obvious source of which, is the aliment. Now it has been computed that about one eighth only of their weight of ordinary vegetable or animal food, such as potatoes and beef, is carbon, so that, to furnish only

this quantity, a man must consume at the rate of at least six pounds, or ninety-six ounces of solid food per day. But the average daily quantity of aliment, solid and fluid together, does not exceed a hundred ounces, and of this, at least, two thirds may be estimated as drink, so that not more than from thirty to forty ounces of reputedly solid food are left to furnish the twelve ounces of carbon voided by the lungs alone, to say nothing of the very considerable quantity of the same principle, which passes off likewise by the other outlets."* It becomes us therefore to be careful how we speak of the changes going on in the blood, for if we have not yet arrived at a physiological explanation how the carbon gains admission into the blood to that extent in which we know it exists there, we are most probably ignorant of the true causes which lead to its morbid accumulation and retention in that fluid.

Influence of the vital stimuli on the blood.

The influence which the vital stimuli exert upon the blood, is necessarily very great, even if we regard merely the variations they undergo in quantity, as well as quality, the blood still adapting itself to those changes, without indicating so little as a mere functional derangement, and thereby implying that the variations were consistent with health. But when we come to speak of morbid action, it will be obvious that to these sources, some under the control of man, and others altogether beyond it, must be attributed much of the prevalent epidemic and other diseases affecting, at particular seasons, a large section of the population of every country; as well as most of the morbid phenomena which take place in the body.

They are capable of producing many diseases.

Their power to vary the relative state of the blood.

Thus, not only are the vital stimuli of the blood made to vary their relative quantities in supplying animals with the materials necessary to carry on the phenomena

* Rudiments of Physiology, p. 137.

of life, but their quality also from time to time undergoes the greatest possible changes. And these alterations are effected, under some circumstances, as in the case of temperament, hereditary predisposition, bodily and mental exertion, disease, &c., from causes operating within the body; while they are often equally under the influence of causes external to the body, such as climate, temperature, food, and the like. All these, after having determined the materials which enter into the composition of the blood, are circumstances calculated unavoidably to exercise no trifling influence over the mental and bodily constitution of every being endued with life that may be exposed to them.

Influenced by causes from within, as well as from without.

The quantity of blood circulating in the body, constituting about one fifth of the whole weight of the body, has been calculated from eight to thirty pounds. This is to be explained from several causes, such as the relative size of the body, the age, temperament, season of the year, and probably period of the day. Of this, one fifth, or six pounds, supposing the whole to be thirty, is considered to be arterial, and twenty-four, or four fifths, venous. It is probable, also, that this difference is not at all times to be explained by a uniform diminution or increase of all the constituent parts of the blood, but sometimes one and sometimes another may be in excess or deficient. And although the materials of the blood are thus found in every living body to be exposed to causes that must be constantly altering their relative quantities, and therefore their relative position; yet there is reason to suppose that the elements there existing have a standard, fluctuating, it is true, between certain bounds, but nevertheless fixed in the sense of not being able to exceed those bounds without morbid action being the result.

Quantity of blood in the body.

Its variation in quantity.

Causes of variation.

The quantity has a fixed standard.

The great proportion of venous to arterial blood is

Great preponderance of venous over arterial blood.

important to bear in mind, but more particularly with reference to the diseases under consideration. At this rate four fifths of the blood circulating in the brain is of a venous character; and apparently disproportionate as this may appear, it may not be incompatible with healthy action so long as it observes this proportion. When it exceeds this, it is likely, from its containing such deleterious substances, to act injuriously upon the nervous system. It should be remembered, that the venous blood contains all the matters absorbed from the intestinal canal, the serous membranes, cellular tissue, &c. These matters often contain alcohol, and many other strong substances of a saline and mineral character. We cannot have a greater proof that the blood of the venous system requires great purification than in the fact that in its passage from the abdominal viscera to the heart it has twice to overcome the resistance offered by the minute canals of a capillary system.

What is contained in venous blood.

Precautions for purifying it.

The blood undergoes changes from difference of temperament, climate, &c.

But the blood is not only subject to changes effected by the agency of the cause above alluded to: it is also undergoing changes from time to time, consequent upon the age and temperament of the individual, or the climate or season in which he lives: and these causes are found to influence some parts of the blood more than others. According to Lecanu, the quantity of water in the blood varies in the different sexes. Dennis found it vary at different periods of life, and in different temperaments. The blood of the female contains more water in proportion than that of the male, and in children and old persons it is found to be greater. So, likewise, in the lymphatic temperament, the blood is found to contain more water than in the sanguine. The relative proportion of the crassamentum also varies in the two sexes; and Lecanu states that the blood of

the male contains nearly thirty-three parts in a thousand more of this substance than the female. It is also greater in the sanguine than in the lymphatic temperament. The blood-globules undergo great variation in number, size, and shape, according to circumstances. Their number is increased by food, and they are consequently lessened by hunger. Moreover, they vary according to the age, sex, and temperament. Similar variations have been observed in the other constituents of the blood—the fibrin, and especially the fatty matter which appears to enter more generally into the composition of the fibrin, cruorin, and albumen.

Difference in the number and size of the red globules of the blood.

We have thus taken a superficial view of the blood in general, and the variations it undergoes from time to time from causes which we have pointed out. And this was necessary, in order that we might show what share it takes in constructing the different organic parts, but particularly the brain and nerves.

Assuming, then, that the blood is supplied with healthy nutriment, conveyed into it after it has undergone that preparatory state of assimilation which has reduced it to an uniform substance, that it has first been purified in its passage through the portal system, and that it has been supplied with a due quantity of atmospheric air in its passage through the pulmonary system, it takes its course through the body by means of the circulating vessels, supplying the different organic structures with materials to enable them to perform their varied and complicated offices.

Course of the blood.

Of these organs, by far the most important and widely extended is the brain and nervous system, spread as it is over the length and breadth of the body, and communicating so intimately as it does, with every part, by means of nervous filaments.

Supplies the brain and nerves.

Intimate dependence of the brain on the blood.

The source of sensation is believed to be the medulla. Some say the cerebro-spinal fluid co-operates, and there is a prevailing and very probable notion that a vital current, like that of the electro-magnetic fluid, sustains the various nervous relations. Carus compares the current of innervation to the galvanic current, the former depending upon the reciprocal action of blood and the parenchymatous nervous fluid, the latter upon the reciprocal action of acids and metals. According to this, healthy arterial blood is essential to the development of nervous power; and, as all the facts show, venous blood is directly inimical to the development of nervous power. The various intermediate degrees are dependent upon the corresponding purity or impurity of the blood. This has been proved by experiments, first set on foot by Lower in this country, which clearly show that many diseases, hitherto referred to some organic lesion in the brain or spinal cord, are capable of being removed with the condition of the blood.

Proved by transfusion.

Nasse transfused the blood of tame animals into the vessels of wild animals, which rendered the latter more tame. In like manner, the blood of young animals was transfused into the vessels of older animals, and they became more lively and active. Prevost and Dumas showed that this vivifying power resided in the red globules. Dieffenbach confirmed these experiments. But the experiments of Denys and Emerey come nearer to the point. A man had wholly lost his memory, and he was affected with great drowsiness; another man was the subject of insanity; a third, of paralysis. The cases of drowsiness and paralysis were much relieved, and the case of insanity is said to have been quite cured, by the process of transfusion. Denys introduced into the veins of an idiot the blood of a calf in greater quantity than that which had been drawn from him,

and he appeared to recover his reason. By this means a person suffering from ague, and another from lepra, were cured without any untoward result. But, as might be supposed, the injudicious manner of applying so formidable a remedy soon brought this method into disuse. The idiot died soon after from the effects of hematuria, brought on by a second application of the remedy, the first having induced great mental disturbance. After this, a young prince of the blood royal, and two individuals under Riva, having lost their lives by the operation, it almost from this time, as a remedy, passed into complete desuetude. The facts, however, elucidate the question of the close connexion the blood has with the phenomena of mind, and for this cause we mention them.

Composition of the brain, according to Vauquelin.

The composition of the brain, according to Vauquelin's analysis, is as follows :

Albumen	7·00
Fatty matter	5·23
Phosphorus	1·50
Osmazome	1·12
Acids, salts, sulphur	5·15
Water	80·00

By Sass and Pfaff.

He considered the quantity of phosphorus in fresh brain was as much as one per cent., or one third of the weight of the fatty matter. These materials, by a still further analysis given by Sass and Pfaff, show the primary elements to be—

Carbon	53·48
Hydrogen	16·89
Nitrogen	6·70
Oxygen	18·49
Fixed salts	3·36
Phosphorus	1·08

We may thus see that carbon, hydrogen, and oxygen are largely engaged to form the fatty matter, which,

What constitutes the chief bulk of the cerebral mass.

in conjunction with phosphorus which also unites with oxygen for this purpose, constitutes the chief bulk of the cerebral mass.

Carbon is required for almost every tissue.

As carbon is so much in demand in many of the tissues, and therefore enters so largely into the composition of fibrin, albumen, and the blood-globules, it is necessary that some law should exist in the mechanical composition of the blood by which this element could always be secured.

Also phosphorus.

This observation is also applicable to phosphorus, which is required to be present at the formation of almost all the tissues.

Method adopted to secure these substances.

To secure this, a very beautiful arrangement is made, by which, according to Liebig, an equilibrium is established between the phosphoric and carbonic acids, and for the accomplishment of this, the blood is continually kept in a state of alkaline reaction, by the presence of a large proportion of soda. These two acids "divide between them the soda of the blood. There can be no circumstance more favorable to the separation of one or other of the two acids. If we assume that carbonic acid seizes a portion of the soda, we may imagine that the phosphoric acid, previously combined with this portion of the base, is expelled from the place it originally occupied, and thus set free; but it does not yet on that account separate from the compound. We can say that the carbonic acid is converted into carbonate of soda, only when the free phosphoric acid has been removed and employed in another quarter; but, in point of fact, this phosphoric acid, thus displaced, is always present, and retains, unimpaired, its power of again combining with the soda, the slightest cause coming in aid of its affinity, so as to give it the preponderance, (and to this category belong all the causes which diminish the affinity of carbonic acid for soda,) suffices to displace the carbonic acid, and to reproduce the original compound. Agita-

tion with air; the spontaneous evaporation of the water in which the compound is dissolved; the diminution of the atmospheric pressure; all these causes, which have no effect on neutral carbonate of soda, produce decomposition, and cause the separation of carbonic acid, taken up by the phosphate of soda in the blood. In this manner the amount of carbonic acid is kept at a constant value. If more carbonic acid enters the blood from the body, more phosphoric is set free in proportion, and thereby a more easy and complete separation of the carbonic acid in the lungs is secured. If more soda be taken up, then a part of the carbonic acid, which would otherwise have escaped by the lungs and skin, is expelled by the urinary passages."*

Advantages of this law.

By this law, so long as the functions of the body are performed with health and regularity, there can be no fear of the carbon accumulating to excess, and the consequent evils are amply provided against. We can imagine, under such circumstances, that the brain in common with all other organs would receive its proper supply of normally prepared materials, such as are fit to be converted into healthy cerebral matter. And whether the union of phosphoric acid with the fatty matter, the stearine and the elaine, which go to form this cerebral pulp, is dependent entirely upon the healthy function of the blood-vessels of the brain, or whether those substances are previously combined by the vital power of the blood, before it reaches that organ, matters not, so long as the elementary matters are supplied normally, or the great chemical change above stated is not interfered with by the suspension of office of either of the great channels for the purification and elimination of the blood. This can only be com-

* Liebig's Chemistry of Food, p. 120.

pletely done, by supposing that all the vital organs are performing their function with regularity.

Office of the liver and lungs.

The liver is required to separate the carbon and hydrogen from the blood, preparatory to the pulmonary change it is about to undergo. The lungs are required to bring the oxygen of the air in contact with the carbon of the blood, by which the colour is maintained in the system, and such of the carbon removed

Of the skin.

as may not be required. The skin in like manner is employed as an organ of elimination for carrying off the superfluous carbon, so constantly and bountifully supplied to the body, as well as other injurious saline

Office of the kidneys.

matters. And the kidneys are called upon to remove those materials from the blood which contain an excess of nitrogen, together with any animal, saline or earthy matters that may be required to be conveyed out of the system. These are all functions, on the healthy performance of which the relative and just proportioned constituents of the blood mainly depend.

Variations in quantity of vital stimuli.

Knowing how varied, both in degree and kind, the different vital stimuli are which supply the body with support, the wonder is, that the standard of health could be maintained, under such very different circumstances, yet if we only consider the one point of quantity, it is astonishing that this standard should be so long

Their effects.

kept up under such extreme circumstances as we know it sometimes is. Contrast the simple food of the quiet and well-conducted agricultural labourer, consisting of a few ounces of bread daily, mixed with a small portion of vegetable or animal fibre, and place this side by side with the endless variety of food of all kinds and viands of every sort which compose the dinner of a gourmand. It seems almost incredible that Nature should be able, through the medium of these different

organs of elimination, to carry off from the system the superabundant supply of nourishment, without suffering more or less as the necessary consequence. Yet do we know that year after year she undertakes the long and uninterrupted but arduous task of carrying off the excess of carbon, nitrogen, and other materials, from the system without any intimation on her part, that the duty is any other than a natural process carried on by the expansive agency of the vital principle. Thus the action of the skin, or of the mucous membrane of the lungs, is occasionally suspended, when the duty falls upon some other organ. The perspiration suddenly becomes checked, and the blood is driven to the lungs, that pulmonary transpiration may be increased, thus compensating for the suspension of the function of the skin.

Vital adaptation of the blood.

The organic tissues, even in health, are possessed of very different degrees of power in individuals of different temperaments, or at different ages, or in different countries. The excretory organs under these circumstances vary very much. One person has always a free action going on in his skin; while in another, this action seems almost suspended. If we extend the observation to those of a different nation, the variation is very remarkable. Dr. Copeland states, that in making some experiments upon his own chest and that of a negro, whose chest was about the same capacity as his own, he found a larger quantity of carbonic acid proceed from his own lungs, but that this deficiency in the negro was made up, by a greater quantity being exhausted from the surface of the skin, in the proportion of three to two. Even at different periods of the day, the quantities of carbonic acid given off by the lungs, Dr. Prout has shown, vary considerably. And in like manner the secretion from the kidneys

Power of the organic tissues very variable.

Difference of function in the lungs.

varies both in relative quantity as well as in specific gravity.

Reasons for the peculiar condition and adaptation of the blood.

It was needful then that carbonic acid, so much required in the living body, should have some easy way by which to escape from the system when accumulated there in too great quantity. And we must see how wisely the equilibrium has been established, not only by adapting the different organs of elimination with such elasticity of function, as that they can accommodate their work to the altered circumstances in which they may be placed, but also by making the serum of the blood to be constantly in an alkaline condition, so that the excess of carbonic acid may be absorbed at all times.

In contemplating the healthy powers of the blood, there is need therefore that we compute the action of causes both from within and from without, which are important to allude to, as they exert a powerful influence upon the frame, and the neglect of this fact is attended with phenomena which we can no longer regard as the result of healthy function. One person will drink a bottle of wine, which may have little sensible effect upon him, and the alteration it produces in the relative quantities of the constituent elements of the blood may be attended with little more additional duty than a slight increase in the function of the skin or the kidneys. Another person may adopt the same course, but the effect is by no means similar; it may give him a fit of the gout, or it may produce a fever, or the mind may become deranged. These are very different effects—the product of the same exciting cause; and they show there must be another cause in operation—a predisposing one; and this will be found to exist in the blood, which has passed out of a normal condition into one where the chemical changes are

Different effects of the same exciting cause upon the blood.

Action of a predisposing cause.

abnormal, and consequently unable to accommodate itself to so violent an excitement which the wine in this case would produce.

This will lead us to consider some of the morbid changes of the blood, which are in some way or other mixed up with the deranged condition of the brain and nerves.

CHAPTER III.

ON THE MORBID CONDITION OF THE BLOOD, AND ITS EFFECTS ON ORGANIC STRUCTURES, PARTICULARLY THE BRAIN AND NERVES.

Variations in the blood compatible with health.

THE few observations we have made in the last chapter, on the component elements of the blood, and the various changes which that fluid undergoes in persons of different temperament, age, sex, &c., show that, in the constitution of this wonderful medium, much latitude of variation was allowed, which was not altogether incompatible with the healthy gestation of the animal functions.

Morbid changes of the blood.

We come now to speak of some of the changes effected in the blood by the operation of morbid causes; but, as the limits assigned to these remarks are not compatible with any extended view of this important subject, we must confine ourselves to those points which appear to bear more immediately upon the brain, alluding to other morbid phenomena only by way of elucidating our subject.

Difficulties in investigating the subject.

We have seen how many impediments obstruct the path of the physiologist in exploring the difficult science of animal chemistry; how the laws of simple affinity, for example, which, in the inorganic world, are permitted uninterruptedly to have their play, when enlisted in the service of living bodies, are made to yield to the laws of life. Many of these laws are still bound up in mystery, and all the labour and penetration of our greatest philosophers have hitherto failed to unravel them.

But these remarks are not confined to the *physiology*

of the blood: they apply in a similar degree to its pathology. Much of the difficulty which surrounds the subject may be referred to that wonderful circle of agents, which are so placed in living bodies, as that it is impossible to say where they commence or where they terminate.

Referable to a circle of agents.

When it is considered how much carbon is demanded by the system in the building up of almost every tissue, we may readily suppose that the constant alterations between the supply and the demand of this element in the blood is subject to the greatest changes and variations. We have shown how the healthy elasticity of the various organic structures is most wonderfully displayed in the compensating power which one organ or another will take up on emergencies. In disease, however, we have to contemplate a far more difficult position into which these organic structures are thrown. We can imagine the difficulty to be readily overcome, as long as the compensating power of one organ meets the increased demand made upon it by another. When this fails, the inevitable result is, that the elements and materials of the blood must either enter into new arrangements or into forced and unnatural combinations, in order to get egress from the circulation, or else they must continue to accumulate in that fluid, thereby excluding other more important changes, which would otherwise take place. The vital stimuli, but more particularly food, being conveyed into the system in undue quantity or noxious quality, now no longer finds its way through the excretory organs so freely, but is retained in the blood, where it acts in destroying the healthy balance, so necessary to be kept up. If, from this and other sources, the carbon is in excess, it retains the phosphorus, which would otherwise be set free and in a condition

Supply and demand of carbon in the blood.

The balance is lost in the morbid changes of the blood,

—by the excesses of the vital stimuli retained in that fluid.

The consequences that follow.

to form unions with those substances, which together form the basis of the different tissues, and, by being in contact with abnormal compounds, it joins them at the expense of the more healthy tissues.

The carbon being in excess, the phosphoric acid is prevented joining the fatty matter.

It seems, then, that the condition of the blood, tending to weaken the power of the cerebral and nervous mass, is caused by the presence of carbon in excess in that fluid. The phosphoric acid is thus prevented from joining the fatty matter to form cerebral matter, owing to the necessary redundance of soda, the consequence of the excess of carbon in the blood, upon the physiological principle stated in the last chapter, and thus being directed into unnatural channels, and having a ready tendency to permeate all the tissues, it escapes from the body, thereby causing a deficiency in this important medium for the generation of cerebral and nervous matter. There is one mental phenomenon, viz., the retention of past ideas, the result of sensorial impressions made many years before, which strongly favours the idea that the disease called insanity arises from causes connected with the recent formation of cerebral matter that has been going on; and that there has probably been little or no change in the materials composing the brain and nerves, that were formed previously to the development of the mental malady. Many insane persons have no recollection of what is passing from day to day, while they retain accurate impressions of events which took place previous to their derangement, on which events they will even appear to dwell with pain or pleasure, as the case may be. If this difference results from the imperfect secretion of the recent cerebral mass, it may be interesting to know how far such imperfectly prepared organic tissue is defended from the action of the absorbents, like the more perfectly vitalized parts. We

Insanity probably arises from causes connected with the recent formation of cerebral matter.

believe the brains of the insane are relatively lighter in weight than those of the sane.

Brains of the insane are probably lighter in weight.

The prevailing, and, in our opinion, the soundest, impression as regards the connexion of mind with matter, and the manifestation of the former through the latter, is that expressed by Fletcher,* viz., that "the faculty of thinking is born and developed, decays and dies with the body." He thinks that thought may be *attached* to matter, or, as we express it elsewhere, *transmitted through matter*, but it cannot be *a mode of being* of matter. It is not difficult in this sense to understand how the healthy manifestation of mind must most intimately depend upon the condition of the substance through which it is conveyed, and consequently upon the blood, which is so much concerned in the building up of that substance. Hence, the faculty of thinking is increased or diminished according to the amount of healthy nervous matter in which it resides. And the energy of thought is increased by intermission, and diminished by long exercise. This energy is, in a healthy state of mind, closely connected with the quantity and quality of arterial blood circulating in the brain. It is the opinion of Liebig† and Fletcher,‡ that there is not a single thought occurs without a change of matter in the substance of the organ of thought. This change of matter must then be, whether perfectly or imperfectly, carried on through the medium of the blood. Hence, the *process* of thought must depend, not only upon the structure of the organ of thought, but also upon the quantity and quality of blood circulating within the organ of thought. And the *energy* of thought must depend, not only upon the

Relation of mind with matter.

Liebig and Fletcher's opinion of the connexion of mind with the blood.

* Rudiments of Physiology, part iii, p. 87.

† Animal Chemistry, part i.

‡ Op. citat.

quantity and quality of the renovating particles conveyed in the blood to the organ of thought, but also on the susceptibility of those particles to be changed or replaced.* Thus, we must inevitably have morbid thoughts as the consequence of morbid blood, and the way to remove the one is reasonably by attempting to remove the other. We think the true explanation is in the altered relative quantities of the constituents of the blood, by which morbid changes take place.

Effects of alcohol upon the blood.

Of these morbid changes none are so common or so deplorable as those produced by alcohol. The large number of individuals who annually swell the ranks of the insane in this country from the abuse of ardent spirits and fermented liquors of every kind is almost incredible. We believe alcohol has never been detected as a natural product of animal bodies, and therefore there is little doubt that, when introduced into the blood, it not only acts as a poison upon the organism of the body generally, but, in a more direct and specific way, upon the brain and nervous system; so that, to use the words of Dr. Percy, "it would almost seem that a kind of affinity existed between alcohol and the cerebral matter." He has clearly shown that, to a certain extent, it is not only conveyed and contained in the vessels of the brain, but is actually diffused through and intimately mixed up with the substance of that organ. This he proved by many very interesting experiments.† There is no doubt that, at first, the energy of the vital principle is sufficient to decompose alcohol—the acids attack it in the process of assimilation; and this, no doubt, accounts for the fact of so many eminent physiologists having failed to

It is peculiarly attracted to cerebral matter.

* See on this subject, Mr. Ancell's Lectures on the Blood, in the Lancet.

† Experimental Inquiry concerning the Presence of Alcohol in the Ventricles of the Brain, &c.

detect it in the urine. As, however, it continues to be conveyed into the system, this power to decompose it becomes lessened, and thus, failing to be carried off, it acts with greater power upon the organic tissues. Liebig considers that, although the elements of alcohol do not possess by themselves the property of combining with oxygen at the temperature of the body, and forming carbonic acid and water, yet it acquires this property by being in contact with bodies in a condition to absorb oxygen. In this way the elements of alcohol are consumed by going out as oxydised products, the carbon as carbonic acid, and the hydrogen as water.* The theory of Fourcroy, that the gaseous elements of the blood are expelled by a specific organ, appointed for the purpose, and that in this way the hydrogen escapes with the bile from the liver, is strengthened from the fact that, in great spirit-drinkers, the liver is almost always diseased before the mind gives way, and that in this way the hydrogen fails to escape from the blood, and gives rise to that combustion, called *catacausis*, which sometimes takes place in dram-drinkers. Still, we believe that the gradual deterioration of the powers of life by the repeated daily application of alcohol to the animal tissues does not admit of this decomposition of the alcohol, and the consequence is, that it finds its way unchanged, as Ogston, Trotter, Cook, and others have affirmed, into the substance and cavities of the different vital organs, where it acts as a foreign substance, saturating and coagulating the structures it comes in contact with. Taking the more chemical view of the action of spirituous liquors upon the blood, it must be obvious that the great amount of carbon thus produced, must tend to displace the phosphorus, and to prevent its union with that substance.

Its chemical action on the blood.

* Animal Chemistry, part i, p. 97.

The reason why different organs become affected in insanity.

If by this means it is that the phosphoric acid is prevented from joining the carbon in the synthetic process of preparing the cerebral and nervous matter, we have here an explanation why the diseases in the organs of the alimentary system—the stomach, liver, and intestinal canal, and also the kidneys, so often accompany insanity. It is remarkable that, in the renal affections of some of this class of patients, the ammonia and magnesia have joined the phosphorus, and are throwing down the triple phosphates in the urine, together with lithic acid, which contains much carbon.

Some attention has been lately paid to the urine of the insane by Erlenmeyer,* Heinrich,† Sutherland and Rigby,‡ Bird,§ Jones,‖ &c. The most remarkable feature is the excess of ammonia in the form of carbonate, urate, hydrochlorate, or the ammoniaco-magnesium phosphate. It must not be overlooked, that the condition of the urine in these cases may take its character from the low degree of organization in the bladder, which accompanies, more or less, all nervous affections. Mr. Blizard Curling has alluded to this fact, and he calculates that the alkaline state of the urine owes itself, in some instances, to a loss in the natural sensibility of the bladder,¶ or to a secretion of alkaline mucus from inflammation, set up in that organ from the same cause. Dr. Golding Bird's work has much interesting matter on the effects of oxalate of lime being thrown down in the urine, causing great irritability, depression of mind, hypochondriasis, &c. Dr. Bence Jones has made some important observations

* Observat. Physiol.-Pathol., &c., de Urina Maniacorum.
† Häser's Arch., vol. vii, 2.
‡ Medical Gazette, June, 1845.
§ Urinary Deposits, 188.
‖ Medico-Chirurg. Trans., vol. xii, p. 21.
¶ Med. Gazette, 1836.

upon the state of the urine in delirium tremens and inflammation of the brain, showing that phosphoric acid is largely given off by the kidneys in both these diseases. Whatever cause tends to bring the oxygen in more abundant or more frequent contact with the cerebral substance would be likely to produce this effect.

The increase of the muscular power and the decrease in the sentient power in the insane.

In insanity the muscular power is often very much developed; many imbeciles can lift extraordinary weights and walk great distances without fatigue, while the sentient power seems so weak that they will look at the sun, or endure considerable pain, without apparently feeling it. We think this is capable of being explained from the altered condition of the blood. The muscular fibre is formed by a union of phosphorus with potash, which it has a great affinity for, and though not in so high a degree as for soda, yet probably more so than for carbon, which it would join to form the nervous mass. In this way the phosphorus probably gets diverted to a morbid degree in the channel of the muscular system.

Explained.

Whether this is the cause or consequence of paralysis.

Whether this increase of muscular power in some of the insane is the cause or the consequence of paralysis, is a question of interest. The two conditions often alternate, and they appear to make equal claims upon the notice of pathology. In epilepsy, so often the precursor of insanity, there is a condition of the muscular system which implies an irregularity of nervous energy, in all probability depending upon a deteriorated condition of the blood. This condition, in some respects, resembles the muscular power in fishes, which is low and irregular. Carus says, "In fishes, the muscular fibre is usually soft, gelatinous, and colourless. As the red colour and the greater density of muscles are dependent on the quantity of blood con-

Condition of the muscles depending on the blood in epilepsy.

tained in them, this fact indicates a very sparing supply of blood-vessels to the muscles in this class, which is so much the case that even an extensive incision into the great lateral muscles is followed by a very slight effusion of blood. If we compare this circumstance with the vital phenomena of these organs, we shall be inclined to attribute to their imperfect vascularity, and consequently less rapid change of materials, together with the less complete centricity of the nervous system, the permanent irritability of individual parts of the muscles of fishes."* For these reasons, we should say the flesh of fish would be contra-indicated for the improvement of the epileptic, and the muscular fibre of the higher animals would be more likely to supply the deficiency. Epilepsy often comes on after great muscular exertion. Dr. Sutherland states,† that there was a practitioner in Amsterdam famous for his treatment of epilepsy, who would never allow his patients to touch fish.

Action of phosphorus in rickets and cretinism.

This irregularity in the action of phosphoric acid upon different substances in the blood is seen in the two diseases cretinism and rickets, in which the intellectual antithesis is very striking. In the former, the phosphorus is so deficient in the cerebral matter, as to render it indifferent to the action of the most powerful stimulants, of heat or cold, the light of the sun, blows, and even wounds. It accordingly passes off abundantly in the urine, which it does readily, on account of the facility it has in passing out of the system by this channel, as well as by the alvine secretions. In the latter disease the phosphoric acid does not enter the osseous system in healthy proportion, and, from the very precocious development of the intellect, it is not

* Comparative Anatomy, translated by Gore, vol. i, p. 350.

† Further Report of Commissioners in Lunacy, 1847, p. 465.

improbable that it has joined the fatty matter in undue quantity.

We would here state that often for a day or two previously to the coming on of an attack of mania the external senses become dull, and seem apparently to have lost much of their sentient power. In this respect they resemble, temporarily, that condition which in the idiot is a permanent symptom. They can look up at the meridian sun with a pleasurable feeling, or bear pricking or pinching the skin without pain. And there is also some resemblance in these symptoms to that condition of the nervous system artificially induced by what is called mesmerism upon certain individuals, whose derangement of the general health has implicated the brain and nerves in some abnormal condition, and this would seem to infer that those who were thus readily acted upon, would be more predisposed to the invasion of insanity at some future period. It is to be presumed that in these several conditions the nervous system has, from destructive assimilation, or some other cause, given off a portion of the phosphorus which should enter into its healthy composition.

The skin is generally in an inactive state, which is the chief channel for conveying away the carbon.

But that which seems to prove that the carbon of the blood in insanity is in some way retained in that fluid, and prevented either from forming the proper tissues, or from getting egress through the ordinary channels, by which the preparation of the cerebral and nervous tissues in healthy proportions is prevented so as to admit of the mental phenomena being rightly performed, is that the chief channel for the elimination of carbon—the skin—is, in this disease, almost always deranged in its function. The offensive effluvia given out by the skin in the insane are sometimes so great as to make a room almost unbearable. It is singular, nevertheless, how very little the skin acts in this

disease. When we speak of acting, we must not be understood to mean the mere power to transude the aqueous particles of the blood, for this kind of perspiration is common to many of the insane with other classes, and it resembles closely the same power under similar circumstances possessed by the kidneys, of carrying off the mere water of the blood, combined with a small proportion of ammoniacal salts. We should say that in this disease, both the skin and the kidneys, failing to receive the proper supply of nervous energy, are nearly suspended in their action, and that decomposition takes place of what effete materials are conveyed there.

Also the kidneys.

Skin of the negro.

We would direct attention to the fact mentioned in the last chapter, that the skin of the Negro carries off so much more carbonic acid than that of the European by this channel, adding here the remarkable coincidence, that insanity is so little known among that race of the genus homo; and, we may add, in most other nations within the tropics. This excessive perspiration in many of the savage tribes may account for the immense appetite which most of them possess even for the most highly carbonized food, and which gives to them often so powerful an odour. The same circumstances, viz. the extreme perspiration and odour, also attended those extraordinary cases of bulimia—Tarrare and Dommery.

Insanity little known amongst them.

Seguin's experiments on the skin.

It is mentioned by Seguin, who made careful observations, that the exhalation from the skin in health is equal to 15,840 grains, or 33 ounces, in twenty-four hours. Sanctorius affirms that five eighths of the ingesta were carried off by this channel. As a channel of elimination, therefore, it does not fall far short of the kidneys; and while these latter organs are able to perform their duty, this important action of the skin

may be compensated for; but in nervous affections nothing is so common as for the kidneys to fail to carry off the nitrogenous particles from the blood. The watery part passes through the organ, but little besides. Hence the specific gravity of the urine of insane persons is often lighter than natural, the carbon and nitrogen being thrown back upon the circulation.

Action of the kidneys in the insane.

This inconvenience would not be accountable if it did not continue for a long uninterrupted period, during which no more action of the skin than usual is either manifested or sought. Indeed, it is reasonable to suppose that the same irregularity or want of power in the nervous system would be as likely to affect the function of the skin as that of the kidneys, and in such a case it must be evident that the blood must become the recipient of all the cast-off and disintegrated particles of the body, the very presence of which, if it does not cause disease, must at least prevent the nourishment of the body, upon bare mechanical principles.

Inconvenience of their not acting.

In such a state of things, it is not surprising that disease establishes itself in organs which have failed to receive their supply of nervous power to enable them to carry on their function. This explains satisfactorily why, in so many cases of insanity, the organic disease is seated in some of the abdominal viscera, and not in the brain, for this organ may, and does in many kinds of nervous disease, fail to perform its duties to the organic structures with which it communicates, long before any actual mental deviation from health may be noticed.

Probable cause of organic diseases,

in parts distant from the brain

We, however, believe that at this early period the foundation is laid of functional derangement even of the mind, first manifesting itself through the feelings, but exciting little attention even to the psychological

Early foundation laid of insanity.

observer, from the frequency of its occurrence, and the assumed inference that it will pass off.

When any organ has received an additional charge placed upon it, it may long perform its increased duty; or if this is distributed over several organs, the period may be still more distant when the disease has really assumed an organic form. But this state of things cannot be kept up so long, with reason, as if the duty bore a more accurate relation to the instrument. There is, most assuredly, a time when the vital force in every organ is weakened, and the continuance of the same causes morbidly increased must finally lead to complete disorganization. *Gutta cavat lapidem non vi sed sæpe cadendo.* The cause may be slight enough in the first instance, but its continuance alters the relation between the thing acting and the thing acted upon. This relative difference in the degree of healthy function in different organs of the body is often produced by hereditary causes. The predisposition to particular organic weakness may be conveyed from one generation to another, but it may long continue only a *functional* weakness, and be perfectly compatible with healthy action, if caution is taken to lighten the duties which are so constantly imposed upon the weak parts.

Hereditary causes.

Caution in such cases.

This fact may be aptly elucidated in the disease we term hypochondriasis—a disease in the course of which the function of the brain becomes disturbed, so as to lead to complete mental derangement. It was the opinion of Hoffman and Stahl that this disease arose from a primary derangement of the circulation; and this opinion is singularly borne out by the researches of morbid anatomy at the present day. The venous, and more particularly the portal, system becomes, first of all, overloaded with carbon and other deleterious matters, from mechanical obstruction,

Illustration from hypochondriasis—

a disease of the blood.

caused by the pressure either of an undue quantity of food or of excrementitious matter, or of flatulence in the primæ viæ. Year after year is this pressure kept up, and the causes leading to it are not removed. Probably for a season the symptoms will yield to a steady attention to those rules which would prevent accumulations in the course of the alimentary canal, or lessen the labours of the already weakened powers of digestion; but the symptoms being mitigated, the person returns to his old habits, and with them returns the disease. Thus does it go on from slight functional disturbance to real organic mischief, not in the brain, be it remembered, which mischief invariably shows itself after death in some of the abdominal viscera connected closely with the portal system, as the liver, duodenum, colon, rectum, &c. It is doubtful whether any real change of structure has ever been found in the brain in this disease; yet numerous persons expose themselves to similar causes, and do not suffer from hypochondriasis. They die of diseases probably very similar in character, as regards the abdominal appearances, and seated in the same parts. Their temperament, food, occupation, may all favour the development of the disease; yet it is not manifested, and hence there must be a predisposing cause in the nervous system of those attacked with the disease; and there can be little doubt that this predisposing cause, which, there, is functional, and remains so for a long period of time, is, in other viscera of the body, converted into a change of structure. Here, then, is a disease not depending upon the morbid condition of one organ, the structure of which may be inflamed from causes acting from without, but having its origin in the blood of a whole system of vessels, in which it has been mechanically detained, producing morbid results in

Doubtful if there is any disease of the brain in this disease.

Depends on a predisposing cause.

Is essentially a disease of the blood of a whole system of vessels.

every organ from which this blood should be returned. Hence the variety in the symptoms affecting this class of patients; and hence the cause why the brain suffers by sympathy.

Organic disease of one organ depends on another.

So intimately connected with, and so mutually dependent as are the different vital organs upon each other, especially through the nervous system, we can see readily how a deficient action in one is calculated to implicate all the rest. Hence it is that a structural disease of the kidney will produce morbid and like structural changes in the heart, liver, intestines, or brain; and a disease in the brain will involve in a serious organic lesion almost every important organ of the body.

Brain far less frequently involved in structural disease than any other vital organ.

We believe that the brain, as a vital organ, is far less frequently than any other involved in structural disease of any kind, and in those diseases of the adynamic form, so typical of insanity, still less frequently. This we shall prove by several facts. But first it may be inferred

Proved from accidental injuries.

from the known power the brain possesses of repairing injuries done to it, and of resisting the invasion of organic disease which such injuries would be likely to predispose it to. There are numerous instances where injury and compression of this organ has been neither attended nor followed by any morbid symptoms whatever. The memorable case mentioned by Sir Astley Cooper, which was operated on by Mr. Cline, shows that even morbid symptoms may follow a mechanical injury, and, after continuing above a year, may be removed without any detriment to the mental or bodily functions. A sailor fell from a mast, and received a blow on his head, which produced a depression of the skull, and symptoms which deprived him of all mental and almost all physical power. He took food and he breathed, but little more than this did he do for thirteen

months, when Mr. Cline trephined the skull in that part where the depression had occurred, and having removed the pressure, he almost immediately spoke, and only a week afterwards his mind had almost completely returned, when he could converse and move about nearly as well as he did before the accident occurred. He remembered now all the circumstances of his being pressed and carried down to Plymouth; but from that period till the operation was performed his mind remained a perfect blank; soon after which it was restored to healthy action. Surely, if the brain is easily destroyed by injury, the man ought never to have recovered his senses, even if he did his life.

Mr. Cline's case.

But, secondly, as regards the power of resisting the invasion of organic disease, the brain is far more able to bear the action of causes which produce inflammation in other organs, without becoming itself so affected. If this observation applies to inflammatory diseases, it is still more forcibly applicable to what are called nervous and mental diseases, which are asthenic in character, and in which few, if any, of the true symptoms of inflammatory diseases are present. Pathologists have examined the brains of lunatics, expecting to find the ordinary sequels which in those organs are found to characterise inflammatory action; yet they find no such appearances. They do not go on to examine the substance of the brain by chemical analysis; if they did, they would find the deficiency to rest here. It has been clearly proved that the nervous matter of the brains of the insane is deficient in phosphorus; and, in the deficiency of this essential ingredient in the normal constitution of cerebral matter, no surprise ought to take place, that this substance is incapable of executing the office of the mind.

Proved from organic disease.

Which are very rare.

Degenerate state of the cerebral mass.

How far this degenerate condition of the cerebral

How far the cause of congestion.

mass depends upon, or is the cause of, that particular state of the venous circulation in the brain which we call congestion, and which so often attends those diseases which are comprehended under the general term insanity, is a very interesting question.

Ramollissement: what is comprehended in the term.

In some forms of mental disease, after death, it is true, we occasionally meet with an alteration in the consistence of the brain, which is comprehended in the term ramollissement, and it is extremely doubtful whether this peculiar appearance is really the result of inflammatory action in the brain. All the symptoms during life most decidedly negative the idea. M. Rostan thought this disease was not inflammatory, but one *sui generis*. It is certainly a very different disease from that softening which is the result of true inflammation of the brain, where no symptoms of insanity are manifested. We contend that it is nothing more than the result of an atonic state of the secernent vessels, by which the cerebral globules become chemically deficient, and are consequently soft. In other words, it is not disorganization, but mal-assimilation.

Doubtful if such a term is applicable to the state of the brain in insanity.

Power of absorption in health and disease.

It is possible that all the organic structures possess in a healthy state the power of extracting what nourishment may be contained even in the imperfectly assimilated portions of the blood that may be conveyed to them, and, having done so, of returning those particles again to the circulation, to be carried off by the proper emunctories; and it is in this power of the organic tissues that rests the means of averting a condition of the organ which leads to disorganization, the true pathology of which consists in a retention or deposition of those mal-assimilated portions of the blood, now no longer capable of being thrown off by the organ to which they are conveyed.

There is little doubt that organic disease is often

suspected, and even affirmed to exist, when the result shows it could not even have been formed, so closely are the symptoms of functional derangement made to approximate those of diseased structure. It is true the structural disease of one organ may be more clearly known from peculiarities of position, office, or texture, as in the case of the kidneys, where, for example, the albuminous deposition so clearly marks the existence of Bright's disease; but this does not imply that with the same certainty we may speak of changes of structure in other organs. Neither does the presence of an excess of albumen in the urine give us any idea how long the causes leading to the change of structure in the kidney may have been existing in the blood, or how long those organs may have been resisting the injurious action of blood surcharged with albuminous matter.

Symptoms of functional and structural disease closely allied.

In many cases of insanity, there can be no doubt that those which are looked upon as incurable cases, on account of some preconceived notion that, from the long duration of the malady, there is organic mischief in the brain, have really no more structural disease there than they had the first day of the manifestation of any morbid symptoms. Our own experience most incontrovertibly assures us of this fact. We have examined the heads of those who have died insane, after having manifested the morbid symptoms for many years, and found none of the appearances referred to inflammatory action, or even any appearance whatever of a morbid character.

No structural disease in many old cases of insanity.

A gentleman was placed under my care who had been for some months under the care of one of the most celebrated physicians for the insane in Paris. It was the opinion of this physician that there was ramollissement of the substance of the brain. He

Shown by case.

had loss of memory and speech to a great extent, and there was a paralytic contraction of the flexor muscles of the legs. This occurred six years ago, yet he is still living, and has lost all the contraction of the limbs, has great additional muscular strength, and can talk better, and even sings frequently. Could this be so if the brain had undergone six years ago a softening of its structure from inflammation? This case shows either that he was not the subject of ramollissement, or, if he was, that that ramollissement which is sometimes associated with insanity is not an inflammatory disease, but one of mal-assimilation of the cerebral globules, depending upon very different causes.

Another remarkable case in proof.

To mention another case: A poor man was married at the age of 19, soon after which his wife became unfaithful to him, and he went out of his mind, in which state he continued for nearly thirty years in an asylum. His mother, thinking she might undertake the management of the case without danger, took him home to her house, where he resided for a year or two, but, from causes possibly connected with a less moderate or appropriate diet, in one of his fits of depression he cut his throat. He was of a sanguineous temperament, and the loss of blood was quite as great as was compatible with life. After much care and anxiety, his life was saved, but the most astonishing fact is yet to be stated; he recovered his right mind, and has remained well, *cum sana mente in corpore sano* ever since, and this is fifteen years ago. It would be curious to know, after this man had been nearly thirty years in an asylum, what was the opinion of the visiting physician upon a case of so long standing. Could it be possible that the brain, exposed as it was for so many years to the operation of some morbid cause, no doubt latent in the blood, which led to a derangement of mind, could

Inferences from these cases.

only have been affected functionally, that is to say, in this case curably? And yet it is inconsistent with reason to suppose that the organic structure of the brain was involved; for, if so, how could the man, after thirty years, be restored to all his faculties? How much more probable is it that the brain in this case was only functionally disturbed from a disease existing in the blood; which disease, during the long series of *thirty years*, failed to alter the structure of the brain; and, consequently, when the violent remedy came to be applied, which abstracted so large a quantity of that material in which the disease resided, the mental derangement vanished.

Arguments deduced from idiots and imbeciles.

The success which attends the efforts of many enlightened physicians to restore in some degree the mental powers of the idiotic and imbecile is again a verification of the same principle we are contending for. If these poor creatures had organic disease or malformation of the brain, they would manifest no improvement when exposed to the action of those second causes which have been so long denied them; but if the natural organization of the brain has only been arrested, there is both reason and hope that human efforts may partially, though not entirely, restore them. This is precisely what has taken place. The efforts of M. Seguin, MM. Falret and Voisin* are being responded to in this and other countries, and we shall soon have the happiness of contemplating the restoration of thousands of our fellow-creatures who were sunk into the most wretched and helpless of all human conditions. It will also be found, that not only can the imbecile and idiotic child be made susceptible of enjoyment, and capable of assisting itself, but even

Efforts of Seguin, Falret, and Voisin.

Not only children, but adult idiots may be much improved.

* See Notes on the Parisian Lunatic Asylums, in the first number of the Psychological Journal, by Dr. Stubbs.

those whose bodies have been preserved to adult age are capable of undergoing considerable physical improvement and of manifesting greater intelligence. This was remarkably exemplified in the case of a lady, brought to us three years ago, who was 33 years of age, and from the period of teething, when she suffered from some convulsive attacks, she never made any mental progress. She could not speak or assist herself in any way, but was fierce in her manner, voracious in her appetite, and destructive of everything placed near her. Her body was emaciated, and she uttered a noise of distress. Her kind and faithful sisters had endeavoured all this time to extend to her the protection of their house; but now their health was giving way, and they were obliged to give it up. Much of this long period had been passed in bed, and often from necessity the windows were closed, and the light was excluded from her room. We soon got up her flesh, and successively she has learned to walk, to feed herself, to amuse herself with pictures, to dress herself, and the like. She seldom makes any kind of noise, and she evidently knows what she ought or ought not to do. She enjoys the sun and the fire, and has learnt to discriminate what is good with considerable ability.

Case to illustrate this.

It is not our intention to crowd these observations with the same facts, variously stated in other words. The doctrine we have set forth has been borne out by ample proof, we shall therefore close what more we have to say, by pointing to what we consider the most successful and curative treatment in the next chapter.

Unnecessary to repeat cases in proof of our argument.

CHAPTER IV.

TREATMENT OF MENTAL DISEASES.

Treatment of mental diseases.

AFTER the observations we have been making upon the probable seat and causes of insanity, it may be desirable to offer some remarks upon the treatment we propose to be adopted. If the disease is really what we state it to be, in four cases out of five only a functional disease, it must certainly be a more curable one than hitherto has been stated or admitted; and to stake such an assertion without some further remedial proofs, would hardly make sufficient claim upon the public mind to ensure its belief.

They are more curable than hitherto supposed.

The fault is in the treatment.

If we have succeeded in proving that the fault is not in the seat of the malady, or in the structural nature of its character, we must, as the only alternative, look for it in the method of treatment, and here we think we shall be able to show the fault really lies.

Extensive character of the disease.

It should then be borne in mind that this is a disease, not only lengthened in respect to the time involved in the process of cure, but also protean as regards the character it assumes. Instead of confining itself to one particular part, it is often manifested by a disturbance of many parts. Instead of being traceable to a change in the action of vessels communicating with a single organ, it is more uniformly the result of changes going on in the general circulation, of chemical formations which are taking place in the blood before it arrives at the organ manifesting any failure of mental power.

The sphere of remedial agents must be extended.

This circumstance obliges us, if we hope, by avoiding the errors of those who have gone before, to attain to greater success, not only to extend the sphere of our remedial agents, but also the time usually computed as necessary for the purpose.

Published tables do not bear relation to the extent or nature of the disease.

Tables have been published heretofore, showing the ratio of incurable cases to rise in number, in proportion to the time suffered to elapse from the period of the first invasion or explosion of the disease. But these are of little value, if it can be shown that the method of treatment has borne, in many such cases, a very trifling relation to the nature or to the extent of the disease.

Symptoms are often very insidious.

In many cases of insanity, as regards their approach, the symptoms are insidious in the highest degree, neither the friends nor the physician having detected them till a complete explosion has taken place. Others, though more clearly marking out the course they are taking, and the end to which they point, are nevertheless often disregarded, and not unfrequently, even with these preparatory warnings, entirely overlooked.

Also overlooked.

The treatment has hitherto been as to an inflammatory disease.

Every remedy for a disease must bear a relation to that disease, or it fails to be entitled to the name. If, therefore, a great mistake has hitherto been made in regarding insanity as an inflammatory disease of some degree or kind in almost every case, when, in fact, it is rarely shown to be such, whether from the symptoms before death, or the morbid appearances after, it follows that what has beforetime been regarded as a remedial process, has in fact not only been no remedial process, but, what is worse, a barrier to recovery, by taking the place of a remedial process when it is not one. What is more common than for the medical attendant of a person suffering from an attack of mania to plunge a lancet into his arm, and extract a large quantity of

It has on this account extensively failed.

blood from the circulation. He is deceived by the quiet effected in his patient into the idea that the remedy has done good, whereas the chances are greatly contingent, whether this first step has not placed the disease in a relation to the patient at once out of the reach of cure. If the mania was not inflammatory, the abstraction of blood was doing little to remove the mental disease, and much to reduce a body already enervated.

But it will be said that the remedies hitherto made use of in the cure of insanity are most numerous, and that it would be untrue to affirm that they are not. It is very certain that the therapeutic method has received much attention, and multitudes of so-called remedies have been proposed and tried. But if these have been made use of only in obedience to certain preconceived opinions, their number is no proof of the incorrectness of our observation. It is the comparatively short time these remedies have hitherto been resorted to, nearly all of which are confined to therapeutic agents ;* the almost general impression on the minds of all, that after a few months', or a year's treatment, these cases should be no longer submitted to the action of therapeutic agents, but merely be protected from the danger of doing harm to themselves or others; it is the very trifling value that has been affixed to, and consequently the very little regard that has been paid to, those important hygienic means—air and exercise, food and beverage, which strengthens our belief that there is yet much to be done by persevering efforts towards the recovery of the insane.

Therapeutic agents used in relation to wrong pathological views of the disease.

Little attention paid to other agents.

* Dr. Burrows, in his Commentary, gives twenty-one different kinds of remedial means, as proposed for the treatment or cure of the disease, out of which number nineteen are therapeutic alone.

When a disease has been characterised by a long period of incubation, it is contrary to reason to suppose it susceptible of cure in as speedy a manner as an inflammatory disease that commences as abruptly as it terminates. In insanity our remedies must often go back to the time when the offending organ—not necessarily the brain—may have first betrayed symptoms of weakness, and if this was in the process of primary assimilation, we must hope for no improvement in the state of the mind, while the same errors of diet, exercise, &c., are permitted to continue.

Method of treatment necessary.

In insanity the enemy does not take up a redoubtable position in one particular locality, making known its formidable character to all around, but it lurks about in secret places, committing devastations more particularly at those times when, unsuspected, it has no real opponent to encounter. All who seek to conquer such an enemy, must never attempt a pitched battle; but, by a series of manœuvres, they must be prepared, by acting on the defence, to defeat its subtle purposes. Insanity is a monstrous and a powerful enemy, that has taken possession of the constitution by many long-continued and successful stratagems, and to expect to get rid of it in a pound of blood, or a dose of calomel and jalap, is as fruitless and unreasonable as it is hopeless and preposterous.

Mode of attack in insanity.

The treatment, then, of insanity admits of four distinct divisions, each of which, like the wings of an army, has its indispensable duties to fulfil, and upon the accomplishment of which the final victory very chiefly depends. We do not say that, as the particular case may be, circumstances may not call occasionally for more fighting in one direction than another; nevertheless, as a rule, we must

The treatment divides itself into four kinds:

go to war with the whole armament, and not with a part.

These divisions are—the hygienic, the therapeutic, the moral, and the physical.

Hygienic, therapeutic, moral, and physical.

I.—*The Hygienic Treatment.*

Under this head we are to consider the operation of air and exercise, food and beverage, upon the diseases of the insane; and certainly if we are called upon to fight the battle of the disease with the choice of either of these means alone, we should select the hygienic.

1. The hygienic method.

It is so common a thing to eat, drink, and breathe, that we scarcely even turn aside to ask ourselves the question whether it is possible to do wrong in these respects. Whereas it ought to be indelibly impressed upon our minds how great is this error, how gigantic is the evil which obviously flows from it, and how imperatively necessary it is that we should be set right upon the matter; for nothing is so common as to treat with entire neglect these great hygienic functions. And in England, perhaps more than in any other country in the world, there is greater need to attend to these important points; for we would ask, in what other country do the inhabitants indulge in such large quantities of animal food, or constantly partake of such highly stimulating beverages. Speaking of the prevalence of insanity in Great Britain, Lord Orrery says, "But what can be the reason that it is so remarkably epidemical in these kingdoms? I am inclined to believe that it must be owing to the grossness of our food, and to our immoderate use of spirituous liquors;

It is possible to commit errors in diet, regimen, &c.

the one frequently causing the deepest melancholy, the other the most unlimited rage."*

Almost every form of the disease may be traced up to these sources.

Will it be credited that to these sources—to some more directly than to others—are to be traced up, almost every form of mental disease? When we take air into our lungs, we little consider how possible it is to inhale at the same time the most deleterious gases, and if they do not produce actual insensibility, no notice is taken of the evil. When food is taken into the stomach, little or no regard is paid to either quantity or quality; but these points are generally made to bear some relation to the caprice or the outward circumstances of the individual, but not to the degree of strength which the organs of digestion may possess. Of beverage also it is remarkable how much error is committed in quality, deteriorated as it is by alcohol in every shape, the true element of our beverage—water—in thousands of individuals, seldom enters the stomach uncontaminated with spirit of some kind or other.

Errors on this subject in air.

In food.

In diet.

Consequences of this neglect.

Now let the reader cast his eyes upon that miserable and degraded mass of human beings, of whom there are 20,000 alone in Switzerland—the Cretins, and he will at once see the effects of deteriorated air upon the human health and constitution, and its power to produce insanity. Let him go into the private and public asylums of Great Britain and Ireland, and he will behold there the pitiable but awful effects of alcohol upon more than two thirds of their inmates. Let him then pay a visit to our spas, to Cheltenham, or Leamington, or Buxton, or to those of Germany, to Hombourg, Nauheim, or Kreutznach, and he will there meet the hypochondriac and melancholic crowd-

* Remarks on the Health and Mind of Dean Swift.

ing the walks, eking out their prolonged and miserable life, full of aches and sorrows, created by their excessive indulgence in the luxuries of the table. After this, he will not be surprised to learn that in our remedial efforts to restore such cases to their right mind, the long and diligent attention to these hygienic points are almost the only treatment left at our disposal, that can be called curative. For what will medicine do towards restoring the elements of the blood, which in these cases are exhausted by the almost complete suspension of the digestive powers?

Amount of air taken into the lungs in twenty-four hours.

The bare statement that every adult human being must, in the course of 24 hours, take into his lungs 1,152,000 cubic inches of some sort of air, is sufficient to bring conviction to the mind that it is quite possible for the blood to be very much altered for better or for worse, and vice versa, by this channel. Long before people lose their minds, those that are predisposed to it in all classes of society, either from fashion, necessity, or bad legislation, are brought under the baneful effects of a vicious atmosphere. That this state of things points the way to insanity, is unhappily too clearly proved by what takes place in cretinism, so common in Carinthia and the Valais, and many other valleys in the Alps and Pyrenees, as well as in other parts of the world. Here, then, exists a disease in which the brain and nerves are greatly involved, and which Saussure* first showed was entirely dependent upon the depressed state of the air in the deep valleys, acted upon as it is by moisture and the reflected rays of the sun. Nothing can prove more strongly that

Vitiated air the cause of cretinism.

* Travels in the Alps. The disease was first pointed out by Felix Plater (F. Plateri Praxeos Medicæ, cap. iii, Basil, 1656). See also Ackermann's Institutiones Historiæ Medicinæ; Fodéré, Essai sur le Goitre et Crétinisme.

this is the medium through which the blood became degenerated and unable to prepare healthy cerebral matter, than the fact now incontestably made certain by the humane and indefatigable exertions of many able physicians since the publication of Saussure's work, but particularly by those of Dr. Guggenbuhl, that the Cretins are gradually recovering their nervous power and energy by being removed from those valleys, and placed higher up in the mountains.*

Dr. Guggenbuhl's testimony.

Not only does good air, often and freely brought in contact with the surface of the body and lungs, help to render the body less predisposed to attacks of insanity, but when attacked it forms one of the many curative means which should be daily resorted to.

Advantages of good air in the treatment.

The great use and necessity for water in the animal economy cannot be better shown than in the fact that it forms one of the vital stimulants, and as such enters largely into the composition of every tissue of the body. Some persons, when they are asked what beverage they drink, often reply, "only water." They little think that out of the four gaseous elements into which every part of the body may ultimately be resolved, two of them are supplied to a great extent by this fluid.

Of water as a beverage.

As an article of beverage for the insane, the use of water will soon be more fairly appreciated, and we have no doubt it will become more generally adopted, constituting in fact the rule, and malt liquor, wine, and spirit the exception. Already it has been attended with good results in the Lincoln Asylum, as well as in several of the lunatic asylums of Ireland.† And here we would observe how difficult it is to arrive at a

* See an interesting account of this truly Christian physician's labours in 'Some Account of Cretinism and the Institution for its Cure on the Abendberg, near Interlachen, in Switzerland. By W. Twining, M.D.' See also M. Seguin's Hygiène et Education des Idiots.

† See Further Report of the Commissioners in Lunacy, 1847, p. 374.

sound opinion upon the actual superiority of water over the more stimulating beverages in such cases. When admitted into an asylum, the poor lunatic has, in the greater number of instances, lost his mind from starvation or poverty of living, or from some causes involving the healthy supply of the vital stimulants of the blood. He is at once placed upon a nutritious and generous diet, and his improvement is obvious. If he does not actually recover his mind, his body is placed at least in a fair way to accomplish it. Some of the improvement is attributed to the "good wholesome beer," but how much this article is entitled to claim in sharing the improved condition of the patient is very problematical. Though, upon the principle of all stimulants, it may help to revive the exhausted state of the nervous system, yet in this sense we can regard it only therapeutically; but as a beverage, there is much reason to fear that, as a well-known disturber of the first process of digestion—a function in most of the insane which is very imperfectly performed—beer would be likely to keep up that very evil we consider it so necessary to counteract, viz. a morbid preponderance of carbon in the vital fluid. We cannot, with such a body of evidence before us, dismiss from our mind the rapid tendency which all stimulating liquors have to derange the functions of the mind.

Abuse of water as a beverage.

As an hygienic agent the value of water is unquestionable, whether taken internally as a beverage, or applied externally to the skin. Yet in the former way its use is deteriorated daily by contamination with spirits and other objectionable matters; and in the latter way it is comparatively neglected in this country, and forms the exception, instead of the rule. This is unfortunately reversing the order of things, that cannot be done with impunity.

Seldom used as a hygienic means to preserve health.

Example of the Romans.

When the Romans built their house, they simultaneously built their bath and their tomb. They knew that some time or other their bodies would pass away into another state, however ignorant they were of that state. But they seemed to have also either a real or instinctive impression, that the more frequently they used the bath the longer they should keep out of the tomb. If this custom was found to be of high sanitary value among the Romans, where insanity was little known, many of whom were engaged in athletic and warlike occupations from their youth up, it surely ought to receive additional notice at our hands.

Warm baths.

As an hygienic means for the treatment of the insane, we must add our full assurance of the benefit they derive from the warm bath. Independently of the mechanical assistance it affords in the removal of the epithelial obstructions, which prevent the skin from acting in cases like these, where it is so indisposed to act, it has the advantage of attracting the blood away from the deep-seated organs and blood-vessels, and moreover it operates in producing a calm and tranquil state of the mind. We generally use it the last thing at night, and have found it most serviceable in acute dementia and hypochondriasis.

Hygienic application of water is chiefly in the hands of hydropathists.

At the present time the hygienic application of water is very much in the hands of hydropathists and herb doctors, who, in defiance of all knowledge, physiological or pathological, daily manipulate and excite the skin, well knowing the practical results. They may not be aware of the fact, that the surface of the body contains twenty-eight miles of perspirable tube, according to Mr. Wilson, and perhaps, being ignorant of their existence, they may now and then apply their remedies a little too much in contempt of the highly-organized state of the part; but they are fully alive to

Extensive office and function of the skin.

the fact that the skin is the channel for carrying off from the system much that excites irritation and disease.

The practice of substituting spirit of any kind for water has its own consequences, which we have not failed to point out elsewhere, and which swell the ranks of the insane in this country to a frightful extent.

When a man begins to drink spirit, he has commenced a race which will finally involve either his life or his mind. If his body does not perish in the waters of a dropsy, or in the fire of spontaneous combustion, his mind ceases to act through its appointed organization, and he becomes a fierce or paralytic lunatic, hopelessly given up to terror or despair. In those who indulge such habits, long before the reasoning powers become finally lost, the power of the will is so weakened, that they seem to have lost all control over it. We have elsewhere alluded to the action of alcohol upon cerebral matter, and we will here add, that the first morbid change which this poison effects in the brain is the weakening of the great attributes of the mind—judgment, memory, will, conscience, &c., after which the faculties and feelings follow in the general wreck.

We need not then enforce here the necessity of using water in all shapes and degrees in insanity. It is the more indispensably requisite, seeing how long and how perseveringly it has been either neglected or perverted.

Importance of attention to food.

We have said enough to ensure conviction that the state of the blood in this disease is very intimately mixed up with the condition of the digestive organs, and the food that is put into them. A long-continued course of neglect, whether from deficiency or redundance, must necessarily lead to the most hopeless results, if the same habits are continued during the

attempts made to restore the exhausted nervous system. The food in most cases should be solid, partly animal and vegetable, taken often, and in small quantities. Red meat, wheaten bread, and pure water are the three most valuable articles of regimen for the insane. The further all articles of food or beverage are removed from these, as a rule, the less valuable do they become.

In cases of moral perversion, unaccompanied with delusion, such as in some cases of melancholy and hypochondriasis, there is often great propensity to excess in diet, which nothing but the control of an asylum can overcome. And even here the greatest vigilance must be used, or they will obtain by stealth that which the pressing voracity of the appetite cannot resist. Dozens of such cases daily gain their end in every asylum by perseverance. Those who have the immediate care of them, for the sake of peace and quietness, give them their fill, but in so doing they are perhaps little aware that they are shutting out all hope of final recovery, by keeping up the very chief exciting cause of the malady. In almost all such cases, if narrowly observed, the error will be discovered in the quantity and not in the quality of the food. A carefully graduated diet, with the warm bath, plenty of exercise in the air daily, an opiate every night, with the citrate of iron by day, taking care that the bowels act daily, would, if persevered in for many consecutive weeks, cure multitudes of cases that heretofore have been looked upon as incurable, simply because they did not yield in the first instance to some individual therapeutic agent. In the Lancaster Asylum, Mr. Gaskell says he believes attention to the diet of the patients has reduced the mortality of that institution, within the last twenty-five years, from 18 to 8 per cent. He speaks also of the

Particularly as regards quantity.

importance to the health of the inmates of removing all noxious and depressing odours.

Amongst the most frequent causes of insanity in the lower classes are habitual intemperance and want of sufficient sustenance. A few years ago, when the diet of the different lunatic asylums was revised, more solid and animal food was substituted for broths, &c. This has been attended with happy results, and the Commissioners assert that the alteration in this respect has been the cause of much increase in the number of recoveries.

Beneficial results.

While pauper lunatics have thus often become insane from insufficient or unwholesome food, the higher classes have been drawn into the same vortex by committing errors of another kind, both as regards quantity and quality. The antithesis does not save them. We cannot say more to urge the necessity of attention to this point. *In medio tutissimus ibis.*

Consequence of the two extremes.

The nervous and the insane, therefore, ought to be much in the air and much in the water, often in exercise, and very measured as regards diet and beverage. It should be ever remembered that the withdrawal of these vital stimuli have been very gradual, and therefore their useful application should be long continued. But can this be done without constant and persevering watchfulness? It is a difficult task to perform, but not the less important on that account. We can fully verify the fact as regards the insane, for their pertinacity on this point is quite enough to gain them the victory without the greatest firmness and moral courage on the part of those who take charge of them. Exercise of body, too, is very important, not that exercise which would simply involve the muscular system. It is not the object to produce exhaustion, which much muscular exertion would certainly cause; although,

Long continued application of these means necessary.

Exercise of body very necessary, but not confined to muscular exertion.

short of fatigue, exercise out of doors should, where possible, be taken every day. The exercise most likely to benefit the insane should be applied to all the surfaces of elimination, but particularly the skin, which, in these affections, is so apt to get out of order. And here the use of friction with oil is most serviceable, after which the warm bath will not only bring blood freely to the skin, but be enabled there to part with some of its effete particles. This process must often be continued for many months before benefit will ensue.

II.—*The Therapeutic Method.*

2. The therapeutic method.

We come now to speak of the therapeutic treatment of the insane, and of these the most important are—bleeding, counter-irritation, purgatives, sedatives, tonics, and diuretics. We know of no author who has

Bleeding.

put the question of bleeding in insanity in a more practical light or in fewer words than the late Dr. Gooch. His words are—"never use it as a remedy for disorders of the mind, unless that disorder is accompanied by symptoms of congestion or inflammation of the brain, *such as would lead to its employment though the mind was not disordered.*"* To this observation we might safely add, that even where inflammatory disease accompanies insanity, there is no case where the abstraction of blood, by leeches or cupping, will not answer the purpose better than general bleeding. In all the forms, both acute and chronic, of idiopathic diseases of the mind, general bleeding seems to have been almost universally superseded in every public and private asylum in this country.†

Dr. Gooch's opinion.

The general practice in this country.

* On Disorders of the Mind, &c.

† See Further Report of the Commissioners in Lunacy, Appendix, 1847.

In speaking of the advantages which followed the abstraction of blood in some forms of mental disease consequent upon falls and blows, in some observations we published* two or three years ago, we took the opportunity of stating one or two cases of suicide, in order to prove that the abstraction of blood by such formidable means, if life was spared, seemed to be the true explanation why such cases completely recovered their mind. And there can be little doubt that the venous system in the head in these cases being so effectually evacuated, is the true reason why the brain, receiving that relief perhaps from pressure, whereby it is enabled to share a more just proportion of healthy arterial blood, recovers its function. As we have stated, the very large proportion of venous blood, compared with arterial, circulating in the body, favours the idea, that if the disease exists in the circulating mass of the blood, it is likely to have a more powerful effect upon the different vital organs, when charged with the corrupt and worn-out portions of the body, as it is in the venous system, than it is in the arterial, where the material, however short it may fall of healthy blood, is nevertheless the least blended with noxious substances. Amongst the symptoms accompanying many forms of insanity, we often observe drowsiness. This can only be referred to the pressure we speak of. It is known that after a hearty or immoderate meal the sensorium will sometimes become dull and almost incapable of action. The thoughts do not flow, and sleep is induced. Are not these the common consequences of distension of the veins of the brain? This is a condition of these vessels often kept up for some time previous to an attack of insanity, if it does not more speedily end in apoplexy; for the last state of things

The reason why suicidal cases recover so often their mind, if they do not die of hemorrhage.

Cause of drowsiness in insanity.

* Provincial Medical and Surgical Journal, vol. vii.

is not so often attended with extravasation as with simple distension. We must not be misunderstood. Acuteness of thought, we believe, entirely depends upon the quantity and quality of blood carried to the brain, but it must be arterial blood, and it must be carried to the gray substance. As natural sleep indicates a diminution of sensibility and the faculty of thinking, as well as of voluntary motion, so does this drowsiness indicate that these powers are exhausted, from a morbid deficiency in the blood supplying the gray matter, and thus being impeded in its passage through the brain by sleep, the distension of the veins is the natural consequence.

Having stated thus much, though we hold insanity to be an asthenic, non-inflammatory disease in so many instances, it will be seen that we do not disapprove of the abstraction of blood in some cases, but we do most decidedly affirm, that not one case in every hundred requires bleeding from the arm at any time, much less that periodical bleeding which has left its permanent results indelibly marked in many cases for ever consigned to asylums. In cases where there are pain and fulness in the head, with depressed spirits, while general bleeding will do harm, the local abstraction of blood will do good, and the nearer it is to the longitudinal or lateral sinus the better. For this cause, we have thought Dr. Wallis's* longitudinal incision, first recommended by him, was the most valuable remedy in these cases, and have not been disappointed.

Not one case in a hundred requires bleeding from the arm.

Local abstraction sometimes of service.

We were consulted by a respectable unmarried female, about 50 years of age, in consequence of pain she suffered over one side of the head, extending into the orbit. The light was painful to her; she had become altered in her manner, was very suspicious that all was

Dr. Wallis's method. Successful in a case of mental derangement.

* Trans. of the Provin. Med. and Surg. Assoc., vol. xi, p. 307.

not right, and that those she was living amongst were using some means to poison her. She had many delusions, and amongst the rest she fancied she was with child. Her conduct was strange, and excited great alarm. We recommended the incision to be at once made. The result after a few weeks was very satisfactory, and in as many months the morbid symptoms had vanished, and the mind returned to health.

The symptoms in this case appeared to us to combine those of local inflammation with mental derangement, and on this account we tried the incision. Most of Dr. Wallis's cases, in which he used this remedy, implied the presence of symptoms indicating inflammatory action. We are pleased also to find this operation has proved successful at the East Riding Asylum, where Mr. Casson has tried it in cases of mania produced by a blow upon the head.*

Advantages of the method.

The advantage of this method over general bleeding, or even the local abstraction of blood by leeches or cupping, is that a larger drain is kept up in the neighbourhood of the great sinuses, which no doubt carried off some of their contents. Still there are many cases where the distress in the head is greatly relieved by leeches applied either behind the ears or within the nostrils.

Some melancholic and hypochondriacal persons often lose a considerable quantity of blood by the hemorrhoidal vessels, with much relief to the system. As these vessels have been shown by Breschet to be in communication not only with the inferior cava, but also with the vena portæ, which are found to be nearer the surface of the mucous membrane, we can readily account for the relief afforded by the occasional emptying of their contents in many such cases.

* Further Report of Commissioners in Lunacy, 1847, Appendix, p. 466.

Setons and issues.

In the ordinary way that setons and issues are applied, we believe them to be of little use in insanity, they bear so trifling a relation to the cause. But if applied nearer to the head, and made larger, such as we have in the longitudinal incision, we get the best advantage from these applications. An extensive application of the tartar-emetic ointment we have thus seen to do good.

Purgatives.

Of purgatives, we think much stress should be laid upon their kind and degree.

Their use.

In young persons of sanguineous temperaments, an active degree of purgation may relieve the head symptoms, but they never cure, and seldom fail even in such cases to increase the mental depression. In multitudes of other cases, they are directly and decidedly injurious. Indeed, it must be obvious that, after they have succeeded in mechanically removing any matter from the bowels that may be obstructing their functions, to proceed further, and to hasten on by purgative action the food which in so many cases is slowly taken up or assimilated in the first processes of digestion, would in this way be doing mischief, and still more, by causing the serum of the blood to be uselessly poured out.* Whereas the changes we desire to effect in that fluid must be slow, and they must have for their object the removal of the decayed particles, not the serum. Many persons get into a low and nervous state by taking great numbers of the advertised purgative pills. They thus drain off from the blood what little nourishment it contains, and leave behind all the offending matters. This rough work is

Possibly may do harm.

* Dr. Golding Bird (Urinary Deposits, p. 82) has shown that, in an ordinary fæcal evacuation, "a quantity of large crystals of triple phosphate of magnesia can be easily detected" by the admixture of water. Purging, therefore, is not likely to improve a disease in which phosphorus is already deficient in the elementary tissues.

badly borne by the class of diseases under consideration. The warm aperients are the best.

Sedatives.

The effects of sedatives of all kinds upon this disease have been very variously stated. They are unquestionably of high value in some cases. It must not, however, be forgotten that this is only one means out of a great many more that must be resorted to in most cases. We cannot agree in the universal application which some physicians have lately made of this agent to all forms of insanity, and we can hardly conjecture the amount of mischief it is likely to do by being so universally applied. It could not, however, have done as much good as it has, if the doctrines upheld in these pages were not pathologically correct. Sedatives have not such opportunities of doing good in inflammatory diseases. Of their useful application in mania and other forms of insanity, we have the valuable testimony of many able and practical physicians in the last report of the Commissioners in Lunacy.

Use.

Abusive application.

Useful in puerperal insanity and delirium tremens.

Dr. Gooch has remarked that he seldom or never knew a case of puerperal mania recover, where the pulse was rapid.* We have seen a case, and they are comparatively rare, where the pulse was very rapid (140), and which fell to 60 in a few hours, after sleep produced by the use of large doses of the sedative tincture of opium. We have seen also the highest degree of excitement in many cases of delirium tremens, with rapidity of pulse, yield to large and successive doses of opium where sleep was induced, and many cases die where the antiphlogistic method was resorted to. As a remedy, it is better adapted for the acute than the more chronic forms of insanity.

Still, though there are perhaps more conflicting

* Account of some of the most important Diseases peculiar to Women. p. 119.

opinions upon the use of this than any other therapeutic agent, we are bound to say it has, as a remedy in some forms of insanity, been either misapplied or entirely overlooked. Some of Dr. Seymour's† cases confirm the observations we have been making on the error of supposing in this disease, that because a remedy fails to produce effect in a few days it should be discontinued as useless. Seymour's cases, treated with morphia, recovered, not because he gave them morphia, but because he continued it long enough.

Tartar emetic.

The impression made by tartar emetic on the nervous expansions of the mucous membrane of the stomach and duodenum, is most valuable in allaying the excitement of mania. The manner in which it acts is very remarkable, and the recovery from mania after its use is often most rapid and complete.

Prussic acid.

We can give our testimony to the great advantage to be derived from prussic acid in some forms of mental disease. Where the stomach is unusually irritable and depressed, we have found no medicine that could take its place. In one instance of melancholy, after being persevered in for *ten or twelve weeks*, combined with infusion of hops, it effected a complete removal of the morbid symptoms. It is very useful also in hypochondriasis, in which disease we have witnessed its utility if persevered in.

Metallic tonics.

There are a class of remedies of great value in these affections, which are known as metallic tonics. And certainly their effects in rousing the dormant energy of the nervous system, and in destroying its morbid action are very striking. Knowing how invariably all tonic remedies tend to augment the mischief when inflammatory symptoms indicate that the brain or its

† Thoughts on the Nature and Treatment of several Severe Diseases of the Human Body, vol. i, p. 160 et seq.

membranes are thus affected, we may almost infer, from the great assistance the metallic tonics afford in insanity, that inflammation is not the rule, but the exception, in this disease. We have seen the preparations of silver, iron, gold, copper, and zinc, all useful and of proportionate value, in the order we mention them. Their most marvellous effects are seen in the young. A nervous child, 3 years old, was brought to me that had been frightened by the schoolmistress. She had almost daily attacks of epilepsy, and the fits were becoming stronger and more frequent; every little excitement brought them on. The nitrate of silver completely removed this state of things in a few months. The oxide of silver is also a valuable remedy. The same medicine entirely recovered a bad attack of chorea in a delicate boy, 6 years old. We, however, paid great attention to the bowels and skin.

Nitrate of silver.

Case.

We have found the ammoniated chloride of gold of some service in cases of dementia. The dose must not exceed $\frac{1}{12}$ of a grain at first.

Gold.

As a remedy of this class, and more generally applicable, some of the forms of iron are most valuable. We cannot forget the integral part it forms in every red globule of blood, and the wonderful alliance it makes with the four gaseous elements in that fluid. We have persevered with this medicine for *months together*, combined with the infusion of hop, and with the extract of conium, with the best results at last.

Iron.

In one case of dementia from fright, a young lady, æt. 22, we persevered uninterruptedly for nearly a year with the different forms of iron, with the great satisfaction at last of seeing the mind gradually restored. There was one instructive point worthy of attention in the progress of this case. She had the warm bath at night twice a week, and complaining of

Case.

great pain and weight over the top of the head, I directed her maid when she was in the bath, to pour a small stream of cold water over that part. It threw her back for several days, during which she was more unconscious of things around her, the bowels acting involuntarily.

Diuretics.

The influence of diuretic medicines on some forms of this malady, is striking. Previously to the appearance of the mental malady, the urine is found to be throwing down the phosphates in great abundance, and it either becomes deficient in quantity or in specific gravity. Some years ago, Dr. Henry, of Manchester, made some trial of the spirit of turpentine in calculous disorders, and he found that it had the effect of throwing down large quantities of lithic acid in the urine.* We can thus imagine that the operation of this medicine would be valuable in allaying irritation, and removing the causes of depression from the blood in insanity. Dr. Edward Perceval accordingly found this medicine of great service in many old and confirmed cases of epileptic mania.† It lessened the force and the frequency of the attacks, and would have probably cured some of them, had the remedy been sufficiently long pursued. If these old cases of epilepsy owed their existence to some organic change in the head, it is obvious a few doses of turpentine could never have mitigated the disease. Still it is a very prevailing opinion that these cases are hopeless, because they are connected with organic mischief; and some physicians go so far as to say it is always associated with some alteration in the structure of the brain. Let the strictest rules of diet be observed, with abstinence from all fermented liquors; let the skin and the

Turpentine.

Inferences to be deduced from these remedies.

* Marcet on Calculous Disorders, p. 183.

† Dublin Hospital Reports, vol. i, p. 161.

kidneys be kept up to their function, and the muscular powers be conserved by cautious exercise and food yielding a due supply of the salts of potash; and we doubt not, these cases will be less numerous and less frequently found to depend on organic mischief. These remarks obviously cannot apply to every case. Epilepsy is the effect of many causes, though too often it has become incurable from long neglect, or rather prejudice, when the cause has had nothing to do with a change of structure of the brain, or pressure of any kind upon that organ. Our remarks on the condition of the muscular system in this disease in the last chapter, point to the necessity of supplying materials best adapted to restore that part of the organism in these cases.

Epilepsy is more curable than is supposed.

In some forms of the disease oxaluria is an accompanying symptom; this is the case in some forms of melancholy and hypochondriasis. Dr Prout* has recommended the mineral acids, and certainly under their use we have seen the oxaluria disappear. Dr. Golding Bird† does not think the mineral acids here reaches the kidneys, but that the change is effected before it quits the blood. Nevertheless the oxaluria will often disappear for a time, and return with a more incautious diet, the mental symptoms not manifesting any marked change. This is important as showing that the mental phenomena do not vary with the morbid alterations of the blood, and that for some time after these morbid conditions have been removed, the mental symptoms are continued. These appear to bear some relation to the length of time the urine has been throwing down such deposits. This was remarkably exemplified in a case sent to us by Dr. Engledue, of Southsea, who most adroitly detected the crystals

Mineral acids.

Their mode of action.

* Stomach and Renal Diseases, p. 73.

† Urinary Deposits.

before the mind had given way so far as to render it necessary to remove the patient. By a prudent diet, and the use of the nitromuriatic acid, and subsequently the citrate of iron, the crystals disappeared. But not being careful in her diet, she became worse in mind, and the crystals reappeared. In no case have we ever had so much difficulty with regard to food since she has been under our care. She would actually take it out of the dishes at table after it had been refused to her. Nevertheless, by firmness of purpose, we have caused the crystals again to disappear, and the hypochondriac symptoms are less painful. We have now no doubt that this and many other forms of disease owe themselves to errors in *quantity* far more than in *quality*—a doctrine much insisted on by Dr. Prout.*

We think with Dr. Golding Bird,† that permanent good is more likely to be accomplished by the action of the mineral tonics in such cases. He speaks highly also of colchicum.‡ Still, as a channel for conveying off a large amount of nitrogenous particles, the kidneys should be often brought into action in these affections.

Phosphorus.

Of the advantages to be derived in many atonic diseases from phosphoric acid, we have had ample proof, from the writings of Bertrand Pelletier, Hacke, Couerbe, Lobstein, and other continental physicians. It acts powerfully on the skin and kidneys, and it might be thought that its effects in insanity would be great in supplying the deficiency of this wonderful substance in the organic tissue of the nervous system of the insane. We cannot, however, speak of its effects from personal experience, and we are more inclined to the belief that great attention to the

* Stomach and Renal Diseases.

† Urinary Deposits, p. 186.

‡ Ibid., p. 187.

process of digestion, is far more likely to ensure the healthy combination of this substance with the tissues, than the careless introduction of large quantities of it medicinally into the stomach.

Its probable mode of action.

We see this clearly proved in cases of rickets, where the preparations of lime, however long persevered in, or however largely administered, fail to deposit that needed material in the bony tissues, while the phosphoric acid is found in an uncombined state, accompanied with free lactic acid, at points where bones and muscles meet. Schmidt has observed this only when such parts are in an abnormal state.* Moreover, we have often observed, in weak states of the nervous system, that food immoderately taken throws down the phosphates in the urine, and causes the iridescent pellicle to form.

Strychnia.

We have had one or two opportunities of trying the strychnia, and in one case it certainly was of service, removing the cause. This was a case of hypochondriasis, in which the muscles of the neck became so much paralysed as to render the recumbent posture unavoidable. As the muscles recovered their power, the neck became rather drawn to one side, and subject to sudden contractions. In this case we persevered with remedies for a year and a half, giving the strychnia for a fortnight in doses of one twelfth of a grain, three times a day, then intermitting it, and giving prussic acid and hop, and we finally had the pleasure of seeing the patient perfectly recovered, and she has remained so four years.

* Schmidt, Annalen der Chemie und Pharmacie, vol. lxi, p. 329, quoted by Liebig.

III.—*The Moral Treatment.*

3. The Moral treatment.

In the moral treatment of the insane, as well as those predisposed to insanity, there is no doubt much to work upon. It is a powerful remedy if dexterously and faithfully applied, even more extensively valuable than physical restraint.

Exemplified.

A young lady, who had met with a very severe disappointment, was placed under our care. She was 23 years of age, and hereditarily predisposed to the disease on both sides. It manifested itself by an excited state of mind, with startings and restlessness, and she had frequent hysterical fits. Every attention had been paid to her health before she quitted home, but having attempted to throw herself out of window, it was deemed proper to remove her from the scene of her excitement. She was cheerful and clever, and very susceptible of admiration. When she first came, she stated that her fits were so frequent that it was not right for her to go to church, but as they were really not violent, we observed to her that it was always the rule of the house to go to church, and that if the fit came on there, we should be obliged to call for the assistance of the beadle to take her out, and she would thus make herself very conspicuous. After the service of the first Sunday, she observed, on coming home from church, that she was very nearly attacked indeed, and it was remarkable that she never had any fit at these times afterwards. We took courage from this, and hoped the time would come when the fits would disappear, not only at church, but altogether, by a similar method of treatment. One day while at dinner her knife and fork dropped suddenly into her plate, and she was simultaneously upon the floor. There

were several at the table, and the servant was requested to give no heed to the lady. After a few minutes had passed away, a gentleman who was at the table, whose pharmaceutical knowledge would never make his fortune, feeling a little nervous about the issue of the case, rather anxiously suggested that she might have some *Epsom* salts, meaning no doubt to say smelling salts, given to her. This was quite enough. She laughed very much, and resumed her place at the table, and all went on as before. And it is very pleasing to be able to add, that for the few months longer she remained with us, she experienced no return of the fits either at church or at home; her irritability and oddness of manner went off, and she continued well. This is now eighteen years ago, and there has been no actual return of the threatened malady, though she has been extremely nervous at times, many sorrows and trials having attended her. If these fits had been neglected or encouraged by bad management at the first, the probability is she would, with all the predisposing circumstances of the case, have been the subject of insanity at the present time.

Its power in insanity.

We quote this case from a number of others, to illustrate the power of the moral treatment of insanity. We treated the case as one being able to reason, for hysteria is not incompatible with consciousness, and we have no doubt that such power may be judiciously exercised over the insane for their improvement, and even their cure. If the same principle were carried out on all occasions from the first, not only would insanity be less frequent, but our criminal code would be much improved.

Wrong psychological views of insanity.

In insanity, it is too often taken for granted that, in every case, reason is dethroned. This error arises from wrong psychological views of the mental constitution,

and the power exercised by certain properties of the mind, of which reason is one only. In this sense the mind is not a monarchy. In multitudes of cases, even among such as have long since been furnished with certificates of insanity, the reasoning power would put to shame the acts of those who, in possession of their liberty, are constantly taking advantage of the weakness of the law on this point. Long after the will has lost its balance, the power of reasoning upon the consequences of right and wrong is preserved in the mind. Even many of the insane know this practically, and can calculate pretty accurately how far they may go with impunity; and the will here is often weak enough. Yet our courts of law trifle with the question, as lightly as if the destination of the case before them was the only matter involved in the computation. When it is convenient we can act differently. If a sailor takes a fancy to call his captain a blackguard, he is hung up to the mast-yard forthwith. All due allowance being made for the fact that no plea of insanity is here put in, it is very remarkable how seldom the officer in command is greeted with this epithet. If the circumstance of being fully aware of the consequence of such a step did not entitle the sailor to the plea of insanity, the same plea can be claimed with less reason by those who commit far graver acts without fear of the consequences. In the case of the sailor, it is at once seen that the trifling circumstances of suspending one or two men in a century is far better than drowning ten times as many thousand at the bottom of the sea. And what is the moral effect? Though it would be impossible to concentrate in the same compass the essence of villany, disorder, and profligacy, which may be found in a man-of-war, yet nowhere is there less crime, less misery, or less insanity.

The courts of law trifle with the question, or else mistake it.

Applied to the treatment of criminals is the best.

Let this principle then, which we trust we put in force both firmly and mercifully in the young hysterical lady, standing as she was on the confines of insanity, be applied not only to the insane or those bordering upon it, but likewise to those who, with all their senses about them, think to paralyse the very law itself in the contemplation of their barbarous deeds. We should have fewer candidates in the field. We think this secret, if it be any, of the moral treatment of the insane should be recognised by the law ;* it would then operate far more extensively for good than when adopted only at those times when the disease comes under the direction of the mental pathologist.

Moral responsibility greater in those who use insanity as a plea.

If all persons who urge insanity as a plea for committing crimes, well knowing the nature and the consequences of such, are to be considered of unsound mind, then in justice we ought to have begun from "the fall," and to have included all the murderers from the commencement. For, speaking strictly in a psychopathological sense, we ask what man in sound mind would commit murder? In so extended a sense as this, we cannot regard the disease otherwise than as hopelessly incurable. Yet even for this the best cure we can find is in the Word of God.† The treatment there given is made subject to no contingency. It is, in the strict sense of the word, final. Now, as we are discussing the question of the moral treatment of the insane, we are anxious to show that that property of the mind which enables us to discriminate right from

Treatment should be final.

* We cannot speak in too high terms of the judgment given by Mr. Baron Rolfe, in the case of William Allnutt, tried (December 15, 1847) for the wilful murder of his grandfather. A more cautious or able judgment never came from the bench, and its effects will long be felt, for the good of society in after times.

† Genesis ix, 6, which was *before* the giving of the law ; and Numbers, xxxv, 31, which was cotemporary with that event.

wrong, which may be termed consciousness, is the last to quit the council chamber, if we may so express it, previous to the entire break-up of the mental constitution; and, therefore, in those cases which appear to excite the most doubt, we need never be uncertain about their moral responsibility. In all these cases the *will* appears to be the most weak, particularly in relation to what are called the faculties and feelings; and the way to make it weaker is to put no restraint upon it, whether by law or by custom. We see the consequence of this in drunkenness. There is no law to prevent continued intoxication. The consequence is, after a frequent repetition of the practice, the will ceases to act, and, though perfectly aware of the sin and the consequences, nothing checks the habit. The law operates more directly upon thieving; the will is here kept in check, and it is consequently far less common for it to lose its balance on this point. Hence the thief has "got his wits about him." Not so the drunkard. From this cause it is that so many insane persons lose their mind. The same remarks apply to the liar. A person may tell as many falsehoods as he pleases, the consequence is, that many lose their minds from this cause. They speak falsely till they believe a delusion. Thus, "even the greatest blessing we enjoy,—the freedom of our laws,—may, in some measure, contribute to those rash actions that often end in dreadful murders of the worst kind—parricide and suicide. Men must be reckoned in the highest class of lunatics who are capable of offending the great Author of Nature, by depriving themselves of that life which He only has a right of taking away, because He only had the power of giving it."*

Disease is in the will.

Deficient laws make matters worse.

The moral treatment is applicable to every stage of

* Lord Orrery's Letter.

the disease, but more so to the early stage, and to every remedy we may have occasion to apply.

There is yet much to be done towards the moral treatment of the insane. Even when, in some measure, they have been regarded by the law in the light of irresponsible beings, they are clearly to be controlled in their actions by a well-adjusted application of such treatment, and the bad habit of the mind is often thus overcome. There are so many cases of mental disease, where the feelings alone are involved, that it must be obvious that any method, having for its object the healthy regulation of those feelings, must be beneficial. Insane persons have their likings and their dislikings as well as others, and, if possible, they feel the privation of any gratification they have hitherto indulged more than those whose minds are more completely intact. This is the ground, then, on which they should be met, and it is seldom that even the most desperate cases will not yield in some measure to a well-timed or wisely-directed application of such means as would tend to withhold the particular gratification most coveted. This is often difficult to discover, but close observation will detect it in almost all cases.

But if we extend the moral treatment over those periods which precede the attack in the life of every individual who, from hereditary or other causes, may be more peculiarly predisposed to insanity, we shall find here the vigorous application of the moral treatment, when united with others we have just spoken of, will be sufficient to avert the danger of a more complete explosion. Many such cases, not actually regarded as insane, are, nevertheless, so low in the scale of morals, that they have great need to be protected. Still they may become hopelessly lost, both to this world and to that which is to come, before they

may commit any acts that would bring them in collision with the law as it now stands. It is painful to reflect that the sages who have hitherto dictated our laws should not have provided some means for facilitating the treatment, and also the restoration of such cases to society. Instead of which, they are allowed to bring irretrievable disgrace and ruin upon others, and misery and disease, and even death, upon themselves. All these evils, and they are by no means uncommon, might be averted, if, in legislating upon subjects so completely out of their province, the government would now and then condescend to call to their councils men who have made the physiology and pathology of the mind their constant study.

Without the possibility of its leading to any infringement of that true liberty of the subject, which in a free country is so much kept in view, it would be as possible to provide a legal remedy for such cases as for the more decidely insane. And this might easily be done by simply extending the number of certificates from two to four, or even six, carefully guarding the form, and by placing such cases under the charge of those only who may have been wisely selected for the trust. At any rate, in the present state of the law, when such cases arise, their doom is marked by the observant physician with as much certainty as any human event can be. And painful as is the reflection, it is not the less true, that every attempt to treat such cases morally or physically, while at large, is only bringing conviction more strongly to our minds that one of the causes that is operating to swell the ranks of the insane in this country, is the carelessness with which such questions as these are treated by the legislature.

IV.—*The Physical Treatment.*

3. The Physical treatment.

The more the principles of the moral treatment are carried out, the less cause is there to resort to the physical.

Mistakes on the subject of restraint.

Nothing can exceed in absurdity the preposterous attempts that have been made to impose on the public mind the idea that the insane are treated without restraint. Why, the very building they are confined in belies the word non-restraint. Is it possible that the public really believe such a thing to be true? And still more, do they believe, even supposing it to be true, that it is a humane principle? Two causes seem to have conduced mainly to this popular delusion, viz., a desire to remove the evils which the old system of restraint had given rise to, and which had very properly produced the greatest disgust and even horror in the public mind; and a desire to substitute some plan that would attract notice by its antithesis to the one that had preceded. Without any practical knowledge of the success of such a plan, supposing it to be susceptible of application, according to the literal meaning of the word, the simple reflection that it comprehended a plan as ultra in its way as the old extreme system of restraint, should put the public upon their guard before they seek to adopt it so universally, or believe that it can be said truthfully to be practical. We wish we could say that no evil had already arisen from what is called the non-restraint system. We believe it to be full of evil, as must every plan be that assumes to adopt an extreme method. Every branch of the science of medicine testifies that, when we hope for success, we must avoid extremes; and this rule has its advantages, we are fully persuaded, in the

Causes.

Restraint is unavoidably used in every case.

Evils of the system called non-restraint.

treatment of the insane. All see the evils plainly enough that were allowed to continue under what has been called the old system, where those agents, which must be admitted even by the most fastidious non-restraint advocate, have their use. Is it at once to be inferred that because brandy is calculated to produce intoxication, thereby depriving man of his senses, it is incapable of restoring the senses under different circumstances, as, for example, from a state of syncope. We hear of cases where life has been forfeited to the injudicious application of hydropathy. Should we do wisely, if, on this account, we ceased to avail ourselves of water as a useful hygienic agent? What should we argue of that so-called philosopher, who, having discovered for the first time that fire, for example, had the property of destroying bodies, proceeded to denounce it not only as a dangerous, but as a useless agent? It may with great certainty be affirmed that the human mind has been permitted to make no discovery, whether relating to the laws or the combinations of matter, that has not some use for which it has been made known. It is true we may be living in an age when an agent may be only known to us by its abusive application; but who can say its use has never been applied with advantage? It is therefore a gratuitous and a disingenuous assertion to say there is no use in restraint; and those who use such expressions lay themselves open to one or other of these charges—either that they are ignorant of the nature of those remedies which they denounce, and which they are all the while hourly but unconsciously using, or else they are really practising a fraud upon their own consciences. This state of things cannot be permanent, and sooner or later the deception will yield to the forcible impulse of truth.

Everything has a use.

Absurdity of saying there is no use in restraint.

It arises either from ignorance or disingenuousness.

One of the most valuable remedial agents in the treatment of insanity is restraint. The first step in the cure of every case is involved in it. The more wisdom there is displayed in its use, the less liable is it to abuse. We do not speak here of restraint only in the mechanical sense, in which, for some purpose, it has been designedly mixed up. The restraint we speak of is not abstractedly applied to the securing of the limbs or the whole body by bands. This is rarely required, although it is unquestionably necessary in some cases. It applies itself at once to the right extension of liberty to be enjoyed by the insane, and in this sense it can be most wisely and beneficially applied to almost every case.

The term not confined to mechanical restraint.

Taking this view of the use of restraint, we can safely venture to say, that the liberty which the insane enjoy in a well-arranged and well-regulated asylum, which is placed under the immediate supervision of an enlightened and experienced physician, is infinitely greater than that which they can possibly have in any private dwelling, where everything that bears a proper relation to the disease has been contrived out of the most inefficient means, though perhaps the only ones at command. It is the relation which restraint bears to those who are intrusted with the management of it, which appears to us to have operated so generally, not only to bring this agent alone into disrepute, but also more or less every other remedial agent, whether it be hygienic or therapeutic, physical or ethical. And hence the necessity of placing the insane, however few in number, not merely under the supervision and direction of a person experienced in the art of conserving those interests, which the outlay of money has a right to demand; not of one whose habits of life or mode of education, enable him to regard with indif-

ference the annoyances resulting from scenes of eccentricity, violence, or strife, which have been found so generally to accompany such an office; not, in fact, a mere uneducated man of courage or of tact, or even an educated physician, necessarily inexperienced by youth or by physical or mental qualification; but such a supervision as can alone be afforded by one, who, to the ordinary education of a physician, whose talents may have obtained for him both academical and professional honour, is able to bring the indispensable proof of great practical experience, and the evidence that, morally as well as physically, he has been prepared and fitted for the office.

How much argument presses upon the mind in proof of this assertion; and in the neglect of this principle, both by the legislature as by the community at large, how clearly do we discern the secret spring, which not only links together and is connected with every evil incident to the treatment of the insane, but which is the cause of the partial failure of almost every agent hitherto resorted to.

Not only are these great points almost entirely disregarded in the appointments of resident physicians to large public or private asylums, many of whom are inexperienced young physicians or medical men, having everything to learn, but we grieve to see by the latest reports,* that in Ireland, where there are eleven large county asylums, in which there is an aggregate of 2610 insane persons, in only one of them does a medical man reside. This is exclusive of some twenty other private asylums, very few of which have a resident medical officer. The Editor of the Journal whence these reports are taken, asks whether this is not disgraceful to a Christian country and a Christian government? We

* Journal of Psychological Medicine, No. I, p. 151.

will go a little further than this, and ask if, for example, Mr. Catlin, after his very interesting visit to the savage Mandan Tribes, had made such a report of the treatment of their insane, supposing him to have discovered the existence of insanity there, should we not have said such neglect reflected shame and disgrace upon them, barbarous as they were?

We hope soon to see all these difficulties swept away, and those whom God, in his infinite wisdom, has afflicted with the greatest calamity that can befall the human race, placed in circumstances the most favorable to their mitigation, or their cure, by a government calling itself Christian, and living under the full blaze of the Gospel.

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