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PART I.—ORIGINAL ARTICLES.

*A Review of the Influence of Reflex and Toxic Agencies in the
Causation of Insanity and Epilepsy.** By F. ST. JOHN
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The object of this paper is to present in concise form recent views upon the influence of Reflex Stimulation and Toxic Agencies upon Insanity and Epilepsy. For the most part these will be dealt with together, although the influence of reflex irritation will of necessity be chiefly confined to epilepsy. With regard to both insanity and epilepsy, cases will occur in which it is impossible to decide whether a reflex or toxic condition originates the mischief. It must not be supposed that these views are novel, except in their development. Both Abercrombie and Henry Monro long ago discussed these theories. The latter acute observer, in his "Remarks on Insanity" (1851), dwells at length on both toxic and auto-toxic origins of insanity, and his views even at the present day may be considered with interest and advantage. Since this time there has been a continual increase of experimental and clinical evidence lending support to the theories advanced. It is the purpose of this paper to state dispassionately the accumulated observations upon this subject. Some apparent contradictions arise at the outset; amongst these are—

(1) Any given disorder may survive the removal of its supposed cause.

(2) Given in two different cases the operation of precisely similar morbid conditions, the same results are certainly not invariably met with.

* Read before the Brit. Med. Assoc., 1894 (Psychology Section).
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(3) Undoubtedly a neuro-psychosis may arise without any ascertainable causation, reflex, toxic or otherwise.

These contradictions, however, admit of an explanation. Firstly. Interference with causal conditions of a disorder is often so late that the complications and functional disturbances have become permanent and organized. Secondly. The power of resisting with success the morbid influence varies not only in different individuals, but at different epochs in the life of the same person. Thirdly. Our knowledge hardly allows us at present to negative the existence of causes in their very nature most difficult of detection.

The intimate relationship between the functions of the nervous system and those of the rest of the body compels us to consider their interdependent action. Legrain expresses himself thus* :—"There is no substance which, introduced accidentally into the circulation, does not affect in some way the cerebral functions. All functions are connected the one with the other, and in certain intoxications which are not altogether psychical we observe secondary intellectual disturbances." It is, however, at once admissible that of these two sets of functions either may be disturbed by the other. The following problem must first be dealt with :—What are the relations of insanity towards (1) primary brain disease and to (2) disturbed cerebral function, the result of some deleterious material existing in the circulation? Taking "delirium" to denote the latter condition, this part of the question may be thus expressed: What is the relation between insanity and delirium, acute and chronic?

True insanity is by the majority of alienists considered to be dependent upon a primary neuro-centric disease. This is the more intelligible because the brain, as the seat of mental action, appears to father all its perverted functions. And most would insist that there is a marked distinction between delirium and insanity. To estimate this properly it needs us to review the stated characteristics of delirium. These include the merely functional character of the mental disturbance, the excitation of this by factors outside the brain, the transient character of the malady, and the type of symptoms (mental confusion). Whether all or any of these features constitute a criterion of delirium requires consideration. Cases classed under "acute insanity" are un-

* "Poisons of the Mind," Art. "Dict. Psy. Med.," Tuke.

doubtedly sometimes functional disturbances only, are but transient, may be of confused and delirious type, and probably are sometimes due to microbic action directly or indirectly. Again, if delirium is definable as an aberration of mental function produced by the influence of toxic matter in the circulation, then it must be admitted that there can hardly be any characteristic symptomatology, since the type of mental symptoms will be modified according to the particular poison, its dosage, and the complications brought about by the effects of generally disturbed metamorphosis. Nor can the transient character of delirium be urged as a feature, for the toxine or its results may be ineradicable.

If it be possible to draw any distinction between delirium and insanity, this can only be done through an accurate knowledge of the conditions occasioning each. If by delirium we signify a morbid mental state produced by a poison generated without the brain, and existent only during the activity of the poison, we shall on the other hand define insanity as the result of some pathogenic process originating in the brain itself. There is, however, a third title required under which to group those cases in which the toxic materials have occasioned organic change, and, therefore, in which mental disorder persists after the disappearance of the exciting causes. Such cases may be classified as toxic insanities; they are often merged into the group of chronic insanities. They should rather be termed toxic mental degenerations.

The distinction of these various classes is not a matter of pathological interest alone; their true nature is a guide to their treatment. And since the probability of self-poisoning by various materials generated in and by the individual is become worthy of serious consideration, it is highly necessary that "insanities" of toxic origin should be differentiated. And this is what is left to be attempted.

From the clinical standpoint the fact has to be recognized that mental aberration, acute or chronic, can be induced by the action of poisons, either generated by the individual or imported into the system, and apart from any primary brain change. However we may regard acute delirium in relation to acute insanity, there is little doubt that the toxine, which in overwhelming dosage may produce the former, will in smaller and longer repeated doses cause a systematized mental disorder. The action of alcohol is an example of this,

and perhaps another instance may be afforded by shock and chronic worry. Shock, a severe and therefore painful stimulus to the nervous system, and which is sometimes followed by delirium and even insanity, is, as we know, now generally viewed as an arrest of normal metabolic processes with subsequent toxæmia.*

Probably the alkaloidal products are very deleterious, and under circumstances of violent excitation their toxicity may even be enhanced. Be that as it may, any delay in the prompt removal of the katabolized tissue must be gravely prejudicial to the healthy activity of nervous function.

It is certain that no structure can carry out its duties properly unless the products of its work are effectually removed as soon as produced. Thus there should be a well-preserved balance between the leucomaines formed and the competency of the means employed for their removal. And this is maintained in a normal brain, and not only during sleep. The unfortunate person who suffers from worry has a condition of chronic brain irritability which allows no respite. Stimulation of nerve tissue, whilst constant, is imperfect; there is neither time for perfect metamorphosis, nor for complete removal of the effete material; waste products accumulate, the scavenging system of the nerve centres at first hypertrophies in answer to the increased demands made upon it, and finally becomes incompetent. From this accumulation auto-toxis may ensue, and irreparable mental deterioration result.

Just as over-frequent stimulation of the brain may bring about the preceding condition, so over-fatigue of body can produce a state of mental depression similar in its pathology. Lagrange † states that "the peasants show transitory melancholia at the beginning of autumn, induced by the excessive labour of the harvest, short sleep, and poor dietary." The injurious influence of excessive muscular fatigue may also be found in cases of acute insanity, where intense motor agitation is present. Here over-loading of the system with the toxins of "surmenage" may result, and in some cases turn the scale, so far as the patient's mental or even bodily recovery is concerned. The typhoid character of many cases of acute delirious mania or melancholia is very probably due to intoxication with the products of rapid tissue waste.

* H. M. Roger, "Arch. de Physiol.," 1893.

† "Physiol. des Exer. du Corps."

With the purpose of ascertaining the existence of toxic matters in the organic fluids of the insane, research has been made by numerous observers (notably Régis and Lavaure, Voisin and Péron, Mairé and Bosc). The majority have investigated the urine chiefly, but the excessive difficulty attending organic analyses of this kind prepares us for the varying results obtained. Space forbids quotation *in extenso* of the opinions arrived at by these various observers, nor until more unanimity is attained can we draw any conclusion, but that there may be found in the urines of the insane a more or less pronounced variation from the normal toxicity. From Lucini's experiments with the injection of urine from healthy and diseased persons into frogs and toads, it appears that the toxic effects are in relation to the amount of urea, salts, extractives, and leuconaines present. Hence the increased toxicity of urine in cases of insanity may afford inference of the kind or quantity of the abnormal matters present. Perhaps the results of MM. Mairé and Bosc's* experiments may be worthy of quotation, as showing the state to which our knowledge has advanced. The urinary toxicity of the insane persons chosen for experiment was found to be increased in cases of melancholia, and in proportion greater as agitation was a feature. It was also augmented in melancholia with stupor, persecutory insanity, and mania agitans. A normal amount was found in "quiet mania," and a subnormal amount in purely stuporose and senile conditions. The following are stated as the toxic properties which the urine of the insane possesses, in addition to those of normal urine: hypo or hyperthermy, anæsthesia, auditory hyperæsthesia, diminished reflexes, psychomotor disturbance and agitation.

Other observers, be it said, have found only diminution of the toxic constituents of the urine. As Bouchard has found the toxins in the blood vary in amount inversely to those in the urine, the above condition indicates faulty elimination. Régis and Lavaure have asserted that the toxicity of the urine is changed in two ways, *i.e.*, lessened in mania and increased in melancholia, and that in the former state its injection into animals produces excitant and convulsivant effects; in the latter depressant. It is, however, necessary to mention that their statements have been adversely criticized by Séglas and Ballet. Researches into the urine

* "Journal des Soc. Sci.," Nov. 11th, 1891.

of epileptics have also been made. Here, again, assertions are antagonistic; according to some, toxic matters in the urine are reduced prior to a fit. It is, on the other hand, said that they are increased before the convulsive attack. Griffiths is said to have separated a toxic convulsivant base from the urine of epileptics.* Haig has found that the excretion of uric acid is much diminished before an epileptic seizure, the fit and subsequent mental depression corresponding to a larger excretion; the fit being thus due to the previous retention. His views have not received corroboration by Herter and Smith as regards attacks of "grand mal," but they have observed a continuously high uric acid excretion, apparently related to seizures of "petit mal."†

We are familiar with the views of Haig concerning the relation of lithiasis to mental depression. He instances in support of his argument the frequent despondency accompanying *Morbus Brightii*, also alternating melancholic and gouty attacks. Other writers have recorded corroborative evidence. Lithiasis, according to Haig, may be induced by anything which causes defective oxygenation of the blood. These statements may be considered together, with the results of researches into the blood of the insane. The inference to be drawn from the latter is that very often a lowered proportion of red corpuscles or hæmoglobin, or both, is found. Under these last conditions, according to Gautier, substances of the character of leucomaines or ptomaines accumulate in the blood.

Brieger has found certain ptomaines and vegetable alkaloids to be nearly or quite identical in nature and constitution. Some of these latter, as we know, have a special affinity for nervous tissue, and produce delirium and other mental disorders. And this is regarded by some as lending proof to the view that ptomaines resembling these alkaloids, and which may be present in the circulation, can create similar disturbances. Brouardel and Boutmy, indeed, claim to have discovered, in cases of rheumatic tetanus, progressive paralysis and imbecility, substances having all the characters of the putrefactive alkaloids, and experimentally proved to have a deleterious effect upon the nervous system.

Amongst other attempts to find in chemical processes an explanation of mental disturbances should be noted that of Sir B. W. Richardson, who indicated that mercaptan, or

* "*Mercredi Méd.*," Aug. 3rd, 1892.

† "*N. Y. Med. Journ.*," Aug. 20th, 1892.

sulphur alcohol, might be produced within the body, and be accountable for melancholia and other neuroses (this substance experimentally causing intense depression). His theory, so far, has received no corroboration, and has been adversely commented on by Dr. Farquhar.

We shall now shortly allude to the various channels by which it is considered that auto-toxis may occur, dealing first with the gastro-intestinal tract and liver. Mention may be made in passing of the popular (though none the less true) association between dyspepsia and despondency, and between hepatic insufficiency and hypochondriasis. It is not needful to detail the morbid events which attend upon a faulty digestion. The modes of systemic poisoning *viâ* the alimentary tract have been summarized by Ayres.* They are, absorption of microbes, ptomaines, either or both, of noxious gases into blood, and retention of leucomaines.

The moment the barrier which the liver, in health, according to recent observations, interposes between these deleterious materials and the general circulation, is withdrawn, there occur all the needful conditions of dyspeptic poisoning, followed by headache, oppression of mind, languor, loss of memory, and sleepiness. Hence the increased danger of infectious maladies and the greater tendency to delirium, the result of alcohol, emphasized by Roger. Klippel, Régis, and Lavaure and others uphold the views that forms of visceral insanity, which they term hepatic and renal, are distinctly referable to auto-intoxication.

Not only as a result of hepatic insufficiency may unaltered peptones, sugar, and leucomaines be retained in the circulation, but intestinal waste material, also free lithic acid, and other urinary products; whilst uric acid and sugar are not only in themselves prejudicial, but, according to Calabresi, lessen the bactericidal power of the blood.

Drs. Herter and Smith have shown evidence of the occurrence of excessive intestinal putrefaction in cases of epilepsy, and also of the relationship between the degree of the putrefaction and the epileptic seizure. If this be so, it is possible that the cortical discharge in these cases is directly dependent upon the defective quality of blood supplying the centres. Reference to the injurious influence of constipation must not be omitted. Bouchard has experimentally

* "Med. News," July, 1891.

demonstrated the poisonous activity of the fæces, and abundant clinical evidence exists of sapræmic intoxication originating from decomposing fæcal matter. Newington and Farquharson have recorded cases of mental disorder, the apparent result of copræmia, and relieved more or less promptly by treatment of this. The serious consequences of any interference with the eliminating function of the kidneys have, to many observers, suggested renal insufficiency as having a large share in the causation of mental disorder. Attempts have been made to show a relation between renal disease and insanity by setting forth an increased percentage of lesions of the kidneys, found post-mortem in the insane, over that noted in general hospitals; also a greater frequency of albuminuria amongst lunatics. For several reasons these views will not be discussed here. Christian's grouping of cases of mental disorder dependent upon *Morbus Brightii* as instancing their mutual relationship, may be alluded to.* He divides them into two classes (a) Uro-toxic; effects produced by direct toxic action and lowered bodily nutrition; (b) Vascular; arterio-capillary-fibrosis influencing the brain as the rest of the body. This condition of cerebral arterial fibrosis, together with cardiac and renal morbid changes, constitutes of course the recognized condition, chronic brain atrophy.

There is but little to be recorded concerning the influence of lung disease in the causation of insanity. We know that the latter may follow pneumonia as it may an exanthem, but since pneumonia itself is regarded by many as the effect of a vagal neurosis, the connection of it with insanity as a causal agent is doubtful. The work of Drs. Clouston and May (of Philadelphia) dealing with the relationship between phthisis and insanity well repays perusal. There is, however, but scanty evidence to warrant the assumption that products of pulmonary disease may affect mental disorder, although no reason is evident why these should be excluded from similar potentialities in this direction possessed by other *materies morbi*. Bezançon suggests that the tachycardia occurring in pulmonary tuberculosis may be due to a vagal neuritis caused by the toxins of the bacillus tuberc. or staphylococci, and quotes a case supporting this view. Perhaps there may be forms of mental disorder evoked by the action of these toxins on the central nervous system,

* "Journ. Amer. Med. Assoc.," Vol. xii., No. 12, 1889.

corresponding to the insanity with multiple neuritis termed "Psychosis Polyneuritica," and which has been ascribed to toxins evolved from gastro-intestinal and other sources. Chantemesse describes cases of aphasia and hemiplegia more or less transitory, occurring in the course of acute pneumonia. These, he believes, are neither hysterical nor organic in nature, but due either to direct action of toxic microbes on the nervous centres or to contraction of the Sylvian artery induced. These inquiries of Chantemesse have some interest in relation to the so-called congestive seizures of general paralysis, a variety of mental disease which has been regarded by some French authorities as having an infective origin, and being in fact a chronic toxæmia.

Diseases of the Pelvic Organs in Women, and Morbid Conditions associated with Child-bearing.—Probably more discussion has taken place concerning the influence of these states upon the mind than has been held in respect to diseases affecting any other organs in the body. Especially in America has prominence been given to this subject, and in many instances the attempts to connect the special diseases of women and insanity have been obviously over-strained. We may, however, give due value to the opinions of Dr. Skene,* who expresses his belief in the important influence of organic diseases of the sexual organs in causing insanity and in retarding recovery from it. He affirms that much relief will accrue in cases of insanity, fairly recent in origin, from the cure of the pelvic trouble which has been the exciting cause. Notable amongst those in this country who have held similar views are Robert Barnes and More Madden. The latter, several years ago, expressed his opinion that many cases detained in asylums were instances of reflex cerebro-spinal irritation from neglected pelvic disorder. Barnes, Routh, and Madden have quoted many cases in their own practice, and that of others, in which even chronic forms of insanity have been cured by gynecological treatment. Against the allegation that such cases are more often those of hysteria than real insanity, Barnes urges that "even hysteria is not an independent entity; it is a symptom, and it is certain in many cases that hysteria is the forerunner of insanity."

There are, on the other hand, many skilled observers who

* "Diseases of Women," 1892, p. 939.

do not admit that disorders of the pelvic organs are capable of causing insanity. Because, if this were so, pelvic disorders should be found amongst the insane with greater frequency. Wiglesworth has met these objections in his valuable and original paper on Uterine Disease and Insanity.* He writes: "That such diseases are common enough among the population at large without giving rise to insanity is no argument against their having this effect in persons of unstable nervous organizations." He draws the conclusions that uterine abnormalities are more common amongst the insane than is generally supposed, and that the failure to recognize them must result in cases, at one time capable of cure, eventually passing beyond the possibility of this. Various other opinions from both gynecologists and psychologists might be quoted, but no more complete and careful observations than those of Dr. Wiglesworth can be given. When pelvic disease is claimed as a cause of insanity, its method of action is by (1) direct irritation, (2) constitutional exhaustion from pain, chronic discharge, etc. There is yet, perhaps, a third mode, viz., chronic infection *via* lesions of the genital organs. There may be but a difference in intensity between the poison in puerperal septicæmia and that of the insidious toxæmia resulting from cervical erosions, lacerations, etc. Resistance to invasion doubtless differs in the two cases. It is true that to this theory of a chronic infection the objection can be raised that, if there is sufficient septic matter absorbed thus to cause or precipitate an attack of insanity, there would be enough to produce more serious local consequences. Of the extent to which oöphorectomy has been carried in America for the expected cure of certain forms of insanity, we are well aware. Hystero-epilepsy appears to have been benefited, but no decidedly satisfactory results in any numbers balance, as yet, the serious nature of the operation. Passing over the subject of functional derangements of the pelvic organs and the widespread symptoms they occasion, and with these the influence of menstrual epochs upon insanity and epilepsy, also of uterine displacements (of which many cases have been put on record), we must now consider the nature of the psychoses of child-bed and lactation.

Puerperal fever is now recognized as a toxæmia. Bourget has found highly toxic bases in the urines of patients

* "Journ. Men. Sci.," Vol. xxx., p. 510, Jan., 1885.

suffering from this disease. There is no need to detail here the reasons which have led to the belief that puerperal insanity is an infectious psychosis; it may be accepted that such is, at present, the generally received view. Apart from the existence of lesions by which septic absorption may occur, there is, doubtless, a constant risk of auto-intoxication in both the pregnant and suckling woman. Under the first condition, she is burdened with the toxins of the foetal organism in addition to her own. During the period of lactation, she has to encounter at first the saturation of her blood by the products of involution of the uterus, its appendages, and the heart, whilst her power of elimination and resistance is diminished by the nutritional drain of suckling. Equally probable is the view that eclampsia arises from a definite toxæmia, whether during pregnancy and from poisons uncombated by the liver, or from saturnism, copræmia, etc. Tarnier upholds this theory, and has given experimental proof. The lactational psychoses may indicate different modes of origin according to the stage of the post-parturient period at which they occur. Those following closely upon child-birth probably arise from the surcharging of the blood with products of involution. Other forms, appearing after a lapse of some months and preceded by evidence of impaired general health, are likely due to the accumulation of toxins in the system which inevitably succeeds prolonged exhaustion. How frequently degrees of this last condition must exist can be seen at a glance from the tables of causation given in Bevan Lewis' text book. The more frequent occurrence of these lactational psychoses at from the sixth to the tenth week (about the termination of uterine involution) may be legitimately referred to the gradual saturation with toxic material, and explains the greater seriousness of cases happening at a late period. Toulouse affords examples of mental disorder excited during lactation by insignificant causes, and expresses his belief that auto-infection accounts for lactational as for puerperal psychoses.

Allusion would have been made to the influence of inter-current disorders upon insanity but that the subject has been more fully dealt with in a joint paper by Dr. Goodall and the present writer.

Having said so much concerning toxic insanities, toxine-produced epilepsies must now receive attention.

Epilepsies and epileptiform convulsions, differing as they do mainly in extent, depth, and locality of area involved, indicate that the question of the determinant of a convulsive discharge is the prime one for our present consideration.

Many epilepsies show plain evidence of the stamp of a congenital imperfection of nerve structure, the unstable constitution of whose elements requires no excessive stimulation to excite a morbid discharge. All degrees of differing construction and stability, up to the normal, are to be met with, as also all varieties of discharge. But with the epilepsies dependent upon developmental arrest we have less concern than with those which may be inferred to result from nutritional impairment of the cell nucleus. Just as the characters of toxic insanities have been supposed to be those of a general diffuse disturbance of mental action, so it might be conjectured that the toxic epilepsies would be convulsions of a similarly irregular kind. But it is necessary to remember that the path of a convulsive discharge is largely determined, at any rate when some general disturbing agent is at work, by the readiness of transit procured by physiological currents. So that it may not follow that, because a specialized form of epilepsy exists, its causation may not be a poison which is circulating equally throughout the whole nervous system. As acute and chronic cerebral toxæmia may be represented by symptoms of delirious confusion and systematized delusion respectively, so epileptic discharges may in their nature be general and indiscriminate, or specialized and recurrent according to the rapid or retarded administration of the poison. It is important to note that the nuclear vacuolation of the cortical cells, which Bevan Lewis considered the physical basis of epilepsy, has been ascribed with much reason by A. W. Campbell to a toxæmic condition. As it is important to compare insanity with delirium, so it is to regard epilepsy and eclampsia in their mutual relations. The latter has been separated from epilepsy because it is merely a transient condition of recognized toxic origin. Thus it has been viewed as a functional disease, and has been disassociated from what is considered an affection of organic origin. So far as clinical symptoms are concerned, the diagnosis between epilepsy and eclampsia is often very difficult; even albuminuria in the latter case no longer serves as a clue, since some observers maintain that albumen is always found in the urine passed by epileptics after a paroxysm.

The point for consideration is whether toxic materials in the circulation can be in any number of cases the cause of what is known as true epilepsy (when there is no predisposition to it), as they can of eclampsia. That they may excite epilepsy there is no doubt whatever. Pierre Marie has gone so far as to regard idiopathic epilepsy as an infectively-originating disease, and has, with Lannois, advocated treatment in accord with this. Féré has remarked that reflexly-produced convulsions in neurotic children or the eclampsia of scarlet fever may end in true epilepsy.

Reflex Causations of Insanity and Epilepsy.—It now remains to consider the above. In many instances it will be found that cases classed as “reflex” are really of the nature of toxæmia. Brown Séquard, in 1861, asserted that various forms of insanity and delirium might be caused by irritation of centripetal nerves or by alterations of the blood, and adduced proofs. His views have received apparent confirmation from time to time, but on the whole the consensus of opinion seems to be that such causes rarely have effect apart from a mental predisposition. Such, too, is the common impression with regard to epilepsy. Nevertheless there are but few who will not concede an important position to the so-called “reflex” theories of causation in the production of the cerebral and spinal neuroses. And certainly there is no excuse for an insufficient acquaintance with these theories, since the evidence of the benefits conferred on the neuroses by the removal of reflex irritation is shown with fair conclusiveness in very many cases. We will now glance in succession over the various organs and regions of the body, from the disturbance of whose functions reflex neuroses have been occasioned.

Disorders of the Visual Organs.—The influence of errors of refraction upon the production or excitation of epilepsy has been investigated by Wigglesworth and Bickerton, Dodds, Stevens, Starr, Hern, and others. The important paper of the first two authors* space forbids us to quote at length. The majority of the 151 patients examined by them were of too old standing for any treatment to be effectual; but in seven cases of epilepsy, uncomplicated by mental degeneration, two were relieved and three cured by correction of the ocular defect. Errors of refraction existed in about 45 per cent. of the cases. Dodds, more recently, has found astig-

* “Brain,” January, 1889.

matism to be present in epileptics to the extent of 26 per cent. more than in normal persons. He claims good results from treatment; the minor part only remained unbenefited. These two investigations are the most important. W. S. Colman, in a recent paper,* records cases of retinal and choroid mischief in which definite hallucinations existed, and cites similar cases. It must be confessed that a much larger series of cases than at present chronicled, showing a relation between epilepsy and ametropia, is needed to form a definite opinion. At present this question must be considered as under discussion.

Aural Disease.—Examples of a relation between aural disease and epilepsy or insanity have only been found sparsely. Such scarcity of evidence is hardly to be expected, both from a consideration of the cerebral complications of ear disease and the intermediate position occupied by Ménière's disease between epilepsy and the latter. Cases showing an association between aural disease and the neuroses have been described by no few, but cannot be given here. The post-mortem records of Beliakoff† show that in 100 lunatics, otitis had presumably existed in 12·5 per cent. This number is too small to warrant any conclusions. Valuable information is contained in Ormerod's‡ article upon ear disease and epilepsy. According to this, ear disease may excite fits either by reflected irritation or by setting up disease in the Rolandic area of the cerebrum. Out of 100 cases of suppurative otitis media no less than seven had genuine epileptic seizures. (The usual ratio of epileptics to the total population is less than this.) Colman, in the paper before quoted, records three cases of labyrinthine disease associated with hallucinations. These were not confined to aural kind. He cites four other instances. Régis has published details of five cases of unilateral hallucinations manifestly caused by lesion of a special sense on one side.

Nasal Diseases.—The relation of these to the neuroses has been discussed fully by Burnett,§ who has also given the literature of the subject; it will, therefore, not be further discussed here. Other cases will be found in the bibliography of this paper. Laryngeal epilepsy can only receive

* "Hallucinations in the Sane," "B. M. J.," May 12th, 1894.

† "Archiv. de Neurol.," Paris, 1892.

‡ "Brain."

§ "Diseases of the Nose and Throat."

passing notice, as comparatively few instances are to be found, and some of those recorded appear to be instances of vertigo rather than true epilepsy.

Dental Disease.—The influence of this has been recognized for many years, and numerous cases illustrating this are to be found. The *modus operandi* appears to be by (a) direct irritation; (b) septic absorption. The elaborate communications of the fifth nerve and its supposed influence on the vaso-motor centre in the medulla explain the widespread disturbances which may arise from its irritation. It is important to recognize the influence of chronic septic absorption from carious teeth, as this, of course, may exist quite apart from pain.

Genital Disorders in the Male.—Dr. Althaus recorded the cases of several epileptics with phimosis who were circumcised.* From the results he concluded that it was doubtful whether the fits were ever a consequence of the peripheral irritation occasioned by phimosis, but that the propriety of the operation was certain. Several cases have been recorded in which improvement in forms of psychic and other neuroses has resulted, but evidence of the equal importance of peripheral irritation of the male genitalia in affecting the nervous system is not forthcoming to the same extent as in the female.

Several other causes have been assigned for the production or excitation of insanity, epilepsy and epileptic convulsions. These need not be dwelt upon, inasmuch as the cases recorded are not numerous.

Conclusions.—It has been impossible to incorporate in this brief paper the numerous cases illustrative of the views stated. These have, therefore, been separately compiled for the Journal, together with the various theories upon the subject, which it is hoped will prove of service to those working in this field. Although there may be little that is new to us in the foregoing, yet we cannot too often picture to ourselves the variety of ways in which morbid nervous action may be originated or excited. And whatever credence may be given to some of the theories stated here, yet it is doubtless of great importance to investigate systematically every organ and region of the body, with the object of discovering a relationship between the existing neuroses and disordered bodily function. Notwithstanding the finding of

* "Lancet," February 16th, 1867.

this connection and the successful treatment of the disorder, we must not count definitely upon a cure, and this for reasons too obvious to need quotation. Time and careful observation alone will decide the importance of the various circumstances which have been described in producing mental and convulsive disorders. Certainly it is necessary to study the pathology of insanity from another point of view than that of morbid anatomy. The late Dr. Moxon observed that "spying into the brain with the highest object glasses is something like using extra big spectacles to examine the closed edges of a book you are wanting to read but cannot open."* Without echoing these sentiments unreservedly, we must lay stress upon the importance of the study of organic chemistry in the insane. In the words of Sir William Aitken, "it is by chemical combined with biological and bacteriological methods that we must look for the discovery of the many factors in the causation of disease, and for the power of preventing or removing it."

Lunacy Administration in Berlin and in Scotland, with Special Reference to the Care of the Insane in Private Dwellings.
By JOHN SIBBALD, M.D., Commissioner in Lunacy for Scotland.

(Concluded from page 13.)

The Supervision and Management of the Patients in Private Dwellings.

The way in which the boarding-out system is administered at Berlin is the result of experience. Its present form differs in some respects from the arrangements made at the commencement of the experiment. It is unnecessary to describe the gradual evolution of the system, the way in which cumbrous regulations were eliminated, and in which greater efficiency was given to the arrangements; but it is proper to recognize the great capacity as an administrator which has been shown by Dr. Sander, to whom, as director of the asylum, the development of the system has been chiefly due.

When a patient is to be entrusted to a guardian a formal agreement is entered into between the Asylum Committee and the guardian, by which the guardian comes under obligations, in return for a certain monthly payment, to give

* "Pilocereus Senilis."