

creasing frequency of the abuse of alcohol, the spread of syphilis, all of which act with especial violence upon the brain of such individuals as are hereditary weaklings.

Nationality.—It is somewhat doubtful if under similar conditions individuals of one nationality are more susceptible to insanity than those of another, and in this connection statistics are often misleading. Thus, for example, we find that the association of cretinism and goitre with mental incapacity is very common in certain of the Swiss and Tyrolean valleys. But although in a general count of the entire population of these districts alienation would be considerably augmented, in other portions of the same country, not influenced by similar telluric conditions, there would be only the average number of insane. Under conditions in which the burden of life is brought to bear with unaccustomed violence upon the members of any race, as for instance the Irish who have emigrated to this country, or the Russian Jews who have been driven from their homes and obliged to start afresh in the world under unaccustomed conditions, the proportion of insane individuals is extremely high, though in their own land it may not be above the average.

In both of these races we may note an exception to the above general statement that the disposition to psychoses is about the same for the several races, in so far that with these there is a certain instability of the nerve elements that render them ready victims when the stress of life falls too heavily upon them. Again, our American negroes afford a striking example of the baneful results of altered conditions. Before the Civil War there were few or no psychoses among them, and such organic degenerative diseases as syphilitic insanity and dementia paralytica were practically unknown. To day in communities where many are collected, as in Washington or Baltimore, the percentage of insane negroes, not to mention idiots and imbeciles, is already fully up to that of the Caucasian races with whom they are associated, and bids fair to surpass it. This is largely owing to the spread of alcoholism and syphilis among the colored people, to the deleterious effects of bad hygiene and inferior food, and to an irregular mode of living, which has taken the place of the wholesome diet, the enforced regular habits, and the freedom from anxiety that belonged to slave life.

Climate and Seasons.—These are factors of very minor importance in the evolution of insanity. The harmful effects of heat in the South are more than counterbalanced by the more prevalent abuse of alcohol in colder regions. In a general insane asylum where the middle and lower classes of the population are received, a study of the records will show that a larger number of admissions in one year may occur during the winter, whereas in other years the same holds good for the spring, summer, or autumn. Hence one is obliged to conclude that the seasons have little to do with the evolution of insanity.

Gender.—In 48,587 admissions into the New York State hospitals there were 1,043, or two per cent., more insane men than women. Nor need the smallness of the difference surprise us much when we consider that the greater inclination in men toward the abuse of alcohol and the mental stress that falls upon the bread-winner are to some extent counterbalanced by the trying incidents of the puerperium, the climacteric, and the weight of family cares in the case of harassed housewives, whereas in single women the lack of natural sexual intercourse often predisposes to morbid psychological conditions. Hence in general it may be stated that the disposition toward insanity is about equal for the two sexes.

Religion.—While it is frequently true that certain sects, notably the Hebrew communities, show a higher percentage of alienated than others, it is probable that the faith of the insane person is not so often responsible as the repeated consanguineous intermarriages, particularly of neurotic strains, and to the fact that in past generations these people have been herded together in close and squalid habitations in crowded cities.

The duty, piety, abnegation of self to the needs of

others, the raising of the moral and social tone, the trust in a hereafter taught by true religion, supply a strong prophylactic against, rather than a cause of, alienation. It is a matter, however, of daily note that many unstable persons, when insanity is beginning, take a new and violent interest in prayer-meetings and missions, and that the mystic, erratic, evolutionary paranoiac seizes upon the outward semblance of religion, not for its true intent, but as a stepping-stone in their perverted imaginings.

Civil State.—Experience has shown conclusively that among the unmarried the percentage of insane individuals is far larger than among the married. A partial explanation of this preponderance, however, may be found in the fact that many persons do not enter into the bonds of matrimony because they recognize their strong proclivities to the psychoses, and do not wish to continue a degenerate race.

The greater regularity of the sexual relations, the influence of home life, the better sanitation and better food that belong to the home are undoubted factors in lessening the frequency of mental troubles among the married. To counterbalance these to some extent are the increased duties and obligations in providing for the progeny, nor can it be doubted that the irritation of constant strife and vexation incident to unhappy marriages tends to disturb mental equilibrium.

Age.—It has been generally thought that three periods of life are particularly liable to outbreaks of nerve storms of variable violence: the time of the evolution of the sexual functions at puberty, the time of their retrocession (especially in women), and the years of senility. In the first two, besides the evolution and involution of the sexual apparatus, the growth and recession of certain tracts of the central nervous system no doubt play an important part. In the last period imperfections of the vascular apparatus are of especial moment. On the other hand, statistics of a large number of insane of all ages show that from puberty to the forty-fifth year there is a gradual increase in the number of the alienated, and that the wave crest of the psychoses is not at an early or late age, but in the later years of middle life; also that afterward there is a recession. Accordingly the three periods mentioned above are notable only by the character of the psychical disturbances that originate at these times.

About the seventeenth to the eighteenth year the intracortical association fibres reach their maximum development; nerve cells before inactive now come into function, the new adjustments of the neuron terminals affording paths of conduction that before this period were unavailable. As a result the mental development is now at its height, and the period of best attainment in both the intellectual and physical spheres is now beginning.

Should the brain organization be unstable, this rapid development may result in serious disturbances of the functional equilibrium, not alone of the nervous system but of the entire body, and a precocious senility may set in, accompanied by nerve storms of greater or less severity (excitement or depression), which end only with the death of the psyche, and the person becoming relegated to an intellectual plane lower than that of the beasts of the field. The depths of the psychic tumult may be increased and the subsequent dementia greatly augmented by the presence of constitutional or acquired vascular insufficiencies or degenerations. This oversetting of the intellectual equipoise may be promoted or greatly assisted by excesses, especially in alcohol, onanism, and venery, as well as by over-study without sufficient outdoor relaxation, to keep the body healthy.

Insanity in childhood is a rare phenomenon. It is true that there is such a thing as an insane baby, but the disturbance represents merely an impulsive rage. Later, as mental development proceeds, the forms of the psychoses become more diversified, and we may encounter impellent acts, mania, as well as melancholia, and in rare instances, in families with a luetic taint, even a form of dementia paralytica.

For the reasons above given the age of puberty is perhaps the most hazardous in life for the mental stability

of man or woman. While actual outbreaks of insanity are not nearly so frequent at this period as at some subsequent epochs, the groundwork is often laid for the later collapse. A sound education—using the term as meaning an efficient hygienic and moral training—begun in early childhood would go far to bring about the avoidance of the many factors (sexual, alcoholic, social excesses) that later lead to serious consequences.

It is somewhat difficult to determine the relative incidence of insanity in the sexes at the age of puberty. Krafft-Ebing states that females are more disposed than males on the ground that inheritance plays a greater rôle in the case of the former. Maclachlin, on the other hand, holds a diametrically opposite view, and his assertions are borne out by statistics from the immense material accumulated in the New York State asylums. In any case, however, the disproportion is not great.

Besides inheritance and excesses, especially onanism, other factors come into play as immediate evokers of alienation in youth. Of these the frequent anæmias and chlorosis, the confinement in close rooms at school, mental over-exertion, insufficient sleep, and lack of open-air exercise in cities, all claim their victims.

Insanity in both sexes is much more frequent from the eighteenth to the twentieth years than in earlier life. Indeed as adolescence approaches the tendency toward insanity increases and the maximum is reached only some years after its attainment.

As nearly all the pubescent and adolescent insane are the victims of inherited predisposition, the majority of the cases may be classified among the psychoses of the degenerate. They afford to the clinician certain characteristic stigmata, the principal of which are the frequent recurrences, automatism, and tendency to early dementia. Forms of depression (melancholia) are more frequent than those of exaltation. The former are chiefly of the periodic kind, sometimes simple, sometimes complex and alternating. It is not rare to find at this age the first phases of a circular insanity, or the germination of the seeds of a paranoia which is destined to come to maturity at a later period of life. The moral insanity of Pritchard is only a form of imbecility, the subjects in their one-sided character being not distantly related to the paranoiacs. Perhaps the most distinctive of the insanities of this period must be recognized in the hebephrenias (states of excitement) and katatonias (states of depression) of Kahlbaum, with the dementia præcox of which so much has lately been written by Kraepelin and others. Epileptic insanity and hysterical insanity are also common at this age.

Age of Maturity.—From the twentieth up to the fiftieth year there is a steady increase in the numbers of the insane, male and female, the acme being reached about the forty-fifth year.

All varieties of insanity are now prevalent, one only being distinctive—general paralysis of the insane. In the earlier periods of full manhood and womanhood the less complicated forms obtain, the melancholias predominating, the acute manias being next in frequency. Toward the end of the third decennary alcoholic and syphilitic psychoses outnumber the insanities connected with a constitutional basis, though it is reasonable to presume that inherited tendencies still play a principal part; besides, one can but suppose that the toxins of syphilis, as well as of alcohol, act with greater potency upon the man who has inherited psycho-corporal infirmities than upon the individual whose nervous matter and blood-vessels are constitutionally sound. The dread disease of modern times, dementia paralytica, is ever growing in frequency, and though our home statistics (six to eight per cent.) do not show the enormous increase of the German and Austrian asylums (about thirty per cent. of the total admissions) the figures afford food for reflection. Syphilis is undoubtedly the most frequent predisposing element, being certain in at least fifty per cent., and probable in thirty per cent. more of the cases of progressive paralysis. Many other more common causes belonging to the prime of life and to our present civilization—the

cares of the bread-winner, poverty, the burdens of a family, debilitating occupations, failures in business, mental over-strain in the great struggle for existence—all tend to overturn an already invalid brain.

Climacteric.—Whether we can speak of a true climacteric for the male is doubtful, but in any event this period does not come on until much later than in women, and is not accompanied by the same severe types of nervous and psychic disturbance. Between the fortieth and the fiftieth year a woman would appear to pass through the critical period of her mental life, not less than 19.8 per cent. out of 23,772 insane women falling victims within this period. Nor should such a result be unexpected. The fifth decade not only brings with it the gradual involution of the sexual functions with its concomitant emotional and nutritional disturbances, but also marks the beginning of senescence in the entire organism, the cerebrum included, and changes in the blood-vascular system, which from this time onward become more and more pronounced. As a natural consequence fatty alterations take place in the brain tissue, as is evidenced by the accumulation of metaplastic granules in the pyramidal cells. The evolution of productive creations of the intellect in some measure now comes to a standstill, though it does not cease altogether. The creative faculty is never so noticeable after the menopause as before that period.

The immediate factors in the causation of an insanity after the climacteric are often profuse menorrhagias or leucorrhœas which tend to induce anæmias and general depravity of the system. The sudden cessation of the menses not infrequently brings about a severe derangement of the entire system which may spend its force upon the nervous tissues, aggravating any psychical defect which may previously have been latent. Organic uterine disorders (myoma, carcinoma) do not seem to exert the same bad influence that follows the exhausting drain of a profuse, continued leucorrhœa or metrorrhagia.

Inherited predisposition still plays an important part in the psychoses of the climacteric, as is proved by the forms of mental disorder (periodic melancholias, paranoia).

The majority of women at this period of life suffer from more or less severe disturbances of various kinds. All physicians are familiar with the frequent "flushings," the feeling of fullness in the head, the roaring in the ears, the headaches, the disturbances of digestion and neuralgic pains, accompanied by a more or less marked loss of the intellectual stability, and a greater or less degree of thought inhibition. Many of these cases afford the clinical picture of various types of neurasthenia.

The graver disturbances of the psychic well-being are manifold, but do not attain to the dignity of any peculiar form of psychosis, unless the delirium of suspicion, which is quite common, may be classed as such. Many of these cases are so pronounced as to warrant the diagnosis of a paranoia. The patients show a hesitancy in both their thought and action; they are suspicious of every one and everything, although they may not reach the stage of actual delusions, and are usually able, if tactfully reasoned with, to correct their false impressions. Many of them stand on the border-line of sanity and insanity, and if carefully attended to and watched fully recover their mental stability. Of evil augury are the hallucinations of smell and hearing which usually mark the beginning of a chronic form of insanity.

Among the true psychoses the melancholias are the most frequent, and are ordinarily of the delusional resistive type. Some forms of periodic insanity, especially the depressive type, may begin at this epoch of life; circular psychoses also are occasionally encountered. What has just been said with regard to the suspicions which characterize some of the milder mental disturbances at the climacteric is equally true for the large number of cases of paranoia that reach a stage at this age that places the patients beyond the pale of society and necessitates confinement in an institution. Among sixty cases of menopause alienation Krafft-Ebing diagnosed forty-two

as belonging to one or the other of the various forms of paranoia, and although this proportion is not conceded by other observers, experience nevertheless shows a high percentage of persecutory systematized psychoses occurring at the climacteric. Cases of dementia paralytica, as well as those that run the course of a precocious senility, are now and then encountered.

The Insanities of Old Age.—For a man to have reached the age of sixty years and upward without the occurrence of an alienation of any kind is a distinct compliment to his ancestral protoplasm, and to a less extent to his own moral and hygienic habits. In advancing age the insanities of the psycho-degenerate have been left behind, except those that continue to recur periodically, and with whom the habit is retained. As a matter of fact, however, these are comparatively few in number, the most frequent being the periodic melancholia, a disorder that belongs not only to early but also to late life.

In the senium other factors arise. Comparatively few human beings wholly escape, in advanced life, some form of that involutive change in the cardio-vascular apparatus that we designate as arteriosclerosis.

These degenerative states of the arteries (which are also met with in the veins though in a less marked degree) affect mainly the intima and muscular layer of the vessel, and with the exception of one form bring about a certain diminution of calibre in the blood channels, while in all the proper transudation of the nutrient portions of the blood stream is seriously interfered with. These circulatory disturbances are often increased by the formation in the inner arterial sheaths of localized, circular, or nodular thickenings composed of fibrous knots or calcareous plaques embedded in dense fibrous masses, or deposits of fatty cholesterol matter covered by a thin fibrous calcareous layer that during life protrudes into the lumen of the artery, cutting off one-third or one-half of its blood-carrying capacity. The favorite seat of these nodules is in the internal carotids just as they pass into the skull through the foramina. In the small arteries and arterioles changes are met with which, although differing somewhat in character, produce the same effect—namely, the shutting off of a sufficient supply of nutrient fluid from the brain tissues. Moreover, there occurs a retardation of the outward lymph flow both in the cerebral substance and in the pia mater, caused in part by the accumulation of debris of all kinds in the extravascular lymph spaces, and in part by thickening of the trabeculae of the pia with accumulation of leucocytes, hæmatoidin crystals, and debris in the lymphatic channels. As a consequence the brain as a whole becomes ill-nourished; there is a degeneration of the white fibres both in the cortex and in the gray layers, with accumulation of a metaplastic material within the cells of the cortex and basal ganglia which may reach a degree sufficient to bring about destruction of the function and vitality of the entire neuron.

The psychoses of old age are, therefore, with few exceptions, essentially of an organic-degenerative nature, and possess especial brand marks, which distinguish them from the forms that occur in youth.

In all, the most striking feature is the loss of memory for recent events, while incidents in earlier life, temporarily at least, are retained. At the same time there can be noted an emotional childish tendency, accompanied by disturbances of the sensory, trophic, and vaso-motor nerves, followed in due course by apoplectiform and epileptiform attacks, which further increase the mental weakness, even though no actual paralysis is left behind. These insults are more frequently caused by the closure of an artery of medium or small calibre than by the rupture of its coats with consequent extravasation of blood and tissue necrosis.

Excluding senile dementia, which has been described as the "physiological death of the brain cell," and from which no man can escape should he live sufficiently long, we have, relatively as well as actually, fewer true psychoses among the aged than in middle life. Among 5,542 insane patients of all classes less than 14 per cent. (772)

had become insane in the twenty years between sixty and eighty. The women outnumber the men to some extent, 416 females to 356 males.

The melancholias are far more frequent than the manias, and are characterized by an anxious, distressed, agitated, errabund state of mind. As hallucinations and delusions have not the same relative frequency as at an earlier age, the agitation may be regarded as an exposition of the malnutrition of the brain centres, and the tendency is ever toward a terminal dementia. Suicide is extremely common.

The manias are characterized by their blind violence, approaching in intensity that of the paralytic dement; the erotic excitement is often intense; the delusions assume an expansive form, the imagery is senseless, and the periods of remission are infrequent. Many of the sufferers from agitated melancholia or senile mania absolutely refuse food, rendering treatment more difficult, as artificial feeding may become dangerous to life itself.

Confusional insanities are now and then seen in the aged. At times these are referable to the accumulation within the system of toxic products that the senile renal apparatus is unable to carry away, to intestinal autotoxis, occasionally to the absorption of putrescent substances from a chronic cystitis, or an extension of a bladder inflammation to the pelvis of the kidney.

In aged persons who have retained a moderately good vascular condition one may encounter benign forms of insanity, which may result in a complete recovery. A careful examination of the condition of the peripheral blood-vessels may give the necessary diagnostic clinch, although, unfortunately, the cerebral arteries are often more diseased than those accessible to the finger.

Occupation.—Certain callings appear to be more frequently followed by insanity than others. Poets and artists are especially prone to the psychoses, not so much by reason of their occupation as from the possession of genius, which generally means inherited nervous ability, and from the fact that the nature of their work allows of much time for introspection. Among the working classes, certain employments from their debilitating nature are more prone to occasion insanity than others. Among these may be mentioned the employees of railroads, especially engineers who live a life of constant nervous tension, workers in lead, in mercury, in caoutchouc, or aniline products, iron-workers, and others who are almost continuously exposed to the effects of artificial heat.

The same holds good, although to a greater degree, for brokers, bankers, domestic servants, governesses, students, and day-laborers. Pro rata the lower the social class the more frequent are the psychoses.

II. ACCESSORY CAUSES OF INSANITY.

These may be roughly divided into psychical and physical. It is often impossible to separate accessory factors from the underlying inherited taints, and for the most part careful inquiry will elicit a history of constitutional weakness serving as a background to the immediate cause.

1. *PSYCHICAL.—Anxiety.*—In a large proportion of cases of melancholia the immediate etiological factor is ascribed to the death of a near relative (mother, father, son, or daughter). Many are also directly caused by domestic worries, inability to meet liabilities, to provide properly for the family, and the dread of poverty. In the same category come business cares, loss of property, unsuccessful speculations, and similar reverses. It is hardly possible that these agents, in the total absence of constitutional predisposition, would be sufficient to interfere materially with the smooth running of the mental gearing, and though in rare instances such may be the case, for the majority an additional underlying cause must also be sought.

Exceptions of greater frequency may be noted in the instances of alienation closely following some business or domestic calamity occurring in old people, who though

they may not have derived neuropathic tendencies from their ancestors are themselves standing on the verge of a declivity, owing to advancing senile degeneration of the tissues.

Fear.—Numerous instances are recorded in which the witnessing of the commission of a murder, an attempt at assassination, the shock of coming into contact unexpectedly with burglars, an attempted rape, and other experiences calculated to produce a vivid mental impression, have been followed almost immediately by an insanity, the person within a few hours becoming stuporous or violently excited.

Examples of this kind are met with principally in individuals of weak mental organization, incapable of prolonged psychical effort and the disturbance for the most part must be attributed to the constitutional predisposition.

In the same class must be included a certain number of the psychoses of *child-birth*. The sudden lighting up of an acute insanity, occurring within a few hours of the parturition, can only be brought about by nervous instability. Not a few of the sudden manias coming on during the puerperium are merely instances of periodic insanity, the mental and physical strain incident to labor upsetting the hair-fine equilibrium and producing, what may be termed, a precocious return of the mental disturbance. Women who are always insane at the hour of parturition, and return shortly afterward to a more normal state, always belong to the degenerate class.

2. *PHYSICAL.—Poverty.*—Anything that depletes the bodily strength, if it is far-reaching enough, may become a factor in the production of an alienation. With indigence is associated bad and insufficient food, close crowding in foul air, and lack of hygiene in the widest meaning of the word. Hence it happens that the rank and file of the insane come from the poorest classes, and the crowding from country districts into towns, in recent years, has been very instrumental in increasing their numbers. Poverty also brings with it a host of attendant evils of which not the least is the tendency to make up for the lack of food by taking alcoholic stimulants which are cheaper and more satisfying for the moment. Actual starvation induces a delirium of the hallucinatory-confusional type, and may be a direct cause of alienation, which, however, is usually temporary if the case be treated early enough to save the victim's life.

Over-Exertion.—The over-exertion of the college gymnast, of the soldier during campaigns, or the strain incident to particularly arduous occupations, in which heavy weights are carried, as in the case of stevedores, favors the occurrence of changes in the vascular apparatus, that may lead, when youth has passed and early middle age is reached, to early senescence, and to organic-degenerative alterations in the central nervous system which eventually produce an insanity.

3. *CONSTITUTIONAL DISEASES.—Anæmia.*—A dyscrasia, finding one expression in an anæmia, is present in all cases of the severer forms of melancholia, as well as in neurasthenic and other types of insanity. This habit of body is so common as to make one question whether the impoverishment of the blood is not the direct underlying cause. In the sense that it heightens any inherent tendency to irritability of the central organ of the mind it is undoubtedly an excitant, but deeper lies the instability of the protoplasm itself. Even when there is no actual psychosis, anæmic individuals often show a certain degree of mental incapacity with thought inhibition and irritability, and any strain, physical or mental, super-added to the dyscrasia, may cause the balance beam to oscillate violently.

Syphilis.—Next to alcoholism this is the most frequent direct cause of insanity. In addition it may also have an influence indirectly by lowering the resistance of the organism and producing a secondary mental indisposition. As a direct agent it acts by inducing widespread changes in the intima (less severe in the fenestrata and muscularis) of the arteries, the cellular proliferation being often so extensive as partly or fully to obliterate the lumina of

the vessels. Under such circumstances there may be necrosis of the tissue areas supplied by the most damaged vessels, not confined to the brain but equally apparent in the extremities.

Intense vascular changes are not confined to the early stage of lues; on the other hand, they are more common with the secondary and tertiary manifestations of the disease. In a vast majority of paretics, particularly in those who have a clear history of specific infection, there is found, on examination, a soft thickening of the walls of the vessels, a change for the most part due to an obliterating endarteritis of a peculiar type.

Luetic neoplastic endarteritis has been encountered as early as four weeks after the occurrence of the initial lesion (G. de la Tourette, Alélakoff, Berkley), or as late as twenty years after the infection.

Besides the specific arterial degenerations, syphilomata and gummata may also occur within the cranial cavity, disturbing the return venous and lymphatic circulations and producing congestions and oedemas.

When the syphilitic process is acute the form of mental disturbance assumes a furibund, excited character followed by stupor; with the more chronic changes the excitement, though less intense, is usually more prolonged, and may be followed by pareses, paralyses, or epilepsy, the final stage being a terminal dementia. The greatly increased frequency of the cerebral complications of syphilis in recent years, together with their protean character, is exceedingly striking, and is a comment upon the civilization of the present era.

In strong contrast with the records in this country of a multitude of mental troubles following syphilitic infection is the report of Holzinger of the Russian Red Cross Commission to Abyssinia during the Italian war. In a country where according to his statement eighty per cent. of the inhabitants are syphilitic, only twelve true psychoses occurred among thirteen thousand patients seen in a general dispensary, and none of these appeared to be directly due to the taint. In the same land tabes dorsalis (six in thirteen thousand), and dementia paralytica (none) are extremely infrequent. Either the luetic virus of the East is different from that of the West, or the constitutional proclivities to mental maladies vary very much.

Tuberculosis.—This is an infrequent cause of insanity, and when it is present it usually succeeds instead of preceding the alienation.

Heart Diseases.—Cardiac lesions do not appear to be more frequent among the insane than among the sane. Those that lead to embolism are responsible for a larger proportion of the alienated than simple insufficiencies.

Kidney Diseases.—Mental disturbances are relatively frequent in the chronic forms of nephritis, especially with the contracting kidney, and with diabetes mellitus. In chronic uræmia there is often alteration of the character, delusions generally of an expansive nature, or stupor, even when the urine shows neither the presence of any considerable number of casts nor a trace of albumin.

The non-elimination of the effete products of bodily waste is responsible for the evolution of the insanity in these instances, just as the effects of other chemical or toxalbumic poisons manifest themselves as a psychosis, the mental disturbance assuming the form of an hallucinatory-confusional insanity.

Diseases of Women.—It is noticeable that organic diseases of the uterus and its appendages (carcinoma, fibroma, etc.) are seldom accompanied by profound nervous storms. On the other hand, the leucorrhœas, amenorrhœas, profuse menses, vaginismus, chronic uterine catarrh, and a host of other comparatively benign affections are now and then followed by mental disturbances.

It is probable that the latter act upon the system in two ways: first and foremost they deplete it and induce blood depravities; and secondly, they lead to the fear that some incurable disease is present. In highly neurotic individuals an ever-present dread is likely to be a factor of considerable moment. Although it may be said, in general, that the influence of the affections of the generative ap-

paratus as a cause of insanity in women has been exaggerated, as an accessory factor it is often worthy of consideration. Diseases of the generative organs in men seldom lead to alienation.

III. DIRECT CAUSES OF INSANITY.

It is never possible absolutely to separate inherited predisposition from the direct effects of deleterious drugs, febrile disturbances, and traumatism, so far as regards the degradation of the cerebral substance. Certain suggestions are afforded by the clinical phenomena resulting from such agents that render it very apparent that an invalid brain is much more readily overthrown by them than a sound one. Mark, for instance, the difference of the effect exerted by a febrile disturbance in a child the offspring of neurotic parents, and in one who comes of sound ancestry. With only a very moderate degree of fever the first child may exhibit a wild delirium with the evolution of vivid sense phantasies, while the other may not be appreciably disturbed. Again, in cerebral traumatism, a slight commotion may set up a train of psychical symptoms in the neurotic, while in the other the mental capacity remains unimpaired.

1. CHEMICAL POISONS.—*Alcohol*.—As has already been said, although syphilis may be a direct agent in the production of an insanity, its poison acts not upon the brain cells immediately, but upon the blood-vascular tissues, the nerve and neuroglia elements never being primarily involved. Alcohol, on the other hand, exerts its noxious influence alike upon mesoblastic and epiblastic elements, with the result that both suffer in equal or diverse degrees. An over-dose of alcoholic liquor acts by causing, first, congestion of the brain, and later paralysis of the walls of the vessels, inducing stasis and edema with profound unconsciousness. If the same effect is produced time after time, the vaso-motor paralysis leads to the permanent widening of the blood-vessels, especially of the arterioles and capillaries, with lowering of the vascular tonus. As a sequence we have lymph stasis with exudation of the white elements into the sheaths, and clouding with thickening of the pia-arachnoid. At length the alteration of the arteries becomes chronic, the sheaths undergo fatty-atheromatous changes, and there is established an arteriosclerosis with some narrowing of the lumen from thickening of the intima, which is in part compensatory. At a later stage fatty degeneration of the heart muscle may ensue with increasing defects in the circulation.

With the alcoholic arteriosclerosis come changes in organs of the body other than the brain, cirrhosis of the kidney and liver being the most frequent.

The effects of ardent spirits upon the human brain varies with each person. Upon certain individuals large quantities seem to have no immediate bad influence, beyond the slight immediate flushing and depression of the circulation; while in the case of others a few glasses of wine or liquor will entirely overthrow the mental equipoise and render the drinker temporarily insane. In a very few, an equally small dose, perhaps the first and only one of their lives, will permanently disturb mentalization, so that the unfortunates retrograde to the plane of demented.

From a psychical standpoint the evil effects of alcohol are usually shown in two ways. If a large quantity be taken at one time the result may be an immediate breaking down of the mental powers, so that there is produced an effect similar to that of various other irritant poisons—an acute hallucinatory excitement with thought inhibition. In the case of the alcoholic the condition is known as delirium tremens.

On the other hand, if the doses of liquor be small in amount but frequently repeated the same result is finally attained, the duration of resistance depending upon the individual, the frequency of the drinking, and to some extent upon the quality of the liquor partaken of. Since physiological experiments have shown that it takes about two days for the organism completely to eliminate alco-

hol, it is clear that if dose follows dose in rapid succession and an insufficient time is allowed for the expulsion of what is present in the body, an accumulation of the poison within the tissues must take place, which in the ordinary course of events will ultimately produce a nervous explosion—the so-called trembling delirium.

If, on the other hand, the ingestion of the drug is slower, but is constantly continued and fatty degenerative changes are set up in the tissues, particularly in the arteries and nerve cells, the result is an insanity of a more chronic type—persecutory psychoses, manias and melancholias of especial character, a pseudo-dementia paralytica, as well as amnesic and epileptic states. Characteristic of all forms of alcoholism is the peculiar mental clouding known as amnesia, and an unreasoning irritability and suspiciousness.

If the individual who abuses alcohol was the only sufferer from its deleterious effects, the crime of its misuse would not be so great, but unfortunately this is not the case. Even unto the third and fourth generation the effects of the poison may be traced in constitutional neuroses, psychoses, early mental break-downs, and eventually imbecility and idiocy. Drunkenness on the part of the parents is represented by feeble-mindedness and epilepsy in the offspring, while statistics show that intoxication in both parents at the moment of copulation induces a larger proportion of the lower grades of idiocy than any other single factor.

Intemperance is directly the cause of about ten per cent. of all cases of insanity encountered in asylums. Indirectly the figures assume colossal proportions when we include the psychoses and psychoneuroses of the descendants of alcoholic parents that are attributable to the ancestral vice. Women afford only about one-third as many examples of alcoholic insanity as men, but in the lower classes this disproportion is much decreased.

Besides the alcohols there are a large number of poisons and chemical substances that produce a direct alienation, usually of the hallucinatory type. Among these may be mentioned cocaine, atropine, morphine, salicylic acid, iodoform, antipyrin, nicotine, chloroform, ether, chloral, illuminating gas, carbon disulphide, and numerous others.

The metals, lead and quicksilver, act upon the organism somewhat differently. They are essentially of the nature of chronic poisons, and while they may occasion an hallucinatory delirium with much motor agitation of a transitory type, the peculiar nature of their action is to evoke a permanent insanity with hallucinations and delusions approaching the character of a dementia paralytica and ending in mental annihilation.

2. AUTO-INTOXICATIONS.—*Intestinal*.—A profound obstipation, with absorption into the circulation of certain products resulting from the splitting up of albuminous substances within the intestinal canal, as shown by the presence of indican and skatol, or of other less readily recognized substances in excessive amounts in the urine, may be the cause of an acute insanity, and as an etiological factor is too frequently overlooked.

Cases of this nature are by no means uncommon, and should the inducing agent be recognized and the proper remedies applied to correct the faulty digestion, they are usually readily curable. According to the degree of mental instability we may find conditions varying from simple obtundity to actual stupor; or a true psychosis, commonly of the melancholic type, may develop. On the other hand, the case may assume an alternating character, melancholia changing into mania, to be succeeded by stupor. Uremic and diabetogenic insanities have been already mentioned in another paragraph.

Among the autochthonic insanities the occurrence of an alienation following the disturbance of the secretion of the thyroid gland in the adult should be remembered. Examples are now and then met after disease of the gland, after child-birth, and occasionally without any ascertainable reason, in which the skin becomes doughy and foul, the face assumes a half-moon appearance, and soon an insanity manifests itself. The psychical torpor

steadily increases, and eventually there may be melancholic depression, or excitement with hallucinatory delirium, followed by stupor.

The majority of these conditions are curable if proper measures be instituted. In some examples of Graves' disease there is also met a form of maniacal or melancholic insanity which does not yield so readily to the thyroid treatment.

3. ACUTE FEBRILE DISTURBANCES.—The occurrence of an insanity during or after an acute febrile disease is by no means rare, but inasmuch as these cases are for the most part treated in private or general hospitals statistics as to the actual frequency are lacking. Wille gives 0.81 per cent. of typhoid fever cases as having post-febrile alienation, a not inconsiderable number in the aggregate when the frequency of this disease is considered.

Febrile psychoses may occur in either predisposed or non-neurotic persons, in the latter case intensity of the disease process overwhelming the natural tissue resistance.

The common mental disturbance that occurs during the acme of the fever is termed *delirium*. It is characterized by illusions, hallucinations, temporary facility of thought with confusion and interference with the ordinary association of ideas. Such departures from normal mentalization are produced by three agents: the rise of bodily temperature, the increase of the respiratory and circulatory activities, and lastly, but not least in importance, the impression made upon the vitality of the tissues by the toxin of a micro-organism circulating in the blood and bathing the cells in a vitiated serum.

True psychoses do not accompany but follow the febrile disturbance: the acme of the fever is past, the excessive action of the heart has subsided and its contractions have fallen below the normal in force, while the toxin of the specific bacterium has been to a great extent overcome by the natural tissue resistance, though there may still remain within the organism sufficient to vitiate the nutrient plasma.

The condition is now one of profound nutritional perversion with blood depravity, and irregularity or actual disturbance of the circulation from cardiac weakness. At the same time there may also be venous congestions and oedemas of the cerebrum, arising in some instances from actual damage to the arterial sheaths from the immediate effects and deleterious after-results of toxalbumins engendered in the course of the acute disease. The mental disturbance induced by these several factors is therefore in the nature of an exhausting or collapse delirium. It is apt to be stormy in its onset, confusion being the predominating characteristic, accompanied by visual and auditory hallucinations, rapidity in the change of thought from one subject to another, and increasing mental obtundity. In addition there is generally active motor excitement and entire sleeplessness. The bodily temperature is now subnormal, the heart's action is feeble, and the reflexes are slightly elevated. The condition may last only a few days or may continue for several weeks.

Typhoid fever, influenza, pneumonia, scarlet fever, measles, erysipelas of the head, polyneuritis and variola, in the order named, are the most frequent of the exanthemata to be followed by psychoses. Before the introduction of quinine malarial fevers added a considerable quota to the ranks of the insane. Probably the blood-letting then in vogue often aggravated the nervous phenomena. Even to-day in countries where the severer forms are encountered, about two per cent. (Pasmanik in Bulgaria) of those affected have some mental complication, usually stupor. The debilitating effects of a marked paludal intoxication would often account for these disturbances of the mental equipoise, though plugging of the capillaries with aggregations of the parasites may play a not unimportant part. A number of the psychoses accompanying *parturition* must be classed among the febrile insanities, as they are the result of infection by cocci that have entered through the uterine passages, notably the placental site. The organism most constantly found is the *Streptococcus pyogenes*.

4. CORPOREAL INSULTS.—Meningitis of a severe character is not uncommonly followed by a form of insanity approaching mania. The inflammation of the brain coverings, the disturbance of the circulation in the cerebrum, the obstruction of the pathways for the returning lymph along the vessel sheaths passing finally into the pia mater, together with the increase in the intracranial pressure are sufficient to account for the perversion.

In tumor or abscess of the brain, in primary internal hydrocephalus of the adult, in disseminated sclerosis, after apoplexies and embolisms as well as other local abnormal conditions, insanities are now and then encountered. They usually assume the form of a progressive dementia, the patients only occasionally exhibiting depression or exaltation, though rarely after a hemorrhage or embolism of one of the larger arteries of the brain, conditions of frenzy are seen.

Trauma and Insolation.—All degrees of injury to the skull and brain tissues may be followed by an insanity, sometimes coming on immediately after the reception of the lesion, while at other times it may be postponed and remain latent for months. A trivial local traumatism, especially in the case of persons suffering from some constitutional disease, as syphilis, may start up an inflammation of the tables of the skull and the meninges beneath that eventually may implicate the brain, either by direct extension of the process or by pressure upon it. At other times, again, the neoplasm following the injury may interfere with some of the exits of the venous blood and the lymph fluids from the brain cavity and evoke an alienation. Active motor excitement is less common than a dull apathy with loss of memory and weakening of the faculties. An apparently trivial injury may also be the match that lights up the flame of a periodic insanity, circular or maniacal in type.

The form of alienation that follows insolation is also ordinarily a dementia of passive type, though now and then a series of mixed motor-psychical phenomena, strongly suggestive of the demented form of paresis, is seen. The condition results from the degenerative effects of the thermic fever upon the cortical gray matter, inducing changes in the vascular lymph apparatus and degradation of the cellular elements.

Operations.—Instances of insanity following surgical operations are somewhat rare. In this connection the mechanical shock to the nervous system, especially in the case of an unstable subject, and the effects of the ether or chloroform are elements to be considered. Operations that involve an extensive loss of blood are, perhaps, more commonly succeeded by an acute alienation than minor surgical procedures.

Operations upon the eye and castration are said to be especially dangerous. Simple *anesthesia* from chloroform or ether has occasionally been followed by a psychosis of short duration. The mental impression induced by the dread of the procedure and the fear that death would occur during the narcosis, together with the systemic effect of the drug, all play their part in the overwhelming of the faculties. The precocious advent of a periodic insanity must also be borne in mind.

Henry J. Berkley.

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