

is imperfect glandular action in the skin, products of tissue waste are retained rather than eliminated, and a disagreeable odor results. One of the strongest arguments in favor of rain in preference to tub baths for the demented insane is the tonic effect of the shower upon the skin. There is imparted to the latter tissue a glow, the circulation is stimulated, and waste products are removed more effectually than by the poorly applied warm tub bath.

One of the most important glandular secretions is that of the kidneys. The exact relationship of kidney disease and insanity, whether the kidney affection is causal or secondary to the mental disturbance, has long been a subject of discussion. There is no question that the two are quite constantly associated. The following conclusions arrived at by different observers during the past nine years are interesting and deserve careful study.

The toxicity of the urine of the insane has been tested. No very positive results have yet been derived. Dr. George T. Tuttle, of McLean Hospital, after citing Purdy, T. Clifford Allbutt, Dickenson, and Savage, all of whom believe in mental anxiety as a chief cause of kidney disturbance, concludes as follows:

"First. Chronic nephritis is sometimes the cause of mental aberration, which may be called insanity.

"Second. Long-continued anxiety may cause albumin, hyaline, granular, epithelial, and blood casts in the urine, with accompanying oedema in some cases.

"Third. This kidney affection may be temporary, disappearing when the cause is removed, or, the cause persisting too long, may become chronic renal disease.

"Fourth. Contrary to the opinion of many observers, disease of the kidneys is quite common among the insane." ("Kidney Disease in Insanity," by George T. Tuttle, M.D., *American Journal of Insanity*, April, 1892.)

Dr. E. D. Bondurant, of the Alabama Insane Hospital at Tuscaloosa, made a careful analysis of the urine of the insane and recapitulates his collective results in regard to Bright's disease and insanity as follows: "That albumin, together with renal tube casts, can be detected in the urine of more than half the cases of chronic insanity treated in this institution, and in the urine of quite seventy-five per cent. of the cases of recent insanity admitted.

"That a large proportion (not all) of the patients whose renal secretion is thus abnormal exhibit at some time some other evidence of renal disorder.

"That a small percentage, say twenty-five per cent., of those whose urine contains tube casts and albumin present such clinical evidences of nephritis as should enable any competent practitioner of medicine to make the diagnosis of nephritic disease or complication without examination of the urine.

"That seventy-five per cent. of the kidneys examined post mortem show pathological changes.

"And finally, the facts obtained seem to justify the opinion that many of the patients (not all, be it remembered) in whom insanity and nephritis coexist are insane because of the nephritis; *i.e.*, the insanity is one of the mental symptoms of acute or chronic uræmic intoxication." ("Bright's Disease and Insanity," by E. D. Bondurant, M.D., *American Journal of Insanity*, July, 1895.)

In a comparison of sane patients in a general hospital and insane patients in hospitals for the insane Dr. Prout finds a higher percentage showing gross kidney lesions among patients dying in hospitals for the insane than among those dying of general diseases in a general hospital. Dr. Prout considers that an increased elimination of toxic compounds in the urine would naturally lead to structural kidney change, and he considers the increase of kidney lesions found in autopsies on the insane an argument in favor of the autotoxis theory ("Kidney Disease and Insanity," by Thomas P. Prout, *American Journal of Insanity*, January, 1897).

Cleon Melville Hubbard arrives at the following conclusions in regard to the urine of melancholia:

"(1) The amounts of urine and solids are generally

diminished, and they usually increase with the patient's improvement.

"(2) The specific gravity is normal.

"(3) The urea and uric acid are, as a rule, diminished.

"(4) The diminution in nitrogenous excretions is due in most cases to a diminished ingestion of proteids, but in some it may possibly result from a lessened absorption of food.

"(5) The ratio of uric acid to urea shows no constant relation to the mental condition." ("A Study of the Excretion of Urea and Uric Acid in Melancholia," by Cleon Melville Hubbard, *American Journal of Insanity*, April, 1898.)

Dr. W. L. Worcester, of the Danvers Insane Hospital, in an article on "The Relations of Renal Diseases to Mental Derangement," arrives at the following conclusions: "Renal disease in some degree is very common among the insane, but it is by no means certain that it is very much more common among them than in the population at large at corresponding ages.

"Cases in which insanity is due simply to disease of the kidneys are rather infrequent in hospitals for the insane. Taking the term 'Bright's disease' in its broadest significance, however, it is probably one of the most common causes, if not the most common, of mental derangements."

Dr. Worcester calls attention to the fact that in acute delirium without exception he has found urine "heavily charged with albumin and has contained large quantities of casts." He doubts whether the starting-point of this condition of the urine is in the kidneys. Dr. Worcester still further calls attention to the great prevalence of vascular degeneration as a cause of the mental decay in senile dementia and its association with degeneration of the kidneys and infers that kidney degeneration and senile dementia may have a common cause ("The Relations of Renal Diseases to Mental Derangement." Proceedings of the American Medico-Psychological Association, vol. vi., by W. L. Worcester, M.D., Assistant Physician and Pathologist, Danvers Insane Hospital).

Dr. M. Allen Starr, of New York, believes that among several causes of neurasthenia and melancholia a toxic origin occupies a prominent place. In such cases "the urine is irregular in quantity, at times scanty, of high color and of high specific gravity; at other times profuse, light, and of low specific gravity, and at all times it contains large quantities of indican or indoxyl." Exactly what the toxic agent is Dr. Starr does not say. He says that "indican or indoxyl is the one particular thing found in the urine in varying quantities according to the general condition of the patients, and yet I do not suppose that indican is the active poison" ("Toxic Origin of Neurasthenia and Melancholia," by M. Allen Starr, *New York Medical Record*, May 11, 1901).

The analyses that have come under the writer's own observation give the following results for melancholia: *Quantity* diminished, *specific gravity* diminished, *solids* diminished, *urophain* increased, *urea* diminished, *indican* increased, *uric acid* diminished or increased, *sulphates* diminished, *earthy* and *alkaline phosphates* diminished, *albumin* generally absent. From all these observations it may be concluded that in melancholia and neurasthenia there is imperfect elimination from the kidneys of the ordinary waste products of the blood, and that there is impaired intestinal digestion with more or less decomposition of the contents of the intestinal tract. As with the pathological condition of the blood so with the kidney disturbance, it is difficult to say whether these functional irregularities are the cause or the result of the mental disease. The writer inclines to the opinion that in the majority of cases the renal disturbance is secondary to the psychosis, and dependent on the impaired functions of the central nervous system.

4. In disturbances of motility, the reflexes may be exaggerated, diminished, or otherwise modified in different psychoses. In the earlier stages of paresis there are usually exaggerated knee-jerk and ankle clonus, followed by a progressive failure and final disappearance of these

phenomena as the central degeneration advances. As a rule the deep reflexes are diminished in those varieties of insanity in which depression is the prevailing feature, such as melancholia, the stuporose stage of *dementia pra-*

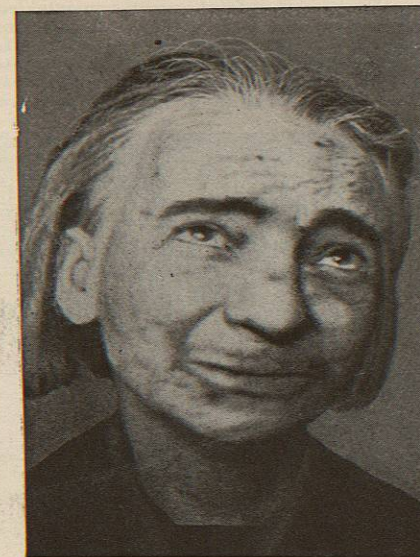


Fig. 2820.—Case XXVII. Chronic Melancholia. Morbid and inhibited expression of grief. Darwin's "grief muscles" in contraction producing "horseshoe mark." (From photograph taken by author.)

*cox*, and dementia, and they are exaggerated in those varieties in which activity is a marked symptom, as in mania. The temporary disappearance of the deep reflexes followed by their reappearance in the same patient in different stages of the functional psychoses is an evidence that this symptom alone is not necessarily an indication of organic disease. Absence of the eye reflexes, however, is usually an evidence of organic brain disease, and is most frequently noticed in paresis.

In hemiplegia the Babinski reflex appears in about seventy per cent. of the cases, according to Drs. Walton and Paul, and is also associated with pyramidal-tract disease.

The most noticeable evidences of disturbed motility are seen in the changed physical expression of the insane. All outward muscular movements, whether of the face, trunk, or extremities, succeed definite functional activity of some portion of the central nervous system. It follows, then, that functional or organic disturbance of the brain in insanity must lead to varying peripheral changes, both those of expression in the countenance and those consisting of peculiarities of gait, posture, and other muscular movements. These changes in physical expression when analyzed resolve themselves under the following heads: I. Impairment of healthy inhibition, which is so frequently associated with insanity, and one result of which is weakening of the faculty of attention. II. Excessive or defective nerve-muscular activity of an involuntary character, dependent upon morbid irritation or degeneration of the cerebral structure.

I. In health the inhibitory function is exercised in a twofold manner: First, in checking irrelevant trains of thought, repressing whatever is impertinent to the subject engaging the attention; and secondly, in checking certain muscular movements which, though they naturally follow the stimulations which have preceded them, still, for the time being and with other objects in view, are undesirable and out of place.

In the early development of insanity one of the first symptoms to attract the notice of the friends, and to arouse their suspicions of mental disturbance, is a manifest inability on the part of the patient to concentrate his attention. This will declare itself in various ways. The patient becomes inaccurate. If a mechanic, he either accomplishes less work or is careless; if in business, he makes frequent mistakes and fails to fulfil important obligations. All this inaccuracy and omission of detail are due to varying degrees of self-abstraction. The patient has lost the power of successfully inhibiting the fleeting thoughts or suspicions which crowd his mind and which supplant the ideas that immediately concern his daily work and life.

The asylum workshop affords an excellent illustration. Here you may study inhibitory incapacity in every stage of development. A stranger enters the room and probably half of the patients will cease working, some will arise from their seats, and possibly one or more will walk about the newcomer, looking him over inquisitively and either talking to themselves or to the visitor. And in what a scattered and desultory way is much of the work performed! Evidently ideas irrelevant to the occupation in hand absorb and divert the attention of these diseased minds into other channels. In just the proportion that the individual possesses inhibitory capacity, to just that extent does he seem capable of performing successful and intelligent work.

Bearing in mind, then, that weakening of healthy inhibition is one of the first results of insanity, we find this impairment of the inhibitory capacity manifested in the physical, and particularly the facial, expression of the insane in two ways:

1. There is inability to control the movements of the facial muscles. The insane make few attempts at concealing the facial expression of their feelings. With them impaired inhibitory power interferes with that slight volitional control which we possess over those facial movements that habitually follow certain emotions. In the familiar language of daily life the insane *look* very much as they *feel*, and their attempts at concealing their real emotions are few and unsuccessful.

2. For the same reason that there is impaired inhibition, there is inability to concentrate the attention, the result of which is an expression of self-absorption quite peculiar and characteristic of the disease.

The insane patient makes few and ineffectual attempts at disguising the feelings which oppress him. The conflicting emotions by which he is disturbed are reflected through the various motor tracts to the face, and as a result we may often read the character of the delusions which preoccupy the mind. Thus the expression of the countenance in acute melancholia is generally quite characteristic of a depressed state of the feelings; and what is especially noteworthy is the fact that this diseased expression is far more intense than would be the expression of similar emotions



Fig. 2821.—Case LV. Acute Melancholia. Marked and characteristic innervation of Darwin's "grief muscles." Intense motor disturbance. (From photograph taken by author.)

in the same individual in health. Impaired inhibition does not exercise any restraining influence upon the countenance, and, whether alone or in the presence of



FIG. 2822.—Case X. Alternating Insanity. Exhilarated stage.

others, the melancholic presents the furrowed brow, the anxious and distressed expression about the eyes and mouth that are characteristic of these especial emotions, whether they proceed from natural or morbid causes. The only difference is that the normal manifestation of grief is modified by healthy inhibition, while morbid sorrow is persistent, intense, and not subject to outward restraint.

Figs. 2820 and 2821, Cases XXVII. and LV., illustrate the complete abandonment of the patient to the predominant emotion, the individual making no effort whatever to control the expression of the feelings. Case X., Figs. 2822 and 2823 respectively, show the transition of expression in the alternating phases of exhilaration and depression, both cases being subjects of manic-depressive insanity. In acute mania inhibition exercises no restraining influence whatever over the constant nerve-muscular activity which so transforms the physiognomy. Case XLII., Fig. 2818, illustrates how completely has intelligent control over the features been swept away by the storm raging within the cerebral centres.

The faces of the chronic delusional insane show quite clearly the absence of healthy inhibition. Thus the sly, distrustful glance, the bitter, lowering look of hatred and enmity, the self-satisfied air of exaltation, or the dejected countenance of self-abasement, are expressions quite frequently noted among this class of insane, and

are another evidence of the inability of the patient, through impaired inhibition, to control the outward manifestation of the inner feelings. These same feelings exist in health, oftentimes with great intensity, and yet how perfectly are they concealed! In this connection it is interesting to note that in the weaker mental conditions of childhood these same feelings and emotions are frequently and as clearly represented in changes of facial expression as are the corresponding emotional states in the faces of the adult insane. The main difference lies in this fact, however, that in childhood inhibition through



FIG. 2823.—Case X. Alternating Insanity. Depressed stage. Ocular divergence.

the will has not been developed, while among the adult insane it has been weakened by disease.

Case XII., Fig. 2824, quite plainly manifests in his countenance his all-absorbing egotism. In sitting for his portrait he chose his own position, arranging with great care his decorations, consisting of old buttons, bits of glass, brass wash-bowl chains, etc., which, as he imagined, possessed great value. The violin, which he made himself out of limited materials, and with an old knife and awl, he was anxious to display as a Cremona instrument of rare worth. The inconsistency of his real position (that of confinement for life in an asylum), the utter worthlessness of his jewelry and improvised insignia do not in the least lead to the inhibition of the expressions of morbid vanity and self-importance which pervade his countenance. Indeed, in nearly all forms of acute or chronic insanity characterized by active persistent ideas there will be noticed in the facial expression a complete abandonment to the prevailing morbid emotions, with scarcely any attempt at inhibition.

II. The second manner in which the physical expression of health is modified by insanity is through excessive, deficient, or automatic nerve-muscular activity of an involuntary character, dependent upon morbid irritation or degeneration of the cerebral cell structure.

It may be stated that all those movements which are caused by irregular cell activity of the cerebral centres

have one characteristic distinguishing them from the ordinary changes of facial expression: they are entirely meaningless, subserve no purpose, and do not conform to any of the well-known expressions of the emotions, as grief, joy, etc. In health the expression of these emotions is always recognized by certain well-known muscular contractions which observation has taught us are characteristic of corresponding mental states. We know, for instance, that laughter will be manifested by contraction of the *corrugators*, of the *malaris*, and of the great *zygomatic*; in grief we know that the eyeballs will be rolled a little upward and inward, and that the contraction of the central fibres of the *frontalis* acting upon the *corrugators* will produce a peculiar and very characteristic wrinkling of the forehead above and between the eyes, and that the *depressores anguli oris* will draw down the corners of the mouth. These muscular contractions follow in a certain definite manner their causative mental states. So regularly and constantly do they succeed their antecedent mental conditions that, given the state of mind, the resulting movements of expression can be foretold even before their appearance. Hence the expressions of the emotions can be easily separated into groups: thus we have the expression of joy, grief, disgust, and all the others.

On the other hand, the movements under discussion are not regular, do not indicate any particular state of mind, but represent rather that irregular and interrupted action of the brain cells which often takes place in acute insanity, and is of very frequent occurrence in the degenerative brain conditions of chronic alienation.

To avoid confusion we may study this phase of the physical expression of the insane under three heads:

I. As representing states of excessive nerve-muscular activity due to central irritation.

II. As representing states of deficient nerve-muscular activity due to central degeneration.

III. As representing states of automatic cell activity in the cerebrum occurring not infrequently in acute insanity, and quite constantly in the chronic form of the disease.

I. *Physical Expression of the Insane Caused by Excessive Nerve-muscular Activity.*—A certain constant and regular transmission of nerve force from the central cells to the muscular periphery is natural and in accordance with health. Indeed, a state of general good health demands this outward relief for the potential energy constantly accumulating within the brain cells. Thus the excessive muscular activity of all young and growing animals, the playfulness of young dogs and kittens, the pranks and follies of boyhood, are oftentimes merely the expression of this great natural law. In adult life the potential energy of cerebral cells is manifested in more practical and useful ways, but still in the most tangible results of a successful business, mechanical, or professional life we recognize the outward manifestation of the potential energy which has been stored up within the brain cells until the proper stimulation called forth its discharge.

In diseased conditions of the brain, however, the pathological irritation of these delicate nerve centres may be so great as to overcome any acquired inhibitory resistance, and thus liberate an excess of nerve force which will seek an outlet in the usual way by passing along the efferent motor tracts to the muscles, and there appearing as muscular movement. Thus it is that in the functional or organic brain disturbances of insanity, abnormal motor activities are a frequent accompaniment of disturbed states of mind.

Pathological motor activity is, as we have seen, spasmodic, irregular, and purposeless. The most striking illustration of this fact is afforded by cases of chorea and epilepsy. There seem to be good reasons for supposing that in these diseases the brain cells are in an unstable condition, owing to hereditary, traumatic, or nutritive disturbances, and that, as Gowers says, the discharge of these same cells "may depend on the production of force within being increased in excess of the resistance, or on

the resistance being duly lessened" ("Epilepsy and other Chronic Convulsive Diseases," p. 213).

In the active stages of mania and melancholia, in the acute excitement which sometimes occurs in paresis and other organic diseases of the brain, this same discharge of nerve force takes place. The unceasing jactitation of acute mania, the restlessness of melancholia, are familiar illustrations. Such patients are apt to be in a state of constant muscular activity, pacing the floor, tearing their clothing, and destroying whatever comes in their way.

These irregular and motiveless movements of the insane are earliest manifested in the facial muscles. The extreme sensitiveness of this region to cerebral conditions, and the weaker inhibitory control which the brain possesses over these delicately poised muscles, are reasons why the face so often presents the first physical manifestations of the advancing mental disease. Very frequently the muscular disturbance does not extend beyond the face; but it is quite rare that this region does not show some evidence of the morbid irritation of the brain cells. When the face alone is disturbed in this way, the resulting expression is quite peculiar, and resembles those meaningless contractions that are produced when a mild galvanic current is passed through these muscles. The muscles are gently but continuously contracted, particularly those about the forehead, at the root of the nose, and about the mouth, giving to the patient a peculiar kind of *troubled* or *anxious* expression. It is often noticed by the friends at a very early stage of the disease, and they will tell you that the patient does not look natural, that his countenance has a strained, intense look, quite different from his normal expression, but still very difficult to describe.

In Case XLII. (Fig. 2818), the patient was entirely incoherent, and in a state of constant muscular agitation.



FIG. 2824.—Case XII. Paranoia. Morbid egotism and fondness for display. (From photograph taken by author.)

He was destructive, and almost too confused to eat his meals, so that frequent feeding with the nasal tube became necessary. The staring eyes, wrinkled forehead, dry, dishevelled hair, and torn coat are in striking con-

trast with Fig. 2819, in which the hair has assumed its natural condition, the face is smooth, and the eyes are calm and quiet.

In cases of melancholia with motor disturbance we see the effects of central irritation reflected in muscular agitation. Sometimes the patient will pace the floor wringing the hands, groaning and moaning, or the excitement will become so intense as to lead to an impulse to tear or destroy whatever comes within reach.

In many cases of chronic insanity almost constant tooth-grinding is a noticeable feature, and another illustration of morbid transmission of nerve force from the



FIG. 2825.—Case XXXIX. Acute Mania. As he appeared on arrival at asylum from prison. Morbid innervation of facial muscles. (From photograph taken by author.)

central cells to the muscular periphery. Tooth-grinding is not uncommon in nervous children, and is of very frequent occurrence in the insanity proceeding from structural brain disease. It is noticed oftener in connection with paresis than with any other disease. In passing through wards for demented patients it is a familiar sound, and sometimes is made with such force that it can be heard at a distance of thirty or forty feet. Warner thus alludes to this symptom: "Tooth-grinding is produced by the action of the deeply situated pterygoid muscles; champing of the jaws is produced by the masseter and temporal muscles; all these muscles are supplied by the fifth nerve, and it is to their condition that we must look for information as to the condition of the central origin of the nerve." By means of the Gasserian ganglion and small nerve filaments branching from it, the fifth nerve is brought into intimate connection with the dura mater and adjacent membranes. In chronic insanity associated with dementia these membranes are nearly always found to be in a pathological condition. It is quite natural, therefore, that morbid sensations should be transmitted from these diseased membranes, through the sensory branches of this portion of the fifth nerve, back to its origin in the pons Varolii and medulla, and thence be reflected outward along its motor tract to the pterygoid and masseter muscles.

In many cases of maniacal excitement attention has been called to the dry, rough, and almost bristling condition of the hair. In those patients who have recovered from mania the hair resumes its normal condition, is softer, and more easily kept in place. Illustrations of this are seen in Cases XXXIX. (Figs. 2825 and 2826) and XLII. (Figs. 2818 and 2819). In chronic or in recurrent mania the dry and bristling state of the hair is of common occurrence. One case under the writer's observation, that of a woman, was characterized by exacerbations of excitement, and at these times her hair was exceedingly dry and stood out in a striking way all about her head and face. In two cases the hair was naturally curly, but, as one result of the active mental excitement, there seemed to be imparted to it a stiffness quite different from that produced by the curliness; each individual hair, during the period of excitement, appeared to have a special prominence of its own.

This singular condition of the hair, in states of active mental excitement, has been alluded to by Darwin in his



FIG. 2826.—Case XXXIX. Taken at time of discharge and recovery. Disappearance of morbid innervation, improved nutrition. (From photograph taken by author.)

"Expression of the Emotions in Man and Animals." His explanation, which is undoubtedly correct, affords another illustration of excessive nerve-muscular activity following cerebral cell irritation. Every hair sac is provided with delicate unstriped muscular fibres—*arrectores pili*. These minute involuntary muscles are exceedingly liable to contract under the influence of strong emotions, such as fear and anger, as well as from the effects of cold. The contraction of these muscles causes a more or less complete erection of the hair shaft. Darwin concludes that "the erection of the dermal appendages is a reflex action, independent of the will; and this action must be looked at, when occurring under the influence of anger or fear, not as a power acquired for the sake of some advantage, but as an incidental result, at least to a large extent, of the sensorium being affected" (*op. cit.*, p. 102).

In the active mental excitement of mania, acute or chronic, persistent irritation of the cerebral cell structure leads to the transmission of nerve force along this channel to the *arrectores pili*—all the more readily because the natural emotions of fear and anger have made this a customary route. Hence in those forms of insanity which are accompanied by excessive nerve-muscular activity this erection of the hair is an almost inevitable result. This condition of the hair is seen only in those forms of mental disease which are characterized by active excitement or marked emotional disturbance. The bristling and erection is intensified by the dryness and roughness of the hair due to the impaired action of the sebaceous glands. Darwin also informs us "that with man the hairs on the front of the head which slope forward, and those on the back of the head which slope backward, are raised in opposite directions by the contraction of the *occipito-frontalis* or scalp muscle" (*ibid.*, p. 297). This muscle is, as we have seen, often kept in a state of unnatural tension in conditions of pathological cerebral excitement, and hence its action would assist the *arrectores pili* in maintaining an erect and bristling state of the hair.

II. *Physical Expression of the Insane Caused by Deficient Nerve-muscular Activity due to Central Degeneration.*—Deficient nerve-muscular activity plays a prominent part in the etiology of the physical expression of insanity. A recognition of its existence in any case frequently enables the physician to make a correct diagnosis and prognosis of the mental disease affecting the patient. In nearly all forms of chronic insanity accompanied by mental enfeeblement, deficient nerve-muscular activity corresponds to the degree of mental impairment.

Whatever the pathological alterations in the brain cells may be, varying degrees of motor impairment constitute one very constant result in all cases of chronic insanity attended with mental weakness. We have already noticed how excessive nerve-muscular activity characterizes nearly all attacks of acute mania, as well as the excited stage of paresis, and the temporary exacerbations of excitement occurring in dementia. In these cases the nerve force is discharged in excess of the power of resistance, either because the inhibitory power itself is diminished, or because there is an excess of nerve force generated within the nerve centres. On the other hand, in cases of persistent and long-continued acute insanity, as well as in chronic insanity associated with the varying degrees of dementia above mentioned, deficient nerve-muscular activity is a prominent symptom. And the inference seems a legitimate one, that this deficient nerve-muscular activity represents or corresponds to certain degenerative processes occurring within the brain cells. This deficient nerve-muscular activity varies from the slightest motor impairment in a few of the delicate facial muscular strands to an extreme degree of general muscular paresis.

This deficient nerve-muscular activity represents imperfect or weakened innervation on the part of the central organ—the brain. All nerve tissue is endowed with one peculiar property, that of *sensibility*. By means of it, "the nerve cells feel excitation from without, and react in consequence, by virtue of the excitement of their natural affinities" (Luys, "The Brain and its Functions," p. 81). Impaired sensibility of the nerve cells is a fre-

quent result of protracted attacks of acute insanity, and a constant accompaniment of the various forms of dementia. And in such cases there is imperfect reaction to the various sensory stimulations which, in health, are being constantly transmitted from the periphery to the higher nerve centres of the brain. Dementia is characterized by imperfect responsiveness to external impres-



FIG. 2827.—Case LI. Chronic Dementia. Showing peculiar and uncomfortable attitude assumed by demented person as a result of morbid and persistent nerve-muscular activity. (From photograph taken by author.)

sions. It is difficult to arouse and interest such patients. They care little for their surroundings; they eat and sleep, but their energy seems lost. They lie or stand around in a listless way, and oftentimes it is necessary to speak to them in a louder voice in order to attract their attention.

Impaired nervous sensibility is attended with imperfect motor reaction, probably for the reason that the afferent and efferent tracts do not transmit impulses to and from the brain as readily as in health, and also because the brain cells themselves are less sensitive. Those regions which in health are most responsive to this excitation are very apt to be the first to become affected in diseases of the central nervous system. For this reason the face, in the earliest stages of dementia, begins to show evidences of impaired innervation. The lines about the eyes, the forehead, and the mouth, which were formerly well defined and which represented the healthy muscular tonicity already referred to, begin to lose their precision and appear to be smoothed out. The peculiar pose of the features, due, as we have seen, to the continuous transmission of nervous force along the various efferent nerve tracts to the muscular periphery, and which gives what we call character to each individual countenance, seems to have lost its definiteness. As a result the face begins to lose its expression, and in the very earliest stages of the disease constitutes a painful symptom for the friends to behold, and leads the physician to make a grave diagnosis and prognosis.

This defective nerve-muscular activity, which is first manifested in the faces of demented patients, in time extends to the larger muscles of the extremities. Demented patients become clumsy, and, if good mechanics, gradually

lose the muscular precision which formerly characterized their work. Quite frequently such individuals are obliged to give up a certain line of skilled labor in which they formerly excelled, and undertake a less exacting branch of the work, or renounce it entirely before it becomes fully apparent that their mental health is being seriously undermined. At a still later stage of the disease the muscles of locomotion become impaired, and the patient grows clumsy in gait.

In the wards for demented patients in a large asylum one is struck with the slow, lumbering gait of the patients, with their lifeless attitudes and the general absence of healthy muscular activity which is evident on every side. A party of demented persons is easily recognizable at a distance. Their muscles, like their clothing, seem to *hang*, and there is none of that elasticity of movement characteristic of health.

This progressive muscular failure is quite noticeable in the cases of terminal dementia, which constitute so large a proportion of the population of public hospitals for the insane. Oftentimes these patients are under observation for years. In the earlier stages of their asylum residence they are capable of performing much manual labor. Gradually, as their dementia advances, they become less capable of sustained work; they may grow fleshy, but their muscles become weaker and more unreliable; and finally they cease to be efficient workers, and spend their time in the ward or on the grounds, lying or lounging about in a listless way. In these cases there is a real



FIG. 2828.—Case LVIII. Chronic Dementia. Peculiar and uncomfortable attitude maintained daily for years. Automatic nerve-muscular activity. (From photograph taken by author.)

failure in nerve-muscular force, which is represented by an inability to enter into mechanical employment, as was formerly their wont.

In cases of structural brain disease the order in which failure of muscular innervation occurs is quite interesting. First the muscles about the mouth begin to show weakness; then those about the forehead and between the eyes; later, the articulation begins to fail and to grow