A text-book on mental diseases for the use of students and practitioners of medicine.

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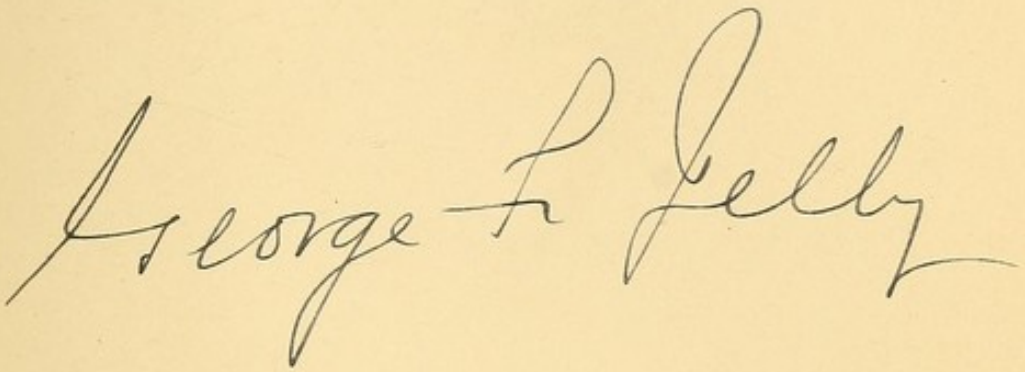

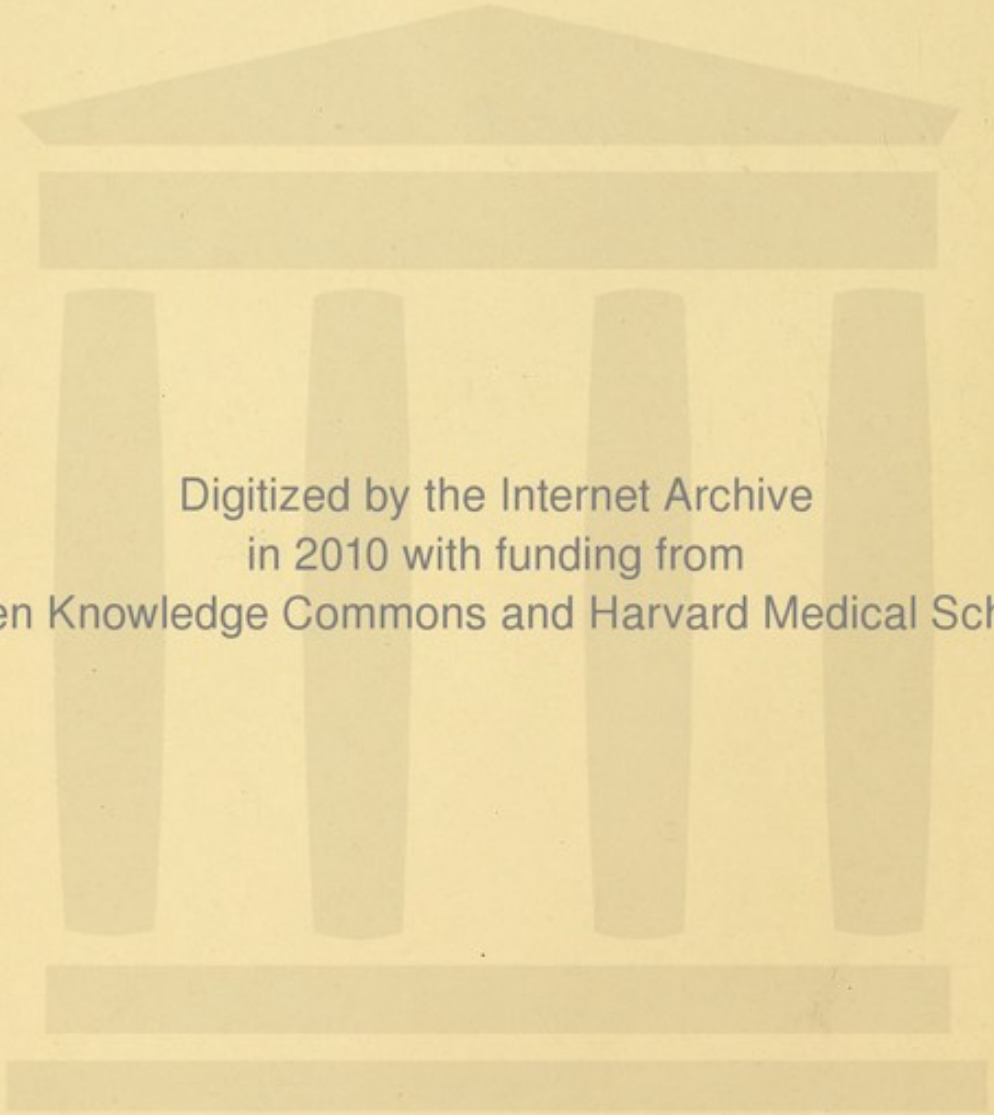

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A TEXT-BOOK

ON

MENTAL DISEASES

FOR THE USE OF

STUDENTS AND PRACTITIONERS OF MEDICINE

BY

THEODORE H. KELLOGG, A.M., M.D.

LATE MEDICAL SUPERINTENDENT OF WILLARD STATE HOSPITAL, FORMER PHYSICIAN-IN-CHIEF OF NEW YORK CITY ASYLUM FOR THE INSANE, FORMER PHYSICIAN-IN-CHARGE OF SANFORD HALL PRIVATE ASYLUM, FORMER FIRST ASSISTANT PHYSICIAN OF HUDSON RIVER STATE HOSPITAL, AND OF NEW YORK CITY ASYLUM

With Illustrations in the Text

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1897

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To

GEORGE F. SHRADY, A.M., M.D.

IN SPECIAL APPRECIATION OF HIS PERSISTENT AND ABLE ADVOCACY OF PROGRESSIVE AND SCIENTIFIC METHODS OF TREATMENT OF THE INSANE; IN RECOGNITION OF HIS USEFUL AND DISTINGUISHED PROFESSIONAL CAREER AS MEDICAL EDITOR, MANAGER OF A STATE HOSPITAL, AND VISITING AND CONSULTING HOSPITAL SURGEON; AND AS A PERSONAL TRIBUTE TO HIS STERLING TRAITS OF CHARACTER

This Work is Dedicated

BY

THE AUTHOR

PREFACE.

The Science of Mental Diseases advances so rapidly that there is no apology needed for new treatises. All modern English, French, and German books on the subject have proved highly instructive, and have served to educate the profession in a most important branch of medical knowledge. An endeavor is here made to set forth in a condensed but comprehensive manner the present state of the Science of Mental Diseases. The book is made to embrace the wide range of the history, statistics, nosology, etiology, clinical course, symptomatology, pathology, diagnosis, prognosis, and treatment of Mental Disorders.

An attempt has been made to introduce such clear and systematic subdivisions as would best tend to facilitate the comprehension of the whole subject and render the work available for students and practitioners of medicine. The book aims to be a practical guide to the diagnosis and treatment of all the various types of Insanity with which the physician has to deal in public hospitals or private practice, and also to serve as a work of ready reference for psychiatrists, in the emergencies of their specialty. Parts of the treatise may merit the attention of psychologists and of all interested in the study of mental pathology.

The whole work is written independently of leading philosophical or medical hypotheses, and is the clinical rendition and general outcome of the writer's experience in psychiatry while in charge of public or private hospitals for the insane, or in practice in New York City. A full table of contents and a complete alphabetical index will render the book of ready service to the busy professional man.

New York City, May, 1897.

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PART I.

TEXT-BOOK ON MENTAL DISEASES.

PART I.

GENERAL MENTAL PATHOLOGY.

CHAPTER I.

THE HISTORY OF INSANITY.

It is a universal law that the most highly integrated functions of vital organisms are the most apt to suffer derangement. The human mind, as the highest evolved function of the most wonderfully complex of all organisms, has always been subject to partial or total disintegrations. Historical note of these mental disorders has been made from the earliest to the present time by various writers, and by the careful chronological arrangement and interpretation of the known facts an attempt will here be made to present a brief history of Insanity.

The whole subject is divided, according to chronological order and with reference to the general history of medical science, into four periods.

The first period extends from 1700 B.C. to 400 B.C.—from the first recorded mention of Insanity to the dawn of psychiatric science in the Greek school of medicine.

The second period is from 400 B.C. to 200 A.D. It is the first scientific evolutionary period of psychiatry, ending with the decline of the Greek school of medicine.

The third period, from 200 A.D. to 1500 A.D., is the dormant period of psychiatric science continuing through the Middle Ages to the Renaissance.

The fourth period, from 1500 A.D. to 1800 A.D., is the second evolutionary period of psychiatry from the Renaissance to the present day.

The actual treatment of the insane as well as the existing knowledge of Insanity during the above periods will be simultaneously considered.

First Period (1700 B.C.—400 B.C.).

The modern study of Egyptian antiquities and papyri reveals indications of a knowledge of mental disease even at that prehistoric time. It is not to be understood that it has been possible to decipher from Egyptian hieroglyphic records that at that remote period Insanity was recognized in the sense that it is now known to exist. The conception of Insanity, such as prevails in modern times, would have been a moral impossibility in an Egyptian mind.

All learning was then confined to a caste, to Egyptian priests, whose ideas on all subjects were tinctured largely with a species of mystical religious philosophy.

The obscuration of human intellect did not escape their keen perception, but it was interpreted by them to mean a divine affliction which was to be averted by sacrifices.

The mentally afflicted in those days were therefore taken to the Egyptian temples, and they were there treated by the priests, according to the manner of their peculiar religious practices, by oblations, incantations, purifications, and sacrifices.

Some simple truth of wide application has always formed the basis of philosophic ideas, which have governed the world at all periods of its history. The truth that good and evil exist in the world, when elaborated in the highest Egyptian religious philosophy and applied to the insane, signified that they had become possessed by a good or an evil spirit. This may be said to have been the only principle of classification of Insanity at that time, and it was not without decided indications for treatment.

If the spirit was diagnosed as an evil one it was to be driven out by the most active religious proceedings, and the patient passed through a heroic ordeal. On the other hand, if the spirit was a good one, non-interference was the order of the day, and the patient was treated with deference and even at times regarded as inspired.

Some of the earliest authentic cases of Insanity are related at considerable length in the Bible. The history of King Saul, 1063

B.C., is probably the first recorded instance of homicidal mania. It is related that he removed his clothes, and that he remained naked by day and by night, and that he attempted to kill David by throwing his javelin at him. David himself, according to biblical account. may be regarded as the first instance of feigned insanity, for when he appeared before King Achish of Gath, according to the words of the Bible, "he scrabbled on the doors of the gates, and he let his spittle fall upon his beard," and the King ordered him from his presence, exclaiming that he had no need that a fool should appear before him.

Another remarkable case of Insanity was that of King Nebuchadnezzar, who became insane 569 B.C. His disease took the form of chronic mania of lycanthropic turn, and for years he wandered in the woods and ate herbs, and his body became covered with an extraordinary growth of hair, and his finger-nails grew to an extreme length. The most astonishing point in the biblical history of this case of Insanity is that Nebuchadnezzar recovered his reason after an attack of seven years' duration, and he was restored to his throne as King of Babylon in the year 563 B.C.

Numerous other instances of mental disease are to be found among biblical records, but those above cited are sufficient to show that at that early historic period Insanity was recognized in types not essentially different from those of a later day. The Jewish idea of the genesis of Insanity was theistic, and the priests were the physicians of the soul, as they alone could intercede in behalf of those inflicted from on high as an indication of divine wrath, or possessed by a demon avenging some sin supposed to have been committed by the sufferer or by his progenitors.

In cases of Insanity complicated with epilepsy demoniacal possession was almost invariably the diagnosis.

Among the early Hebrews the general treatment of the insane, under the direction of the priests, was more humane than at many subsequent periods.

The Oriental Indians, 1100 B.C., possessed considerable traditional medical knowledge. Their learning, however, was confined strictly to a certain order of priests, and it was professedly of an occult and mystical nature, so that it has been difficult to learn what their belief and treatment were as regards mental disease, but it is safe to presume that it did not differ materially from the theories and practices already mentioned as prevalent among the Egyptians.

The history of Insanity among the ancient Greeks takes a wide range, and there is not space to recount here the numerous cases of the disease mentioned by Greek poets, philosophers, and historians. Sophocles and Euripides, Aristotle and Plato, Herodotus and Thucydides, all refer in their writings to cases of Insanity. The poets mention Ajax, Orestes, Œdipus, Hercules, Bellerophon, and Ulysses, who feigned insanity. Then again, there was Cleomenes, King of Sparta, probably the first recorded case of alcoholic Insanity, and King Lycurgus, likely the first lunatic on record as having slain his own son. Herodotus recounts at length the history of three sisters, princesses and the daughters of Pretus, King of Argos, who became insane simultaneously. They were cases of leprous Insanity, and the mental symptoms took the form of lycanthropy, so that they ran wild through the woods, making animal-like noises. Herodotus further relates that they were cured by Melampus by the use of veratrum album, and by bathing in a mountain-stream after they had been chased by youths until they were in a state of profuse perspiration.

The insane among the Greeks were still treated, as among the Egyptians, by priests. The Æsclepiades constituted an hereditary order of priesthood among the Greeks, and they had sole charge of the temple of Æsculapius, to which the insane were conveyed for curative purposes.

Solon (500 B.C.) made laws with reference to the insane, and he defined those lunatics who were to be confined.

With the advance of Greek civilization at this period some of the grosser superstitions with regard to lunatics were dispelled, and it became recognized that they were still human and had certain rights to be respected.

The Romans, at a somewhat later period, made wise and complete laws for the control of lunatics, and for the appointment of guardians of their persons and estates, and they defined the insane to be treated in their own houses, and such as were to be confined "pro bono publico." In lunacy, as in other matters, the Roman law was so perfect a model as to have served as a basis of all subsequent legislation on the subject.

During the long ages embraced in this first period of the history of Insanity there had been a gradual evolution of medical knowledge. Egyptians, Oriental Indians, Turks, Persians, Greeks, and Romans had all contributed something to the common fund of med-

ical lore which, at the close of this first period (400 B.C.), may be said to have attained to the respectable dimensions of a science of medicine. The most crude part of this science, however, was psychiatry, in spite of the fact that in all ages it had been studied by the most learned men, by philosophers, priests, and physicians.

The nomenclature of Insanity was limited to the three terms, phrenitis, mania, and melancholia. Phrenitis applied to mental disorder with inflammation of the brain or other internal organs. The etiology of Insanity was based on vague views of changes in the bile, mucus, and other secretions. The treatment was by hygienic means, outdoor games, baths, mineral waters, and a few simple therapeutic remedies, apart from the religious practices on the part of the priests.

Second Period (400 B.C.—200 A.D.). The First Scientific Evolutionary Period of Psychiatry, Ending with the Decline of the Greek School of Medicine.

The beginnings of psychiatry having been made by many peoples in various lands, the time was now ripe for some master hand to mould the crude material thus contributed into some definite shape, and the genius for the work arose in no less a person than Hippocrates, the Father of Medicine, himself, who laid the first foundations of the science of psychiatry.

Hippocrates was born 460 B.C., in the island of Cos. His teachings as to Insanity are not given collectively, but they are to be found scattered throughout his wonderful clinical descriptions of diseases in every domain of medical practice.

With but slight knowledge of the anatomy of nervous centres, he still conceived that the brain was the seat of Insanity. He recognized acute and chronic forms of mental disease. He spoke of the latter under the use of the terms mania and melancholia, and to the former he applied the word phrenitis, which he also used to describe Insanity with cerebral or visceral inflammation.

It is evident from his clinical descriptions that he was familiar with puerperal, alcoholic, and epileptic forms of mental disorder. His depictions of insane symptoms bore the stamp of everlasting truth, so that to-day, twenty-three hundred years after they were written, they might be applied to cases of mental disease with truthful fitness.

In his views of the nature of Insanity he was a humoral pathologist. Though descended from the Æsculapian order of priests he completely emancipated himself from their superstitious views. He keenly ridiculed their religious observances in the treatment of Insanity, and he boldly declared that epilepsy was not a sacred disease (mal sacer), or an infliction by the gods, as was then believed. His genius did not enable him, however, to rise above philosophic heights, for, though he ignored the priests, he agreed with the philosophers in locating Insanity sometimes as a disease of the soul which resides in the head, and at other times as a disorder of the soul which, it was taught, had its habitat in other parts of the body. It is to be borne in mind that philosophy at that time embraced and controlled all branches of human knowledge.

Hippocrates employed in the treatment of Insanity bleeding, purging, emetics, counter-irritants, mineral waters and baths, gymnastics and outdoor games, together with music, travel, and change of climate.

In general, it may be said that Hippocrates had humane and, for his time, remarkably advanced ideas of the treatment of the insane.

Following Hippocrates, the physicians for the next two centuries would seem to have simply pursued imperfectly the maxims of the Father of Medicine in psychiatry.

During the Alexandrian period of medicine, judging from subsequent citations by Galen of the writings of Herophilus and Erasistratus (300 B.C.), no special additions would seem to have been made to the knowledge of mental disease. It would appear, however, that Erasistratus was gifted with perspicacity in defending the doctrine that the superficial parts of the brain were especially concerned in intellection, and might be taken as a measure of the degree of individual intelligence.

Asclepiades of Bithynia (circa 100 B.C.) was a bold and original writer, and he did not even hesitate to differ from the views of Hippocrates in certain respects. He had just conceptions of the derivation of disease from bad water, food, and air, and he attached much importance to hygienic conditions in treatment. He made a clear distinction between mental disease with and without fever. He observed the transformation of one form of Insanity into another, and he made a special study of the deranged perceptions of the insane. In his treatment he discarded dark rooms and bleeding; and he used poppy, henbane, sun baths, inunctions, and water-cure—es-

pecially cold baths. His enthusiasm in the doctrine of the transformation of one type of mental disease into another led him into some inconsistency in the use of intoxication to convert incurable into curable forms of Insanity. He seems to have made a somewhat free use of mechanical restraint, and he added nothing to the terminology of the subject, but employed the terms phrenitis, mania, and melancholia, then in common use.

Titus Aufidius of Sicily (44 B.C.) was a student of Asclepiades, though he does not appear, to say the least, to have improved upon his master's teachings. He seems to have believed that the insane retained, to a considerable degree, their free will and responsibility, and that their efforts at self-control might be materially aided by severe measures. He accordingly favored deprivation of food and drink as punishment, and he even prescribed flagellation in extreme cases. In order to make a pleasurable change in the organic emotions he occasionally recommended sexual indulgence in melancholia.

Celsus (25 B.C.—45 A.D.) considered Insanity to be due to perversion of the secretions. The doctrine of heredity had not yet come into vogue. He distinguished between Insanity with and without fever, and divided it into acute and chronic forms, which were partial or general in type. He was acquainted with the hallucinations of the insane and described them. He attached great importance to individual differences in patients and the treatment to be given them, and he gave complete instructions for the hygienic and moral measures to be employed. Exercise in the open air, bathing, music, reading, the removal of fear by kindness or by deceit, if necessary, were some of his resources. Other measures which he deemed remedial were decidedly harsh, and consisted in restraints and even severe punishments of various kinds, to subdue violent cases of mental disease.

Aretæus of Cappadocia (30—90 A.D.) gave remarkably correct descriptions of alienation under the terms mania, melancholia, and chronic insanity, all of which he regarded as forms of one disease, the melancholia forming the introductory stadium. He differentiated Insanity from the effects of drugs, and he distinguished paralysis of sensation from paralysis of motion. He described the heightened recollection of some acute maniacs, the fixed ideas of the insane, and the erotic forms of mental disorder, especially satyriasis. He advocated the use of emetics, bleeding, and a variety of drugs, and

he regarded the moral treatment as of much importance, and change of scene and climate as beneficial to convalescents. His therapeusis related particularly to the bodily functions, the perversions of which in Insanity he described with the greatest precision.

Cœlius Aurelianus (100 A.D.) had most humane and enlightened views as to the moral treatment of the insane. He is the first historical defender of the system of non-restraint, and of the control of patients by nurses instead of by mechanical means. He denounced the iron chains and other crude apparatus then in use for the restraint of lunatics. He studied, with considerable success, the false beliefs of the insane and the relation of visceral disease to mental depression. He conceived melancholia to be most often due to gastric disorder and mania to cerebral disease. He clearly differentiated the delirium of fevers from true Insanity. He believed in a generous diet for the insane and in occupation of a customary kind, such as agriculture for farmers and boating for seafaring patients. It is not improbable that he borrowed largely in his ideas from Soranus of Ephesus, whose works he translated.

Menodotus of Nicomedia (100 A.D.) appears to have been a good clinical observer of Insanity, and of the relations between causes and symptoms. He seems to have been about the first author to comprehend and definitely state the relation between traumatic injuries and mental disease. His observation was that trauma capitis gave rise to mania.

Galen (131—201 A.D.) represented the culmination of the science of medicine in the Greek school, and, next to Hippocrates, he was the greatest of the medical writers of antiquity. He made a nosological division of mental diseases into mania, melancholia, dementia, and imbecility. He made a decided advance in the definition of Insanity with native defects of mind.

The pathology of mental disorders, according to him, was by sympathy and in connection with disease of internal organs chiefly. He gave lengthy and often most excellent descriptions of the symptoms of Insanity. He described the insane temperaments, the different forms of lycanthropy, and the difference between fever deliriums and Insanity. He had an extensive armamentarium of drugs for the treatment of mental diseases, and a great variety of baths, also gymnastics and massage, with inunctions, after the manner of the Romans. He also recommended music, poetry in recitations, theatrical performances, and in general humane moral treatment.

Like all the medical men of his day, he was imbued with the prevailing philosophic ideas, and he shared Aristotelian views as to two souls symbolic and correlative of the two great elemental conditions of heat and cold, which he believed to be accompanied by corresponding disorders of mania and melancholia. In fine, it may be said of this remarkable man that he fully reflected in his writings all the most advanced knowledge of his times, and also made some real additions to psychiatric science as it then existed.

Third Period (200 A.D.—1500 A.D. The Dormant Period of Psychiatric Science Continuing Through the Middle Ages to the Renaissance.

Psychiatry under the Greek school had attained to the dignity of a science, so far as the knowledge of the symptoms, diagnosis, prognosis, and treatment of mental diseases was concerned, but after the decline of the Greek school much of that which was known was forgotten or perverted. Pneumatists, dogmatists, empiricists, methodists, and other medical sects arose and discussed with partisan feelings such worthless technical theories as have always been the bane of true medical science.

With the invasion of Rome by the Goths, and of the centres of civilization by hordes of northern barbarians, there was a general decline of all kinds of learning. Forms of pseudo-science arose and began to exert an influence on medical beliefs and practice, such as alchemy and astrology, and, much worse still, theosophy and necromancy and every form of charlatanry came to abound in all parts of the earth. To complete the misery of mankind, plague, pestilence, and famine spread in different sections of the world, and the number of lunatics was increased. The insane wandered or were driven from place to place, and many of them perished by the way, of neglect and starvation. Some of them found shelter in convents, where they were free from persecution, but not always from severity of treatment, which had again come to be regarded as a necessity in dealing with the more excited cases.

In the midst of the darkness of ignorance and superstition which had overspread the world there were still here and there individuals who carried the true knowledge of a past medical science, and some of these will now be named.

Oribasius of Pergamus (circa 370 A.D.), who was physician to the Emperor Julian, appears to have had considerable knowledge of In-

sanity and to have written some upon the subject. He described especially an epidemic of melancholia which had symptoms of a lycanthropic type.

Alexander of Trolles (560 A.D.) wrote some commendable things about Insanity, but he seems merely to have copied some of the traditions of the Greek school, and to have added nothing of special value to the subject. He considered the moral treatment to be of great importance, and he maintained ingenious ways of combating the delusions of the insane, and resorted to emotional shocks, and practised various forms of deception for the sake of the moral effect which could thus be produced. He deemed abstinence from food and mineral waters to be efficacious means of treatment.

Paul of Egina (630 A.D.) was a physician of original talent, and distinguished through his writings upon diseases of women. He would seem to have had a very good knowledge of the mental disturbances which attend the puerperal state.

Rhazes (850—923 A.D.), like many of his predecessors, regarded visceral disease as the chief source of Insanity. He had the aptitude of the Arabian medical school for the selection of a great diversity of drugs in the treatment of mental disorders. The only novelty in the moral treatment which he introduced was the game of chess, which he considered a mental discipline as well as a diversion particularly useful in melancholia.

Ali Abbas (obiat 994 A.D.) added nothing new to psychiatric knowledge, with the single exception that he described clearly the depressive forms of mental aberration which arise at the age of puberty.

Mondini de Luzzi of Bologna (1315 A.D.) made anatomical demonstrations on animals, and stimulated others to research in the same direction in a way which tended to throw future light on the study of mental disease. It was one of the first rays of light which foretold the coming dawn of another era of medical science.

Antonio Guaineri (obiat 1447 A.D.) rose above the superstition of his day in regard to lunatics and rejected their treatment by exorcism and the idea of demoniacal possession. He was a physician of remarkable diagnostic acumen, and was the first to describe aphasic conditions. He also made the perspicacious observation that imbeciles, during attacks of acute mania, manifested unwonted intelligence and astonishing activity of memory. He further noted the clinical connection between gout and Insanity. He

made a free use of caustics and counter-irritants in the treatment of mental disease.

To turn once more from the writers on Insanity to the actual state of the insane during these dark ages of the world, it is to be remembered that the enlightened views of the Greek school as to the origin and treatment of mental disorders died out gradually after the third century of the Christian era, and the reign of ignorance and superstition in regard to lunatics had become general. The insane were regarded everywhere as afflicted by the gods or possessed by the Devil or his attendant imps, their symptoms were mistaken for wilful demonstrations of wickedness, and they were treated accordingly in prison cells, or in cells attached to the cloisters under the care of the priests. The Middle Ages were the dark ages of psychiatry. Epidemics of Insanity occurred, and thousands of lunatics wandered about in neglect and terrible suffering, as all doors were closed and all hands were raised against them, since they were, as taught and believed by many, deserted of God Himself and delivered over to evil spirits as a punishment for imaginary sins which they often confessed. To complete this chapter of horrors there arose anew, out of the cruel animal depths of human nature, the fanatical and diabolical belief in witchcraft, and an eagerness to persecute and kill those accused of it. It was not all witchcraft. It was the opportunity to seek revenge upon enemies—it was the gratification of a brutal and instinctive delight in the infliction of suffering—it was the vicarious escape of that pent-up and unformulated feeling of injuries sustained and wrongs unrighted which is ever latent in the heart of the populace, and always ready to be poured forth upon any suspected victim. The same tendency to fix upon some person the responsibility for present evil, and to cause the selected victim to suffer in proportion to the general amount of wrong supposed to have been done, has existed in all ages and among all peoples. In this sense the Egyptians, the Indians, the Persians, the Arabs, the Greeks, and the Romans had their belief in sacrificial victims, sorcery, and witchcraft, which was handed down by tradition, like an evil heirloom, to the Middle Ages. It is estimated that not less than 100,000 persons were tormented or burned to death as witches from 1400 to 1700 A.D., and that of this number not less than 30,000 were insane at the time they were accused and executed.

Perhaps the earliest record of special places for the accommodation of the insane is to be found among the Turks, before the

fourteenth century. At Rome and other places in Italy, as early as 1300 A.D., places for the confinement of lunatics had existed. It was during the fourteenth century that structures for the reception and treatment of the insane were set apart in Italy at Florence, 1389 A.D., and from 1400—1500 A.D. at Feltre, Seville, Padua, and also several in Spain—1408 A.D. at Valencia, and at Saragossa 1425 A.D.

In 1403 A.D., lunatic patients were first received at Bethlehem Hospital, London, England, though that hospital was first formally devoted to the care of the insane in 1547 A.D.

In 1472 there was a special place for lunatics in Ghent, in Belgium, and at Gheel the insane were cared for at a very early period.

It is true that all these places were custodial rather than curative, and that they were not conducted with a true understanding of Insanity as a brain disease, to be treated and cured like other diseases, but they represent the crude beginnings of that better system of hospitals for the insane which has since been inaugurated in all parts of the civilized world. The darkest hour in the history of the insane had now passed and the dawn of a better day was approaching.

Fourth Period (1500 A.D. to 1800 A.D.). The Second Scientific Evolutionary Period of Psychiatry, from the Renaissance to the Present Day.

Medicine as a science has always been dependent for its advance on the allied sciences and on the development of general knowledge. At the period here mentioned it underwent a rapid evolution, in sympathy with the general revival of knowledge, science, art, and literature. The dormant period, the night of the dark ignorance of the Middle Ages, had passed, the Renaissance was the dawn—and the reawakened human intellect once more resumed its onward march. All branches of medicine were investigated with great zeal, and prominent physicians in all the principal European countries studied and wrote about mental diseases.

The mention of the chief writers and the leading points in their teachings will suffice to sketch the evolutionary course of psychiatry during this period.

F. Platter (1536—1614) made a profound study of mental diseases and wrote a treatise on the subject. He was the first systematic nosologist, and made a complete classification of mental disorders,

and he added much to the knowledge of symptoms and to orderly methods of their study.

Paul Zacchias (1584—1659) wrote the first complete treatise on the medico-legal relations of Insanity, and he discussed therein the responsibility of the insane, their civil capacity, the question of lucid intervals, and a great variety of subjects of juridical interest in connection with mental disorders.

Prosper Alpin (1553) studied the symptoms of Insanity with much care and described them well in his writings, which contain some good suggestions as to water-cure in mental diseases, especially the warm bath with cold effusions to the head in acutely maniacal cases.

V. Chiarrugi (1759) advocated humane treatment of the insane and the non-restraint system. He wrote good clinical descriptions of Insanity in his treatise, which appeared in the year 1794.

Stahl (1660—1734), the originator of the theories of the German Psychological School, was largely influenced by metaphysical and philosophic ideas in his belief as to Insanity, which he held to be an affection of the soul, which, as the immortal part of man, could not be subject to physical disease. Insanity was, according to his teachings, a spiritual disorder. Langerman and Ideler, his followers, elaborated these theories at length in their writings on Insanity.

Heinroth (1773—1840), the most representative writer of this psychological school, taught in Leipzig to enthusiastic students that all Insanity was the result of the violation not of physical but of spiritual law; that the influence of spirit upon matter was supreme; that conscious sin causes all the symptoms of mental disorder, which could only be cured by faith, hope, forgiveness sought from the Divine source whence the disordered spirit first emanated. Heinroth ignored completely the etiological influence of heredity in mental diseases. On the other hand, he analyzed, with great precision, the mental faculties and the various disorders which they undergo in Insanity.

In contradistinction to the Psychological School there arose about this time in Germany the Somatic School, with notable adherents like Nasse, Friedreich, Vering, Jacobi, and other prominent medical men. They taught, in diametrical opposition to the spiritualistic theories, that Insanity was of purely physical origin, and that it sprang from disease of internal organs, and some even went to the extreme of the grossest materialism in declaring that the

mind was little else than a functional secretion of the brain, as the bile was of the liver.

The teachings of this Somatic School led to a much more thorough research for the bodily causes of mental disorder, and also resulted in more scientific study of somatic symptoms and of the morbid anatomy of the disease.

Thomas Willis (1622—1675) did much to lay an anatomical basis for mental science. He recognized Insanity to be the result of brain disease. He also observed stupor and cyclical mental disorder. He employed heroic treatment by powerful drugs and mental shocks, and unfortunately did not hesitate to use severe punishment in violent cases.

Vieussens (1641—1720) also did much to advance the idea of anatomical study in psychiatry. He wrote upon the neuroses and ranked Insanity among them.

Boerhaave (1668—1738), whose writings had a wide influence, taught the humoral pathology of Insanity, and described the stuporous forms of mental depression and gave good directions for the hygienic treatment of mental disorders.

Denis, in Paris, 1667, practised transfusion with success in a case of melancholia. He tried transfusion of lamb's blood in a case that had been excessively bled in 1668 without success.

Bonet (1700) resorted to a like surgical remedy in Insanity and aided in the study of the pathological anatomy of mental disease.

Sauvage (1706—1767) made the most complete classification of Insanity thus far attempted according to natural history methods of division, and made a decided scientific advance in treating Insanity as a neurosis. He well illustrated the pertinacity of philosophic ideas, for, although he was of a thoroughly scientific turn of mind, he still harbored many of Stahl's animistic and metaphysical theories.

Cullen (1712—1792) occupied in England a place corresponding to that of Sauvage in France as a systematic nosologist. He also contributed much to the pathological anatomy, etiology, and symptomatology of mental diseases.

Brown, a student of Cullen's, particularly developed the idea of the asthenic nature of Insanity and classed most cases under this single term—æsthenic.

Andrew Marshall (1742—1813) drew attention in his writings to the etiology of Insanity from vascular and cerebral lesions.

Mason Cox (1762—1822) described cerebral hyperæmia as the chief pathological factor in mental disorders.

Crichton (1763—1856) wrote of the psychosomatic origin of Insanity from powerful passions, as well as from bodily disease, and justly enlarged upon the influence of heredity.

Haslem (1764—1844) deserved credit for his autopsical studies and his contributions to the subject of the morbid anatomy of mental disorders.

Arnold (1786) wrote a treatise on Insanity from the point of view of mental philosophy, giving especially logical descriptions of the psychical symptoms of the disease.

Thus it is seen that active and able men had studied the subject of Insanity from many points of view. They had practically exhausted every resource of human knowledge in endeavors to solve its difficult problems. They had summoned to their aid the highest religious and spiritualistic doctrines, the most thorough clinical study of mental and bodily symptoms, philosophic theories, chemical, physiological, and anatomical researches, the sympathy of the nervous system, disease of internal viscera, post mortem appearances, changes in the blood and other secretions, malarial disease, heredity, and a host of other considerations, in their strenuous efforts to build up a science of psychiatry. Individual contributions to this common end have been now sketched as far as space for this purpose will permit, and if the reader, seeking fuller information, will turn to the chapter on Nosology, he will find further facts and an analysis of the nosological part of the works of the more recent authors.

Throughout this fourth period (1500—1800) there had been a gradual amelioration in the general condition and treatment of the insane. In the year 1660 wards were set apart in the Hôtel Dieu, Paris, for the care of the insane. A large lunatic asylum was built at Moorfields, England, in 1675, and another one at Avignon, France, in 1681.

In 1751 the act creating Pennsylvania Hospital, Philadelphia, Pa., was passed, providing for a department for the reception and care of lunatics.

In 1773 the first American asylum for the insane was constructed at Williamsburg, Va.

Daquin, in France, 1792, strongly denounced restraint and harsh treatment of lunatics.

William Tuke, of the Society of Friends, in England, 1792, ad-

vocated humane methods, and founded the York Retreat, which was not formally opened until some years later, in 1796.

Phillipe Pinel (1755—1826) worked his great reform in behalf of lunatics at the Bicêtre in 1793.

Benjamin Rush at this date also spent some of the force of his genius in attempts to better the condition of the insane in America.

Dr. Fricke, 1793, is said to have reduced the amount of restraint and to have improved the condition of patients in the asylum in Brunswick, and at a somewhat later date Langerman reformed the asylum at Bayreuth, and Dr. Glawnigs is credited with exertions at this time to ameliorate the treatment of the insane and to employ them in agriculture.

Esquirol made his appeal to the French Ministry in behalf of the insane and worked his renowned reform in 1818.

Guislain labored to better the state of the insane in Belgium at Ghent in 1828.

Gardiner Hill, practically through his single efforts, abolished restraint in the Lincoln Asylum, England, in 1837.

Conolly followed, with his bold and wholesale abolition of every kind of restraint, and he deserves, and has always received, credit for his uncompromising combat in this direction.

In England much wise and humane legislation for the welfare of the insane was brought about by the Earl of Shaftesbury.

In Germany Hayner made a published appeal for the abolition of the more cruel forms of restraint in 1817.

Since the events above mentioned there has been in Europe, Great Britain, and America a gradual but constant improvement in the general condition and treatment of the insane. In all these countries large numbers of special hospitals, thoroughly appointed for the care and cure of the insane, have been constructed, and they are now administered in accordance with the most modern ideas.

It is, of course, a most complicated and difficult question for political economists, and for social and medical scientists, to decide, whether the present hospital system is the best and final solution of the problem of provision for the constantly increasing numbers of the insane requiring public care. It is the author's belief that some radical innovations and changes in the present system will ultimately be made.

CHAPTER II.

THE STATISTICS OF INSANITY.

General Principles of Statistics as Applied to Insanity and Errors to be Avoided.—The difficulty in the application of the statistical principle to the solution of the problems of psychiatry lies not in any inherent deficiency of the science of statistics, but in the erroneous methods of its use in the study of mental disorders.

Uniform methods of statistical returns have not been employed in the various institutions for the insane throughout the country, and the difficulty of obtaining comparable data for statistical deductions is the obstacle to the student of mental science from a statistical point of view. Thus the recovery-rate has been variously calculated on the total numbers treated, on the discharges, on the supposed curable cases, and on the average number resident for the year, and on the number of admissions. Like differences exist in the methods of calculating the death-rate. These discrepancies become still more marked in attempts to compare the statistical information of different countries.

The prime question of the relative amount of Insanity in different countries cannot be accurately determined, because the returns are much more complete in some countries than in others.

In order to determine the actual increase or decrease of Insanity in a country it does not suffice to compare the total numbers of insane at two different periods with the total general population at those periods.

The improved care in modern institutions for the insane tends to prolong life and to diminish the annual mortality, so that there is a constant accumulation of chronic cases of mental disease to be carried forward in all calculations of this kind. *The true principle for the calculation of the actual increase of Insanity is to determine the ratio of the new cases of mental disease to the mean of the general population living at the time of the occurrence of these first attacks.*

In the application of this principle in returns from institutions for the insane, first admissions and not readmissions should be considered, and persons must be distinguished from cases, and it is to be borne in mind that first admissions do not invariably accord with first attacks, which may have occurred prior to admission.

In comparing the existing number of cases of Insanity, in different countries or different sections of the same country, with the general population a common error has been to determine simply the percentage of the occurring cases to the general population in the two localities, but a wide difference in the mortality of the cases which have occurred may vitiate the conclusion. To avoid error the number of deaths must first be taken out of the total number of cases arising during the period in question, in order to determine the total remainder of existing cases and the true terms for comparison.

Correct Basis for Tabular Returns from Institutions for the Insane.—The rate of recoveries has been calculated upon the average number resident in some English institutions, and in applying this method to a series of years the annual percental recovery-rate multiplied by the average length of residence in all cases admitted during the time gives a percentage of recoveries not greatly different from that calculated upon the total admissions during the same period. The length of time patients are under treatment must be taken into account in this method, and if this average length of residence were the same for all institutions there would be less objection to this mode of calculation. The proportion of recoveries has also been calculated on the discharges, but this gives a slight excess over the percentage of recoveries estimated on the admissions during a series of years, and this excess is most marked in the early periods of institutional existence. The recovery-rate may be calculated upon the supposed curable cases, but in the long run this does not give a very different result from that based on the total admissions.

The correct basis for this return of recoveries is the percentage obtained from the total annual admissions. It is true that this percentage of recoveries calculated on the admissions is too small in the first period of an institution's history, and naturally increases with its age, and that patients admitted and practically cured toward the close of the year are often not credited as recoveries of the year, but eventually it is the most correct method of calculating the recoveries.

The mortality has been calculated incorrectly by some on the admissions or discharges. The element of time, which is all important in a chronic disease like Insanity, is here left out of the calculation; whereas, in any community the death-rate is only indicated by the total deaths among a given number of people living a given length of time, as, for instance, the percental number of deaths in 10,000 inhabitants during a year.

The correct calculation of the mortality must be based on the annual average number resident. Even this method leaves the question of age out of consideration, and it is well known that the mortality-rate increases decidedly with advancing years, and the average ages of patients in different institutions might vary sufficiently to affect the mortality-rate. A still more correct estimate, therefore, might be based on the proportion of deaths at each age compared with the average number living at that age.

The average number resident during the year should be calculated from a census book giving the number present for each day of the year, and the grand total or sum of the numbers for the year divided by 365 will give the average number resident. In the absence of such a census-book a weekly or monthly record, showing the numbers present, will suffice; the divisor in this case will be 52 or 12 respectively; and where no census or other record of numbers present has been kept by the week or month the average for a series of years may be nearly ascertained when calculated on the total numbers remaining at the end of each year.

Thurnam, on "Statistics of Insanity," p. 18, says: "Where no register of the number of patients at intervals not exceeding a month or a quarter of a year has been regularly kept, the only method of ascertaining the average number is the laborious one of extracting from the register of patients and adding together the exact duration of time passed in the house during the entire period by each person admitted, and then dividing the total by the number of which such period consists."

Tuke says that by the multiplication of the average number resident in an asylum by the number of years it has been opened the years of insane life passed therein are calculated; and he gives the following formula for calculating the average duration of residence, viz.: Average number resident, × years of operation ÷ number admitted = average duration of residence.

As the recovery-rate and the death-rate tend to increase with

the lapse of years in hospitals for the insane, it is evident that only statistics extending over a considerable period of time in any one institution from the time of its first opening are fully reliable.

As age is such an important factor in both the recoveries and the mortality, and also in order to institute comparisons with the general population, all the returns mentioned should be calculated by quinquennial periods as well as by the average of the total age periods.

Every hospital for the insane should keep the most complete records of all patients and furnish, for statistical or other purposes, tables as to date of admission, causes of Insanity, forms of mental disease, percentage of recoveries and deaths, causes of death, number of admissions, hereditary tendency, civil condition, degree of education, duration of Insanity previous to admission, and the period under treatment of the recoveries and of those discharged not recovered, and of those who died, ages of all discharged or died, duration of Insanity previous to admission, occupations, nativity of patients and of their parents, sex, color, and personal description, bodily diseases, and bodily weight. All such extensive and accurate individual records are of great value for special statistical studies.

The main object of statistics is to present, however, information, condensed by the exercise of special judgment and skill, for objects of general comparison on a broad scale, and for the deduction of general conclusions, and any attempt to improve their value by the introduction of largely specialized particulars will always defeat its own object. Where vast numbers of cases, accurately recorded by skilful observers, are concerned individual exceptions and particular differences equalize themselves and disappear before the force of grand averages, and do not impede the discovery of general laws, which are the real objects of statistical research.

Total Numbers of Insane—European, British, and American Figures.

The statistical figures and information under this head are derived chiefly from the latest United States census report prepared by Dr. J. S. Billings, expert special agent of the Census Office. The number of insane and idiots to 100,000 of the general population was: For the United States (1890), 323; for England and Wales (1891), 336; for Scotland (1891), 384; for Ireland (1891), 450;

for Austria (1890), 217; for Prussia (1880), 243; and for France (1879), 252.

Omitting idiots, the actual number of the insane to 100,000 of the general population, reported by census in different countries, has been as follows: For United States (1890), 170; for England and Wales (1881), 199; Scotland (1891), 259; Ireland (1891), 317; Austria (1880), 135; Hungary (1880), 81; France (1876), 124; Italy (1871), 98; Prussia (1871), 87; Bavaria (1871), 98; Saxony (1875), 84; Denmark (1871), 138; Norway (1865), 185; and Sweden (1870), 176. There has been a constant increase of the proportion of the insane to the general population in all civilized countries, but whether this is due to more complete census reports, to a gradual accumulation of chronic cases, to diminished death-rate, and to the wider recognition of cases of Insanity by medical men, or to a veritable increase in the total amount of Insanity is difficult to determine positively. There can be but little doubt, however, that there has been a positive increase in the proportion of Insanity in most countries, to be etiologically ascribed in the main to alcoholic excess, specific disease, and general paresis. There can be no question but that the increase in Ireland is real if there be no mistake about the figures reported as per 100,000 of population in 1881, 188; and in 1891, 317. The total number of insane reported in the United States, June, 1890 (including Chinese, Japanese, and Indians, 231 in all), was 106,485, or a ratio of 170.0 to each 100,000 of living population at that date. In 1880 the total number was 91,959, and the ratio per 100,000 183.3. In 1880 physicians made special reports of seventeen per cent. of the total numbers, but for the census of 1890 they failed to make special returns, and this accounts for the apparent decrease in the ratio. Of the total 106,254 insane (exclusive of 231 Japanese, Chinese, and Indian insane) 99,719 were white, and 6,535 were colored. Among the whites 64,419 were natives, and 35,300 were foreign born. Out of every 1,000 of the insane whites in 1890, 581.1 were born in the United States of native parents; 64.9 had one or both parents foreign born, and 354.0 were born foreign.

The ratio of the insane for 100,000 of the living population, 1890, was 387.0 for the foreign born whites, 140.5 for the native whites, and 86.6 for the colored. It is thus evident that the proportion of insane is much less among the colored and very much greater among the foreign than the native white, in part due to the excess of adults at the vulnerable age among the foreign population. It

is of interest to note that the proportion of insane to the colored population is double among the colored living in the North than that among the colored living in the South.

In cities having over 50,000 inhabitants the ratio of the insane to 100,000 of the general population was in 1890 242.9, as compared with 170.0 for the whole country, showing apparently that the supply and the demand for institutions for the insane is greater in large cities. On the other hand, the feeble-minded, deaf and dumb, and blind are found in greater proportions in the country and in small towns.

Out of the total population of 62,622,250 in the United States in 1890, about 500,000 had some defect or disorder of mind or of the special senses. The exact ratio per 1,000 of the general population in 1890 was, for the insane, 1.70; for the feeble-minded, 1.53; for the deaf and dumb, 0.65; for the blind, 0.81.

Counting the lame, the deformed, the sick, and permanently infirm, one person in every fifty in the general population, including the classes previously mentioned, is mentally or physically disabled.

The reason for the giving of these figures is that it is not easy to separate the nosological relation between the insane and the feeble-minded, and that there is in all countries a certain proportion between the sensorially and physically defective and the mentally defective classes. These figures also give numerical force to a general law (broader than that of heredity), which is the law of chances of organic failure traceable at every grade in the rising scale of animal intelligence. This law will be again mentioned more fully under etiology, and it is sufficient to cite the above figures as showing in general the percental chances of organic failure as regards the intellectual and special sensorial functions.

Reasons for the percental increase of the insane to the general *population* in civilized countries may be given in brief as follows: There has been a decided increase in the amount of hospital accommodations and better quality of medical care given to the insane and a prolongation of insane life. The diminished mortality has led to an accumulation of chronic cases. The increased confidence in institutions for the insane has brought into them many cases formerly kept hidden in private families. There have been more complete returns made of the existing insane, and the education of the medical profession generally concerning mental disorders has extended the limits of diagnosis as regards Insanity. More persons are living

in large cities crowded together under bad hygienic surroundings, and the total conditions of life are more highly artificial and necessitate a keener competition and a greater mental strain, and intemperance and specific disease and general paresis account for an actual increase of Insanity in connection with the above considerations. Some of those formerly classed among the feeble-minded are now returned as insane. This is an important point, as this combined class of feeble-minded and idiots is very numerous, and it numbered in 1890, in the United States, 95,609.

The proportion of first attacks of Insanity to the general population is not to be reliably determined except in England during certain periods, and this is the needed information to determine accurately the question of actual increase of Insanity in different countries at sequent periods. Thus in England and Wales in 1859 the ratio of the pauper insane to the population was 1 in 578, whereas in 1889 it was 1 in 384. The number of first attacks to the population does not indicate so large an increase of Insanity, taking the following figures given by Tuke: For each 10,000 of the population the number of the first attacks was, in 1878, 3.33; in 1879, 3.34; in 1880, 3.22; in 1881, 3.25; in 1882, 3.25; in 1883, 3.43; in 1884, 3.33; and in 1885, 3.10. Since 1885 there has been an increase in the annual average number of first attacks. For the five years from 1881 to 1885 inclusive the average annual number of first attacks per 10,000 of the population was 3.29. The corresponding figure for the proportion of first attacks to the population from 1886 to 1890 was 3.46. These figures relate to certified cases only.

General Statistics as to Sex, Age, Nativity, Civil Condition, Occupation, Form of Insanity, Heredity, Sensorial Defect, Degree of Education, Recovery-rate, Relapses, and Mortality-rate.

Sex.—Esquirol, from statistical research, came to the conclusion that more women than men were insane. The researches of Thurnam and of Dr. Jarvis would tend to show that men are more exposed and more liable to become insane. It is probable that in France there is a greater numerical liability to Insanity among women. It also appears that in England more males than females were formerly admitted to asylums, but of late years the reverse is the case. From 1886 to 1890 in England the average of male admissions was for each 10,000 of the population 5.24, while for

females the corresponding average was 5.26. In England and Wales, from 1878 to 1887, there were admitted to public and private asylums 69,560 women and only 66,918 men. The proportion of male idiots, on the other hand, is greater in all countries, and in the United States in 1890 the total feeble-minded reported were 52,962 males as against 42,647 females, and the ratio per 100,000 of the general population was 165.2 for males and 139.6 for females. Exclusive of 231 Chinese, Japanese, and Indians, of the 106,254 insane reported June, 1890, 53,264 were males and 52,990 were females, or 100.52 males to 100 females, which is a relatively high proportion of males. This ratio of male insane to every 100 female insane was, in the United States in 1880, 93.32; in England and Wales (1881), 84.27; in Scotland (1881), 88.18; in Ireland (1881), 98.77, and in 1891, 99.74; in Prussia (1871), 91.51; in Bavaria (1871), 86.16; in France (1876), 86.89. Among the native whites born of native parents this ratio was 102.46 males to 100 females, while among the native whites born of foreign parents the corresponding figure was 126.94.

It is to be borne in mind that there are one and a half million (1,513,510) more males than females in the United States, and there were reported in 1890, in each 100,000 males, 167 insane, and in each 100,000 females, 174 insane. This greater actual proportion of female than male insane to the general population may be due to a smaller mortality and an accumulation of females, and to the modern competition of women with men in the various walks of life. The numerical returns of the sexes insane in the United States have not varied greatly for the last five censuses. Thus, out of every 1,000 insane in 1890, 502 were males and 498 females; in 1880, 483 were males and 517 females; in 1870, 487 were males and 513 females; in 1860, 493 were males and 507 were females; and in 1850, 506 were males and 494 females.

In 1890, 74,028 were reported as inmates of asylums for the insane, or 697 out of every 1,000 of the total number reported as insane. Out of this 74,028 in asylums for the insane, 38,330 were males and 35,698 females, or a proportion of 107 males to 100 females. In cities having 50,000 inhabitants or over the average ratio of the male insane to 100,000 of the general population was 229.3 in 1890, and the ratio for females 256.6.

The differences of sex in regard to the recovery-rate and the mortality-rate will be mentioned later under those headings.

Age.—The following figures from the last census report give information on a large scale as regards age and Insanity. In 1890, of the total number of insane (106,254) reported, the age was not given for 2,368, but for all the others the quinquennial age-periods were as follows: From ten to fifteen there were 311; from fifteen to twenty, 1,691; from twenty to twenty-five, 5,131; from twenty-five to thirty, 8,863; from thirty to thirty-five, 12,386; from thirty-five to forty, 12,857; from forty to forty-five, 12,879; from forty-five to fifty, 12,207; from fifty to fifty-five, 10,719; from fifty-five to sixty, 7,931; from sixty to sixty-five, 6,641; from sixty-five to seventy, 4,708; from seventy to seventy-five, 3,502; from seventy-five to eighty, 2,055; and eighty and over, 2,005.

Table Showing for each 100,000 *of Population of certain Groups of Ages the Number of the Insane of Corresponding Groups of Ages, but excluding those under Fifteen Years of Age.*

	Total.*	15–20 years.	20–25 years.	25–35 years.	35–45 years.	45–55 years.	55–65 years.	65 years and over.
Total	263	26	83	218	367	455	467	508
Male	257	28	94	230	359	417	417	448
Female	270	23	72	204	375	495	521	571

* Fifteen years and over including unknown.

This table shows that Insanity steadily increases with advancing years; and especially among women is this the case.

The proportion of the insane of certain ages found in institutions for the insane in 1890 is as follows: Of those from twenty-five to forty-five years of age, over 75 per cent.; of those from forty-five to fifty-five, 71.5 per cent.; of those from fifty-five to sixty-five, 64.6 per cent.; of those from sixty-five to seventy-five, 52.6 per cent.; and of those more than seventy-five years, 33.3 per cent.

The age-periods at which Insanity first appeared in 79,274 cases reported in 1890 were as follows: From ten to fifteen, 1,548 (male, 772; female, 776); fifteen to twenty, 5,902 (male, 3,163; female, 2,739); twenty to twenty-five, 11,935 (male, 6,608; female, 5,327); twenty-five to thirty, 13,061 (male, 6,826; female, 6,235); thirty to thirty-five, 11,617 (male, 5,731; female, 5,886); thirty-five to forty, 9,536 (male, 4,655; female, 4,881); forty to forty-five, 7,781 (male,

3,562; female, 4,219); forty-five to fifty, 5,787 (male, 2,600; female, 3,187); fifty to fifty-five, 4,271 (male, 2,064; female, 2,207); fifty-five to sixty, 2,658 (male, 1,339; female, 1,319); sixty to sixty-five, 2,024 (male, 1,062; female, 962); sixty-five to seventy, 1,275 (male, 636; female, 639); seventy to seventy-five, 931 (male, 451; female, 480); seventy-five to eighty, 539 (male, 244; female, 295); eighty to eighty-five, 262 (male, 120; female, 142); eighty-five to ninety, 109 (male, 49; female, 60); ninety to ninety-five, 26 (male, 9; female, 17); ninety-five years and more, 12 (male, 3; female, 9).

Of the 79,274 insane above mentioned, 93.98 per 1,000 were under twenty years of age when the Insanity first appeared. From twenty to forty-five years, 680.29 per 1,000; from forty-five to sixty-five years, 185.94 per 1,000; and among those sixty-five years and more, 39.79 per 1,000 of the 79,274 insane mentioned first became mentally disordered.

Sixty-eight per centum of the first attacks of mental disorder occur between twenty and forty-five years of age. The greatest proportion of first attacks in any quinquennial period occurs from twenty-five to thirty years of age. The greatest proportion of first attacks in any decennial period falls between twenty and thirty years. More first attacks are to be enumerated from twenty to twenty-five years than from thirty to thirty-five years, counting the total of both sexes, but among the women alone there is a slight preponderance of first appearance of Insanity in the quinquennium thirty to thirty-five years. In order to furnish statistical proof of the actual tendency to Insanity at certain ages, it would be necessary to compare the number of cases occurring at those ages with the mean of the living population of like age at the time of the occurrence of the mental disease, and such complete information is not to be had. The data given, however, clearly indicate points above mentioned, and also that the tendency to first attacks is greater among males under twenty years than among females, but after that age the reverse is true.

Natirity.—In 1890, for every 1,000 of the general population the number of the insane was, for the native-born in the United States, 1.40; for the foreign born, 3.87; and for the colored, 0.87. The proportion of Insanity among the foreign-born population is thus seen to be vastly greater than among natives, and in some degree this is to be attributed to the fact that there were relatively more adults of an age liable to mental disorder among them. It

also appears that the proportion of Insanity is much less among the colored people.

Among the same classes the figures for the feeble-minded per 1,000 of the general population were, for native born, 1.66; for foreign born, 1.00; for colored, 1.42. There is a less decided difference between the white and colored race in this instance, and the native white number exceeds the foreign white because the actual proportion of children was less among the latter. Sensorial defect, at least as regards blindness, was greater numerically among the colored than among the native whites, and it was still greater among the foreign-born whites. This fact is given on account of the causative relation between deprivation of the special senses and Insanity. Among the Chinese, Japanese, and Indians the proportion of Insanity and of other defects, such as idiocy, deafness, and dumbness, excepting blindness, was less than among the white population. The proportion as regards blindness was only slightly excessive.

In 1890, out of every 1,000 insane reported, 581.1 were natives of native-born parents, 64.9 were natives with one or both parents foreign born, and 354.0 were foreign born. The ratio of the insane per 100,000 of the living population was 387.0 for the foreign-born whites, 140.5 for the native whites, and only 88.6 for the colored. The ratio among the Chinese was 182 insane for 100,000 of the living population, which is almost entirely adult, and hence proportionately more liable to Insanity; and the ratio, though small relatively to the general average, is more than double that found among the negroes.

The ratio among the Indians of the insane per 100,000 living was only 12.8, and, after making due addition for probably defective reports, the proportion would still be very much less than among the other races.

Civil Condition.—In 1890, out of 99,257 insane whose ages and civil condition were reported there were 49,463 males, of whom 29,793, or 602 per 1,000, were single; 16,227, or 328 per 1,000, were married; 3,010, or 61 per 1,000, were widowers; and 433, or 9 per 1,000, were divorced. Of the 49,794 females, 19,401, or 390 per 1,000, were single; 21,665, or 435 per 1,000, were married; 8,171, or 164 per 1,000, were widows; and 557, or 11 per 1,000, were divorced. The corresponding ratios in the general population were: for males, single, 416 per 1,000; married, 542 per 1,000; widowed, 40 per 1,000; divorced, 2 per 1,000; and for females there were: single,

318 per 1,000; married, 568 per 1,000; widowed, 110 per 1,000; and divorced, 4 per 1,000.

The conclusions to be drawn from these statistical data are that the tendency to Insanity is considerably greater among the single than among the married, and this is specially marked as regards males; that the proportion of mental disease among the divorced is even greater than among the unmarried, and that the proportion of Insanity among the widowed is also greater than among the married or the single.

In England the proportion of married to single in the general population is greater than in the United States, but the same preponderance in the numbers of single persons admitted to asylums holds there, as here, to support the view that single life favors Insanity.

In an article on Insanity, written some years ago for Wood's "Reference Handbook of the Medical Sciences," the writer pointed out a possible fallacy as regards the large number of single insane who, it was suggested, did not marry perhaps because they were physically or mentally weak or defective. It is also possible, on account of the difficulty of gaining accurate information, that on admission to hospitals for the insane some who have been married are enumerated as single.

Occupation.—It is a question whether the comparison of the number of the insane of given occupations with the total numbers of the same occupations in the general population furnishes reliable data as to the degree to which the various occupations favor Insanity.

If the proportion of lawyers reported insane in 1890 to the total number of lawyers in the general population in that year be compared with the proportion of physicians reported insane the same year, to the total number of physicians in the general population, it appears that the ratio of insane is considerably greater among the lawyers than among the physicians. And if a like comparison on a like statistical basis be made between physicians and clergymen it appears that fewer relatively among the latter than among the former become insane. By thus comparing those fed, clothed, and housed somewhat alike, and doing brain work, the sole influence of occupation may perhaps be more nearly determined than by the comparison of classes living under totally different hygienic conditions and engaged variously in manual and intellectual labor. No attempt, however, will be made to pursue this subject in a statistical

way through the complexities with which it is surrounded as regards the various occupations.

Form of Insanity.—Of the 106,254 insane reported in the United States in 1890, the form of Insanity is unknown or not specified in the following data in 15,237: in 17,481 the form was acute mania; in 21,511, chronic mania; in 2,286, acute melancholia; in 11,847, chronic melancholia; in 2,258, monomania; in 1,615, paresis; in 29,218, dementia; in 4,104, epileptic Insanity, and in 697, dipsomania. The following are ratios as to these 106,254 insane, taken from the census report of 1890. The average ratio of cases of acute mania is 192.1 per 1,000 of all cases of Insanity. The same ratio is, in native white women of native parents, 199.1; in colored males, 273.0; in colored females, 246.2; in males with French mothers, 250.0; in females with French mothers, 276.8.

The average ratio of cases of chronic mania is 236.3 per 1,000 of all cases of Insanity, and it was, in foreign-born females, 257.5, and in colored females, 260.5.

The average ratio of cases of acute melancholia was 25.1 per 1,000 of all cases of Insanity; in native females of foreign-born parents, 35.1; in colored males, 12.4; in colored females, 13.1.

The average ratio of chronic melancholia is 132.2 per 1,000 of all cases of Insanity; in females, 137.8; in colored males, 71.7; in colored females, 89.6.

The average ratio of monomania is 24.8 per 1,000 of all cases of Insanity; and in foreign-born males it was 30.1; in the colored males, 14.2; colored females, 15.4.

The average ratio of general paresis was 17.7 per 1,000 of all cases; in males, 27.8; in females, 7.3; in colored males, 18.4; in colored females, 7. It was much above the male average here given in those males whose mothers were foreign born.

The average ratio of cases of dementia was 321 per 1,000 of all cases of Insanity; in males, 319.8; in females, 322.3.

The average ratio of epilepsy was 45.1 per 1,000 of all cases of Insanity, being 50.6 in males and 39.4 in females. It was highest in the colored—males, 94.8; females, 73.0.

The average ratio of cases of dipsomania was 7.7 per 1,000 of all cases of Insanity, being 12.2 in males and 3.0 in females. It was highest in males whose mothers were born in Scotland, being 19.8, and in Ireland, 19.1.

The greatest number of cases of acute mania at any quinquennial

period was from 30 to 35 years both for males and females; of chronic mania, from 35 to 40 for male, and 40 to 45 for females; of epileptic Insanity, from 35 to 40 for males, and 30 to 35 for females; of chronic melancholia, from 30 to 35 for males, and 35 to 40 for females; of dementia, from 30 to 35 for males, and 40 to 45 for females. Acute mania, chronic mania, and chronic melancholia increase in numerical proportion to each 100,000 of population of like age up to fifty-five years of age, and they then diminish, but after fifty-five years dementia continues to increase (in the ratio of cases relative to each 100,000 of like ages in the general population) to the end of life.

Heredity.—In the census returns of 1890, as to 70,340 insane in point of heredity, it was reported that 22,077, or 314 per 1,000, had insane relatives. The number having insane fathers was 2,531, and insane mothers, 3,159. The number having insane grandfathers was 784, and the number having insane grandmothers was 810.

The number having insane uncles was 2,408, and the number having insane aunts was 2,034. The number having insane cousins was 1,708.

The number having insane brothers was 3,630, and the number having insane sisters was 3,704.

The number having insane sons was 465, and the number having insane daughters was 480. The ratio of the insane having insane relatives was greater among females (being 337 per 1,000) than among males (being 289 per 1,000).

The number having insane uncles on the father's side was 243 as against 206 on the mother's side, and the number having insane aunts on the mother's side was 289, as against 179 on the father's side, which apparently points to heredity in the same sex. Before hereditary influence as an etiological factor can be determined, statistics must be made to embrace *every member* of all tainted families affected with not only Insanity, but with idiocy, epilepsy, and other nearly allied neuroses which appear vicariously with mental disorder. The members not affected must be reported as well as those mentally diseased in a family, for it is just as important to determine the number having insane parents who are not insane, as to fix the ratio of those having insane parentage who are insane, and until statistics are made to include these additional particulars they cannot aid greatly in the solution of the problem of direct heredity. The broader law of the probability of organic failure, which will be dis-

cussed under etiology, as previously mentioned, is of first importance in this connection.

Sensorial Defect.—In 1880 the total insane reported in the United States as deaf and dumb were 268, and in 1890 there were 409 thus reported, so that there has probably been a real increase of Insanity in this class. The number of insane reported as blind in 1880 was 528, and in 1890 582. The number of the insane deaf, dumb, and blind was 30 in 1880 and 62 in 1890.

The total number of insane having sensorial defect has increased beyond the relative additions to the general population in the last ten years.

Degree of Education.—Information on this point in the census returns of 1890 was given as regards inmates of institutions in 65,065 cases, out of which 51,362, or 785 per 1,000, could read and write; 1,684, or 26 per 1,000, could read but could not write; and 11,833, or 182 per 1,000, could neither read nor write.

Recovery-rate.—The rate of recovery diminishes with age, and it is slightly more favorable among women than among men. It averages from thirty per cent. to forty per cent., calculated on admissions in hospitals for the insane in the United States. Of those thus enumerated as recovered, a certain number relapse into Insanity, and it is probable that Thurnam's estimate ("Statistics of Insanity," p. 123) is about correct, as follows: "In round numbers, of ten persons attacked by Insanity, five recover, and five die sooner or later during the attack. Of the five who recover not more than two remain well during the rest of their lives; the other three sustain subsequent attacks, during which at least two of them die."

After a study of returns from hospitals for the insane in the United States, and of all other available statistical information, the following estimate is given as probably very nearly the average result to be anticipated in mental disorders, by striking an average as regards age, sex, and form of mental disease: Of one hundred persons attacked for the first time by Insanity, seventy will eventually die insane; thirty will recover and die sane; twenty will recover, but will relapse and will be among the seventy to die insane; fifty will not recover and will, with the twenty just mentioned, make out the seventy to die insane. This estimate is based on experience in the treatment of Insanity in private practice as well as in hospital practice, and, if it did not relate to Insanity in general as well as to cases in institutions for the insane, it would be too favorable as

regards the permanent recoveries, and it would have to be reduced considerably in this one particular if applied solely to cases in public hospitals for the insane.

Relapses.—Relatively more females than males relapse. The proportion of relapses given in reports of hospitals for the insane is relatively too large, because the recoveries are too favorably judged, and in the estimate above given the relapses have reference strictly to complete recoveries, and not to recoveries of a defective nature. Taking hospital recoveries as they average, more than twenty per cent. of them are followed by relapses. Of 74,182 cases of Insanity reported in 1890, the number of attacks was as follows: One, 63,390 (male, 32,683; female, 30,707); two, 7,127 (male, 3,560; female, 3,567); three, 1,820 (male, 886; female, 943); four, 730 (male, 344; female, 386); five, 300 (male, 135; female, 165); six to ten, 405 (male, 163; female, 242); eleven and more, 401 (male, 160; female, 241).

A separate return should be made by hospitals for the insane as regards the number of relapses in strongly hereditary cases, and the length of the lucid intervals should be stated, and this, like all other returns, should be by quinquennial age periods.

Mortality-rate.—The mortality-rate is higher among insane men than women, and it increases after fifty years more rapidly than in the general population, and it is greater in the early than in the later period of institutions for the insane, and it is from four to five times greater than among the sane. Mr. Noel Humphreys, for inmates of asylums in England and Wales, gives the following average death-rates on average numbers resident for the year, viz., 1859-1868, 10.31 per cent; 1869-1878, 10.17 per cent.; 1879-1888, 9.55 per cent.

In an aggregate of 36,517 patients treated in hospitals for the insane in 1890, the last census report gives an average death-rate of 65.0 per 1,000, which is nearly five times above the average for the general population above fifteen years of age; and from the same source is derived the following table, in which is calculated the expectation of life from 7,875 insane and feeble-minded of known ages above fifteen years who died in institutions. The table shows also, for comparison, the corresponding figures for the population of Massachusetts in 1880.

Table Showing Expectation of Life in the Insane.

Ages.	Expectation of Life in Years.	
	Insane.	Population of Massachusetts.
15 years	35.78	46.85
25 years	28.51	39.81
35 years	23.14	32.96
45 years	18.80	26.01
55 years	14.87	19.02
65 years	10.37	12.95
75 years	7.33	8.31
85 years	5.79	5.82
95 years	2.00	

Statistics for special forms of Insanity will be given in the clinical part of this work.

CHAPTER III.

THE NOSOLOGY OF INSANITY.

From time immemorial writers on Insanity have given special appellations to the various pathological departures from mental health, and they have endeavored to group the varieties of mental disorder with some show of logical consistency according to one or more principles of division. Their endeavors in this direction were perfectly natural, and they constituted a necessary step in the development of the subject, which, like all branches of research, absolutely required some sort of division for purposes of study.

It is the worst form of obstructive ignorance to oppose the use of working theories and provisional classifications, which are indispensable in all departments of human knowledge and have served a useful purpose in the evolution of all kinds of sciences. What, then, are the general nosological principles applicable in the study of Insanity? The reply to this question will be given seriatim under the following terms, which define the principles deemed available for the classification of mental diseases; viz., psychological, symptomatological, etiological, pathological, anatomical, physiological, and combinative.

The *psychological principle* is one which would naturally commend itself to a reflective student seeking some means of dividing the disorders of the mind. It is the natural order of science to study the normal before the abnormal activities of organs, and it would seem appropriate to determine the physiological activities of the brain, as the organ of the mind, and to make a corresponding psychological division of its separate functions, as the only scientific basis for a study of the pathological disturbances of these functions in Insanity. A clear idea of the separate faculties of the mind, and of their actions in health, would seem to be a prerequisite of their study in disease.

The derangement of one or more of these mental faculties is always the most striking feature of Insanity, which has no social or legal recognition without psychical symptoms, even though the medical expert may determine its existence without mental manifestation.

There have been two extreme attitudes maintained toward the use of this psychological principle in psychiatry. One has been the extreme refinement of the principle in metaphysical directions, leading to useless theories and subdivisions in mental diseases, and the other has been the utter negation of the value of the principle, and the consequent neglect of a most useful adjunct in the study of mental alienation. The fact is that mental states, whether normal or abnormal, will always require to be studied from a metaphysical as well as from a physical side. The most ultimate fact yet attained by human science is that a physical and a psychical process coincide to form every mental event. The pathological mental events in Insanity have their physical and their concomitant psychical processes, which must be studied coincidently as correlatives, which constitute the two sides of a subject otherwise indivisible. A wise empirical psychology should go hand in hand, therefore, with experimental physiology in the study of psychiatric science.

The symptomatological principle has been more constantly employed for nosological purposes in Insanity than any other. It is natural and customary in all branches of medicine to classify diseases by objective symptoms, and this principle is equally appropriate in mental medicine, and it is the one which has best stood the test of time. The division of Insanity by mental symptoms into mania, melancholia, and dementia has stood for twenty-five hundred years and will probably remain forever.

The symptomatological principle is extremely flexible, and admits of endless subdivisions in mental diseases, and some nosologists have abused it in this particular, making tiresome and trivial subclassifications of pathological mental phenomena. When used with discretion, however, it may safely be ranked as one of the foremost and almost indispensable nosological principles in the study of Insanity.

The etiological principle in the nosology of Insanity consists in the classification of mental diseases according to the causes which have been most active in their production. It is beyond all com-

parison the most useful principle of division for practical purposes of treatment. It is manifestly more important to the practitioner to know that the Insanity is puerperal, alcoholic, or syphilitic, than to know that it is of the melancholic, maniacal, or demented form.

The etiological principle is also mostly decisive for diagnostic and prognostic purposes. It is not a sufficient principle for the complete classification of mental diseases, which, as a rule, proceed not from one, but from several causes, and from sources often not to be clearly ascertained, but so far as it is available for the scientific division of pathological psychical affections it should be employed preferably to principles thus far described.

The pathological principle of classification, when completely carried out, is the most scientific in Insanity and in all other diseases. Unfortunately, the knowledge of the pathological conditions which underlie morbid mental states is not yet sufficiently advanced to serve as a basis of division, except in a few of the types of Insanity. It will appear presently how premature efforts at pathological classification have been made by certain able writers on Insanity.

It can only be said, therefore, that this principle should be employed to the exclusion of all others, so often as the pathological lesions which occasion the mental disease are definitely known. In the distant future, when pathological anatomy shall have advanced vastly beyond its present limits, this principle will become the scientific basis of a division of brain diseases with accompanying mental disorders. Mental diseases will then be scientifically grouped and causatively understood, but they will not be philosophically or rationally explained, for the intimate relation between anatomical structure and physiological function will still be a mystery. The absolute nature of mind, like that of life, will always be beyond the ken of mortal man.

The anatomical principle in mental pathology seeks to assign definite limits to the cerebral structures affected in mental diseases. The day will doubtless come when this clear demarcation between anatomical structures and physiological mental functions can be determined. Of late years a vast amount of labor has been expended on cortical localization and a hopeful advance in the knowledge of the subject has been made. It is also a fact that improved technical methods of research in the finer anatomy of cerebral structures has added greatly to existing scientific data. It is reasonable to believe, therefore, that in course of time the anatomical principle will be

employed in mental pathology, as it now is in neurology, for the classification of various types of disease. To this very end the lamented Meynert, among other noted collaborators, expended some of the best efforts of his genius.

The physiological principle is the counterpart of the one just mentioned. Cerebral activity and psychical manifestation correspond in both health and disease. Functional activity of the healthful brain is attended by normal mental manifestations, while the action of the diseased brain develops corresponding morbid psychical reactions. The nature of the functional cerebral process invariably determines the character of the objective psychical symptom. The physiological standard of mental activities would seem to be, therefore, a true principle for the comparison and classification of the morbid variations of mental functions in Insanity. The new science of physiological psychology, it is to be trusted, will in due season furnish some valuable principles of use in the nosology of Insanity. The psychologist also looks expectantly to physiological chemistry for revelations as to biochemical tissue changes and resultant perversions of brain function and of corresponding morbid psychical manifestations.

The combinative principle in the nosology of Insanity arises out of the fact that none of the principles heretofore described are adequate separately for the classification of the different varieties of mental alienation, so that an eclectic or combinative procedure becomes necessary. Classification is simply the orderly arrangement according to some given principles of the known facts of a science. When nothing but the objective symptoms was known of Insanity, the symptomatological principle was all that was required in its nosology, but with the advent of anatomical, physiological, etiological, and pathological facts, other principles of grouping the known data became essential.

The limits of psychiatric science have become so extended, and the facts pertaining to it so numerous, that none but a combinative principle will suffice for a complete nosology of Insanity at the present day. This preliminary analysis of nosological principles will assist in the review of some of the chief classifications of authors which will now be presented in condensed form.

Former accepted classifications will first be passed in review, as they are highly instructive, and have served as models for the more recent nosological schemes, in comparison with which they are

in some instances of equal value, and the simple chronological order here observed of course excludes any intentional precedence of one classification over another on the ground of comparative worth.

Stahl (1660—1734) has already been mentioned under another head, but, as he represents in nosology a school which had predominant influence in Germany for many years, his teachings must be here noticed. Stahl was the founder of the Psychological School in Germany, which was based on animistic, philosophic views, and it had as its followers men of note like Ideler, Langerman, Hoffbauer, Reil, and Heinroth. The teachings of this Psychological School were that in man material changes are governed by spiritual influences, and Insanity was only an indication of a disease of the soul, as the result of sin. Insanity was classified in accordance with metaphysical distinctions, which were again elaborated, in keeping with animistic philosophy. The forms of mental disease were classed under one of three heads; viz., the spiritual faculties, the moral powers, and the volition, including the instincts and propensities.

The Somatic School in Germany, contemporaneous with and a rival of the one just mentioned, taught diametrically opposite views, and it was represented also by prominent men like Nasse, Vering, Friedreich, and Jacobi.

Jacobi reflects the doctrines of the school, which rapidly found followers in all parts of Germany. He declared that Insanity was a purely physical disease, arising through sympathy with visceral affections or from gross lesions of the nervous system, and that it might spring from disease of an abdominal viscus just as well as from the brain. The only classification he admitted was as follows: 1. Insanity without delirium. 2. Insanity with delirium or incoherence and without delusion. 3. Insanity with delusion.

Sauvage (1706—1767) was the first systematic nosologist who employed natural history methods, and grouped general diseases and the special affections of Insanity by classes, orders, genera, and species. In thus systematically classifying all the facts then known about Insanity, he conferred a great service on psychiatric science, for some logical arrangement of a heterogeneous mass of empirical observations is the first step toward evolution in any branch of knowledge.

Sauvage, in his "Nosologia Methodica," grouped mental diseases in his eighth class and third order, under the general term, "Vesaniae," which was redivided into: 1, Hallucinations; 2, Morosities;

3, Deliriums; 4, Abnormal aberrations; and these were again subdivided to include every manner of mental symptomatic disturbance which had been recognized up to that time. His descriptions alike of separate symptoms and of clinical forms of Insanity were especially good and true to the most minute details, showing the painstaking genius of the author.

Pinel (1793), great as the champion of the rights of the insane, and as an author of the widest influence in France, taught that the symptoms of Insanity as a whole should be studied by aid of mental philosophy, inasmuch as they represented psychical phenomena, but that when a large number of these symptoms had been separately analyzed they should finally be classified, like the facts of natural history. He did not attach much importance to lesions of material structures in relation to psychical disturbances nor to materia medica remedies for mental disorders, which were to be dealt with by hygienic and moral means and by isolation, and he insisted that the psychic derangement coincident with acute diseases was not Insanity.

He classified diseases of the mind under the following simple but comprehensive division according to mental symptoms, viz.: Mania, Melancholia, Dementia, Idiotism.

Esquirol, the student of Pinel, celebrated alike in the annals of lunacy reform and of psychiatric science, was the author of a classic treatise on Insanity translated into modern languages and read the civilized world over.

Esquirol was loyal to the views of his great teacher, and he did not depart essentially from Pinel's classification, to which he added, however, a knowledge of partial insanity with gayety or with sadness, and also a clear distinction between congenital and acquired states of weakness of mind. Esquirol's classification is as follows: 1, Lypemania; 2, Monomania; 3, Mania; 4, Dementia; 5, Imbecility and Idiocy.

Cullen (1772), in his general nosology (on natural history lines) of diseases, includes Insanity among the neuroses as Order IV., under the term "vesaniæ," and the subdivisions were: 1. Amentia, which included congenital or acquired mental affections. 2. Melancholia, which embraced eight subvarieties, erotomania, and demonomania being among them. 3. Mania, which had three divisions, according as the cause of the mental disorder was psychical, physical, or unknown. 4. Oneirodinia, or derangement of sleep, somnambulism.

A condition pertaining to all of these forms was that they were free from fever and coma.

Cullen deserved credit for calling attention to and introducing for the first time in nosology the Insanity of disordered states of sleep under the term oneirodinia.

Arnold (1806) treated of the symptoms of Insanity with clinical discrimination and excellent descriptions of the psychical manifestations, but unfortunately in classification he was governed completely by metaphysical ideas. His division of Insanity was: 1. Ideal, which had four subdivisions. 2. Notional, which had twenty varieties, according to the mental complexion of symptoms.

Benjamin Rush, who showed a touch of genius in all the diversified topics upon which he wrote, published in 1812 his "Medical Inquiries and Observations," with an article on mental diseases, which he divided simply in accordance with the psychical symptoms, much as did Esquirol, using the new term amenomania to denote monomania with expansive feelings.

Isaac Ray, whose "Medical Jurisprudence of Insanity," like its author, is so widely known, classified Insanity also in simple form according to the mental features of the disease.

Guislain, of Belgium, who worked such important lunacy reforms at Ghent in 1828, classified Insanity under a new nomenclature of Greek derivation according to a psychological principle of divisions as follows: 1. Phrenalgia (melancholy). 2. Phrenoplexia (ecstasy). 3. Hyperphrenia (mania). 4. Paraphrenia (folly). 5. Ideophrenia (delirium). 6. Aphrenia (dementia). Conolly, the great English lunacy-reformer, at this date admitted no further classification of Insanity than Mania, Melancholia, and Dementia.

Noble, some years later, offered nothing new as a basis of division, which he made with reference to mental symptoms and metaphysical ideas into: 1. Emotional. 2. Notional. 3. Intelligential disorders.

Griesinger, in 1845, published his "Mental Pathology and Therapeutics," which, in view of the fact that it was a quarter of a century in advance of contemporary psychiatric science, and gave a masterly analysis of the bodily and mental symptoms of Insanity, and presented, with laborious care and the most skilful clinical interpretation, all the physiological and pathological facts relating to mental diseases, was the most remarkable work which has ever adorned the literature of Insanity. Griesinger employed the psychological principle in the classification of Insanity, not by exclusive prefer-

ence, but of necessity, for, as he justly affirmed, anatomical, physiological, and pathological knowledge were not sufficiently advanced at the time to serve as a basis of nosology.

His nosological arrangement was the following:

States of Mental Depression—Melancholia.

I. Hypochondriasis.
II. Melancholia in a more limited sense.
III. Melancholia with stupor.
IV. Melancholia with destructive tendencies.
    (*a*) Melancholia with suicidal tendencies.
    (*b*) Melancholia with murderous tendencies.
V. Melancholia with persistent excitement of the will.

States of Mental Exaltation.

I. Mania.
II. Monomania.

States of Mental Weakness.

I. Chronic Mania.
II. Dementia.
III. Apathetic Dementia.
IV. Idiocy and Cretinism.
    (*a*) Idiocy in general.
    (*b*) Endemic Cretinism.

To the above was added the "Complications of Insanity," which included general paralysis and the major neuroses.

Schroeder van der Kolk, influenced by the Somatic School of Germany, but avoiding its extremes, in 1852 made a decided effort to classify mental diseases by the etiological principle, tracing their causation largely to affections of the thoracic and abdominal viscera, through sympathetic action. While retaining some customary terms indicative of the mental phases of the disease, he still held that the symptoms were too variable, and that the causes alone were sufficiently stable for the classification of Insanity.

He divided it into two main groups, idiopathic and sympathetic. The first term included mental disease from intra-cerebral causes, and the second term embraced mental disorder from extra-cerebral sympathetic causes. His nosological scheme was formulated thus:

Genus A.

1. Acute Idiopathic Mania.
2. Chronic Idiopathic Mania.
3. Obtuseness.
4. Dementia and Idiotism.

Genus B.

1. Sympathetic Mania, from disease of the colon.
2. Sympathetic Mania, from disease of the sexual organs.
3. Sympathetic Mania, from diseases of the chest.
4. Sympathetic Mania, from erethica senilis.
5. Intermittent Mania.

Morel (1860) strongly advocated the etiological principle of division, which he labored assiduously to perfect, and his nosology, published in the year here mentioned, contained several important additions to the subject, viewed in the light of causes, and was substantially as follows: 1. Insanity from hereditary transmission. 2. Toxic Insanity. 3. Insanity from the transformation of other diseases. 4. Idiopathic Insanity. 5. Sympathetic Insanity. 6. Dementia.

Skae, in 1863, propounded a classification in which the etiological principle was carried to its extreme limit, as is evident in this, his full arrangement of mental diseases: 1. General Paralysis. 2. Paralytic Insanity. 3. Traumatic Insanity. 4. Epileptic Insanity. 5. Syphilitic Insanity. 6. Alcoholic Insanity. 7. Rheumatic and Choreic Insanity. 8. Gouty Insanity. 9. Phthisical Insanity. 10. Uterine Insanity. 11. Ovarian Insanity. 12. Hysterical Insanity. 13. Masturbatic Insanity. 14. Puerperal Insanity. 15. Lactational Insanity. 16. Insanity of Pregnancy. 17. Insanity of Puberty. 18. Climacteric Insanity. 19. Senile Insanity.

Skae described, in addition to the above, some exceptional forms of mental disorder in connection with affections of the thoracic viscera, with goître and fevers, and occurring in the delirium of young children, and in relation to the disturbances of sleep, and also following the excitement of marriage.

Laycock, in 1864, in his "Medical Observation and Research," endeavored, with ingenious ability, but rather prematurely, to con-

struct a complete nosology by the physiological and anatomical principle of division of mental diseases.

His nosological attempt consisted in the demarcation by anatomical lines of cerebral centres, which subserve in function: 1. The Instincts and Propensities. 2. The Emotions and Sentiments. 3. The Intellectual Faculties and Special Senses.

The normal and abnormal activities of these cerebral centres, explained by the laws of mental physiology and mental pathology, afforded, in his opinion, the best basis of explanation and of classification of mental phenomena, both in health and in disease.

Space will not permit the insertion here of this complete nosological scheme, nor of that of Parchappe, also based on the anatomical principle, nor of that of A. Voisin, relating to morbid anatomy, especially vascular pathology, nor of that elaborated on anatomical lines somewhat later by that original and industrious worker, Luys.

It will not do to omit, however, the nosology from an anatomical standpoint, of that great psychiatric genius and brain anatomist, Meynert, whose grouping in the original text not being at hand is here quoted from Tuke's "Dictionary of Psychological Medicine:" viz., "1. The clinical forms which arise from anatomical changes caused by injury to the skull and brain during pregnancy, parturitions, or infancy (idiocy, deaf-mutism, etc.); those which arise from changes caused by focal or coarse brain disease, as tumors, hemorrhages, sclerosis, and syphilis (delirium, paralysis, organic dementia); thirdly, those caused by diffused changes, as atrophy, hypertrophy, and meningitis (senile dementia, epilepsy, general paralysis), etc."

"2. Disorders of nutrition, involving cortical excitement (mania, melancholia, exalted ideas, etc.), or subcortical localized irritation and feebleness (delusions, hallucinations, mental stupor, hypochondriasis, hysteria, partial insanity, persecution mania; disorders of the subcortical vascular centres—epilepsy, hystero-epilepsy, circular insanity, ascending paralysis, goitre, etc.).

"3. The last group comprises 'intoxications.'"

In 1867 the International Congress of Alienists, held in Paris, adopted the following classification of Insanity, prepared by a committee especially appointed to draft the same: 1. Simple Insanity (mania, melancholia, monomania, moral Insanity, and dementia). 2. Epileptic Insanity. 3. General Paralysis. 4. Senile Dementia. 5. Organic Dementia. 6. Idiocy. 7. Cretinism.

Delirium from trauma, alcohol, or fever, was mentioned as not pertaining to the typical forms of Insanity.

Maudsley (1868), in his "Pathology of Mind," admits the necessity of the psychological principle in psychiatric nosology, while he at the same time deplores its insufficiency. He seems to think that there is greater stability in the objective character of the psychical symptoms than in the actual causes of the mental disease, which, he claims, varies infinitely in outward manifestation, even in cases having the identical same cause. He therefore gives this psychological classification:

Affective Insanity, or Insanity without delusion.
- (*a*) Instinctive.
- (*b*) Moral.

Ideational Insanity.
- Melancholia.
  - Acute.
  - Chronic.
- Mania.
  - Acute.
  - Chronic.
- Monomania.
- Dementia.
  - Acute.
  - Chronic.

Amentia.
- Imbecility.
- Idiocy.
  - Moral and Intellectual.

The inconsistencies of this arrangement of mental diseases are harmonized through the great ability of the author.

Blandford, writing with all the tact and skill of an accomplished clinician, suggests classification primarily according to the general psychical and somatic state of the patient, and secondarily in keeping with the mental complexion of the malady, while he at the same time takes into consideration the etiological factors when clinically grouping patients for purposes of treatment.

Hammond makes a division of mental diseases in strict accord-

ance with the psychological principle. He classifies under three main groups, denominated Intellectual, Emotional, and Volitional, and he then subdivides, by clinical peculiarities and mental features of the disease, reflecting the partitions of the human mind regularly established in mental philosophy. The practical delineations of the forms and the versatile style atone for the misconception that a nosology of Insanity can be constructed by the psychological principle alone, or from any one point of view.

The nosological divisions of recent standard writers will now be presented.

The earnest student of mental diseases will nowhere find more general and condensed information than in these classifications of Insanity, representing, as they do, the best efforts of the ablest alienists to portray, with a few strokes of the pen, the salient features of the whole subject.

Bucknill and Tuke, in their "Manual of Psychological Medicine," which is the standard English treatise on Insanity, recognize fully the fact that no complete classification can be made from any one exclusive principle, inasmuch as the mental symptoms are for didactic purposes, at least, the very essence of the disease. The students of the manual are supplied with the following classification of Insanity by Tuke:

Disorders of the Mind.

Class I.—*The Intellect or the Ideas.*

Order 1. Development incomplete.

Idiocy.

Imbecility.

Order 2. Invasion of disease after development.

Dementia.

Delusional Insanity.

Monomania.

Mania.

Class II.—*The Feelings and the Moral Sentiments.*

Order 1. Development Incomplete.

Moral Imbecility.

Order 2. Invasion of disease after development.

Moral Insanity.

Melancholia.
1. Religious.
2. Hypochondriacal.
3. Nostalgic.

Exaltation, regarding
1. Religion.
2. Pride.
3. Vanity.
4. Ambition.

Order 1. General.
Mania.

Order 2. Partial.
Homicidal mania.
Suicidal mania.
Erotomania.
Dipsomania.

Bucknill, viewing the whole question from all standpoints, and with a happy combination of all the principles, has evolved the following classification in which the psychical phenomena form the classes, the pathogenic relations the orders and the genera, and the pathological conditions the species.

1. Melancholia (simple, with excitement, with stupor, alternating with mania).
2. Mania (simple, with depressing emotions, intercurrent with melancholia or with dementia, alternating with sanity).
3. Dementia (simple and primary, consecutive to mania or melancholia, congenital).

1. Simple Insanity. 2. Allied Insanity. 3. Sequential Insanity. 4. Concurrent Insanity. 5. Egressing Insanity. 6. Metastatic Insanity. 7. Climacteric Insanity.

The genera of pathogenetic relations and the species are too numerous to be quoted in full, but they embrace substantially the following points: Heredity, overwork, cerebral injuries, visceral diseases, fevers, cachexias, neurotic affections, epochal crises, influences of the reproductive organs, and hæmic and trophic changes in the general system.

In this nosological attempt Bucknill conceived the true idea,

which is first to make a summation of all the known facts, and then to arrange them in some consistent order, and to allow no clinical truth to be crowded out by fancied logical necessity, or any other preconceived theoretical notion, since the object of any such attempt is not to teach perfect methods of nosology, but to convey complete information about mental diseases.

Ball (1880), in his "Leçons sur les Maladies Mentales," written in a most accomplished style, takes a comprehensive view of mental disorders, as will be seen by a glance at his schematic arrangement here given in full:

Insanities
- 1. Vesanic or essential (without lesion), circular and partial.
- 2. Neuropathic
  - Hysteric.
  - Epileptic.
  - Choreic.
- 3. Diathetic
  - Gouty.
  - Rheumatic.
  - Tubercular.
  - Cancerous.
  - Anæmic.
- 4. Sympathetic
  - Genital.
  - Cardiac.
  - Gastro-intestinal.
  - Pulmonary.
- 5. Toxic
  - Alcoholic.
  - Saturnine.
  - Morphinic.
- 6. Organic or cerebro-spinal
  - General paresis.
  - Aphasia.
  - Delirium acutum.
  - Hemiplegic dementia.
- 7. Congenital or Morphologic
  - Idiocy.
  - Imbecility.
  - Cretinism.

Clouston (1883), following the teachings of his talented master Skae, recognizes the great importance of the etiological factors of Insanity, but he still classifies, by a combined psychological and symptomatological principle, as follows:

1. *States of Mental Depression.—a.* Simple melancholia. *b.* Hypochondriacal melancholia. *c.* Delusional melancholia. *d.* Excited melancholia. *e.* Resistive melancholia. *f.* Convulsive melancholia. *g.* Organic melancholia. *h.* Suicidal, homicidal melancholia.

2. *States of Mental Exaltation.—a.* Simple mania. *b.* Acute mania. *c.* Delusional mania. *d.* Chronic mania. *e.* Ephemeral mania. *f.* Homicidal mania.

3. *States of Regularly Alternating Conditions.*—*a.* Periodic Insanity.

4. *States of Fixed and Limited Delusion.*—*a.* Monomania of pride and grandeur. *b.* Monomania of unseen agency. *c.* Monomania of suspicion.

5. *States of Mental Enfeeblement.*—*a.* Secondary dementia. *b.* Idiocy, imbecility, cretinism. *c.* Senile dementia. *d.* Organic dementia.

6. *States of Mental Stupor.*—*a.* Melancholic stupor. *b.* Anergic stupor. *c.* Secondary stupor.

7. *States of Defective Inhibition.*—Impulsive Insanity, epileptic, sexual, homicidal, suicidal, destructive, dipsomaniac, kleptomaniac impulses.

8. The insane diathesis.

Krafft-Ebing (1883), in his "Lehrbuch der Psychatrie," having scientific methods, and a thorough practical acquaintance with all the facts of mental diseases, made one of the best classifications ever given to the patiently expectant medical world. It is thus worded:

A. Psychical Diseases of the Developed Brain.

I. Psychoneuroses.
  1. Primary curable conditions.
    a. Melancholia.
      (*a*) Melancholia simplex.
      (*b*) Melancholia attonita.
    b. Mania.
      (*a*) Maniacal exaltation.
      (*b*) Acute delirious mania.
    c. Stupor or Curable Dementia.
    d. Hallucinatory Delirium.
  2. Secondary incurable conditions.
    a. Secondary Monomania.
    b. Terminal Dementia.
      (*a*) Agitated Dementia.
      (*b*) Apathetic Dementia.

II. Psychical Degenerations.
  a. Constitutional affective Insanity.
  b. Moral Insanity.

c. Primary monomania.
  (*a*) With primordial delusions of persecution.
  (*b*) With primordial delusions of ambition.
d. Mental disorder with impellent ideas.
e. Insanity sequential of constitutional neuroses.
  (*a*) Epileptic.
  (*b*) Hysteria.
  (*c*) Hypochondriacal.
f. Periodic Insanity.

III. Brain diseases with predominant psychical disturbances.
a. Dementia paralytica. *b.* Lues cerebrales. *c.* Alcoholismus chronicus. *d.* Dementia senilis. *e.* Delirium acutum.

B. Psychical Arrests of Development.

Idiocy and cretinism.

Spitzka (1883), with his wonted quickness of perception, seizes on the psychological, symptomatological, etiological, and pathological principles, and applies them very aptly in this, his classification:

Group First.—Pure Insanities.

Sub-Group A.—Simple Insanity, not essentially the manifestation of a constitutional neurotic condition.

First Class.

1st Division, attacking the individual irrespective of the physiological periods.

Order of primary origin:
Genus 1. Simple mania.
Genus 2. Simple melancholia.
Genus 3. Katatonia.
Genus 4. Transitory frenzy.
Genus 5. Stuporous Insanity.
Genus 6. Primary confusional Insanity.
Genus 7. Primary deterioration.
Genus 8. Secondary confusional Insanity.
Genus 9. Terminal dementia.

2d Division, attacking the individual in connection with developmental or involutional periods.

Genus 10. Senile dementia.
Genus 11. Insanity of pubescence.

Second Class.

With demonstrable active organic changes of the brain.

Genus 12. Paretic dementia.
Genus 13. Syphilitic dementia.
Genus 14. Dementia from coarse brain disease.
Genus 15. Delirium grave.

Sub-Group B.—Constitutional Insanity, the expression of a continuous neurotic condition.

Third Class.

Dependent on the great neuroses.

1st Division. The toxic neuroses.
Genus 16. Alcoholic Insanity.
2d Division. The natural neuroses.
Genus 17. Hysterical Insanity.
Genus 18. Epileptic Insanity.

Fourth Class.

Independent of the neuroses.

Genus 19. Periodical Insanity.
Order: Arrested development.
Genus 20. Idiocy and imbecility.
Genus 21. Cretinism.
Genus 22. Monomania.

Group Second.—Complicating Insanities.

Traumatic, Choreic, Postfebrile, Rheumatic, Gouty, Phthisical, Sympathetic, Pellagrous.

Bevan Lewis (1889) presents mental diseases in a most scientific light, from a pathological point of view by preference, though all the clinical phases of the subject are dealt with in a masterly manner. He treats of Insanity under the following heads:

1. States of Depression. 2. States of Exaltation. 3. Fulmi-

nating Psychoses. 4. States of Mental Enfeeblement. 5. Recurrent Insanity. 6. Epileptic Insanity. 7. General Paralysis of the Insane. 8. Alcoholic Insanity. 9. Insanity at the Periods of Puberty and Adolescence. 10. Insanity at the Puerperal Period. 11. Insanity at the Climacteric Epoch. 12. Senile Insanity.

The International Medical Congress, at Paris, 1889, adopted the following classification of Insanity:

1. Mania (acute delirious mania also). 2. Melancholia. 3. Periodical Insanity. 4. Progressive systematized Insanity. 5. Dementia (Vesanic, organic, senile). 6. General Paralysis. 7. Insanity from neuroses (Hysteria, Epilepsy, and Hypochondriasis). 8. Toxic Insanity. 9. Moral and impulsive Insanity. 10. Idiocy.

This is not complete as a classification of Insanity, but it may be deemed a very useful working formula for grouping patients in the wards of the insane hospitals.

Regis (1891), in his "Manual of Mental Medicine," which teems with modern ideas, gives the following as his classification:

I. Functional Alienations.

Generalized or Symptomatic Insanities.	1. Mania	Subacute mania. Acute mania. Hyperacute mania. Chronic mania. Remittent or intermittent mania.
	2. Melancholia	Subacute melancholia. Acute melancholia. Hyperacute melancholia, with stupor. Chronic melancholia. Remittent or intermittent melancholia.
	3. Insanity of double form.	Continuous. Intermittent.
Partial or Essential Insanities.	Systematized progressive insanity.	First stage—hypochondriacal. Second stage—persecutory, religious, etc. Third stage—ambitious.

II. Constitutional Alienations.

Degeneracies of Evolution.	Disharmonies	Originality; eccentricity.
	Neurasthenics	Fixed ideas; abulias.
	Phrenasthenias	Delusional. Reasoning Insanity; moral Insanity. Instinctive Insanity.
	Monstrosities	Imbecility. Idiocy. Cretinism.
Degeneracies of Involution.	Dementias	Simple dementia.

In this nosology the symptomatological principle is seen to be most skilfully elaborated. Had the other nosological principles been

brought to bear upon the subject with equal originality, the classification would have been extraordinarily successful, instead of only partially complete.

Stearns (1892) regards a complete classification of Insanity in the present state of knowledge as extremely difficult.

He employs the symptomatological and the etiological principles of classification in his tabular presentation of the chief forms of mental diseases, which he divides into two main groups, as follows:

A. Symptomatological.

1. Melancholia. 2. Mania. 3. Primary Delusional Insanity. 4. Folie Circulaire. 5. Dementia.

B. Etiological.

1. Epochal.
   - Insanity of puberty.
   - Climacteric Insanity.
   - Senile Insanity.
2. Sympathetic.
   - Puerperal Insanity.
   - Masturbatic Insanity.
   - Ovarian Insanity.
3. Toxic.
   - Alcoholic Insanity.
   - Syphilitic Insanity.
4. Neuropathic.
   - Epileptic Insanity.
   - Hysterical Insanity.
5. Pathological.
   - General Paralysis.
   - Insanity from coarse brain disease.
   - Acute Delirium (Typhomania).
6. Other less frequent genera and species.
   - Phthisical Insanity.
   - Rheumatic Insanity.
   - Postfebrile Insanity.

The descriptions of the clinical forms are written with the truthful assurance of one long familiar, by actual observation, with the

diversified phases of every type of mental disease, and they are pleasurable reading to one likewise versed in clinical minutiæ.

Ziehen (1894), a very competent writer, after much consideration, concludes, finally, that the nosology of Insanity is best accomplished by a combination of the psychological and the symptomatological principles. He bases his chief division, therefore, on the clinical and psychical fact that some cases present disturbances of the intellectual faculties from the very first, while in other cases the intellect is not thus involved. His classification is as follows:

I. *Psychoses Without Intellectual Defect.*

A. Simple Psychoses: A single chief stadium.
   1. *Affective Psychoses.*—Primary chief symptoms in the emotional domain.
      a. Mania.
      b. Melancholia.
      c. Neurasthenia.
   2. *Intellectual Psychoses.*—Primary chief symptoms in the intellectual domain.
      a. Primary Dementia.
      b. Paranoia.
         (*a*) Paranoia simplex.
         (*b*) Paranoia hallucinatoria.
         (*c*) Flighty and changeable form.
         (*d*) Stuporous form.
         (*e*) Incoherent form.
      c. Insanity with impellent ideas.
B. Compound Psychoses, several chief stadia.

II. *Psychoses With Intellectual Defect.*

A. Congenital mental weakness.
   a. Idiocy.
   b. Imbecility.
   c. Feeble-mindedness.
B. Acquired mental weakness or dementia.
   a. Dementia paralytica.
   b. Dementia senilis.
   c. Dementia secondary to functional psychoses.

d. Dementia secondary to focal brain diseases.
e. Dementia epileptica.
f. Dementia alcoholica.

Sohmer (1894), on the other hand, resorts exclusively to the anatomical and pathological principle of division.

He claims that mental affections are simply diseases of the nervous system, and that there is a perfectly plain ground for their classification into those which have, and into those which have not, demonstrable lesions of nervous tissues. His nosology, in keeping with this anatomo-pathological idea, is the following:

I. *Mental Diseases With Demonstrable Lesions of Brain Substance.*

A. With anatomical and morphological demonstrable lesions.

General paralysis, cerebral tumor, senile atrophy, microcephaly, porencephaly, cretinism.

B. With chemically occasioned lesions:

a. Insanity from alcohol, morphia, cocaine, hydrophobic virus, auto-intoxication, and myxœdema.
b. Infection-deliria from typhus fever, erysipelas, and acute inflammatory rheumatism.

II. *Mental Diseases Without Demonstrable Lesions of Brain Substance.*

a. Epileptic, hysteric, hypnotic, melancholia, mania, hallucinatory delirium, hallucinatory delusional Insanity, katatonia.
b. Degenerative forms:
1. Congenital feeble-mindedness.
2. Congenital partial moral defect.
3. Primary mental weakness.
4. Periodic Insanity.
5. Original monomania (paranoia).
6. Paranoia tarda.
7. Hypochondriasis.
8. Impellent ideas.

Thus, at no small expense of patient endeavor, the chief classifications of writers on mental diseases have been reproduced, and commented upon for the information of the reader, who has been

made acquainted with the principles applicable in the nosology of Insanity, and with the manner in which they have been employed by the best authors, and also with the inherent difficulties of the whole subject, and there only remains a final topic to complete this chapter.

The author's classification of Insanity, and the reasons for the same, will now be given to conclude the subject.

The physician, in his practical dealings with cases of mental disease in hospitals or in private practice, when the fact of Insanity is once established, seeks first and most eagerly for the *causes* of the disease, knowing that they will most aid him in the understanding and in the treatment of the case.

He directs his inquiries somewhat in the following order: He first desires to know whether there has been congenital defect or early acquired mental weakness, or whether there is native singularity and distinct hereditary tendency to Insanity; whether there has been anything like chorea, hysteria, epilepsy, or other neuroses; and, receiving only a negative answer to these questions, he still continues his search for causes, seeking to know if the mental disorder might not arise in connection with puberty, menopause, or senility, according to the age of the patient: or whether it might have sprung from fevers, syphilis, consumption, gout, rheumatism, or from some excess in the use of alcohol or opium, or from accidental poisoning, or severe falls, or blows on the head. If these inquiries bring him no positive information, he turns his search for causation in another direction, and tries to learn whether there has been worry and mental strain, domestic unhappiness, business losses, grief from death in the family, great disappointments or sudden shocks from fright, or other moral cause for the Insanity. Now this line of inquiries is perfectly natural, and is a scientific procedure on the part of the physician, who, as soon as he finds a definite and decided cause for the mental disorder, at once assigns it a clinical position in the category of mental diseases and proceeds to treat it accordingly. In other words, the etiological principle is the one in general use and most esteemed in actual daily practice by physicians, and it is here given a foremost position in the clinical arrangement of the different types of mental disorder.

But, to observe the skilful physician still further, when he fails to find in the history any definite cause, it will be seen that he next resorts to scientific research and personal examination of the patient

with instruments of precision, to determine pathological conditions of the brain, spine, vasomotor or peripheral nervous system, and, having discovered organic disease to account for the mental disturbance, he classifies and treats it on pathological grounds.

Such is the difficulty of exact diagnosis, however, that the pathological principle, though first in point of actual science, is here accorded a secondary position in the nosological arrangement, since it only admits of occasional application.

But, to take the clinical expert in mental diseases as a mentor once more, it will be found that when the etiological and pathological principles fail him completely and he can find neither bodily nor mental causes, nor a pathological state of the nervous system, by which to class the Insanity, he then makes a careful study of the nature and course of the mental symptoms, and he classifies and treats the patient solely on symptomatic lines.

Here, then, is the third or symptomatological principle as it occurs in regular order in the nosology of Insanity about to be given. This classification is drawn on the identical clinical lines above traced, and in keeping with the principles mentioned, and it is practical for everyday use, and sufficiently complete to include every case that the student or practitioner will ever meet. Class I. corresponds to the physician's inquiry for congenital defects. Class II. answers to the question about degenerate eccentricity and hereditary taint. Class III. responds to the clinical query as to actually developed neuroses. Class IV. embraces a reply to the examining physician as to the physiological crises. Class V. contains such farther causes as the clinical expert naturally seeks as a means by which to class and treat his patients. Class VI. is the pathological order in which the clinician sometimes classes his cases by precise scientific diagnosis. Class VII. contains Insanity from psychical causes, to which the practitioner refers some of his cases, and the remaining classes are symptomatological, and furnish a natural means of classification to the physician when, in any particular case, he finds that the etiological and pathological factors are not to be discovered or assigned.

In one word, insane patients are classed in this nosology, first, by bodily and mental causes; second, by the exact nature of the physical morbid process underlying the Insanity, and, third, by the form of the mental symptoms. The facts included in the nosology are necessarily numerous, but they are grouped by the above simple

principles, as will be seen by a moment's study of the different classes.

The natural history method of subdivision is employed as the most convenient means of clearly indicating certain natural affiliations and subordinate relations in the classes, orders, and genera. There is no failure to recognize the difference in the nature of the material with which natural science and mental science has to deal. Pathological mental phenomena, however, are based on changes in physical structures, and they are often not more variable than changes manifested in lower types of animal organisms, and in some regards the laws of the human mind are as immutable as those of natural science, and admit of an equally clear classification.

To proceed, then, to a somewhat broader and more scientific explanation of the nosology here given, it will be noted that there are two main groups. Group A is made in accordance with the etiological and pathological principles, and it is hence briefly defined as etio-pathological, and as having definite assignable etiological and pathological relations.

Group B, on the contrary, consists of the simple psychoses, without definite assignable etiological and pathological relations, and hence classifiable by the psychical symptoms alone, and hence the group is briefly denominated " psycho-symptomatological."

In Group A, by the application of the etiological principle, the lines of division of the classes are caused by organic arrest of development, by constitutional neuropathic states ordinarily hereditary, though occasionally acquired by the established neuroses, by the physiological crises, by general systemic morbid states, either toxic or diathetic, and, finally, by the direct action of powerful psychical causes; and through the use of the pathological principle there appears a class with definite pathological conditions of the encephalo-spinal, vasomotor, or peripheral nervous system.

In Group B, by the symptomatological principle, the classes, based on the fundamental division of the human mind into feeling, intellect, and will, are subdivided in accordance with the universally admitted states of depression, states of exaltation, and states of weakness, and the only farther distinction made is as to whether these states are primary or secondary in origin.

Here, then, is a systematic nosology drawn on practical and natural clinical lines, utilizing, primarily, the etiology and the pathology, and secondarily the mental symptomatology of Insanity for the

purpose of the subdivisions of the various classes. It serves to show the relations between different orders of facts, and that is the object of all classification, which is necessarily more or less artificial; for, in nature there are nowhere hard and fast lines of division, but everything merges, by the most gradual evolution, into something else by such gentle transitions that no lines of division are anywhere perceptible. This is no less true in the animal and vegetable kingdoms than in the domain of human mental diseases.

With these preliminary remarks the classification is now given and commended to the careful consideration of the reader.

Classification of Insanity.

Group A. (*Etio-pathological.*)

With Definitely Assignable Etiological and Pathological Relations.

- **Class I. From general organic arrest of development.**
  - Order 1. Idiocy.
  - Order 2. Cretinism.
  - Order 3. Imbecility.
- **Class II. Emerging from constitutional neuropathic states, usually hereditary, though occasionally acquired.**
  - Order 4. Instinctive Insanity of childhood.
  - Order 5. Primary monomania.
  - Order 6. Moral Insanity.
  - Order 7. Periodical Insanity.
- **Class III. With established neuroses.**
  - Order 8. Epileptic Insanity.
  - Order 9. Hysterical Insanity.
  - Order 10. Hypochondriacal Insanity.
  - Order 11. Choreic Insanity.
  - Order 12. Neurasthenic Insanity.
- **Class IV. In connection with the physiological crises.**
  - Order 13. Pubescent Insanity.
  - Order 14. Puerperal Insanity.
  - Order 15. Climacteric Insanity.
  - Order 16. Senile Insanity.
- **Class V. With general systemic morbid states.**
  - Order 17. Toxic
    - Genus 1. Alcoholism.
    - Genus 2. Morphinism.
    - Genus 3. Plumbism.
    - Genus 4. Hydrargyrism.
    - Genus 5. Oxy-carbonism.
    - Genus 6. Cocainism.
    - Genus 7. Bromidism.
    - Genus 8. Etherism.
    - Genus 9. Chloroformism.
    - Genus 10. Chloralism.
    - Genus 11. Nicotinism.
    - Genus 12. Auto-intoxications.
    - Genus 13. Lyssa humana.
    - Genus 14. Infectious diseases.
  - Order 18. Diathetic
    - Genus 15. Phthisical.
    - Genus 16. Cancerous.
    - Genus 17. Podagrous.
    - Genus 18. Rheumatic.
    - Genus 19. Pellagrous.
    - Genus 20. Limopsoitosic.
    - Genus 21. Malarious.
    - Genus 22. Anæmic.
    - Genus 23. Post-febrile.
    - Genus 24. Myxœdematous.

- Class VI. With definite pathological conditions of the encephalo-spinal, vasomotor, or peripheral nervous system.
  - Order 19. With organic lesions of cerebral tissues.
    - Genus 25. General paresis.
    - Genus 26. Syphilitic Insanity.
    - Genus 27. Organic dementia.
    - Genus 28. Typhomania.
    - Genus 29. Traumatic Insanity.
  - Order 20. With lesions of the vasomotor and peripheral nervous system.
    - Genus 30. Sympathetic Insanity.
- Class VII. From pathological psychic influences.
  - Order 21. Psycho-traumatic Insanity.

Group B. The Psychoses (Psycho-symptomatological).

Without Definitely Assignable Etiological and Pathological Relations.

- Class VIII. Emotional.
  - Order 22. States of depression.
    - Genera primary ..
      - 31. Cœnæsthetic depression.
      - 32. Melancholia simplex.
      - 33. Melancholia agitata.
    - Genera secondary.
      - 34. Melancholia chronica.
      - 35. Secondary monomauia with depression.
  - Order 23. States of exaltation.
    - Genera primary ..
      - 36. Cœnæsthetic exaltation.
      - 37. Mania simplex.
      - 38. Mania transitoria.
    - Genera secondary.
      - 39. Mania chronica.
      - 40. Secondary monomania with exaltation.
- Class IX. Intellectual.
  - Order 24. States of weakness.
    - Genus primary ...
      - 41. Primary mental enfeeblement.
    - Genus secondary..
      - 42. Terminal dementia.
  - Order 25. States of stupor.
    - Genus primary ...
      - 43. Acute primary dementia.
    - Genus secondary..
      - 44. Sequential stupor.
- Class X. Volitional....
  - Order 26. Impaired volition.
    - Genus primary ..
      - 45. Abulic Insanity.
  - Order 27. Suspended volition.
    - Genus primary ...
      - 46. Somnambulistic Insanity.

In regard to the nomenclature of the classification, a word may be said to advantage. Words, of course, are only signs of ideas, but they are accustomed signs, and for that very reason they should not be changed without good reason when they have once passed into general use and been accepted as technical labels in special branches of science. No innovations have been made, therefore, but the terms in current use have been continued, and a new designation has only been employed in one or two acute and chronic types of Insanity to mark distinctions not already clearly made.

In the second or clinical part of this treatise all the typical forms of Insanity named in this classification will be separately described, and it is only deemed necessary here to define the main feat-

ures of the generic types and the reasons for their relative positions in this nosology.

The main grounds of the first division into the two groups have already been mentioned. Group A contains the degenerative and hereditary forms of Insanity and all such as have a definite and assignable etiology and pathology. Group B represents the simple psychoses, without degenerative type or hereditary form, and having no assignable pathological basis, and also having no direct derivative relation to other separately existing diseases of the nervous system, or to any established neurosis. Some authors, considering simple Insanity of the character here described as a neurosis, have applied the term "psychoneuroses" to these simple psychoses. It is important to grasp the clinical idea, but the terminology is a matter of little importance, for, as a matter of fact, all Insanity may be considered to be a neurosis, and properly to be classed among the neuroses.

In order to further unfold the rational method in accordance with which this nosological system was constructed, let a moment's explanation be given in regular order to each of the classes with its subdivisions. Class I. is characterized by general organic arrest of development of mind and body. It represents, in the highest degree, degenerate types and congenital defects. Between the lowest idiocy and the slightest imbecility there is a sliding scale of intelligence, with every conceivable degree of mental defect actually illustrated in different patients. Nor does this gradation of intelligence stop with imbecility, for, between a person distinctly imbecile and an individual of average mental ability, there are to be sometimes seen those of only intermediate intelligence, sometimes spoken of as feeble-minded. To avoid unnecessary terms and limit their number when possible, the feeble-minded are here included under imbecility, which is extended to embrace all beneath the average of intelligence. Cretins, who, as a rule, are the endemic hereditary victims of unfortunate elemental conditions of earth, air, and water, are more nearly allied to idiots than to imbeciles, though the pathology of their affection is not that of ordinary idiocy, and they are here classed intermediately between idiots and imbeciles. Class II. comprises forms of mental disease which emerge from constitutional neuropathic states usually hereditary, though occasionally acquired. The degeneracy is not necessarily structural, and it is often only functionally manifested, and to be traced as hereditary

taint in the history of the patient. The stronger the degenerate taint, the earlier it is apt to reveal itself, and hence the "Instinctive Insanity of childhood" is placed in sequence next to the generic types of the first class. Next in order of constitutional heredity is primary monomania, which is synonymous here with original monomania, or paranoia, as it is more commonly, but less properly, termed.

Moral Insanity comes next in this degenerate class, for, although it raises a vexed question, it has been admitted on the ground previously indicated, that no type encountered in actual clinical practice is to be excluded on theoretical considerations.

Periodical Insanity is the final type in this class, and in it the constitutional neuropathic state is revealed intermittently as aberration of mind.

Class III. is a division based upon the established neuroses. It is one of the degenerative classes, and in it are mentioned neuroses most nearly allied to mental alienation, and later it will be explained, in the clinical part of this work, how vicarious transformation between Insanity and these neuroses actually occurs.

Class IV. is the final distinctly degenerative class, and it contains types in which the mental aberration only appears when the organism is undergoing evolutional or involutional changes, or passing through some crisis, during which the inherited instability reveals itself. Attention is here called to the methodical foresight in this nosological system, by which the degenerative types are given a foremost place, such as they occupy in clinical observation, and that not only the first four classes, but the genera contained therein, are arranged in the order of the prevailing degeneracy or hereditary taint, which diminishes gradatim from the first genus of the first class to the last genus of the fourth class, now under consideration. Any exception to this which may be occasionally met will only serve to prove the rule, which will always hold good when applied to numbers of cases. With this fourth class is exhausted, as a basis of division, the transmitted, degenerative instability of nervous centres, and some other etiological principle of wide application is next sought and found in general systemic morbid states, such as appear in the next class.

Class V. is replete with toxic and diathetic states, accompanied by mental disorder. The writer was among the first, in a monograph published some years ago, to call attention to the toxic origin of

Insanity. At that time it was his impression, from the observation of more than five thousand cases of Insanity that had come under his personal charge, that something more than thirty per cent. were toxic or diathetic in origin. It is now believed that this source of Insanity was underestimated, and that a much larger percentage of cases than that then stated will be found to be classifiable under this head.

With the genera in the first five classes of this nosology once assigned to their respective positions, the value of the etiological principle in classification is chiefly exhausted, and the pathological principle is then brought into use as it here appears in the following class:

Class VI. is the pathological group, with organic lesions of cerebral, and often of spinal, centres, or of the vasomotor and peripheral nervous system. The psychic scourges of mankind, general paresis and syphilitic Insanity, are in this class, and organic dementia, into which some of the brightest minds the world has ever known have finally sunk, and typhomania, which, by the Continental writers more especially, is termed delirium acutum, but, as Dr. Luther Bell first described it in 1844 and called it typhomania, the original name is preserved. Sympathetic Insanity is here more limited than the term as used by many German writers, as will be described later.

Class VII. shows a final application of the etiological principle to include the psychical causes of Insanity. The injury inflicted by repeated mental shocks is here justly classed in the category of psychic traumatism, which it virtually is, and it is sometimes followed by actual lesions of nervous tissues, which in this sense are traumatic in origin.

Group B having no definite pathological basis, and being drawn on psycho-symptomatological lines, it was necessary that the delimitation of the classes should be in accordance with some comprehensive and established division of the human mind, and the one adopted is probably more universal in character than any other.

Class VIII. is composed of orders of mental disease characterized by depression or exaltation of feeling, which constitutes a continuous fundamental tone. The genus termed cœnæsthetic depression, and also that called cœnæsthetic exaltation are important innovations to denote an initiatory form of mental disease first described by the writer. The genera in this class are both primary and sec-

ondary as regards their mode of origin. The inclusion of mania transitoria in this class is open to criticism, if the etiology of the affection is, as some suppose, uniformly epileptic. Of this something will be said when this form is clinically described.

Secondary monomania with depression, and secondary monomania with exaltation, are forms of chronic Insanity described some years ago by the writer. They are distinct clinical types which had previously been merged indiscriminately in chronic mania or dementia. They are not to be confounded with secondary forms of paranoia, and they will be fully written about in the second part of this book, along with the other typical forms.

Class IX. is subdivided into general states of weakness and states of stupor. The genus "Primary mental enfeeblement" is admittedly very rare, but it is the professed object of a classification to provide a place for every distinct type, and hence the provision for this form.

The states of stupor are of great importance, and other forms might have been admitted, but they can all be classed without any undue straining of clinical points under the two genera here named, as it is best, so far as possible, to limit the terminology of Insanity.

Class X. contains mental alienations in which the volitional activities are especially involved. The admission of "Abulic Insanity" is open to discussion, in the opinion of some alienists, but, as it is only possible to judge of mind, either in health or disease, by outward manifestations, this type, which corresponds to the morbid psychical symptoms sometimes seen in actual practice among the insane, is here classed separately.

Somnambulistic Insanity, too, is a rare form, but it has forensic importance, as crimes have been committed not infrequently by patients in pathological sleep-states, while the volitional energies were completely suspended. This final genus of this classification provides that such criminal cases, whose highest form of mental energy, the will itself, is in complete abeyance, are to be classed as in a state of Insanity none the less real because transitory.

The objections which may be urged against this classification will not be anticipated, nor answered in advance, as they are just such as in the present state of knowledge may be made against all the nosologies of Insanity that have been or are to be constructed. It would not have been difficult to formulate a more highly philosophic scheme of classification—one with a greater display of scien-

tific facts, and perhaps fewer vulnerable points of criticism—but it would not have had the value of the present one for clinical working purposes. The theoretical perfection of a classification is no test of its real worth. All classifications in every branch of knowledge are artificial, and in themselves of no inherent value, merely serving as a means to an end, as provisional arrangements of facts, and as working formulæ, to be changed as often as the evolution of science demands it. The Linnæan system was a revelation to the scientific world, and of incomputable value to workers in all branches of natural science, but it was by no means perfect as a system of nosology. Linnæus elaborated a nosology of mental diseases with great success, considering the material out of which he had to construct it. He was practically without any etiological and pathological facts, and his chief divisions, "Ideales, Imaginarii, and Pathetici," were subdivided and complexly compounded by refined metaphysical and psychological distinctions, such as have usually formed the "stock in trade" of metaphysicians in all ages of the world.

In concluding this chapter on classification, it may be well to state what facts are actually still needed for the construction of a rational and complete nosology of Insanity, and to suggest such lines of medical research and of clinical inquiry as in time may, if assiduously pursued, lead to the acquisition of at least some of these needed facts.

It is to be granted as sufficiently proven that the brain is essentially the organ of the mind, though it is also highly probable that the whole nervous system is subservient, to some degree, in the same functional direction. If, then, the cerebral structures are the physical mechanism of mind, the first needed facts are the minute details of the component parts of this thinking machine—the anatomical facts, in other words, which correspond to the physiological mental functions. When the methods of Golgi and Cajal, of Dejerine and Retzius, and a hundred others still more perfect, shall have evolved, in the distant future, the complete microscopical anatomy of cerebral structures as they exist in health, and when experimental physiology shall have connected with these structures the correlative psychical functions as they exist in health, two important kinds of facts now needed will have been supplied. The morphological facts, however, must extend beyond those supplied by microscopical research, and must embrace all those to be discovered by a perfected physiological chemistry, which will eventually reveal the complex

biochemical changes of tissues through which nervous energy is simultaneously transformed and conserved.

With all the needed facts to be supplied by applied microscopical anatomy, biochemistry, and mental physiology, the first scientific step will have been taken in the true knowledge of mind as based on material structures in health. Then another class of facts will be required of a pathological nature, and an independent order of clinical observations must be recorded before positive inferences can be drawn as to the actual nature of Insanity.

The changes which these nervous structures undergo in disease, and the corresponding alterations in mental functions, as seen in mental disorders—facts to be supplied by a new pathological anatomy and a new mental pathology—are the additional classes of data to be sought by the following generations of students of mental science before a truly scientific nosology of Insanity can be constructed.

In the meantime, as the skilled natural scientist infers correctly the unknown from the known, and arrives at many things from a few definite things, or, as the zoölogist reconstructs an extinct species out of the partial discovery of its geological remains and assigns it a relative position on the scale of animal intelligence, so the mental scientist, by inferential methods, must for the present be satisfied to infer mental functions from partial knowledge of actual physical structures, and he must "learn to labor and to wait." A vast amount of labor essential to the evolution of psychiatric science must be performed in the field of clinical research, which has never been thoroughly cultivated by alienists, who have been over-occupied by routine duties. Many of the psychic phenomena, and almost all of the somatic symptoms, have yet to be scientifically studied. The blood and the urine and all the secretions and excretions must be analyzed exhaustively in large numbers of cases of the various types of insanity in like stadia of the disease. The whole question of toxic and auto-toxic Insanity presents an immense field for chemical research. The modifications of all the physiological functions in mental disease are yet to be studied. The application of instruments of precision to the exact determination of the accompanying neurological affections of Insanity has still to be performed and recorded.

Even the gross disorders of the muscular system, and of the special mechanisms of speech and gait, have only been partially ana-

lyzed, and the perversions of the functions of the special senses in mental disease, if properly investigated by psycho-physical and psychometrical research, would yield data of the utmost value.

The intercurrent affections of all the internal viscera, some of which bear direct relations to the Insanity, are yet to be investigated.

The causative relations of the diathesis to the psychoses have never been a subject of extended rational inquiry.

The pathogenetic relations of vasomotor disturbances to mental disease have only just begun to receive due notice, and the changes in intravascular blood-pressure and sphygmographic variations in large numbers of cases in the various phases of Insanity are yet to be duly recorded.

A thoroughly reliable and scientific system of statistics in all branches of the clinical study of mental diseases has yet to be devised, and reliable statistical data in all the lines of medical inquiry above indicated have yet to be made.

Such, then, are the scientific foundations still to be laid, and such is the material still needed by the medical architect who would build a nosological superstructure, with appropriate compartments for every order of psychiatric facts, which are all to be labelled by a complete terminology and confirmed by the logic of figures and by a perfect system of statistical records.

Let the student of psychiatric nosology not be discouraged, for the light of coming knowledge already illumines the darkness which surrounds some points of mental pathology.

CHAPTER IV.

THE ETIOLOGY OF INSANITY.

Insanity, when traced to such final causes as are best known to science, is a disease of the nervous system, and it is to be classed among the neuroses. Hence it is, from the broadest point of view, that all those thermal, chemical, mechanical, and perverted biological influences which are active in the production of general diseases of the nervous system are those most fundamentally involved in the causation of Insanity.

The chief customary division of the etiology of Insanity into *predisposing and exciting causes* is convenient for descriptive purposes, though, as a logical matter, the two classes of causes are sometimes interchangeable, or blend in the same case inseparably, or are to such a degree interdependent that they can hardly be said to have a separate existence. As a clinical fact, also, Insanity is usually the result of a series of causes, which may act sequentially or simultaneously, and in contributive degrees not to be ascertained by even the most careful subsequent study of the case.

Predisposing Causes.

The *predisposing causes*, or those conditions, internal or external, which favor, without actually causing, the development of Insanity, will first receive attention. Heredity, as the chief predisposing cause, will be considered at some length under the next heading, and there will first be noticed the following *predisposing circumstances.*

The consanguinity of parents is generally deemed a circumstance predisposing to deterioration in the offspring. This opinion has prevailed from the earliest times, and both the Mosaic and the Roman law forbade marriages of certain degrees of consanguinity, as does at the present day the legislation of most civilized countries. Pop-

ular prejudice in this regard is not based on instinctive repugnance alone, and there is doubtless some good reason to be found in the nature of the results themselves that consanguineous marriages should be discouraged. Defects of the special senses and intellectual deteriorations have resulted from such unions so frequently that it has become a medical dictum that they are to be forbidden. The experience of the breeders of animals is that "inbreeding," if carried too far, results in loss of stamina, and finally in practical extinction of all the finer traits of the race. The intermarriage in English and European aristocracies has afforded numerous instances of resulting deteriorations, and like examples are also to be found in the history of the Jewish people.

On the other hand, the law of physical inheritance is that the qualities of the parents, when alike, are intensified in the offspring. Theoretically, therefore, the sound bodily constitutions of two vigorous and nearly related parents should be transmitted with double certainty to the offspring, and doubtless this is practically the result in the majority of instances.

It would not be a logical inference from this that a uniformly good result would follow the marriage of two first cousins free from all known tendencies to disease as regards the common family, as decided neurotic taint of like kind might perchance exist in the separate families, and might be inherited by the children in intensified form. Near relatives, also, when married, may be in perfect physical condition, but they are more apt than those not related to become affected with like diseases during life, and to transmit, with increased probability, the greater tendency to the same to their children.

All things considered, there is no doubt that consanguineous marriages between those as nearly related as cousins of the first degree favor the direct transmission of a heightened tendency to neurotic family traits, and that such marriages should be discouraged by the physician as often as positive instances of Insanity have been known to exist in the common family of either of the contracting parties. The arithmetical insignificance of consanguinity of parents as a predisposing cause of Insanity may be surmised from the fact that in this country, with its floating and heterogeneous population, there are relatively fewer intermarriages than in old and permanently located communities, as in England, for instance, where it has been estimated that not more than three or four per cent. of

the marriages are consanguineous, and hence, judged by the law of chances, the actual proportion of cases of mental disease from this source would be very small.

Civilization is to be numbered among the circumstances predisposing to Insanity.

So far as any reliable information is to be had, it appears that Insanity increases as man departs from the savage and semi-civilized states and approaches the highest civilization.

The brain of the savage is a psychical organ of primitive simplicity, responding to sensorial stimuli, and moved by few emotions, which spring chiefly from animal instincts. There are no pent-up mental energies, since, as fast as generated, they find a ready exit through muscular action, and tension of mind is thus avoided. The daily wants of the man are simple and easily gratified, and nature is not cheated of her own demands, and, as night comes on, the child of nature sinks upon the bosom of Mother Earth in sweet and natural slumber, during which there is a perfect restitution of brain forces, and successive days are but the prolonged satisfaction of the natural needs of a healthy organism.

On the other hand, the brain of the highly civilized man is an exceedingly complex instrument, and as such liable to derangement. It differs structurally, as well as functionally, from that of the savage. It generates more highly specialized energies, and it is surcharged from earliest childhood with an ever-increasing burden of knowledge, and it is played upon by a thousand stimuli unknown to the savage, and it acts and reacts to environmental influences innumerable times more frequently in the course of the day, and, as night comes on, continued unconscious cerebration prevents its perfect reparation during sleep. The highly civilized man lives in a state of compound thoughts and emotions, provoked by the necessity of rapid and varied adjustments to most complicated environments, and every day evolves a host of petty battles, which have to be planned and fought out to complete success or defeat, and each successive morrow brings but the renewal of the campaign. The tension of mind is continuous, wants are many and ungratified, artificial desires multiply, ambition fires the overworked brain, and the eager hand reaches to grasp the prize which is plucked away by some other one of the numerous competitors, and bitter disappointment is added to mental overwork and nervous strain.

It has been argued that the increase of Insanity in civilized com-

munities is due largely to the fact that there is a more complete enumeration of cases, that better methods of care prolong the lives of patients and lead to a gradual accumulation of the same, and that the increased confidence of the people in institutions for the insane has brought to light many cases formerly hidden from statistical notice.

According due weight to these arguments, it is still an unquestioned fact that there is a marked increase of mental diseases attendant upon civilization, which, if more closely studied as a predisposing cause, resolves itself into a series of somewhat widely differing questions, which will now be cursorily reviewed.

In the first place, civilization implies the massing of people in large cities and all the hygienic abominations resulting therefrom. Immense numbers of poor people live in crowded and badly ventilated apartments, many in damp and malarious underground rooms, and it is the exception that even the middle classes have well-ventilated dwellings. The well-to-do class abandons the overheated and mephitic air of the city in summer, but the masses must endure the debilitating atmosphere and the reeking odors of superficial drainage and decomposing garbage. In winter the same class suffers from cold and from want of fuel and clothing. It is not alone the filth and squalor of the dwelling, but it is the lack of food, which is defective both in quantity and quality, which predisposes to physical and mental disease.

Then, again, this overcrowding leads to petty miseries and personal discomforts, to humiliating and demoralizing influences in adults, and to the contamination of children, and successive generations bred in this way cannot escape degeneration of body and mind.

But there is another attendant evil of civilization which is worse than poverty, and that is crime, which bears a most intimate relation to Insanity. When the conditions of life become extremely complex, and the highest forms of self-control and prolonged efforts are essential for success, there will always be numbers of unfortunate ones who will not or cannot conform to them, and they will necessarily sink into poverty or drift into crime. In fixing a high standard and in forcing the pace of civilization, society may thus be said to make her own paupers, lunatics, and criminals. Possibly, when a more perfect height of culture and wisdom shall have been attained, these dismal failures may be avoided, but, in the present

state of sociological science, no remedy is known, and the evolution of the many seems to proceed at the expense of those who are physically, mentally, or morally incapable of elevation to that higher plane of existence termed civilized life.

The question of *age* as a predisposing circumstance is one to be determined largely by statistical inquiry. Taking the figures of hospitals for the insane, it will be found that Insanity is relatively rare in childhood and old age, and that the greatest number of patients are attacked during adult life. The decade of the maximum frequency of Insanity, procured by comparing the number of those attacked at a given age with the total number of those in the general population of the same age, varies somewhat in different countries, and, while it falls between twenty and thirty years in this country, it is found between thirty and forty years in England.

Facts which will be adduced in the clinical part of this work to show the large amount of mental disease unrecognized as such in children would tend to fix the maximum decade of the frequency of the occurrence of Insanity at a still earlier period than the one here named, and, on the contrary, the fact that the age of admission to hospitals to the insane is, on the average, later than the actual age of the attack, would, if given due weight, advance the period of maximum frequency. The general pathological law is that the mind is most subject to derangement during the period of its greatest functional activity, and in those having a distinct neurotic taint this period occurs earlier than in those free from all hereditary degeneracy, and it is also found at an earlier average age in women than in men.

Sex, as a predisposing cause of mental disease, has been discussed with divergent views by different authors, who have held, sometimes, that men, and at other times that women, were more disposed to become insane. Formerly, more men than women were found in hospitals for the insane, but now there is not much difference in the sexes in this regard. It is probable that men are more exposed to hardships and bodily injuries, to syphilis and alcoholic excess, and that more of them suffer some mental disturbance, but that women, as inmates of hospitals for the insane, have a lower rate of mortality and tend to accumulate. In short, it would appear that more men the world over are attacked and die, and that, of the fewer women attacked, more survived a longer period in hospitals for the insane, and that the residuum of the two sexes will be about

equal. With a general population presenting no special disparity in the original number of men and women, it would be expected that the above rule would apply to special communities when sufficiently large numbers are considered.

Civil condition, in its relation to Insanity, is another mooted question. It appears, from figures gathered on this point, that more single than married persons become inmates of asylums, in proportion to the number in the general population, and the natural inference is that celibacy predisposes to Insanity. It is just possible, as the majority of asylum admissions are from the poor classes, that single persons, having no one to care for them and no homes of their own, would be sent to asylums more invariably than married persons, who might be cared for during brief attacks by husband, wife, or children in their own homes. Then, again, the stronger and more capable, as a rule, would be more likely to assume the responsibilities of married life, which impecunious or sickly, incompetent or dissipated persons, who are already tending to Insanity, would naturally avoid. For woman, who has so few agreeable possibilities in life outside of marriage, which brings her the surety of a permanent home and the only environment for which nature has physically and mentally endowed her, it would seem that celibacy might be an evident predisposing cause of Insanity. But for man, whose natural sphere of action is the outside world, and whose every wish and ambition can best be attained when he runs the race of life free of all encumbrances, it is difficult to conceive that celibacy, *per se,* should constitute a predisposing cause of Insanity.

Occupation sometimes favors the development of mental disease to a very marked degree.

The army and the navy contribute more than the average quota to the numbers of the insane in all civilized countries. Some of the influences which are most injurious in the lives of soldiers and sailors are physical exposures and hardships, insufficient quantity or variety of food, alcoholic and sexual excesses, malarious, luetic, and traumatic affections, separation from home and relatives, death of comrades, capture or imprisonment, and, on the part of officers, great responsibilities in time of war and idleness and disappointed ambitions in time of peace.

Then, again, there are occupations which are inseparable from influences directly deleterious to nervous centres. Some of those who follow these occupations are exposed continuously to a high

degree of heat, and others to metallic poisoning, and still others to the inhalation of noxious gases or a dust and germ laden air, and there results not infrequently ill health, nervous disease, or mental disorder. Other occupations, less unhealthful in themselves, favor nervous and mental disease on account of the tender age and the long hours of work of those employed, and it has been found necessary to legislate against prolonged hours of labor for young children.

The broad question as to whether those engaged in agricultural pursuits are more subject to Insanity than those occupied in large cities has been decided, seemingly, by English statistics showing a considerably larger percentage of mental disease in agricultural populations. The fallacy lies in the fact that the figures were made from those living in comparative poverty, such as exists in certain rural districts of England and Ireland, and a very different result would be obtained from the tabulation of the facts as they exist among farmers in this country, or even the French peasantry, which is much more prosperous than the English tenantry in their mode of life.

Another wide question, as to whether brain-workers are more subject to mental disease than those engaged in manual occupations, may receive a general affirmative answer. The learned professions seem to contribute more than their proportionate share of cases, and physicians, lawyers, and clergymen, about in the order named, make frequent additions to the ranks of the mentally afflicted.

There are other callings which involve an intensification of the imagination and of the emotions at short and daily recurring intervals, which, in the long run, notably generate nervous, psychic instability, and there is undoubtedly, among artists and actors, an unusual amount of mental alienation. Musicians often present a nervous and emotional erethism, which passes into a distinctly pathological mental trouble in many instances.

In vocalists and players upon wind instruments, the inhibition of normal respiration and hyperæmic cerebral conditions thus induced, with sudden fluctuations in cerebral blood-pressure, bear causative relations to the resulting nervous troubles which are sometimes manifested as pneumogastric disorders. In pianists who practise long hours daily, and in other kinds of musicians, there is also fixation of respiratory muscles on execution of difficult passages, and, through vibration, the nervous centres would seem to suffer

a species of mechanical traumatism, which may become as real as a "railway-spine," and not very rarely one is compelled, by nervous affections, to abandon the profession.

Again, no occupation, or the loss of one, or the sudden change of calling, or the abrupt retirement from business, predisposes to mental derangement.

The pursuit of questionable and illegitimate callings, as in the case of prostitutes, gamblers, desperate speculators, and a whole parasitic and reckless set who live by their wits at the expense of the public, favors the outbreak of mental disease. A large contingent of insane cases is furnished by the ever-increasing predatory tribe of inferior politicians, who, without truth, honor, self-respect, or other motive than greed of gain, are employed as the tools of their superiors in office, and, having served the base uses to which they are put, and having been cast aside by the successive masters whom they follow, often end their careers in poverty, crime, or insanity.

Those who professedly and continuously make of crime a means of livelihood are by inheritance frequently degenerate, and become insane more frequently than others. It is not alone that criminals are so often naturally allied to the insane, but it is also because a life of crime is unavoidably attended with hardships and constant fears and anti-social emotions which tend to undermine mental health, and sooner or later imprisonment and solitary confinement may develop the Insanity to which their calling predisposes. The professional criminal undergoing sentence feels no stings of conscience, but occasional or accidental offenders often suffer the torments of shame and remorse which may induce mental disorder, especially during the early months of imprisonment.

Nationality, in its etiological relations to Insanity, is a complex subject. No one doubts that there are distinct national types of character, and that a man's mental constitution is derived not alone from his immediate ancestors, but also from the race whence he sprang. If it were possible to place all races as they now exist under like physical and moral conditions, and to expose them to like causes of mental disease, very disproportionate morbid results would doubtless follow, and the strong mind of the man of superior race would survive the shocks which would dethrone the reason of the individual of inferior race. Even among the most highly civilized peoples there is a national difference of reaction to powerful emo-

tional shocks, which in one instance may provoke despair and suicide more frequently, as recent study of suicides in different nationalities has shown. That there is a difference in the amount and kind of Insanity in various nationalities admits of little doubt. That general paresis was rare among Eastern nations and among negroes in this country before they were emancipated is not to be questioned, any more than at the present time in Europe the Jews are especially prone to certain degenerative types of mental disease. The Chinese, according to the most reliable account, have fewer insane among them than the other nations of a like degree of civilization. Among the Swiss goîtrous Insanity prevails; among Italians pellagrous Insanity is common; among Swedes, Danes, and Norwegians alcoholic and syphilitic mental disease predominates; and among Anglo-Saxon races, more especially Americans, who are relatively temperate as regards alcohol, psychical causes most powerfully predispose to mental disorder.

Although the predisposing conditions and the types of mental disease differ in the various nationalities, there are still no sufficient data from which to draw conclusions as to the relative and actual liability of different races to Insanity.

Climate is a circumstance of some importance in relation to mental disorders. Great extremes of heat or cold are most damaging to the nervous system, and they have often caused most obstinate forms of Insanity, which, both in symptoms and course, is of the traumatic type. Sufficient importance has not been attached to the effect of heat upon the infantile nervous system, and the "fons et origo mali" in many children exhibiting symptoms of nervous and mental disorder has been undue exposure to the sun or to artificial heat.

Sudden and extreme changes of climate are especially deleterious, and whenever a higher temperature than 100° F. is reached in large cities a long list of fatal cases occurs among children, and some adults suffer insolation, which often results in incurable mental affections.

The general ill health and frequent mental disturbances of Europeans in tropical regions are largely the result of climate, and their only hope of recovery lies in a prompt escape from the high temperature.

Prolonged exposure to a high degree of cold, in those not acclimated, is undoubtedly both a predisposing and an active cause

of insanity, as appeared among Napoleon's soldiers after the retreat from Moscow, and in other well-known instances, and the case of a strong young man insane from exposure on a Polar expedition, and other cases that have come under the writer's observation, are instances to the point in question, though it is to be understood that cold is not as deleterious to the nervous centres as heat.

It is a significant fact, as shown by asylum statistics, both in this country and in Europe, that the bulk of the quarterly admissions occurs not during autumn, winter, or spring, but during summer. It is during this latter season that agricultural populations are exposed in the harvest-fields to the direct and uninterrupted rays of the sun, and that those resident in cities suffer from heat accumulated and reflected from sidewalks and walls of dwellings.

Unfortunately, there are no statistics to permit a differentiation of the effects of climate from other endemic active causes in different parts of the world, or to institute international comparisons of climates as predisposing causes of Insanity.

There can be little doubt that the thin, wiry, and nervous constitution of the American people, taken as a whole and compared with Europeans, or residents of the British Isles, is due chiefly to climatic influences, which imprint like bodily characteristics on the very first generation born of foreign parents in this country.*

As the presence of the sun is the prime source of variable climatic influences, so, too, its diurnal absence from parts of the earth is attended by a rhythmical ebb of both the physical and psychical forces of the human organism. There is even in sane persons at night a relatively unstable emotional equilibrium and a less firm mental inhibition, and the ignorance of this fact has led alienists, in all ages, to attribute the nocturnal intensification of insane symptoms to the coincident appearance of the moon, which there is no reason to believe has ever any other influence upon insane patients than that of a sensorial stimulus of a mild and customary kind. As a matter of fact, sidereal influence is more considerable than lunar effects.

Education may strengthen or weaken character and may increase or diminish any inherent tendency to mental disease. The term is

* Stearns, in his Lectures on Mental Diseases, page 244, in speaking of "folie circulaire," says: "It is quite possible that climatic influences are operative in rendering the system more susceptible and liable to take on such periodic changes in its mental activity."

here used in its widest sense, and it signifies not mere routine knowledge derived from books, but all those social and moral influences which enlighten the understanding and mould the disposition of the individual. It is well known that a person may be trained for a trade or business without book-learning of any kind and may be so well educated in a knowledge of men and things as to become eminently successful in his special calling, and that a college graduate with lofty ideals often makes such an egregious failure in practical life as to suffer from wounded pride and disappointed ambition, and perhaps be driven to suicide or Insanity.

The best education is that which best fits one for the work which one is to perform in the world, and the choice of a calling should be made early, and all energies should then be forcibly directed to the end in view, and all processes of education should be shaped accordingly.

One of the prime conditions of advanced civilization is the division of labor, and, as competition is becoming ever more keen in all special lines of human endeavor, the only hope of success, without mental strain or worry, is an early, definite aim, with systematic and well-directed efforts to attain it. Gross errors prevail and have been disseminated by educators themselves in regard to this whole subject. Instead of the fact that the study of a lifetime would not suffice to learn a minute fractional part of that which is known in one science, the public is allowed to believe that their sons are imbibing the essentials of all the sciences in four years of collegiate study. Instead of the truth that this length of time would scarcely lead to proficiency if well applied solely in one special branch of art, the idea is permitted to prevail that the classical curriculum fits the youth to grapple with the difficulties and intricacies of any or all of the sciences, arts, professions, or business callings. The family may be somewhat impoverished to educate the young man, whose eyes are finally opened to the bitter deception; for, after college graduation, he must struggle in adversity to acquire the real education needful for his success in life.

Present systems of education are especially faulty as regards children, who are of such plastic material as to become permanently warped from the standard of mental health by forced and premature efforts at instruction. The child's mind is crammed with a mass of facts unrelated among themselves and uncorrelated with anything practical, and hence retained by sheer force of memory, which

is thus surcharged, like a beast of burden to which, if not the whip, some equivalent goad of reward or punishment is applied to spur drooping energies. No wonder that at the end of a few years the child looks prematurely old, has headaches and frightful dreams nightly, and grows to be a nervous youth, with possibly chorea, or even symptoms of Insanity, which is much more common among children than is supposed, and is favored by precisely such educational ordeals as here named. But there are other dangers than the gauntlets of over-ambitious pedagogues set for the child to run, and, if not injured in the public school, he may be spoiled in the more important school of the home circle. The child's inmost character is moulded more permanently by parental example than by any other means. Habits are thus formed by imitation and repetition of the acts of parents, who, if they are selfish, harsh, untruthful, and dishonest in their dealings, will inevitably develop like traits in their children.

Parents, also, who are not vicious may have spoiled children through over-indulgence, for the naughtiness of the child is the making of the wickedness of the man, even as "the child is the father of the man."

There is another extreme, and that is heartless severity on the part of the parent, which may imbitter the child against the whole world and ruin the moral nature, or, in very susceptible children, result in suicidal attempts or in actual Insanity.

The best education for young people is that which will promote, first, physical health and strong bodily development, and, second, a firm and compact moral nature, fashioned by the habitual practise of obedience, truthfulness, sincerity, love of others, self-denial and self-control, and respect for superiors. When this primary foundation has been firmly laid, there may be superadded the learning of a profession, the mastery of such knowledge as is essential to success in a special calling, and of such practical points of ethical science as will best guide the social relations of life. It is best to make haste leisurely, for the battle of life is half won if well begun.

Education, then, is a predisposing cause or a prophylactic means as regards mental diseases.

The time is ripe for a great educational reformer to appear and lead the way to wiser and better methods, and the peoples of all civilized lands shall rise up and call him blessed, and in that future day the human intellect shall be expanded, and not weakened, and

the crowning faculty of reason shall be fortified and not dethroned by that which is denominated education.

National crises and public calamities are to be viewed in the light of predisposing causes of Insanity. Wars, pestilence, famine, political revolutions, great conflagrations and floods, earthquakes and volcanic eruptions, with loss of life and violent perturbation of emotions among many people, render some insane at once and are followed by permanent nervous disease in others, and by one or both of these affections occasionally in the generation "in utero" at the time.

It is true that European authors have not reported any notable accession to admissions to hospitals for the insane attendant upon the wars of this century. It does not seem to have been sufficiently considered, however, that some insane perish from war, and that a large class of intemperate, impoverished, and worthless individuals, who are "the insane in the making," are also eliminated by war, and that thus is diminished the very class whence the insane population is largely recruited. The writer has seen many cases of Insanity immediately due to the civil war in this country, and if all those cases directly or indirectly springing from it were marshalled together, they would constitute an array of living examples of the point in question which would settle it beyond all cavil.

Financial crises, bringing business ruin to large numbers, may excite mental disorder at once or lead to general ill health and predisposition to Insanity in the afflicted persons or in their offspring.

Previous attacks of mental disease, apart from heredity, constitute the most important of all predisposing causes. The relative numerical value of this etiological factor has already been given under the head of statistics. It is theoretically possible that a previous attack might arise from depressed bone, or some foreign body in the nervous centres, and that, when the source of irritation was removed, the Insanity would cease, and no real predisposition to a recurrence could be said to exist as the result of the first attack.

The hereditary group of causes consists in certain congenital structural defects, in functional weaknesses, and in a transmitted tendency to nervous or mental disease.

This group of causes is found in what are conventionally termed the degenerative insanities, ranging through the degrees of idiocy, imbecility, feeble-mindedness, instinctive Insanity of childhood,

moral Insanity, paranoiac aberrations, and mental disorders emerging from the established neuroses.

The structural defects in the forms of organic arrest of development just mentioned are cranial asymmetries, macrocephalic and microcephalic formations, atrophies of cerebral hemispheres and convolutions, hydrocephalic and parencephalic states, inequality and simplicity of convolutions, sclerotic changes in pyramidal tracts and lesions of other spinal tissues. The organic arrests of development mark the highest degree of degeneracy, as in idiocy, and in the order of the mental affections above named there is a diminishing intensity of deterioration until the opposite end of the degenerate series is reached in the alienations with the major neuroses, and, in the main, the gross structural defects above mentioned disappear rapidly in this serial order, so that when the paranoiac degeneracies are reached, the structural anomalies consist chiefly in cranial asymmetries, facial peculiarities, and bodily stigmata, which will be described at length under Somatic Symptomatology.

The functional weaknesses referred to are revealed in childhood as general irritability, reaching the point of convulsibility in many instances, and in adult life they are displayed in general instability of nerve centres, and in a special tendency to various forms of nervous disease.

As gross anatomical lesions, therefore, are not to be found in the majority of the degenerative insanities, and as the essential thing in the hereditary group of causes is the transmitted tendency to neurotic and psychic disorders, it becomes necessary at this point to fully present the subject of heredity in its relations to Insanity.

Heredity, generally speaking, is a theory to fit the observed fact that like comes from like in the vegetable and animal world. Heredity in man is the conservative force of nature which supposedly reproduces the organic structure and functional activity of the parents in the offspring with uniform regularity.

Theoretically, the offspring should be the exact reproduction of the parent, and in the simpler forms of organisms there is in this regard a striking repetition of individual likeness. In man generation is dependent on the union of sexual elements furnished by parents who are seldom alike in age, general vigor, or bodily and mental traits. Consequently there is usually a preponderance of the influence of one of the parents, and, other things being equal, of the younger and stronger progenitor. In this way the correction of

morbid inheritance is sometimes accomplished, for, if a feeble, old, degenerate, insane man were to marry a young woman of sound stock and vigorous in mind and body, the diseased tendency in the offspring might be overcome by the preponderant influence of the younger parent.

As a rule, then, children receive much in common from both parents, but they resemble one more than the other. This resemblance is not infrequently between the sexes, the daughter resembling her mother and the son his father, and this is true as to morbid as well as physiological traits in many instances. There are, on the other hand, numerous examples showing that this hereditary resemblance is crossed, so that the son resembles the mother and the daughter the father, and, in accordance with this principle, of course, in the second generation there would be a return of resemblance as regards the sexes, the granddaughter resembling the grandmother, having received the likeness of nature from her father, and the grandson resembling his grandfather, having got the similarity from his mother. This principle is known as *crossed heredity*, and it is found to be frequently exemplified in the transmission of nervous and mental diseases.

Direct heredity is inheritance immediately from father or mother, grandfather or grandmother, from great grandparents, or from ancestors removed to any degree in direct parental line.

As regards the common fund of attributes possessed by the race, direct heredity is always double or derived from both parents, but, as to special attributes, it may be single with reference to either parent. If the special peculiarities are alike in both parents, they may be heightened in the offspring, and this is especially frequent in the transmission of morbid peculiarities. It is not improbable that the child inherits the qualities of both parents, but only manifests those of the parent he is said to resemble and under whose special influence he may be during certain years of his life. So long as a boy is under the constant care of his mother he may fail to display paternal characteristics, which may appear strongly later in life. It is well known that qualities received by direct heredity may remain latent, and finally manifest themselves at certain epochs in the offspring, as in the parent before him. This is frequently the case with morbid defects reappearing at certain times of life through successive generations of the same family. It is not uncommon in women, after the menopause, to have certain appear-

ances of latent masculine traits, and it is well known that bodily defects of the maternal grandfather appear in the grandson after being latent in the mother.

The offspring, then, inherits largely from both parents, but only a part of the qualities thus derived are manifested, and the rest remain latent until special circumstances favor their development, and this leads to the question of reversional heredity, which is of special importance in Insanity.

Atavism is the inheritance from more or less remote ancestors of resemblances, qualities, or tendencies to disease which have remained latent in the immediate parents. Insanity, for instance, often skips a generation, and the son of a sane father inherits mental disease from an insane grandfather. The disease is then said to be atavistic and to have remained latent in the father, and to have been inherited by the son from the grandfather. It may be well to say here that *diseases* are never inherited, but only *tendencies* to disease. In the case of Insanity it is the instability of nervous centres, the tendency to vasomotor and nutritional disorder, and the susceptibility to functional mental disturbance which are inherited.

It will frequently be found that Insanity thus derived by atavism is between members of the same sex, in accordance with the fact that the son often takes after the mother, and the daughter after the father, and that atavistic transmission between grandparents and grandchildren would in this way be from grandfather to grandson and from grandmother to granddaughter. The largest percentage of diseased inheritance is from parents or grandparents, because nature does not favor, but ever tends to eliminate, accidental and morbid peculiarities, which seldom survive the third generation in direct line; and this introduces another important principle of heredity, which is the preservation of the normal type.

The normal type is continued by the constant inheritance from both parents of a certain sum of characteristics which are typical of the race to which the individual belongs. Qualities which are not thus typical, but which are accidental or acquired, are only exceptionally transmitted, and they only tend to become permanent when they are in the nature of special adaptations to the environment. Such acquired qualities, when frequently transmitted, gain strength and may become permanently fixed, and their chance of inheritance is then much greater. Morbid peculiarities occasionally become in some degree fixed and transmitted in certain families, but,

as before said, it is seldom for more than a few successive generations, for so strong is the principle of return to a normal type that the family is more apt to die out than this principle to fail. It would be impossible, by selection and inbreeding of a certain number of the most confirmed lunatics, to permanently propagate a race of lunatics, as there would be in part a return of the normal type and in part extinction of the race through degeneracy.

The child issuing from an insane father and a sane mother has more than an even chance of escaping mental disease. Even when there is insanity in both parents the conservative force of nature may preserve the normal type in the offspring. An insane degenerate, once under the writer's care, after he had entered the demented stage of paranoia, begat five children, all of whom have grown up and remain in ordinary good health. Large numbers of instances of the failure of transmission of Insanity from immediate progenitors to children have come within the writer's observation, and it is perhaps time to collect extensive statistics on this score to aid in arriving at just conclusions as to the laws of inheritance of mental disease. It would seem as if statistics were only recorded in instances confirming the view of heredity, to which is constantly attributed a more and more important influence as a cause of Insanity. The subject is of great importance and complexity, and it must be studied with scientific impartiality; but, before further consideration of it, there is another mode of heredity to be mentioned.

Collateral heredity is the appearance of common family traits, qualities, or morbid affections in relatives not in direct line of descent. Thus the same anomalies of character or the same disorders manifest themselves in the uncles and nephews, in the aunts and nieces, in cousins, or in more remote collateral branches of the family. The supposition, then, is that the disease, which thus appears among relatives, existed in some remote common ancestor, and that it has been latent in some and apparent in other members of the family. The finding of Insanity in collateral branches of a family is circumstantial evidence, but not satisfactory proof, therefore, that the disease is inherited. In studying the etiology of a case of Insanity this mode of heredity is to be taken into careful consideration, especially in the absence of any evidence of direct heredity. If collateral heredity is found on both the father's and the mother's side, the probabilities of the hereditary nature of the Insanity are very much heightened, and the presumption would be that the men-

tal disease was the result of combined latent tendencies on the part of both parents.

Having now described the chief forms of heredity, it is necessary to consider more exactly what is meant by the term in relation to mental diseases, and especially the wide extension which modern writers are wont to give it. It has already been said that in cases of heredity it is the tendency and not the disease which is inherited, and that it is instability of nervous centres and susceptibility to mental disorder which descend from the insane parent to the offspring. Now, as this instability of nervous centres is characteristic of chorea, hysteria, hypochondria, epilepsy, and allied nervous conditions, writers are inclined to embrace all these affections as the transformed equivalents of Insanity, so far as evidence of the hereditary nature of the mental disease is concerned. Some writers go still farther, and add phthisis pulmonalis, syphilis, alcoholism, diabetes, Graves's disease, and other affections, to this group of hereditary equivalents, with an apparent determination to establish, so far as possible, the hereditary character of mental disease in all cases.

It is time to draw the line somewhere, and to enter some protest against this wholesale manner of the hereditary derivation of Insanity; for, if the same course were pursued with other diseases, "confusion worse confounded" would soon reign in our general ideas of etiology and pathology.

It is one thing to recognize the etiological relations of many diseases to Insanity, and it is another thing to represent these diseases as constituting the heredity of Insanity. The practical point is to be borne in mind that every insane patient has two parents, four grandparents, eight great-grandparents, to say nothing of collateral relatives, any or all of whom may have had some of the diseases above enumerated, and to make a direct search for heredity under such circumstances is to enter a maze of pathological conditions through which no scientific line of inquiry can be clearly traced. If statistics are to have any definite value, therefore, in recording the heredity of insane patients, only the most closely allied neuroses, and such as the history of the family shows to have appeared interchangeably with the Insanity should be taken into account as constituting the hereditary equivalents of the disease. Any exception to this rule may be left to the unbiassed judgment of the skilful physician, who, if he finds, on extended inquiry, that in different individuals or generations of a certain family, phthisis pulmonalis

and Insanity have appeared interchangeably, may consider every case of consumption as a link in the hereditary chain of the mental disease; but by the same rule he would have to accept the Insanity as constituting the heredity of phthisis pulmonalis.

In estimating the intensity of the heredity in any given case of mental alienation, it is necessary to consider the character as well as the number of the direct and collateral instances of the disease in the family history. Two or three cases of epileptic, periodical, or other degenerative types of Insanity would imply a much more decided heredity than the same number of simple psychoses from accidental causes. General paresis, though the most hopeless form of Insanity, is less hereditary than other forms, in the opinion of most writers, and Regis, in his "Manual of Mental Medicine," says that the child of a general paretic has no predisposition to Insanity, but to cerebral disorders.

Other things being equal, the nearness of the kinship determines the degree of the heredity, counting first in direct line parents and grandparents, and then in indirect line uncles, aunts, and cousins. A child born after the parents' Insanity will be affected more likely than one born before the attack.

The heredity will be strongest in those born nearest and after the attack, provided the parent's recovery is complete, but the children of imperfectly recovered patients may have decided heredity. Heredity is apt to be intense in children begotten in the acute incubatory stage of mental diseases.

Convergent heredity, that is to say from both parents and of like kind, is apt to be very strong. Some authors think predisposition is greater derived from the mother than from the father, and this is no doubt true for daughters, though an insane father is more apt to transmit the tendency to his sons, who closely resemble him in mental constitution.

Children sometimes derive their outward appearance and physical organization from one parent, and their mental and moral nature largely from the other, and it is from the latter source, in these instances, that morbid psychic abnormities are more likely to be received. Again, a daughter, for instance, may resemble the father strongly in early life, but in middle age may become like her mother in body and mind, and she would then probably develop the maternal neurotic predisposition, especially if it were of a kind wont to appear late in life, as at the menopause.

Heredity tends, in a general way, to appear at the same time of life in the offspring as in the parent, and at the critical points of puberty, menopause, and senility, and at earlier periods in proportion to the degree of its intensity. Morbid heredity during increase, and while being *bred in*, appears earlier in successive generations, but, while being *bred out*, shows itself at later and later periods of life.

Families rise and decay, like nations, and heredity in a rising family and in a degenerating family might have a numerical sameness, and still an absolutely different value. The history of the patient and of the family to which he belongs may clearly show this degeneracy and determine the relative strength of the heredity, but in many instances it is not possible to get sufficient evidence that the family has entered a stage of deterioration.

Thus far attention has been directed to diseased ancestral heritage through direct and collateral lines, but there is a less remote "fons et origo mali." Morbid heredity may be generated, *de novo et ab ovo*, by the unsuitability of the spermal and germal elements of the immediate progenitors.

The spermal force acting on the germal substance, to attain its best result, must be favored by a certain similarity between the paternal and maternal sexual elements, and great dissimilarity leads to sterility or monstrosity. The Arabs, in the preservation of a pure, inbred strain of horses, seem to have practically adjusted to a nicety this required degree of similarity, and at the end of a thousand years they continue to breed these beautiful animals with uniform success.

On the other hand, if this double parental similarity in developmental cells is too great, there result feeble or defective offspring, as has been repeatedly shown in families which, for wealth, caste, or religion, or other motive, have too closely interbred for too long a period.

Here, then, is a source of hereditary mental defects which may extend even to idiocy, received by the child from his parents, who may have neither open symptoms nor latent tendencies of mental disease.

A somewhat similar direct origin of morbid heredity proceeds from physical or psychical influences active in the parents at the moment of the conception of the child. These influences may be exhausting diseases, toxic, and specially alcoholic, conditions, and

powerfully distressing emotions, which, like the maternal impressions of gestation, may be followed by bodily or mental abnormities in the offspring.

Knowing full well the cellular lesions which may be the sequels of sudden fright in children, even in compact dental tissues, it is probable that to powerful and untoward mental influences during the maturation of the spermal and germal elements in parents is to be attributed many pathological results in the offspring.

Then, again, nature has her freaks as well as her eternal lawful sameness, and, as naturalists have been compelled to admit the fact, if not the theory, of spontaneous variations, so psychologists must admit startling exceptions to the hereditary law that like produces like in the mental sphere, as when a moral monster springs from a saintly family, or a genius from the most humble origin. Thus the psychiatrist, in his studies of mental pathology among his patients, will meet with occasional astonishing exceptions, which only go to prove the rule of heredity.

In degenerative families heredity is only exceptionally similar in the parent and offspring, in whom, as a rule, dissimilar mental disease appears. One child of a degenerate lunatic may be suicidal, another dipsomaniac, another criminal, another epileptic, and another imbecile. This appearance of a variety of pathological states in the same family is polymorphic heredity, which especially characterizes the degenerative group of insanities.

The progressive heredity, so well observed and described by Morel and others, in which there may be, for instance, chronic alcoholism in the first generation, simple psychoses and neuroses in the second generation, paranoia, periodical, and other degenerative forms of Insanity in the third generation, and in the fourth generation imbecility, idiocy, and, finally, extinction of the family, is as interesting as it is rare. Serial family degeneracies partly exemplifying the above observations are occasionally encountered, but, if they are traced far enough, it will be found that, finally, part of the family reverts to the normal type, and especially will this be found to be the rule when the histories of large numbers of degenerative families are traced completely.

In tracing these degenerate insanities, numerous pathological states have been treated by writers as hereditary equivalents, such as hysteria, chorea, epilepsy, apoplexy, chronic alcoholism, consumption, and organic arrests of development.

In the absence of all these conditions there are certain bodily and mental anomalies which may mark the individual as degenerate, and these signs, termed stigmata degenerationis, will be described in the chapter on symptomatology. These psychic and somatic stigmata may exist to some degree in normal persons, but, when typically grouped in one patient, they serve to diagnose the degenerative psychopathic constitution.

In attempts to decide the actual proportion of cases of Insanity due to heredity, recourse must be had to statistics including only cases of direct heredity in some, and of indirect also in other instances, and in others still embracing allied neuroses and hereditary equivalents, both in direct and collateral lines. Statistics made thus differently have necessarily led to widely divergent conclusions, which may be stated, in a word, as varying between standard authors so widely that twenty per cent. and eighty per cent. represent the extreme estimates of the numerical value of heredity as a cause of Insanity. In my Annual (1895) Report, as Superintendent of the Willard State Hospital, there were recorded, out of a past total of 2,645 admissions, direct and collateral hereditary influences as causes of the Insanity in 345 instances, or a percentage of 13+. Dr. Hack Tuke * reports, out of a grand total of 136,478 admissions to hospitals in England and Wales, a percentage of 20.5 set down to hereditary influence ascertained. He deems this a low proportion on account of the unwillingness of relatives to give full information. Most modern writers fix the percentage between twenty-five and fifty, and they seem inclined to increase the importance of this cause.

It is the writer's opinion that not more than twenty-five per cent. of cases of Insanity are strictly due to heredity, and that as science advances and reveals the true causes of Insanity, the number of cases attributed to heredity will constantly diminish.

And now, having accorded due respect and weight to heredity as a cause of Insanity, and having treated it in conventional manner as a sort of constitutional affection frequently transmitted in ways above mentioned, let there be ventured some broader views of this whole subject, that the student of mental pathology may not be overawed by heredity as the cause of causes of Insanity, and that he may not too readily commit to this convenient and enlarging receptacle cases which scientific research might show to be due to definite special agents or to wide general causes.

* Dictionary of Psychologic Medicine, p. 1205.

What is, in the broadest sense, man's nature, which is modified in Insanity, and what broader law than family heredity may there be to account for human degeneracy? In the first place, man is an animal, a mammalian vertebrate, and his fundamental nature is animal and is ever inherited as the substance out of which humanity is moulded. What more striking proof of this can there be than that afforded by mental disease, which denudes man of the veneer of civilization and of all self-control, and lays bare his brute nature, alike in man and woman, in youth and advanced age? Turning from the naturalistic to the ethnological view, man is born white, yellow, or black, with radically different ethnic traits, and varying tendencies to psychic anomalies. Then, again, he has a national character, which stamps him with typical peculiarities, both in health and in disease of mind. Again invoking the past, there arise scores of unknown or forgotten beings who labored consecutively, and with predestined certainty of result, on one ancestral line to lay firm or loose foundations of mind and character for the individual. Then comes the family heritage for good or evil, with strength or decay of mind and body, and, finally, the impetus given by the immediate parents toward evolution or degeneracy, and, last of all, the personal modifications effected by good or bad environmental influences. Thus every individual has a racial, national, remotely ancestral, and near parental character, in addition to fundamental, animal, and special individual nature. As the resultant of of all these compound forces, mind in turn is manifested through the channel of the cerebral centres, which are the most highly evolved and the most complex of all organized structures, and the most subject, therefore, to derangement; and the wonder is not that mental disorder appears, but that it is not more frequent.

Then, again, there is a broader law than family heredity, and that is the universal law of organic failure in all living creation, of outward and temporary individual variety, but inward and permanent racial sameness, of personal imperfections and abnormities, but racial perfection and trueness to type. Nature conserves the species, but cares not for the individual. Enter any of her fields in the vegetable or animal world, and study the rank individual failures. Ask the breeder of animals the proportion of successes to failures, and how long he must labor to produce a perfect specimen. Man, as the king of animals, enjoys no immunity from general laws. A certain proportion of mankind is by the universal law of organic

failure doomed to physical and mental imperfections, even to the lowest grade.*

The definite special agents to which Insanity may be due, and which were above referred to, together with the exciting physical causes of the disease, will now be studied.

Exciting Causes.

The exciting causes of Insanity are those which form not the favoring tendency, but the immediate occasion of the attack, and it has already been said that in actual practice the conventional line of division between them and predisposing causes is sometimes plain and at other times not to be distinguished. Thus, intemperance may cause general ill health or special disease of nervous centres and strongly predispose to Insanity, or it may excite an outbreak of alcoholic mania. In the same way syphilis and its attendant dyscrasia may be a predisposing cause of mental disorder, or the exciting cause of the most incurable form of the same, general paresis. Likewise, powerfully depressing emotions may predispose to or immediately excite acute melancholia.

In a perfectly sound individual, absolutely free from any instability of cerebral centres, and with all the vital organs in a perfect state of health, there can be, strictly speaking, no such thing as an exciting cause of Insanity, for the simple reason that nothing will disorder the reason of such a person, unless it be actual partial destruction of the brain, as the organ of the mind, and even then there might be diminution rather than derangement of intellect in proportion to the extent of the destructive process.

It is granted that in such a person chemical agents might produce sensorial disorder, and drugs in large doses might cause delirium, which is to be differentiated from Insanity proper, but which would terminate with the action of the poison.

In other words, it has come to be known that some persons are

* The numerical chances of this law of organic failure are, that in the reproduction of the human species there will once in two hundred times be organic failure shown as monstrosity, idiocy, imbecility, deafness, blindness, dumbness, Insanity, or the allied neuroses. Heredity in mental disorders is only a coincidence in this more universal law to which attention has not been directed so as to lead to the making of confirmatory statistics.

susceptible to the action of exciting causes of mental disease, and that others are not, and that in those who are vulnerable there is some inherent weakness or peculiarity of the nervous system which may be inherited or may be acquired. There is nothing new or strange in this doctrine, for there are in general medicine some analogous, though not strictly parallel, facts which show that causes sufficient to excite various diseases in some persons are entirely ineffective in others, and that certain individuals have an immunity even from the most virulent affections, while others are attacked on the slightest exposure to infectious disorders, some suffering even a second and a third time from the same special contagious complaint. Mechanical causes of identical nature may have widely different sequels. Thus, trauma of the sole of the foot may heal kindly by first intention in one person and occasion tetanus and death in another, and, in like manner, "trauma capitis" may have no untoward result in one case, and in another may be the exciting cause of incurable Insanity. This much is said in a general way in regard to the exciting causes of mental disease, which will now be considered separately under the further customary division into bodily and psychical factors.

The bodily causes of mental disorder are dependent upon the close sympathy which unites all the organs of the body under the special influence of cerebral centres. The influence of diseases of any one of the internal organs may thus be radiated through nervous channels to other viscera, to spinal centres, to subconscious cerebral centres, or to the highest seat of conscious mental activity, thus causing in turn sympathetic visceral disturbance, automatic sensory or motor symptoms, variations of organic consciousness, or disorder of emotion and intellection.

That such bodily causes are active in some cases and inefficient in others, as already intimated, can only be explained on the ground of intrinsic instability existing in the nervous organization of one person and not in that of another, and also through a native difference in the acuteness of the visceral sympathies. One child may have no objective manifestations of the presence of intestinal worms, and another may, as reflex symptoms of the same, have convulsions, hallucinations, or active mental disorder. One man may have but slight symptoms of any kind with organic disease of the stomach, while another may be deeply despondent or acutely melancholy from functional congestion of the gastric mucous membrane. Bearing

these general considerations in mind, the special etiological relations of certain bodily to mental diseases will now receive attention.

The reproductive organs, when diseased, may cause mental disorder, but it is a popular error, as well as a professional fallacy, to attribute a large percentage of Insanity to this source. It is granted that there is no more intimate relation between the physical and psychical part of man than that between the reproductive organs and the mental sphere, which have a simultaneous evolution and involution at the ages of puberty and senility. The mistake has been in taking a concomitant symptom for an antecedent cause in the overestimate of the sexual origin of mental derangement. The fundamental instincts are, as a rule, disordered in Insanity, and especially is this true of the instincts of self-propagation and of self-preservation, which are the two most powerful basic propensities of man. The disorder of the former instinct in Insanity reveals itself in masturbatic and perverted indulgence, and of the latter in suicidal attempts, and the mistaking of the symptoms for the cause is the error here indicated that it may be avoided. Masturbation is a symptom of maniacal states in two-thirds of all cases in both sexes, and at all ages, not excepting the extremes of youth and senility. Masturbation may be said to be almost a universal vice, existing among animals with instinctive persistency, common among savages, and equally frequent among civilized peoples; appearing in children too young to know what impels them, and in single adults of both sexes, and even in married persons as a matter of choice in the mode of indulgence, and if it caused Insanity as often as some claim, the whole race would long since have passed into masturbatic degeneracy of mind. Masturbation does cause Insanity in a small percentage of cases, and it is especially injurious as a habit in the very young and in all who have weak nervous systems. In such it may cause physical and mental arrest of development, as well as moral perversion. It is probably because it is a despicable habit that it causes such disastrous moral effects, and not because it is physically more exhausting to brain centres than sexual excess of the natural kind. The latter is much more apt to produce general paresis, while unnatural indulgence favors spinal disease rather than cortical degeneration. There is considerable evidence that masturbation is transmitted as a strong tendency in certain families, and that it is only one of other neurotic traits in these instances. This accounts for the general neurotic appearance of many who are given

to the habit, which does not, as some suppose, readily impress a characteristic physiognomy and general outward appearance, such as pseudo-experts claim they can recognize at a glance. These physical traits attributed to the habit are common to thousands of neurasthenic and neurotic individuals. It is not denied that these traits may be exaggerated by excessive addiction to the habit, and that in an occasional extreme case a degree of physical and mental degeneracy may finally be reached which may picture in some degree the special effects of the habit, and may admit the true expert to make a positive physiognomical diagnosis. On the other hand, if two men of ordinary good health and like physical appearance were to indulge once a day, the one in masturbation and the other in married intercourse, for two or three successive years, they would at the end of that period present like symptoms of general debility and nervous exhaustion, and no expert could place them side by side and diagnose, from outward appearances alone, the solitary sinner from the married offender against the laws of health. This much is said to correct popular error, which calls upon the physician in the majority of cases of Insanity to decide whether the cause of the trouble has not been masturbation.

The differential pathological fact which science offers the inquiring physician as to the effects of natural and unnatural sexual excess is indeed a most remarkable one, and it is fully confirmed by clinical observation of results, since probably fifty cases of general paresis are caused by indulgence with women to one occasioned by masturbation. The presence of the woman heightens the emotional excitement, and there is a more diffused cortical liberation of nervous energy, with angioparesis of cortical capillaries, and the shock falls upon cortical centres, which eventually undergo the paretic changes. In the other instance the normal stimulus to cortical emotional centres is absent, and it is the automatic lumbar sexual centre which is chiefly concerned, and the nature of the resulting disease is essentially spinal. In rare instances, however, in persons with vivid imaginations, who cultivate the habit of evoking by efforts of phantasy the simulacrum of a woman, and thus succeed in exciting cortical loss of nervous force, there may be developed finally a pseudo-general paresis.

Disease of the reproductive organs in women may become a cause of Insanity, which may be relieved by local treatment or by operative procedure. The results of gynecological treatment in

American and Canadian hospitals for the insane within the past few years fully confirm this general statement. When a woman who is a great sufferer from uterine disease becomes insane and undergoes gynæcological treatment and is cured at once of her local disease and of her mental disorder, and remains well, it is a fair inference that there was a causative relation between the local and mental trouble. This sequence of events has occurred repeatedly, and has been duly reported in large numbers of cases of insane women, who have been thus operated upon, and have been promptly restored to their right mind.

There is a counter-statement to be made in this connection, and a diametrically opposite series of cases to be adduced in order to lay bare the whole truth. Not a few women suffering from disease of pelvic organs, but not rendered insane by the same, have undergone operations which have been followed by Insanity, and here again it is equally fair to infer the nature of cause and effect as between the operation and the mental disorder.

Furthermore, women have suffered surgical ablation of their uterine appendages, which were not diseased, and have become insane as a sequel of the operation. The disturbance established by the operation and the readjustment required in the whole nervous economy is probably greater in the latter than in the former category of cases.

Briefly summarizing conclusions on this subject, it may be safely affirmed that both functional and organic diseases of the sexual organs are sometimes adequate exciting causes of mental disorder—that the partial or complete removal of the uterus and its appendages or surgical operations upon the same may cause Insanity, or may relieve it when it exists; that superadded disease of pelvic organs uniformly aggravates the existing mental trouble; that even the rhythmical and functional activity of these organs is attended, as a rule, by exacerbations of the mental symptoms, but, as a marked exception, cases of Insanity, presumably due to chronic hyperæmic cerebral states, relieved by the local derivation of blood to pelvic regions, enjoy comparative lucidity only during menstruation and gestation.

In men, genito-urinary diseases are, in rare instances, the exciting cause of mental disturbance.

In neurasthenic cases subacute inflammatory conditions of the urethral mucous membrane, with reflex sexual weakness, may act in

this way, and in senile cases urethral strictures, enlarged prostate gland, and chronic cystitis may be the immediate cause of melancholia, as may also be stone in the bladder, with its distressing train of symptoms.

Renal disease is frequently associated with Insanity, and the two affections are sometimes the common symptom of general vascular degenerations. Occasionally the kidney disease precedes the mental trouble, and may be regarded in the light of a cause. In several hundred autopsical examinations of the insane the writer has found renal disease in a considerable percentage of cases, and in one instance a remarkable cystic degeneration of both kidneys would seem to have been the cause of the Insanity. Several writers have reported cases of mental disorder from Bright's disease of the kidneys, and Dr. Bennett, of Pennsylvania, has made an extensive contribution in this direction. It is, of course, important to know the time of the systemic vascular degenerations and the general pathological order of events in these cases before logical conclusions can be drawn, but it is safe to admit Bright's disease among the etiological factors of mental disorder. If there appears, on close inquiry, a history of previous alcoholic excess in these cases, it is more consistent to regard both the renal and mental trouble as resultant symptoms of this antecedent cause.

Kidney disease, with prolonged uræmic conditions, is attended by occasional maniacal or stuporous states, and likewise Insanity is sometimes an epiphenomenon or an interchangeable condition with the diseases of the nervous system, which gives rise to continuous diabetes. The writer has had one well-marked case of Insanity with Addison's disease, and it is not improbable that there is some causal connection between the two affections.

Gastro-intestinal disorders may be the occasional cause of Insanity. The irritability and depression of dyspeptics and the immediate changes in emotional tone produced by affections of the gastro-intestinal mucous membrane show the intimate sympathetic relation between the whole intestinal tract and organic consciousness. This reflex relation is evident also in modification of the symptoms of Insanity by intercurrent disease of the stomach or intestines, and in delusions or illusions corresponding to such disease of this nature as is usually present in all acute cases of mental disorder.

When Insanity appears as a sequel of a troublesome gastric or intestinal disease and disappears when this disease is relieved, it is

natural to recognize the causal connection, though it is possible that both affections might be symptoms of a more general cause, which is probably to be sought in the nervous system. It is a fact that gastric and duodenal catarrh are frequent prodromata of mental disorder, and that skilful treatment occasionally gives simultaneous relief to both the gastric and psychic trouble.

The liver, which the ancients regarded as the chief source of Insanity, is not without causative relations to mental disease. There are to be considered in this connection the frequency of icterus and of gall-stones in the insane, the changes in the quantity and the quality of the bile, the obstruction of the portal circulation, the well-known despondency attending hepatic affections in general, and serious systemic conditions resulting from organic diseases of the liver.

Hammond attributes much importance to the liver as a cause, more especially of melancholia, for the cure of which he has aspirated hepatic abscess.

The pancreas and the spleen have no well-recognized etiological relations to Insanity, but they may have a reflex influence, like other viscera, and it would not do to deny that they might disturb the action of cerebral centres. What the influence of the enlarged spleen may be in malarial Insanity is open to conjecture.

Cardiac diseases have a direct relationship to mental disorders, which they aggravate, modify, and sometimes cause in the first instance, through defects of circulation and nutrition of cerebral tissues. There is more than an average proportion of cardiac disease, apparently, among the insane, who have hypertrophy, dilatation, and valvular lesions of the heart very frequently. Mitral lesions are specially common, and aortic valvular disease is by no means rare, and is apt to be found in the more confirmed insanities.

One writer has even gone so far as to describe the special types of mental disorder to which the different cardiac lesions give rise. It is enough to name anxiety, depression, and irritability as common mental symptoms in these cases. Certain cases of organic dementia resulting from embolism proceed primarily, no doubt, from cardiac disease, just as heart disease and Insanity arise as common symptoms of rheumatism.

It is a question how far the feeble and fatty hearts of terminal dements determine in any degree the mental weakness of the patients, and what favoring relation there may be between the atheromatous degeneration of the aorta and the dementia of senility,

for special symptoms of general morbid processes may still have causal connections among themselves, and all the senile vascular degenerations often antedate the mental decline and in part occasion the nutritive cerebral lesions.

Pulmonary diseases are among the etiological elements of mental alienation. Phthisis pulmonalis, which is foremost in this regard, will be mentioned later under the group of diathetic causes. The statistical fact that pulmonary affections are much more common among the insane than in the general population, and that they uniformly constitute the causes of large mortalities in hospitals for the insane, is significant in this connection. There is the further fact that an important part of the somatic derangement in Insanity is referable to the pulmonary organs, as will be seen in the chapter on somatic symptomatology.

Pneumonitis occasionally develops mild forms of mania, and in alcoholic subjects fatal forms of acute delirious mania.

Pleuritis has been the exciting cause of melancholia, and in chronic pleuritis and empyema unfavorable forms of Insanity, apparently dependent on organic brain lesions, may arise. Chronic bronchitis and emphysema favor the development of melancholia, particularly in senile cases.

The various forms of spasmodic asthma have certain etiological relations to Insanity, of which they may form the prodromes or sequels. In other instances the pulmonary disease and the Insanity appear together, as the result of previous organic brain disease, and of this something more will be said under the head of pathology.

Vascular disease and circulatory disorders are among the possible exciting causes of Insanity. Vascular degenerations are very common in mental disorder, which they sometimes precede and provoke by depriving the brain of its customary blood-supply and by the prevention of the elimination of the waste products of cellular activity. This is the immediate and practical relation of vascular disease to Insanity, though it is freely admitted that there is a previous link in the etiological chain of events, and that, adhering strictly to the pathological order of things, the vascular disease is secondary to cellular tissue changes. Cortical nerve-cells, surcharged with waste products or suffering from toxic exposure, demand and attract more blood, and the cerebral hyperæmia thus occasioned, if long continued, leads to vascular changes, which in turn act in the manner above mentioned; but, as there is no sufficient knowledge of these

biochemical changes in cortical nerve-cells, it is more practical to avoid a theoretical search for the final reason, and to accept the vascular disease as the proximate cause of the mental disturbance. The special vascular degenerations will be described in the chapter on pathology.

Vasomotor disorders not only form prominent symptoms of many forms of mental alienation, but they essentially constitute the connecting link in the causation of Insanity by visceral affections and peripheral nervous disease.

The vasomotor centre of the medulla is under the reflex control not alone of the cerebral cortex, but of the entire peripheral distribution of the sensory nervous system, so that not only emotional stimuli, but peripheral irritations, may effect circulatory changes and variations in blood-pressure which stand in proximate relation to mental disorder. Thus, through the intervention of vasomotor action, is explained the mental derangement which supervenes immediately from an overwhelming emotion, or the sudden maniacal outbreak attendant upon the continued pain of intense peripheral irritation.

Unhygienic conditions, such as are numerously created by present modes of civilized life, and not yet prevented by modern science, deserve notice among the physical causes of Insanity.

The food which man consumes, the liquids which he imbibes, and the air which he respires, largely determine his physical welfare or misery.

If all these elements are highly artificial, the consumer will inevitably pass by slow degrees into an abnormal state of health. Unhygienic points in the dietary of the average resident of towns and cities are numerous. Meats are often poor in the first place, are kept too long, and exposed to various temperature changes, and after reaching the consumer are placed in ill-ventilated refrigerators, or they are salted, pickled, potted, smoked, desiccated, in crudely artificial ways. Vegetables are seldom fresh, and are chiefly canned, and unhealthful often through secondary changes. Cereals of all sorts are usually kept too long exposed to all kinds of atmospheric germs. Milk is conveyed a distance under varying temperature, or passes from one receptacle into another, and is often condensed poorly, and is seldom good, if not positively bad. Eggs are packed, and, through absorption and other influences, are often distinctly bad articles of diet, but necessarily enter largely into the cooking. No more favor-

able account could be given of other staple articles of diet did space permit. Drinking-water is seldom healthful, and tea, coffee, and artificial drinks are substituted from earliest childhood, so that the craving for stimulants increases until some form of alcohol is reached.

Houses are ill-ventilated and usually overheated. The indoor air breathed day and night is charged with germs and simmers with organic dust-particles, as seen by sunlight.

It is no wonder when continuous generations are bred under these unhygienic conditions that they have nervous dyspepsia, neurasthenia, functional neurosis, and finally mental disorder, especially when it is considered that excessive functional activity of brain-centres is superadded, and that exhausted cortical regions are often not restored for want of sufficient sleep.

It might be profitable to divert some of the universal ardor with which heredity and "stigmata degenerationis" are studied to the investigation and scientific prevention of the conditions which make heredity, which has by voluminous writing been erected into a formidable sort of an entity, whence emanates a full-blown tendency to all the ills to which flesh is heir. As a matter of fact, this tendency proceeds from a thousand little commonplace unhygienic influences which escape the study of the scientist and the remedy of the practical hygienist, and perpetuate themselves through generations of beings, who become weak and nervous, and have children who resemble their parents, because they live under the same unhealthful and highly artificial circumstances, and hence have no chance of reversion to the normal type.

The physiological crises as etiological factors deserve consideration. Life is ever a conflict between natural elementary forces, which tend to disintegrate, and vital forces, which sustain the human organism, and there are critical periods in this battle through which every human being is destined to pass.

In this unequal conflict, in which the natural environing forces always prevail, and which always ends by nature claiming her own, some with compact vital forces present an unwavering front to the enemy and pass through all the crises unshaken, and only yield at the bitter end, while others show signs of disorder at the first critical moment, and are demoralized and completely disordered at each successive crisis of life.

The contest between the vital integrating and the environing disintegrating forces may begin before embryonal life, and chemic

and toxic forces acting on the germal or spermal elements may cripple the being which is to be. The moment of conception is also a critical one, and should either or both of the parents be suffering from acute incubatory disease, or toxic, especially alcoholic, influence, or great mental strain, the die may be cast then and there for the future misery of the offspring.

Intra-uterine life is a period replete with dangers, for the embryo, although safely surrounded by muscular walls, is vulnerable through the maternal circulation and nervous system, and it suffers not only from untoward "maternal impressions," but also shares the fate of the mother as regards general diseases, and traumatic, toxic, and all inimical external forces.

The clubbed feet, withered limbs, compressed and distorted crania, and other physical mishaps of embryonal life have received much attention, but the cerebral accidents and fatal mental shocks of this critical period have yet to be studied.

The first independent crisis of existence is birth, and as the little being, hard pressed on all sides, struggles forth upon the stage of life's miseries, and suddenly presentient, as it would seem, of all the ills before him, utters that first long cry of distress, he vocally typifies the echo which comes back at the other end of life in the dying moan, the first and the last sound alike struck in the dominant key of average human suffering.

The most imminent danger at birth is the narrowing of the bony pelvic canal, through which the fetal head has to pass, and the prolonged pressure to which it is thus exposed, and which results not infrequently in idiocy and lesser grades of intellectual defect. Primiparous children naturally suffer more than others from cranial pressure during parturition, and males more than females, inasmuch as the average diameter of the male fetal head is greater than in the female, and this fact may alone in part explain the excess of male over female congenital mental defects.

Premature birth may also account for mental deficiencies, though in nothing like the same degree as primogeniture.

Difficult and prolonged labor and instrumental delivery are also to be here enumerated among the perils of this first crisis, which, brief though it be, is often fraught with the issues of life and death, and though the child survive the parturient injury, it is with an intellect "nipped in the bud."

Illegitimate and unsuccessful abortive attempts upon the life of

the child may likewise have lasting ill results, and the general physical tendency of civilization to enlarge the fetal head relatively while contracting the pelvic outlet may be accorded some weight in this connection, as well as multiple birth and asphyxia and other accidents of this crisis.

The second physiological crisis through which the child has to pass is dentition. Peripheral irritations in dental nerves act with peculiar force on unstable cerebral centres at all times of life, and especially is this the case in early childhood.

The congestions of this period are not confined to dental regions, but extend to encephalic centres, and the continued pain has, as a reflex result, disturbed digestion and intestinal irritations and diarrhœa, which aggravate the general irritability of the patient, and may reach the point of general convulsibility. The dentitional eclampsia thus developed may, if severe and often repeated, permanently damage the organ of mind, or pass into more confirmed forms of convulsive seizures, which will then in turn be followed by the customary unfavorable mental sequels.

Puberty is a physiological crisis of great import, arriving during the period from twelve to sixteen years, and the age of its occurrence varies somewhat with ethnic peculiarity and climatic influence, as well as with inherited idiosyncrasy. The complete evolution in the emotional and intellectual spheres at this epoch is as remarkable as the changes in the reproductive organs. The psychological evolution, however, is not accomplished until some time after the physiological changes have been perfected. Both the psychic and somatic developmental changes are much more rapid in the female than in the male, being completed in a decennium in the former, and requiring a decade in the latter before full maturity of mental and bodily powers is attained. There are correlative functional changes in the cortical regions at this epoch, and dormant emotions and latent hereditary tendencies are for the first time aroused into full activity. Any transmitted instability of cortical centres is very apt to appear at this time as emotional disorder, loss of self-control, and impulsive violence, which symptoms are the analogues of motor disturbances in neurotic childhood. The stupendous work of nature at this period in perfecting all parts of the individual organism, while providing for reproduction of the race, and adjusting the highest nervous centres to the complex relations of adult life, is often attended by

nutritive insufficiences, through actual want of constructive material for these varied purposes. This defect of nutrition of brain-centres is manifested as mental disorder whenever there is a predisposition in this direction. In woman especially there is apt to be scant formative material and impoverished blood, and in this state of unstable nutritive equilibrium the rhythmical diversion from cerebral to reproductive tissues of even a small amount of nutrient fluid at the "nisus generativus" is sufficient to renew the mental disturbance.

When the constructive changes in the vascular, muscular, osseous, and reproductive systems have been accomplished, and the correlative transformations in the cerebro-spinal nervous system, and more especially in the psychomotor regions, have been completed, there is re-established a metabolic equilibrium, and the chief danger of psychic disorder may then be said to have passed, and in woman, if periodic mental disturbance does not then cease, the prognosis is unfavorable. As important complications and morbid epiphenomena of this physiological crisis are to be mentioned constitutional neuroses, cranial developmental defects, neurotic cutaneous affections, and functional sexual disorders, which heighten and complicate the action of this epoch as an exciting cause of Insanity.

The next physiological crisis to be considered is *maternity.*

The functional burden of the perpetuation of the race falls largely upon woman, and it is full of risks for both the mind and the body. In this crisis heredity plays a much less prominent rôle than in that of puberty, but it is still a complicating factor, which, as reason hangs in the balance, tips the scales of mental destiny on the side of disease. During gestation, especially in the last three months, there are important circulatory changes, and constantly augmenting reflex uterine influences, which react upon brain-centres which have to accommodate themselves to a host of new physical sensations, tinged with emotional ideas, maternal, apprehensive, and painfully depressing in case of illegitimacy. The crisis is apt to be somewhat more severe in primiparæ than in multiparæ, and it is certain that mental aberration is more liable to occur in primiparous parturition after the age of thirty-five.

It is thought by some that the sex of the embryo bears a more constant relation to the general degree of suffering of the mother than can be accounted for by coincidence or idiosyncrasy. Heredity, when it does appear, is often homologous and a repetition in the daughter of similar Insanity under like circumstances in the mother.

Previous attacks of mental disorder on the part of the mother are strongly predisposing elements.

Albuminuria, uræmic states, and eclampsia are complicating causes in occasional instances of the Insanity of gestation, which may be attended also by defects of nutrition and excretion, which are to be regarded in the same light as contributive etiological factors.

Parturition endangers mental stability through moral shock, which is greater in cases of illegitimate birth; through intense and prolonged pain, which may rise to the height of frenzy, and pass at once into continued maniacal delirium; through sudden and profuse hemorrhages eventuating in anæmic maniacal attacks; and through retention of excretory products in the system and infectious processes, or as the immediate sequel of eclamptic convulsions.

Contributory causative circumstances in this parturient crisis may be prolonged labor, the administration of anæsthetics, and instrumental delivery, and combined toxæmic and renal affections.

Post-partum causes of mental disturbance are hemorrhages, septic reabsorptions, lochial and lacteal suppressions, uterine inflammation, general infections, and toxæmic states, and, in mothers longing for offspring, grief in case of death of the child.

Finally, the forms of Insanity connected with lactation are due to general nervous exhaustion, malnutrition, anæmia and other pathological states of blood, uterine subinvolution, prolonged lactation and loss of sleep and undue solicitude as to the child, and, in case of hereditary tendency, phthisis pulmonalis is specially wont to develop at this lactational period.

The menopause is the most decided of the physiological crises. In all women, at the grand climacteric, there is more or less mental instability and moral variance similar to such as generally characterize the evolution and cyclic activities of the reproductive organs. The involutional changes are cerebral as well as sexual, and in this fact lies the explanation of the mental disturbances. The cerebral readjustment to the new order of things involves ideational, emotional, and coenæsthetic adaptations of a wide nature, and there is a complex equilibration of sensory motor and vasomotor functions to be brought about. That these involutional changes are accomplished with difficulty, and even open disorder, there is abundant symptomatic evidence in the paræsthesias, local hyperæmias, hemispastic, and general vasomotor disturbances, in the emotional and in-

stinctive perversions, and in sensorial and intellectual aberration in those hereditarily predisposed.

Heredity is less active in this crisis than in the physiological epochs heretofore mentioned, though in occasional instances it is singularly repetitive in the precise similarities of symptoms of daughter and mother at this critical age. Acquired predisposition from previous attacks of Insanity is frequently to be taken into account in mental alienation at the change of life, and other elements of causation occasionally attendant upon the climacteric are toxic influences (especially alcoholic), confirmed nervous diseases, and exceptionally premature arterial degeneration and cerebral senile changes. Strictly speaking, the climacteric and the senile involution are perfectly distinct in women, but in some degenerate families there is a late appearance of the catamenia and an early disappearance of menstruation with all the signs of premature old age, and a merging of the two classes of involutional changes.

It is probable that in most climacteric mental disorders senescent failure of the vasomotor system is causative in some degree, and the syncopal, epileptiform, and congestive cerebral attacks common at the menopause tend to confirm this view. The vasomotor failure and the consequent prolonged circulatory disturbances of brain-centres are more potent etiological agencies than ovarian disease, local hemorrhages, and uterine displacements, occurring at this epoch.

Analogous to the menopause in women during the fifth decennium, but resting upon a narrower physiological basis, is the climacteric in man in the sixth decennium of life. In man it is not a question of the extent of tissue-changes or of a balancing anew of cerebral and peripheral organic relations so much as it is of the disappearance from the higher representative centres of desires and varied emotional phases of mental life, springing originally from the sexual instinct, which is predominant in indirect influences upon the mind.

Intellectual prime coincides with the full height of sexual vigor, and any marked permanent decline of sexual power has a decided psychic effect.

It is the physiological rule, that there is in the sixth decennium a sexual involution, manifested in some men by diminution of desire, in others by loss of appetite and ability, and in neurotic subjects by complete impotence, which may be the immediate cause of suicidal melancholia. The physiological fact of climacteric sexual involution is not to be denied, but the etiological value of the fact

may be cautiously interpreted to mean simply that it may be a determining factor of mental disorder favored by strong hereditary predisposition.

The final physiological crisis of life is senility. The involutional changes are universal at this epoch, involving osseous, muscular, nervous, and glandular tissues.

The whole significance of the epoch as regards the organ of mind lies in excess of waste over repair, and progressive brain-atrophy, more especially of cortical elements, which eventuates in mental decay. The usual changes of mind in old age are too well understood to be mistaken for Insanity, but when there is a rapid decline of mental powers and sudden alterations of character, it becomes difficult to draw the line between physiological and pathological involution.

The most important etiological influence of this epoch in its bearings on mental disease is the general atheromatous degeneration of cerebral vessels, also particularly of the carotid, vertebral, and basilar arteries, which with narrowed lumen fail to furnish a due supply of nutrient fluid. In the absence of atheroma of these large vessels pathological states of the arterioles and miliary aneurisms may exist. Rupture of cerebral vessels, coarse brain-disease, and focal lesions are mentioned by some writers as causes of senile Insanity, but they pertain rather to organic dementia.

Heredity is not as important as in the developmental epochs, but in some families Insanity only appears as the result of senile degeneration. On the other hand, general exciting causes, such as mental strain, business worry, and general unhygienic influences, and excesses of all kinds, act with unusual effect on a brain without resistive power, and which has already entered upon a natural decadence.

The neuroses in the light of causes next require a brief review. Chorea, hypochondriasis, hysteria, neurasthenia, and epilepsy are pathological states of the nervous system allied in some degree to Insanity, into which they sometimes pass abruptly, and at other times by gradual transition.

Such indeed is the intimacy of pathological relation that these functional neuroses and the psychoses may precede, follow, or mutually replace one another by vicarious transformation. These intimate pathogenetic relations will be dealt with in the clinical part of the work, and it is only necessary to note here the farther fact

that these neuroses vicariate with the psychoses hereditarily, as well as in the same generation and individual. Patients suffering from these neuroses beget insane children, who in turn have offspring afflicted with these neuroses. The most hopelessly insane, general paretics, do not beget paretic but epileptic children.

Epilepsy, as an independent and permanent neurosis, is followed by mental deterioration in more than fifty per cent. of all cases. The various forms of Insanity in which it results will be later described.

In all the established neuroses there is a gradual but persistent psychical degeneration, which effectually prepares the way for Insanity.

Taking a more comprehensive view of the whole subject, it may be said that these neuroses consist essentially in a pathological reduction of the higher nervous centres in the same direction but less in degree than that present in Insanity, and that they constitute the preliminary degenerative processes of which the mental disorder is the final stadium in the individual, or the final hereditary outcome in the course of generations.

The toxic origin of Insanity is of numerical and substantial importance.

In a monograph published four years ago by the writer, on " The Toxic Origin of Insanity," it was estimated that thirty per cent. of all cases of mental disorder were due to toxic causes, and subsequent study has confirmed the view that this was not an over-estimate, and that in all truth and probability a considerable addition might be made to the numerical strength of this statement. It is variously estimated by different authorities that alcohol alone, through its toxic action, accounts for from ten to fifteen per cent. of all cases of Insanity, regarding simply its direct, and ignoring its much wider indirect, effects.

It would be out of place to enumerate at full length the toxicological substances which are capable of exerting a causative influence in mental disease.

The toxic agent may be animal, vegetable, or mineral; it may be ingested in fluid or solid form; it may be respired and enter the system through the lungs, or it may gain access through the cutaneous or mucous surfaces.

The poison, once in the circulation, has a pathological action upon nutrition and upon the vasomotor system, and then its bane-

ful effect falls next upon the cerebral vascular system and upon ganglionic and cellular structures. The promptness and the persistency of the various poisonous effects and the nature of the resulting mental aberration will be described in later clinical chapters.

The poisons most productive of Insanity, and the toxic states to which they give rise, may be briefly enumerated as follows: Alcoholism, hydrargyrism, plumbism, arsenicism, atropinism, morphinism, cocainism, haschischism, chloralism, bromism, nicotinism, etherism, chloroformism, oxy-carbonism, iodinism, iodoformism, hyoscyaminism, and phosphorism.

It is important to remember that any drug, not excluding standard pharmacopœial remedies, if pressed too far, may damage the nutrition of brain-tissues, and become the exciting cause of mental alienation in cases with hereditary or acquired predisposition. The individual resistance to toxic influences varies greatly, as is constantly to be seen in those exposed by occupation to carbon disulphide, turpentine, aniline, and other poisons, and there is a like individual variation in the resulting mental disorder.

Auto-intoxications causing mental disorders demand attention in this connection. The toxic agents thus far considered have had an external origin, but there are poisons generated within the system capable of deranging the mind.

The mental disturbances of uræmic intoxication are familiar to the general practitioner, and they sometimes pass into confirmed Insanity. Prolonged diabetic conditions may also be direct etiological factors of mental disease. Diabetes mellitus also bears indirect and hereditary relations to the psychoses, with which it may in the same individual form also a distinct alternation.

Septic reabsorption is a causative element in certain cases of puerperal mania, and the perverted secretions of many acute insanities suggest the toxæmic origin of the disease.

In other cases of Insanity the highly morbid secretions and excretions, and the generally defective metabolism, and the frequent obstipation favoring intestinal reabsorption of waste products, all tend to the view of auto-intoxication, as at least a fitting and rational explanation of the mental disturbance, and the relief afforded by antiseptic treatment in such cases would seem to confirm this idea. Modern chemistry has revealed the highly complex constitution of brain-tissues, and if the varied biochemical products of cortical cellular disintegration accumulate, it is possible that there may be

generated cerebral toxins, *in situ*, and that there may be an actual brain auto-intoxication.

The study of experimental intoxications in animals and bacteriological researches in toxæmias of the nervous system is too broad a subject for discussion here, but there is much therein to support the hypothesis of auto-intoxication as a cause of Insanity.

The psychoses from infectious disorders and acute affections of internal organs are not uncommon. The infectious disorders to be here enumerated are scarlatina, variola, rubeola, cholera, influenza, diphtheria, and erysipelas; and pneumonitis and acute inflammations of viscera are the affections to be noticed.

The mental disturbance may appear in the prodromal stage of the infectious disorders, or at the height of the febrile movement, or in the convalescent stage, or as a more or less distant sequel.

The mental aberration of the incubatory stage is to be attributed to the action on cerebral centres of the virus already in the circulation, and at the acme of the infectious disorder it is due to the specific virus, to high temperature, to waste products and micro-organisms in the blood, and to hyperæmia of cerebral centres, and in the convalescent stage it results from nervous exhaustion, profound nutritional defects, cortical deteriorations, heart-failure, and cerebral anæmia. It occasionally happens at the height of the infectious disorder that the meningeal membranes are acutely inflamed or extensive cortical lesions occur, as the writer has repeatedly (on autopsical examination) found in insane patients dying from epidemic influenza.

Exposure to cold or other cause of sudden repression of the acute exanthemata has also been known to occasion an acute maniacal outbreak.

Pneumonitis and other acute inflammations of internal organs, tonsillitis, gonorrhœa, and cutaneous eruptions may be the immediate cause of mental disorder, and the hydrophobic virus may lead to acute mental aberration in the fatal termination. The pathogenetic relations of these various affections will be fully discussed in the clinical chapter on general systemic morbid states.

The diatheses, in their causative relations to the psychoses, naturally appear in this connection. The diatheses more especially concerned in the etiology of Insanity are the phthisical, rheumatic, podagrous, pellagrous, malarious, anæmic, cancerous, limopsoitosic, postfebrile, and myxœdematous.

The immediate causative, as well as the hereditary relationships of Insanity and phthisis pulmonalis have long been recognized. Mental disorder arising during rheumatism and gout has been explained by metastasis, but there is no longer any doubt that actual lesions of nervous centres, sufficient to account for the psychic disturbance, do occur in the course of these diseases in certain cases. The endemics of Insanity in various parts of Europe, more especially in Spain, Italy, and France, due to the action of diseased maize, are already matters of medical history, and the mental disorder is only one among many groups of symptoms of the pellagrous disease which provokes similar psychic disturbances to those produced by ergotism.

Insanity not only arises from malarious poisoning, but it may appear vicariously of other symptoms of intermittent fever and during apyrexia. Anæmia always predisposes to mental disturbance, of which it may also be the exciting cause, if sufficiently profound to deprive the brain of such nutrient fluid as is essential to its normal action.

Cancer, as an etiological factor in mental alienation, is rare, but undoubted examples of it are on record.

Starvation during sieges in war times and in cases of shipwreck gives rise to mental disorder, and it is an important element of the causation of morbid hæmic and neural alterations and of mental disorder in many instances in which extreme inanition persists in spite of efforts at forced alimentation. A minor degree of the limopsoitosic diathesis, lowering vitality and nervous force and the power of resistance to the inimical influences of the environment, is among the poverty-stricken masses the world over the most universal and deep-seated cause of mental disorder, as of disease in general.

Postfebrile diathetic states occasion mental alienation through general malnutrition, and special forms of wasting of cortical tissues, and enfeeblement of cardiac and vasomotor action, and continued defects of digestion and secondary assimilation, and the imperfect elimination of the products of retrograde metamorphosis. The myxœdematous diathesis results in mental disorder in many cases, and the relations of the thyroid gland to mental integrity are very remarkable. It has been suggested that one function of the thyroid gland is hæmic depuration, and that, therefore, through loss of its action, toxins accumulate in the system and occasion Insanity. Whatever hypothesis be admitted, the fact remains that in atrophy

and morbid (goitrous) states of the thyroid gland, and after its surgical removal, defects and disorders of intellect often appear. Thus certain forms of idiocy, sporadic cretinism, cachexia strumipriva, and myxœdema are attributed to functional or organic disease of the thyroid gland, and what has long been known as the Insanity of Graves's disease belongs in the same pathological category, probably, though exophthalmic goitre has been described as causing a distinct form of mental disorder. The cutaneous anomalies, convulsive states, and general mental enfeeblement in cachexia strumipriva following thyroid ablation, and causal glandular relations in acromegaly, as well as the facts above mentioned, show the importance of the glandular system as regards elimination and neutralization of toxic waste products in the blood, as well as its direct influence on normal metabolism, and the immediate bearings of this system in Insanity will doubtless be understood with the advance of science.

Diseases of the cerebro-spinal nervous system and traumatic lesions are direct etiological factors of occasional mental disorder, to which they may bear the relation of exciting or of predisposing causes. The presumption that diseases of the nervous system, more especially of the brain, would affect the mind is so natural that it is necessary to guard against the inference of cause and effect from mere sequence alone. The cerebro-spinal disease and the Insanity following it may be only common symptoms of some general pathological process due to syphilitic or alcoholic degeneration of nerve-tissues, and the " post hoc ergo propter hoc " view of the case would not be correct.

In some instances, however, the Insanity is clearly the sequel of the nervous disease.

Encephalitis is a common cause of idiocy and imbecility, and in its subcortical forms later in life it often determines mental disorder. Multiple sclerosis not infrequently results in aberration of mind, and, in general, diffused lesions are more apt than focal disease to cause Insanity.

Tumors exerting pressure on cells, fibres, and vessels of the brain, and causing irritation, are also a source of alienation, especially when multiple.

Arterio-sclerosis, embolism, thrombosis, necrosis, aneurisms, abscesses, hemorrhages, and hydrocephalus are brain diseases followed by occasional mental disorder.

Meningitis is often causative of active mental aberration, which

may succeed the ordinary form of delirium. Middle-ear disease is important because followed by meningitis. Locomotor ataxia not rarely precedes mental disorder, and in ascending cases of general paresis it may be the initial process.

Paralysis agitans and hereditary chorea are often followed by Insanity, which is also occasioned by polyneuritis, especially of alcoholic origin, though in a marked case in the writer's practice it was due to arsenical poisoning.

Commotio cerebri may be the direct occasion of serious mental aberration. In one case observed, the mental disturbance followed promptly cerebro-spinal concussion, with great confusion of ideas and almost total amnesia.

Trauma capitis may excite mental disorder by the direct cerebral shock, or by the secondary resulting changes in cortical tissues, as well as by accompanying hemorrhages into brain-tissue, or depression of bone exerting permanent pressure and acting as a constant source of encephalic irritation.

Insolation is an important cause of mental disease, either from the reflected or the direct rays of the sun, or from artificial heat to which many are unavoidably exposed by occupation. It is a slow but sure cause in those predisposed hereditarily and compelled by business to reside in hot foreign climates. Permanent mental weakness or instability is developed readily in infants by thoughtless exposure to artificial or solar heat. A very hot day in a very large city always kills some infants and makes mental cripples of others.

"Coup de soleil" has an etiological action, sometimes of a traumatic nature, and again it is provocative of toxic changes, and of general nutritive lesions, and mental disorder is the remote result, following sometimes at an interval of several years. Surgical operations with prolonged anæsthesia may be the exciting cause of Insanity, and the extraction of several teeth at one sitting has been followed by an acute maniacal outbreak, and in one instance within the writer's observation this happened when anæsthetics were not employed.

There are certain lesions of brain membranes or of brain tissues which result frequently in Insanity, such as those provoked by the alcoholic poison or syphilitic virus, or by general involutional cortical atrophy, or by pachymeningitis hemorrhagica interna, or by tubercular basilar meningitis or cerebro-spinal meningitis.

Substantially, it may be affirmed that disease which simultane-

ously affects many or large tracts of the ideational or emotional centres is causative of mental disturbance. Thus cysticerci, if sufficiently numerous, may constitute such wide brain-lesions as to occasion Insanity, though hydatid cysts and echinococci and brain parasites in general may exist without any psychic derangement, and the same rule applies to intracranial exostoses.

Again, the suddenness of development of the cerebral tumor or other disease, rapidly increasing cerebral pressure and giving no time for compensatory adjustment of the brain circulation, is especially dangerous. It may be said of brain diseases in general that they tend to produce mental disorder in the same degree that they interfere with the circulation or nutrition of the cortical centres.

Anæmia and hyperæmia of the brain, if intense and long continued, however produced, become decided and direct etiological elements of mental disorder, of which the indirect factors are the diseases causing the circulatory derangement. Extensive arterio-sclerosis, leading to renal and cardiac disease, and finally brain-anæmia and nutritive cerebral lesions and Insanity illustrates a clinical chain of causal events, which may be much shortened if, as sometimes occurs, the cerebral blood-supply is directly diminished by arterio-sclerosis of the internal carotid arteries.

The pathogenesis of Insanity from syphilis shows the variety of ways in which the same cause may act. Thus syphilis may act though periostitis or exostoses involving the membranes or exerting pressure on the brain, through chronic basilar meningitis, or encephalitis, through periarteritis and aneurismal dilatations, and endarteritis and occlusion of middle cerebral and basilar arteries; through luetic tumors and obstructed cerebral circulation; through cellular degenerative changes in both superficial and deep cortical layers; through pathological changes in the blood and general nutritional defects; through the immediate dyscrasia and effects of the luetic virus; through disease of internal organs and of the organs of special sense; through the resulting epileptic, ataxic, or paretic disease; through congenital forms of the affection, and, finally, through its psychical morbid influences.

Furthermore, when it is borne in mind that syphilis frequently acts in conjunction with excesses, "in venere et baccho," some idea is gained of the complexity of the etiology of mental disorders, even in the presence of a known prime factor. Alcohol, as a causative agent, has similar and equally varied pathogenetic relations.

The reflex and sympathetic origin of mental disease is next to be considered.

The higher nervous centres are intimately connected with spinal centres, with the entire peripheral nervous distribution, and through the sympathetic nervous system with all the organs of the body, and the reflex relations thus established form the physiological and anatomical basis of what are termed reflex or sympathetic mental disorders. It is no more remarkable that the cerebral centres should respond to reflex influences than that the spinal centres should thus react to peripheral stimuli. In infancy the cerebrum is especially prone to disturbed functional action from eccentric irritation, as seen in delirium from intestinal disorder, or convulsions from worms; and the vomiting of pregnancy, and like visceral sympathies, show the reflex connection of the internal organs among themselves. That the brain as the highest organ should suffer sympathetically from disease of other organs with which it is in intimate relation and over which it presides is a natural supposition.

If, as has been recorded by good authority, a patient with tapeworm suffers from confirmed melancholia, and is relieved completely of the worm and of the Insanity by a vermicide, it goes far to confirm the reflex nature of the mental disorder. Helminthiasis is by a consensus of opinion of many writers a common cause of Insanity. The motor, sensory, and psychic disturbances of dentition are also reflex, and the convulsive seizures, continued pain, and mental disorder have a common origin in the peripheral irritation.

Gastro-intestinal disease of a functional nature is usually attended by mental irritability and gloom, which readily pass into pathological states of mind.

Irritations of cutaneous as well as mucous surfaces may occasion mental disturbance, as is seen in herpetic and other neurotic eruptions, and likewise pruritus vulvæ has given rise to maniacal excitement. It would appear that there is a great individual difference in the keenness of organic sympathies, and in the susceptibility to mental disorders of peripheral origin, and it becomes largely a question of the relative explosiveness of the higher nervous centres and the intensity of the acting peripheral irritation. Irritating ingesta may provoke despondency in one case, epileptic seizure in another, and have no effect in a third instance. Idiosyncrasy it may be which determines that one out of many women suffering from prolapsus uteri should become insane, and be relieved by the replacement of

the organ, as has been reliably reported. The same idiosyncrasy prevails as regards the pathological conditions of the pelvic organs as causes of Insanity cured by operations. It is observed that the psychic result sometimes varies diametrically in different cases, the same surgical procedure causing or relieving the psychosis in different patients, just as the exceptional woman is rendered insane by gestation, or, if already insane, as an equal rarity, may be rendered rational by it, only to relapse after the birth of the child.

The ancient writers observed that the sudden suppression of hemorrhoidal flux or other chronic discharges was followed by mental disturbance, and various instances of this have been recorded in modern times. "Menstruatio suppressa" may provoke mental disorder, which is not merely a coincident symptom, but the result of the intense cerebral hyperæmia caused directly by the menostasis.

Likewise, the mental disorder with *metastasis* in gout, rheumatism, or suddenly suppressed acute exanthemata, is due to active cerebral congestion or actual inflammation.

Clouston ("Mental Diseases," p. 416) says: "I have seen more than one case where the healing of an old ulcer was followed by an attack of Insanity. I have seen instances of erysipelas of the face 'striking inwards' and causing an attack of acute mania."

The widespread disorder of nervous functions from local irritation is well illustrated in the presence of some small foreign body in the sole of the foot, giving rise to tetanic seizures and a possible fatal termination, or, if there be psychic convulsibility, maniacal symptoms may appear.

Cicatrices involving sensory nerves may be the painful points of reflex irritation exciting disorder of the cerebral centres, and cases have been recorded in which pressure on these painful points heightened the mental disturbance, just as pressure on hysterogenic zones may provoke hystero-epileptic seizures.

Severe neuralgias are to be included among the reflex exciting causes of mental disorder, which they may replace or precede, as is the case also with migraine. In fact, prolonged and severe pain of any kind is, in those predisposed, a competent exciting cause of Insanity, which, it is true, may be due to loss of sleep and disturbance of nutrition caused by the pain, or to the cerebral vasomotor disturbance which it provokes. Visceralgias often precede for years, and, as far as the substantial form of the psychic disorder is concerned, constitute the "materies morbi" of hypochondriacal Insanity.

In a paper published two years ago the writer described the intimate relations of the pneumogastric functions to forms of psychic derangement, and it can no longer be doubted that pneumogastric disorders may have direct pathogenetic bearings upon mental disease, and that they should be numbered among the reflex causes of the same.

The irritating and radiating source of the mental disturbance may be in the sensorial periphery, in the eye, ear, or nose, following operations, injuries, or diseases of these organs. The exceptional nature of this source of mental disorder is not a reason for its exclusion, and it is presumed that a predisposition to Insanity exists in these instances, of which the writer has seen several. In like manner, but not to the same degree, traumatic injuries, or painful affections of the extremities, or of any portion of the nervous peripheral distribution, may determine a reflex psychosis.

Peritonitis, hepatic abscess, larvæ of frontal sinuses, Menière's disease, and numerous other affections might be mentioned under this head of the sympathetic and reflex origin of mental disorder, but enough has been said to convey the idea that disease, not of the organ of the mind, but of distant organs, or of parts of the nervous organism, may become the reflex cause of psychoses.

The further discussion of the mode of origin of these psychoses would surpass the due limits of this chapter.

The psychical causes of Insanity remain to be considered. They are also termed *moral*, as distinguished from physical, causes, and they are usually classed among the exciting rather than the predisposing factors of mental disorder, though, as a matter of fact, these are arbitrary, though, for didactic purposes, convenient, distinctions.

Psychical causes, if prolonged and severe, determine physical lesions, and they not only predispose to, as well as excite, mental disease in the individual, but, contrary to usual teaching, they are a constituent element in the formation of hereditary predisposition. A little study of the present and the past science of the human mind shows that the modern man, like the historic man, is completely governed by ideas which, issuing from the highest and innermost recesses of his being, assume authoritative control and wield the sceptre of destiny over his future physical and mental welfare or misery. Many of these ideas are the natural germinations of conceptual seed sown by ancestral acts, and predestined to bring forth fruit after its kind. The hereditary suicide, having purposely, per-

chance, been kept in ignorance of his fatal heritage, struggles in vain against the demon-idea, which culminates in self-destruction, accomplished, as by his parent, in a certain way and at the same age. In like manner, one with alcoholic, libertine, or criminal heredity may struggle through life against the tyranny of innate ideas. It can be readily understood that certain classes of ideas, whether emotional or instinctive, have by repeated transmission gathered hereditary inertia, and act, therefore, in some persons with much greater force than others. The individual equation in the patient under examination is of great importance as to the actual force or value of any particular psychical cause. Every patient has his own vulnerability through some particular ideal area. The mother clings to her young, the miser to his gold, the king to his throne, the maid to her lover, the general to his renown, the poor man to his cottage, the nobleman to rank and title, the author to literary fame, the actor to popularity, the man to his family and success in the world, the physician to his reputation, the business man to his credit, the Crœsus and mammon-worshipper to his millions, and the impoverished masses to the helping hand that doles them out a scant supply of the necessaries of life. Psychical vulnerability, therefore, is as varied as inherited peculiarities, individual temperament, and acquired habits of mind, and the multitudinous external relations of life. It is altogether a question of the potential relationship between the particular psychical cause and the individual mind upon which it acts. Some psychical causes, which become direct excitants of mental disorder, are astonishingly inadequate, such as practical jokes, "hazing" in college, failure upon examination, the reprimand of a child by a parent, the death of a pet animal, all of which have been known to lead directly to suicide or insanity. One young man of temperate habits and previous good health, poor and economical, bought a lottery ticket, which won for him several hundreds of dollars, which threw him into great hilarity for twenty-four hours and then into boisterous mania, from which he recovered at the end of some weeks under the writer's treatment.

When an idea strikes the mind with great force, particularly if it impinge directly upon the most vulnerable psychical area, it liberates a large amount of nervous energy, which may be transmuted into associated ideas, or transformed into related emotions, or spent in motor demonstrations; but, if it find no appropriate outlet, as is frequently the case with powerfully depressing ideas,

it then reacts banefully upon the glandular system, upon secretion and nutrition, or, finding no channel of escape, it results in painful mental tension, which, if prolonged or repeated, ends in acute melancholia.

The following are the modes of pathological action of psychical causes which eventuate in Insanity.

In the first place, there is the direct dethronement of reason by the immediate action of an emotional idea.

Syncope upon the reception of the news of a calamity is a frequent occurrence, and death, though rare, is an equally well authenticated result. In other instances there is an arrest not of vital and cardiac functions, but of intellectual functions. The patient is struck dumb, is motionless and speechless, and there is absolute inertia in the emissive sphere of mind, and primary dementia ensues at once. Sudden fright, likewise, may be followed by partial or complete loss of consciousness, and dementia appearing immediately or at the end of a few days. Anger, too, may pass directly into maniacal frenzy in those free from any epileptic tendency, and in this instance there may be confusion, but no actual loss of consciousness. This widely diffused, radiatory, and perturbatory action of a single emotion, which finally involves the whole psychic sphere in disorder, is a remarkable psychological phenomenon.

Secondly, Insanity results from the cumulative action of psychical causes. The patient may react manfully against loss of fortune, and, by an effort of will, may retain his mental equilibrium under a rapidly succeeding loss of position, but the following death of an only child may furnish the cumulative pathological action from which the Insanity results. This mode of origin of the psychoses is constantly encountered in psychiatric practice, for there is much truth in the saying that "misfortune never comes single-handed," and only the most soundly and compactly fashioned minds can withstand the blow upon blow which foul and cruel Fate often deals an unfortunate victim.

Thirdly, there is another form of psychical traumatism, less sudden than those above described, and resulting from the constant daily repetition of lesser moral shocks, such as the sensitive wife of a drunkard, or a speculative financier, or numberless persons in the endless trying situations of life might have to endure. These constantly repeated and prolonged psychical causes produce cardiac and circulatory derangement, cerebral vasomotor disturbance, and cor-

tical nutritive lesions, disordered disgestion and changes in the blood, neurasthenic and neurotic conditions, and, finally, distinct psychoses.

The manner of reaction to these minor forms of psychical injuries varies much in individual cases. In some the psychical shock provokes continued diabetes, which, in fact, may at first precede and then alternate with the psychosis. In other cases the sequence of pathological events is psychical injury, albuminuria, and a psychosis which is recoverable; but another sequence is psychical shocks, repeated and long continued, albuminuria, vascular degeneration, renal disease, and incurable Insanity.

Among the customary psychical causes, grief at the loss of children, husband or wife, brother or sister, or devoted friend, is specially potent. It works all the more surely when combined with personal attendance upon the departed one through continued sickness. It is common in aged couples to see the loss of a life-companion followed by death or insanity of the survivor.

Domestic trouble among women includes the thousand petty worries of a wife, mother, and housekeeper, which recur daily and hourly, and, like the constant dropping which wears the stone, consume the nervous forces and result in mental disaster. There is a corresponding cause in men, known as business worry, which includes the responsibilities, annoyances, and distressing occurrences of active professional or commercial conflicts with the inevitable misgivings as to future success.

Mental strain and overwork is an often-mentioned cause. Intellectual exertion alone, unattended by any moral perturbation, is seldom an element of causation, but mental labor performed as a matter of necessity and during emotional suffering is an efficient factor. Indeed, prolonged contrariety of feeling and action is ever a strong provocative of mental alienation. The forced action contrary to feelings, the outward appearance of joy with inward sorrow, the compulsory line of conduct against judgment, the force of circumstances which enslave and bind the free spirit of man, these are influences which strain the strongest moral fibres.

Love and jealousy are complex emotions, and the subject of them always presents an area of intense vulnerability. Disappointed love is, in women, an occasional cause of a psychosis, but this occurrence in men is very rare, and it is then to be attributed to wounded pride rather than to unrequited love. Jealousy is a veritable demon among

emotions, and there is probably no keener torment than the fiendish rack of jealousy, to which the sequel is not infrequently suicide, homicide, or Insanity.

Disappointed ambition, among men, is a much more efficient cause than disappointed love, and here, too, the nature of the influence is more nearly allied to wounded self-love.

Fear is the basis of a great generic group of emotional causes. This emotion does not need definite form to work harmful effects, for fear of evils which have not assumed specific shape is equally disastrous to mental health. The element of uncertainty and the possibility of all kinds of evils only gives the greater room for the play of a panphobic phantasy. Space will not permit the naming of the great variety of fears in neurasthenic individuals. The etiological importance of fear lies in the fact that it is the most universal and primordial emotion, and directly allied to the fundamental instinct of self-preservation.

Loss of property and social standing is mentally survived by men of ordinary vigor, but if, as often happens, contrary to the rules of civilized warfare, the man fallen in the battle of life is, in addition to other misfortunes, trampled upon by the united vindictiveness of former opponents, mental disorder will result, except in the instance of rare courage and endurance.

> "Man's inhumanity to man,
> Makes countless thousands mourn,"

and the ruin of men wrought by enemies and persistent persecution of individuals has in all ages been a prolific cause of Insanity.

The wholesale exhibition of brute passion and national enmity and deeds of blood and iron, euphemistically termed war, abounds in psychical causes of widespread mental disorder.

Persecutions of individuals, also, conducted in the name of religion, ever have driven and ever will drive more men into Insanity than into Heaven.

Imprisonment, and particularly solitary confinement, not in the professional, but in the accidental criminal, is a cause of mental aberration. One element of causation in this case is analogous to deprivation of the special senses, for it is not the withdrawal alone of social intercourse, but of accustomed sensorial impressions, which causes the psychical distress. The loss of the special senses, especially of the intellectual senses of sight and hearing, is a recognized

psychical cause of Insanity. The arrest of the constant ingoing current of specialized impressions received by the brain cortex from the acoustic and optic periphery is the deprivation of a sensorial pabulum essential to a normal state of mind, and intellectual starvation, pain, and aberration may follow.

Another psychical cause is the sudden cessation of business activity for a life of idleness, and any forced changes in the habits of old persons act in like manner in disturbing mental equilibrium.

Dreams have important causative relations to mental disorder. They have always had much influence on relatively ignorant or superstitious minds, and they sometimes arise directly from organic sources and may be truthful harbingers of coming disease; and, again, by constant repetition, they become a sort of mental habit, and may form the prodromal psychic phenomena of Insanity.

The dream-state is one in which all voluntary mental acts cease; the power of attention and of comparison is lost and the absurdities, therefore, of the ideas are not realized; judgment and self-consciousness are in abeyance; the accidental association of ideas and the association of ideas with organic and special sensorial impressions remains; phantasy and organic memory are active; conscious personal identity is lost, but cœnæsthetic personal identity—the sum of subconscious organic impressions, which is the material basis of personality—remains and constitutes in a dream the only real thing, and the one fixed point about which phantasy plays, from which it ever departs, and to which it ever returns.

The impressions of the dream-state are so vivid in neurotic persons that they may be mistaken for realities, and they thus form the starting-point of insane delusions.

In very exceptional instances the delirium of Insanity may be the direct continuation of hypnagogic hallucinations and a case of this kind is related by Maudsley (" Pathology of Mind," p. 41).

In the insane the line between dream-life and real life may completely disappear, and there will then be no distinction between the impressions of dreams and illusory impressions of the waking state, just as in a still deeper state of mental decay there is no differentiation between the real and the unreal.

There are certain disorders of sleep which are of etiological importance. The brain repairs its daily waste only during normal sleep, without which nutritive deficiency is sure to result in cortical centres. Insomnia is the most constant prodrome of Insanity.

There is a considerable individual variation in the amount of sleep required, but the average of seven hours out of twenty-four admits of no wide departure without risk to mental health, and the logical sequence of prolonged insomnia is mental disorder.

Somnambulism is an expression of a neurotic constitution, and, in various cases which have come under the writer's treatment, it would seem to have constituted a prolonged preparation for Insanity. It not infrequently involves the sufferer in ridicule, in mental distress, and at times in real difficulties, and becomes, finally, a direct exciting cause of mental alienation.

Hypnotism is in itself a pathological nervous state, and, if it be too frequently induced, it may be the direct means of establishing a psychosis. Individual infection and communication of Insanity is occasionally witnessed in psychiatric practice.

The influence of those clearly recognized to be insane upon the sane persons about them is very slight, and is limited chiefly to unconscious imitations, by attendants, of the mannerisms of the insane. There are instances on record of paranoiacs who inoculated large numbers of persons with their religious delusions, but, as soon as these paranoiacs were recognized as insane and placed in seclusion, their devoted followers ceased to believe, and the endemic folly was at an end. Communicated Insanity, strictly speaking, is that which is produced in the sane by the insane, and the different ways in which this may occur are best made known by illustration. A member of a family has paranoiac ideas of persecution, and, having naturally a strong influence, persuades other members to believe in his delusions and to act upon them. Insanity is communicated in this way, as a rule, from older to younger persons, from stronger to weaker minds, between those already alike in neurotic disposition and accustomed by habit to trust in each other, and usually only to one person at a time. A rare and interesting variety of contagion of latent mental disorder is *Insanity by mutual infection.* Thus, two neurotic sisters of intense feelings and flighty imagination, by mutual suggestions and fortifications of false ideas, persuade each other into belief in the most absurd delusions. If kept separate they may not become insane. After recovery from a first attack, if thrown together, mutual reinfection will probably occur again.

Apart from imposed infection by a stronger on a weaker intellect, and mutual infection—the combined outcome of two neurotic minds—there is Insanity by sympathetic suffering. A nervous and

sympathetic woman nurses an insane relative (who is passive as an agent of infection), and, partly through suggestion and imitation, but chiefly through sympathetic suffering, becomes insane herself. The communication of delusions between insane patients may sometimes be observed, but it is not a full exemplification of the type in question. There is also the exposure, under like circumstances, of two or more persons who, from the same cause, become deranged at the same time, and this is known as simultaneous Insanity.

Mental disorder as the result of simulation is of rare interest, and it accords with known psychological reaction in normal minds.

It is well understood among tragedians who have to play the same part through a prolonged engagement that no small volitional effort may be required to resist temporary emotional perversions, or even permanently disagreeable frames of mind engendered by their oft-repeated rôle. There is also the analogy of the imitation by nervous persons of neurasthenic symptoms, which thus become confirmed and real.

Mental disorder as the result of simulation is presumably a possibility only in those having a psychopathic disposition.

Finally, *moral contagion and epidemics of Insanity* remain to be noticed among the psychical causes of alienation.

Comparative psychology furnishes the prototype of the principle here involved, in the imitation of example and in the contagion of emotions, and in the swiftly spreading epidemic influences among animals. There is a wide field for the study of contagion of minor nervous affections among children in public schools, in which habit-chorea, balbuties, sneezing, coughing, and many neurotic peculiarities show an epidemic tendency. There are instances of the more serious nervous disorders developed by contagion; and syncope, chorea, hysteria, epilepsy, and other convulsive disturbances have been known to appear in epidemic form. The transition from epidemic neuroses to epidemic psychoses is natural and not difficult to understand. Thus there is the principle of imitation and the contagion of example typified in comparative psychology, especially active in the lower forms of human intelligence, appearing in physiological psychic activities, and characterizing minor pathological symptoms of the nervous system, and finally manifested in epidemic neuroses and psychoses.

There never has been a time in the history of the world when a century has elapsed unmarked by endemic or epidemic diseases of

the nervous system, including sensory, motor, and intellectual disorders. The historic period which most continuously abounded in these epidemics was the Middle Ages, but there are Egyptian, Greek, and Roman records of similar psychological anomalies. The moral and intellectual aberrations which have been most widely epidemic have usually been strongly tinged with peculiar religious beliefs and practices. Among the Greeks and Romans there were endemic lycanthropic manias, and in the early centuries of the Christian era demonomanias were epidemic. In the fourteenth century there appeared in Germany the dance of St. John, in which thousands of people joined, dancing until they fell exhausted to the ground, and having often hallucinations, ecstatic states, and convulsive seizures. A similar epidemic was St. Vitus's dance, in 1420 A.D., which continued to appear remittently for nearly a century.

Tarantism in Italy exemplified in epidemic form, for more than two centuries, a like mental aberration, with motor and intellectual disturbances. Another instance is the epidemic madness, which reigned for many years in France among those termed "Convulsionnaires de St. Médard." A more modern example of epidemic contagious diabolism was the fanatic, cruel, and monstrous delusion of witchcraft in Europe and America during the two last centuries, which led to self-immolation or to persecution to death of nearly a hundred thousand human beings, a large percentage of whom were driven insane by the persistent false accusations of neighbors that they were in league with the Devil. The strong-minded went to their death protesting their innocence, but the weak-minded became deranged, and, filled with hallucinations and delusions, confessed the personal relations with the Devil of which they were accused, and also all manner of imaginary crimes, for which, in their profound dejection, they felt that they deserved the death to which they were put. Never before in the history of the world had there been such widespread production of Insanity by suggestion and accusation practised with fanatical cruelty.

The element of contagion was active in the propagation of the popular delusion of witchcraft, but it was not the direct etiological factor of the Insanity here mentioned, which is to be attributed to the causes above named. Did space permit, further instances of epidemic insanities would be adduced as interesting studies in pathological psychology, but enough has been said to give full weight to this point in the etiology of mental disorders.

Finally, the psychical causes of Insanity in general, as compared with the physical causes, are numerically estimated very differently by the opinion of different writers. French authors, from the time of Esquirol, have, like that great authority, considered that psychical causes play a more important rôle than physical causes, and some placed the figure of causation as high as from fifty to sixty-seven per cent.

The personal estimate among German authorities varies considerably, for some, like Griesinger, regard the psychical, and others, like Kroeplin, believe the physical causes to predominate in the total causation of Insanity.

English psychiatrists, as a rule, seem disposed to consider the physical causes the more important, judging from the etiology assigned in reports of hospitals for the insane in England, in which the physical causes the more important, judging from the etiology astion of three to one in cases admitted.

This same statement holds good for causation upon admissions to hospitals for the insane in America, in which, including heredity among the physical causes, twenty-five per cent. of admissions only remain as attributable to psychical causes.

The writer has already expressed his view that psychical influences are of active importance in the determination of morbid heredity. This fact, conjoined to the further fact that psychical causes co-operate largely in the causation of the acquired psychopathic constitution, must, if given due weight, add greatly to the relative etiological importance of psychical causes, which, if it were possible to correctly estimate them inclusively of these facts, would constitute a very much larger percentage of the causation of Insanity than that customarily accorded them in hospital reports for the insane in America and Great Britain.

CHAPTER V.

THE EVOLUTION, STADIA, CLINICAL PROGRESSION, AND TERMINATION OF MENTAL DISORDERS.

Inasmuch as mental disorders are manifested through anomalies of the nervous system, through functions varying so far from the physiological norm as to have passed into pathological limits, and as these wide departures from health are usually more gradual in origin and more continuous than those of ordinary diseases, it becomes important to make a special study of their evolution, stadia, clinical progression, and termination.

The general rule as to these particulars is deduced from the observation of large numbers of cases, and, when understood, it facilitates greatly a general insight into the clinical course and nature of Insanity, and also into its many exceptional varieties. The rule with regard to the special forms of Insanity will be in each instance given separately in the clinical part of the work, and the effort will be here to portray only the broad clinical features of the subject.

Evolution.—The evolution of Insanity is gradual, and, from the incipient perversion of organic functions until the first open mental disorder, there is usually a lapse of several months. Generally speaking, the temporal limits of the evolutionary stage do not vary greatly from those of the acute stage, and a slow development usually indicates a slow course of the disease. The evolutionary stage is characterized by a feeling of general malaise, by disturbances of sleep, digestion, and circulation, and by perverted nutrition and mental unrest and forebodings of evil. These incubatory symptoms become more and more marked, until they culminate in the acute mental disorder. This organic evolution may be completed in a week, a month, or not before a whole year, but the usual lapse of several months has been mentioned, and, in the simple psychoses, if an average for ten thousand cases were made, from the time of the first perceptible disturbance of vegetative and other organic functions

to the outbreak of the mental disorder, it would not probably vary far from three months. This time limit applies to the active evolution, through progressive pathological changes in all the physical functions, which in turn are followed by alterations of organic consciousness, by a sense of ill-being and depression of the fundamental emotional tone. But in some cases there is a pre-incubatory period of very gradual systemic changes, which may precede this active organic evolution of mental disease by months or years. Thus alcohol or other toxic agent for one or more years continues to effect changes in the glandular, vascular, and nervous tissues, and to diminish vital powers of resistance; and then comes the active evolution of symptoms of disordered digestion, nutrition, and circulation, with insomnia and depression of mind, which at the end of two or three months culminates in acute Insanity.

Psychical causes, likewise, such as constant domestic worry or business anxiety, may, through a pre-incubatory period of years, gradually accomplish vasomotor and nutritive disturbances of the higher nervous centres, and lower general vitality, before the evolution of the active perturbations of the entire organism, ending in mental disorder.

But, however varied the duration of the pre-incubatory period or the number of the etiological elements co-operative during the same, the stage of active evolution still appears, with such clinical features and time-limits on the average as have been mentioned.

And now, having stated the law of the active organic evolution of mental disease, it may be well to consider some of its chief apparent exceptions.

Puerperal, toxic, and post-febrile Insanity sometimes appears abruptly, but it will be found, on closer study, that there were secretory, excretory, nutritive, circulatory, or nervous disorders previous to the Insanity, but that they may have escaped attention, and, when this is not the case, it will be learned that there had been previous attacks of mental disorder, or that there were such active hereditary transmitted tendencies that a stage of preparatory evolution had virtually been accomplished. In all strongly hereditary cases the abrupt occurrence of the mental disorder may appear to be an exception, but, even in these instances, paræsthesia, neuralgia, angiospastic or angioparetic states, migraine or other neurotic symptoms will be discovered, on closer research, to have been prodromal to the mental aberration. Even in Insanity with the established major

neuroses there will be found the active evolutionary stage preceding the first attack, as well as the separate attacks in recurrent mania, in Insanity with the physiological crises, with the diatheses, and with gross organic lesions of the nervous system. The law that Insanity is developed at the height of a previous evolution of morbid functional changes in the organism seems to have a glaring exception in transitory mania, which may attain to its maximum within an hour. But, as nothing happens without a cause in nature, so nothing occurs without a cause in mental pathology. A careful scientific inquiry into cases of mania transitoria, as it will be seen later in chapters on clinical description, does not fail to discover the latent occurrence of previous pathological changes in brain-tissues, through alcoholic, febrile, epileptic, and other influences productive of the very explosive state of the cortical centres, which alone admits of this sudden form of Insanity. Whatever be the exciting cause of an abrupt outbreak of mental disorder, therefore, careful investigation will reveal the morbid preparatory processes fitting the system to take on the final pathological change, except in rare instances, in which it is presumable that there is a latent evolutionary stage which escapes the closest scrutiny.

Whether monomania constitutes an actual exception to the general law of development of mental disease is a matter of some doubt. It certainly does not in those instances in which monomania is developed out of the acquired psychopathic constitution. It approaches the nearest to an exception in the degenerative form known as original monomania, in which the Insanity would seem to be a gradual intensification of eccentricities of character. In tracing back the histories of several of these cases, which seemed to be typical of their kind, the writer has found an evolutionary stage of the morbid systemic changes at puberty or in connection with fevers or injuries or exposure to heat about the time the first peculiarities began to be noted, and the memories of which were only revived by much cross-questioning or letter-writing. So that, if the whole truth were known, it would be a question whether there be an original monomania as the gradual hypertrophy of native eccentricity or the outgrowth merely of inherited peculiarities of mind, and which has attained its acme, without any corresponding systemic changes or organic disturbances at any period. So that even the exceptions to the rule of the organic evolution of Insanity become doubtful. Since the brain is not only the organ of the mind, but

presides over and sympathizes with the functions of all organs of the body, it is safe to assume that, when it has reached the highly pathological state of which Insanity is the symptom, correlative systemic changes have already taken place. But it is not necessary to predicate this upon theoretical grounds or from à priori reasoning, since clinical and pathological observation has already established the fact. There is one more apparent exception to be noticed in the sudden outbreak of impulsive Insanity, as some term the homicidal and suicidal attacks and other impulsive insane actions, which develop without premonitory symptoms in rare cases.

The instances of impulsive Insanity here noted will, on investigation, be found to be connected with puberty, alcoholic excess, menopause, or emotional shock, and to have had ample time and cause for a latent evolution of systemic pathological changes, and, when such previous conditions are wanting in the history of the case, the sudden explosion of violent aberration can be traced to an epileptic origin.

The rapid development in some cases of periodic and recurrent Insanity is due to a morbid state of the cerebral nervous centres, which is hereditary, organic, insane evolution, virtually, since it determines the tendency to rapid nutritional defects of cortical centres, which constitute the latent systemic changes in these cases.

The organic evolution of mental disease takes place, therefore, first, through a relatively long pre-incubatory stage during the action of few or many causes, which gradually undermine the foundations of the mental superstructure; and, secondly, through a comparatively short stage of active systemic disturbances, which initiate the mental disorder.

The temporal divisions of the mental disease thus initiated, and the general order of its psychic and somatic phases will next come under consideration.

Stadia.—Insanity is ordinarily a prolonged pathological process with many symptomatic phases, and its division into stadia, in accordance with clinical facts, aids materially in its study. In fact, such is the complexity of mental diseases that a systematic analysis is absolutely necessary to their perfect comprehension.

Physicians who for some years see much of Insanity and read much about it, remain in doubt and confusion still, for want of a scientific method in mental pathology. The student is urgently advised to make an attentive study of the following analysis of this

subject, which is a practical key to the scientific comprehension of mental disorders, and a true method to the study of their various clinical forms.

Insanity is divided into stadia in accordance with the clinical phases of the disease, as will appear later. A stadium is part of an attack of Insanity. Stadia are composed of psychopathic states, which will be presently described.

Psychopathic states are made up of characteristic morbid symptoms, of which a definite description will follow. These morbid symptoms are divided into psychic and somatic. Also, these morbid symptoms in turn have component elements, which will be analyzed in the chapters on symptomatology, as they are not requisite to the present didactic dealing with this subject.

The stadia in regular order in Insanity running a complete course are as follows: 1. Stadium cœnæstheticum. 2. Stadium acutum. 3. Stadium debilitatis. 4. Stadium terminale.

The initial stadium is determined in type by the cœnæsthesis, and hence it is in fact a *stadium cœnæstheticum*. Cœnæsthesis is the state of organic consciousness arising as the resultant of all the organic sensations of the body, whether from visceral, muscular, osseous, vascular, cutaneous, or glandular sources. This cœnæsthetic state may be pleasurable or painful. It is painful, as a rule, in Insanity as well as in other conditions of disease.

This stadium cœnæstheticum accords, in the main, in point of time with the general pathological systemic changes described under the head of organic evolution, and naturally the resultant of all the organic sensations is disagreeable or even painfully depressive. To such an extent is this true that some writers have mistaken this cœnæsthetic stadium for a genuine stadium melancholicum, which they have declared to be the initial stadium, even in cases of mania. Knowing that this initial stadium is based physiologically on the cœnæsthesis, which is painful on account of the general morbid processes active in the system at this time, the psychopathic state of depression which prevails during this stadium cœnæstheticum is readily understood, and the incongruous supposition of melancholia as the prodromal stage of mania is avoided.

As a rule, then, this first stadium cœnæstheticum has a single clinical phase and is composed of a single painful psychopathic state, which gradually attains its height. The psychic and somatic symptoms are: Loss of interest in the outside world and painful in-

trospection, vague fears, perverted feelings and instincts, hallucinations, irritability and loss of self-control, impulsive tendencies, insomnia, anorexia, disorders of digestion, circulation, and nutrition, and gradual loss of weight. It is the altered and painful cœnæsthesis which causes the field of consciousness to be narrowed to self and self-suffering, giving a strong hypochondriacal tinge often to this initial stadium, and withdrawing attention almost entirely from outward things.

The duration of this stadium cœnæstheticum is from one to three months on the average. The exception is that this stadium is marked by an agreeable and exalted, instead of depressed, tone of feeling. This agreeable cœnæsthesis is the most marked feature of general paresis, and the initial stadium is in this case pleasurable and exalted, as it is also in an occasional case of mania.

It is difficult to say why this agreeable and expansive feeling prevails in disease, but it is due in some cases to the action on cortical centres of toxic products generated in the general system or in the disintegrating cellular tissues themselves, a cellular auto-intoxication, varying with the intensity of the pathological cortical process, and hence most marked in general paresis. An analogous euphoria is to be witnessed in the cheerful and hopeful feeling of the patient with lungs completely disorganized by phthisis.

The transition from the stadium cœnæstheticum to the stadium acutum following is ordinarily gradual, occupying a week or more, but exceptionally it is accomplished in a day or a night, the patient awakening, as it were, out of one state into the other.

The stadium acutum is the full bloom of the mental disorder. It ordinarily consists of a single psychopathic state, continuing from one to three months. This psychopathic state is either the maniacal state or the melancholic state, which will be fully studied under symptomatology, but the outlines of which must be sketched here at once.

The maniacal state is made up of the following psychic and somatic symptoms: Loss of inhibition of ideas and actions, greatly increased thought-rate, flight of ideas too rapid for utterance and consequent incoherence of speech, spontaneous liberation of emotions rapidly changing and expressed in pantomime, hallucinations of sight and hearing, illusions of the special senses, delusions of swiftly varying nature, powerful impulsive tendencies, increased muscular activity and co-ordination, perpetual motions and apparent incoherence of actions, diminished arterial tension, turgor vitalis marked

in some cases, insomnia persistent, loss of weight, anorexia or polyphagia, menostasis, increased secretions, and vasomotor disturbances. When the maniacal state, thus symptomatically composed, prevails as the characteristic psychopathic state of the stadium acutum, the latter is termed stadium maniacale.

The melancholic state is made up of the following psychic and somatic symptoms: Inhibition of ideas and actions, a narrowing of consciousness to self and painful introspection, retarded thought-rate, diminished association of ideas, concentration of attention, mutism, general emotional depression, suicidal impulses, hallucinations of the special senses, insomnia, frightful dreams, sombre delusions of a hypochondriacal or persecutory kind, sitophobia, diminished secretions, obstipation, disordered digestion, malnutrition, angiospasm and increased arterial tension, diminished turgor vitalis, and general loss of weight.

This psychopathic state sometimes characterizes the entire stadium acutum, which is then designated stadium melancholicum.

Next in regular order after the acute stadium comes the stadium debilitatis.

The stadium debilitatis is appropriately named, in that it expresses precisely the general physical and mental condition, which is present after the violent storm of mental disorder. This general condition is one of debility of mind and body as the direct sequel of the exhaustion of nervous centres, and of the whole system from the acute pathological processes which have been survived.

The prevailing psychopathic state is characterized by negative rather than active symptoms. There is feebleness of memory and attention, paucity of ideas, loss of spontaneity of thoughts and actions, enfeebled volition, general apathy or great emotional weakness, diminished muscular activity with exceptional muscular rigidities, capillary stasis and angioparetic tendencies, enfeebled cardiac action, hæmic alterations, and general asthenia.

This stadium, after a very severe acute stage, more especially, is marked by a stuporous character, and the psychopathic state throughout may be that of sequential stupor, and in the latter case it is termed stadium stuporosum.

The stadium debilitatis is of relatively brief duration, and at the end of from one to four weeks it merges into the stadium terminale.

The stadium terminale presents three distinct typical forms, having radically different durations and results.

When it leads to recovery it is a stadium convalescens, and it has a duration of from one to four months, dependent in the main on the length and severity of the stadium acutum.

When it terminates in chronicity of the mental disorder it is the stadium dementiæ, and endures for lifetime.

When the Insanity is destined to a fatal termination, it is the stadium lethale, and ends in a variety of ways, according to the immediate determining cause of death, usually within three months.

The stadium convalescens is characterized by pathological remnants of the acute stage, such as emotional weakness, odds and ends of delusions, confusion as to places and persons, an occasional false sensorial representation, remaining antipathies to those of the immediate environment, and some disturbance of vital functions. Gradually all these disappear and give place to a return of normal emotional equilibrium, natural tastes and affections, a correct orientation as to localities and identification of individual acquaintances, an insight into the true nature of the past mental disorder, a desire for former occupations, and a restitution of individuality and of general physical health.

This general advance toward recovery is sometimes marked by periodical recessions of all the symptoms for a day or a week at a time, which is what the nurses call "good days and bad days," but the good turns become longer, and the bad ones shorter, until complete convalescence is established.

In rare exceptions there is a sudden recovery, and the writer has seen several instances in which patients, after a good night's rest, awoke from a state of Insanity in their right mind. The oscillations of reason from the upright standard had gradually diminished, and a plentiful supply of the balm of sleep had started the mental mechanism to running smoothly again.

The stadium dementiæ is the period of dissolution of all outward forms of higher intellectual life. Gradually memory fails, speech becomes verbally incoherent or impossible, inability to construct sentences or simple phrases appears, there is passivity or automatic restlessness, there may be automatic repetition of set phrases, grimaces or gestures, vegetative functions are active, and there is first a great increase and finally a loss of flesh, there are filthy habits and neglect of the wants of nature, and there is complete apathy, which may be interrupted occasionally by a return of brief emotional excitement, and finally the patient comes to represent only the outward and

physical form of a being with an animal existence, but without emotional or intellectual life. This stadium dementiæ ends only with the life of the patient, who may survive to old age, but the mortality of the insane is six times greater than that of the sane at most ages.

The stadium lethale may follow at once the stadium acutum, and death may then be the result of general exhaustion from the acute pathological processes, as in cases of delirium acutum, general paresis, and acute alcoholic mania. Ordinarily, though, death follows from coarse brain disease, diseases of the lungs or some acute intercurrent affection.

Clinical Progression.—The clinical manner in which an attack of Insanity progresses is more readily traced when a knowledge of stadia, psychopathic states, and the special symptoms composing them has been attained, and hence a description of these things has preceded clinical progression.

The clinical progression of an attack of Insanity is the relative order which the stadia bear to one another, and to certain other features of the disease known as intermissions, remissions, recurrences, lucid intervals, and the varied commingling of all these in the production of special types of mental disorder.

The clinical progression of an attack of recoverable mania may be in regular order, thus: 1. Stadium cœnæstheticum. 2. Stadium maniacale. 3. Stadium debilitatis. 4. Stadium convalescens, but, as an exception, the patient may have, as cook or fireman, been exposed to excessive heat, and may have sought relief from alcoholic stimulation, and under the conjunction of toxic and thermic influence may have, without initial stadium, developed suddenly acute delirious mania, which from its very severity passes from its full height to death. The clinical progression then would be: 1. Stadium maniacale. 2. Stadium lethale. These stadial exceptions to the regular order are constantly encountered, but they are more apparent than real. In the case just mentioned, it is more than probable that there would be a cœnæsthetic stadium of depression and suffering, which would drive the patient to drink, but, being brief, would fail to be recognized. A stadium may be of only a few hours' or days' duration and yet be an important reality. Many suicides are provoked by the general organic suffering of the stadium cœnæstheticum, and a vain search is then made for motives for the act.

The progression of curable melancholia is: 1. Stadium cœnæstheticum. 2. Stadium melancholicum. 3. Stadium debilitatis. 4.

Stadium convalescens. But if a neuropathic woman were to learn of the death of her husband or children by an accident in travelling, she might pass at once into profound melancholia, and die of exhaustion and inanition in a short time. The progression would then be: 1. Stadium melancholicum. 2. Stadium lethale. In nearly all these cases, however, there has been a latent evolutional stadium of organic changes, which has developed the instability of brain-centres, which admits of the sudden onset of the mental disorder. Many persons pass through the stadium cœnæstheticum, and heed its timely warnings, and the further progression of the Insanity is thus avoided by hygienic means. There is seldom any arrest of the progression after the stadium acutum has once been entered, but there occur, as the convalescent stadium approaches, more especially, remissions of the acute symptoms in some cases.

A remission is the diminution of the symptoms of mental disorder, but not the cessation of the same. A remission may occur during or between stadia, or may intervene between attacks not really separate. In recoverable mania and melancholia these remissions of a few hours or days are commonly observed as the stadium acutum nears its end. These remissions of the mental symptoms are also occasioned sometimes by acute inflammatory intercurrent diseases, such as fevers or infectious disorders.

An exacerbation is the antithesis of a remission—it is the intensification of the symptoms of mental disorder, and it marks a quantitative rather than a qualitative variation.

Both remissions and exacerbations may have a periodical character in Insanity, just as in nervous diseases in general, and in women this is observable in connection with the catamenial molimen, which ordinarily coincides with exacerbations of all the mental symptoms.

In the stadium debilitatis the exacerbation of the emotional weakness characteristic of this period may be antithetical to the dominant tone of feeling of the stadium acutum, which has just passed, whether it be expansive or depressive. This is an apparent exception to the rule that exacerbations do not furnish qualitative variations of symptoms.

In the stadium acutum remissions exceptionally occur at a certain hour of the day, or every other day, or every few days or weeks, and they are not to be confounded with lucid intervals.

A lucid interval is a temporary restoration of right mind, but not

often a complete removal of the physical conditions of mental disease. A lucid interval may occur during or between stadia, or between separate attacks of mental disorder, and it may have a duration of an hour, a week, a month, or even of several months, though it is better to confine the term to the shorter periods of lucidity, and to the longer ones to apply the word intermission.

An intermission is a complete cessation of all the symptoms of mental disorder, and it may vary from weeks to many months in duration, and it occurs between separate attacks of Insanity.

A recurrence is an independent attack of Insanity in a patient who has previously suffered from mental disorder and has a latent tendency to the same.

Recurrences facilitate and approximate one another, and they usually occur in those having a transmitted psychopathic tendency.

Having thus defined the prominent exceptional features which interrupt the clinical progression of Insanity, it is necessary to show in what way they modify the typical course of the disease.

It will be observed, in patients with inherited taint chiefly, that at regular intervals of weeks, months, or years, an attack of mania or melancholia will occur, and disappear during an intermission of definite length, only to reappear with precisely the same character and sequence of symptoms. This periodic return of like attacks and similar intermissions is known as periodical Insanity.

If the stadium acutum appears abruptly in the form of the maniacal state and is followed by an intermission, and then by another maniacal state and intermission, and this sequence continues, the Insanity is periodical mania.

If the stadium acutum begins as the melancholic state, and is followed by an intermission, and then another melancholic state and intermission, and if this sequence continues, the case is one of periodical melancholia.

The apparently abrupt stadium acutum and the intermission are the salient features of periodical Insanity, which may continue for years or for a lifetime, but it is a mistake to suppose that the mental disorder originates in this exceptional sequence without an initial stadium. On the contrary, this mental disorder, which usually begins at puberty, has invariably a stadium cœnæstheticum, often of long duration and of decided character. Moreover, there is before the stadium acutum of every periodic return an initial stadium of vasomotor, sensory, or trophic disturbances, which will not escape the

close student of nervous diseases. Even the patients come to recognize this initial stadium by the return of neuralgias, severe headaches, gastralgias, or other prodromal symptoms, which are often as uniform in character as the stadium acutum and the intermissions which follow. The clinical progression of periodic Insanity is, therefore, to outward appearance: 1. Stadium acutum. 2. Intermission. 1. Stadium acutum. 2. Intermission, etc. But in reality it is: 1. Stadium cœnæstheticum. 2. Stadium acutum. 3. Intermission. 1. Stadium cœnæstheticum. 2. Stadium acutum. 3. Intermission, etc., and it is only through the gradual shortening of the intermissions with the lapse of years, or the actual final disappearance of the same, that this sequence is broken.

There is a variety of periodical Insanity, known as circular Insanity, which originates thus: 1. Stadium melancholicum. 2. Stadium maniacale. The initial stadium is, contrary to general rule, the fully developed melancholic state, and as the diseased process deepens the maniacal stage appears, and is followed by a lucid interval.

The clinical progression of circular Insanity is, therefore, as follows: 1. Stadium melancholicum. 2. Stadium maniacale. 3. Intervallum lucidum. This constitutes a complete cycle, and each successive cycle is an exact repetition of the same order of clinical progression, which characterizes the original or intermittent type of circular Insanity. In occasional instances the primary cycle and all subsequent cycles have the following clinical progression: 1. Stadium maniacale. 2. Stadium melancholicum. 3. Intervallum lucidum. This also is intermittent circular Insanity.

In circular, as in all periodic Insanity, the general tendency is for the lucid intervals to shorten or disappear, and in cases once completely developed they may form no part of the progression, and the maniacal and melancholic stadia succeed one another directly. This is confirmed circular Insanity without intermission.

Space will not, in this connection, permit a review of the clinical progression in the various types of Insanity, and for complete information of this kind reference is again made to the second part of the work, but sufficient has already been said to show the impossibility of a clear understanding of mental disorders without a knowledge of the stadia, intermissions, remissions, and lucid intervals, and of the order in which they combine to constitute the clinical progression of the typical forms of Insanity.

To the physician who ignores the psychopathic states which

compose the stadia, who mistakes the separate stadia for attacks of melancholia, mania, and dementia, who knows naught of the laws of sequence established by clinical observation, mental disorders will ever remain an incomprehensible jumble of disconnected symptoms.

The evolution, stadia, and clinical progression, as here portrayed, are to be accepted by the student as clinical facts, to be daily verified by study in hospital wards, and as an orderly and scientific means of insight into all cases of mental disorder.

Terminations.—The terminations of attacks of Insanity are as follows: 1. Complete recovery. 2. Incomplete recovery. 3. Transformation into other forms. 4. Chronicity. 5. Death.

Complete Recovery.—Complete recovery is usually gradual, and a sudden return to reason is seldom permanent. In mania, for instance, the stadium convalescens is usually marked by remissions and exacerbations of symptoms, and gradually the remissions lengthen and the exacerbations disappear, and then comes a distinct lucid interval, followed by signs of irritability or emotional weakness perhaps, and finally complete recovery at the end of several months from the first appearance of the convalescent stadium.

Exceptionally, the intervention of inflammatory or infectious disease, producing profound nutritional changes and alterations in the functional conditions of the entire organism, leads to a simultaneous complete recovery both of the intercurrent disease and of the mental disorder.

The powerful revulsion of severe traumatic accidents has been known to be followed by a prompt recovery from Insanity, but this is an extremely rare termination of mental disorder.

Other exceptional terminations in recovery will be noted under the special types of Insanity.

Incomplete Recovery.—Many patients are discharged from hospitals for the insane as improved, and they return to their customary occupations and discharge all their duties as useful members of the community for years or possibly for the remainder of their life. To the world at large they are practically recovered, but to the alienist they are known to be only incompletely recovered. The incompleteness of the recovery consists not in any remnant of delusions or of other active signs of mental disorder, but in a permanent impairment of the higher mental processes of the affective faculties, of general powers of endurance, and in an instability, which exposes them, on slight provocation, to subsequent attacks of Insanity.

Transformation of Attack.—An attack of Insanity may terminate by transformation into another form of mental disease. Thus a case of original monomania or paranoia, at the end of some years, may terminate in general paresis. Acute mania or melancholia sometimes terminates in secondary forms of monomania. In other exceptional instances there is simply a reversion to the original type, of which the acute attack is an epiphenomenon, as in imbecility, with an attack of acute mania, upon the termination of which there is a return to the status of original defect of mind.

Chronicity.—The vast majority of all cases of Insanity terminate, sooner or later, in chronicity of the mental disorder.

The chronic terminations of mental disease are too varied to admit of description here, but as a practical and ultimate fact the stadium terminale of most forms destined to chronicity is a stadium dementiæ.

This terminal dementia is the common goal toward which all mental disease tends and to which most Insanity attains. This terminal dementia is not reached suddenly, except after a severe acute attack, but after repeated attacks, or after various secondary forms of mental disorder have been traversed.

Occasionally, however, the mental disorder retains for a decade of years, or even for life, the form of chronic mania, chronic melancholia, secondary monomania, or even of primary monomania. If life were sufficiently prolonged in these cases they would doubtless all end in dementia. Insanity arising at the grand climacteric or later in life may, by way of exception, terminate in senile dementia.

Senile dementia is itself an independent type of the disorderly involutional termination of mental life, and it illustrates the nature of some Insanity as simply a functional departure from the norm. The atrophic brain-changes and the orderly failure of all the powers of mind in typical senile dementia pertain normally to senility, and it is only the disorderly involutional changes that constitute the pathological process of this terminal form of Insanity.

Death.—The termination of Insanity in a considerable percentage of the cases is in death. The mortality of the insane in general is more than five times greater than that of the general population of like age. The chances of the preservation of life varies according to the age, sex, and constitution of the patient, and the cause, form, and duration of the attack, and the prognosis as to life will be discussed under the special types of Insanity.

There are certain forms of mental disorder which ordinarily terminate in death, such as general paresis, organic dementia, and delirium acutum.

There are diethetic insanities uniformly destined to a fatal issue from the somatic rather than the psychic disorder.

All terminations of mental disorder, whether in complete or incomplete recovery, in transformation, or chronicity, or death, are most instructive subjects for study on the part of the student of mental pathology, for in psychiatric practice the physician is always called upon to express an opinion as to the probable manner of the termination of the Insanity.

CHAPTER VI.

PSYCHICAL SYMPTOMATOLOGY.

Section I.—Disorders of the Intellect.

The differences of the action of the mind in health and in Insanity can only be studied by means of some systematic division of the subject, which will accordingly be presented under the disorders of the intellect, of the emotions, and of volition, with practical rather than philosophic subdivisions.

The morbid psychical phenomena, which are the pith and core of mental disease, cannot be separately analyzed without a conventional recognition of distinct mental faculties, and of their presumably independent action. It is substantially affirmed in advance, however, from a philosophic point of view, that the mind acts as a unit, and that intellection, emotion, and volition are interdependent phases of the action of an undivided psychic force.

The topic of this special section—Disorders of the Intellect—will be treated under the Presentative Faculties of Perception and Consciousness, the Representative Faculties of Memory and Imagination, and the Rational Processes of Thought and Reason.

The Presentative Faculties.—Perception is the conscious recognition of sensorial stimuli, and it is accompanied ordinarily by an effort of definition and of localization of the special sensorial stimulus.

Perception is very constantly disordered in Insanity, and even in the sane there are analogous though minor degrees of like perceptional disorder. Everyone knows that things are not always what they seem, and that the senses sometimes deceive, and that optical illusions do occur.

The part of a straight stick thrust into water appears bent at an angle; to a person rapidly progressing in one direction objects appear to recede; the railway passenger mistakes between the motion of his own and of the adjoining train; a small round body rolled

under the tips of the large finger crossed over the forefinger seems like a double object; the rapid revolution of a luminous object produces the effect of a continuous circle; a few perspective lines make that which is flat appear round and solid; stereoscopic effects are still more perfect illusions; similar persons, things, or places are constantly mistaken, through lack of close attention; the ground rocks under the recently landed sea voyager, and in musically susceptible minds a catching tune may resound for days; and almost endless examples of errors of perception might be adduced. In mental disorder the customary correction of the perceptual error of one sense by aid of the other senses, or by other processes of comparison, does not take place, owing to preoccupation of mind, or to lesion of attention or memory, or failure of the power of discrimination, or to the fact that the false perception chances to be in accord with existing morbid emotions or delusions.

The most common technical form of erroneous perception in the insane is termed illusion.

An illusion is the misapprehension of a sense-impression, or the false interpretation of a sensorial stimulus. The patient who mistakes a post for a man, or the noise of the wind for the human voice, has an illusion of sight or hearing. The sense-impression does not correspond truly to the external object, and there is no exact physical outward equivalent for the psychic image produced. There is, therefore, always a previous and real peripheral source of illusions as well as a uniform failure of correspondence between the sense-presentation and the antecedent reality. It is important to grasp this point, which differentiates illusions from other errors of perception to be presently considered.

Illusions of all the senses are found in mental disorder, and those of sight and hearing are most frequent. Visual illusions, both in sanity and insanity, are somewhat more common than auditory. More than sixty per cent. of all insane patients have decided illusions, which may be either visual, auditory, tactile, gustatory, olfactory, or kinæsthetic.

Illusions are rarely constant, but they ordinarily recur at brief intervals, and they are bilateral or unilateral. They are more frequent in the acute stage of mental alienation, but they may exist at any period of the mental disease, even in the convalescent stage, and they also persist in modified form in certain cases after recovery.

The fact that the sensorial impression from which the illusion

originates is transformed by the association of ideas or by imagination has led some modern writers to comprise all illusions under hallucinations, which are admittedly purely imaginative psychic products.

The distinction between these two classes of disordered perception is sufficiently valid to warrant its continuance, as illusion relates to real objects, springs from actual peripheral stimuli, and has an environmental counterpart, which does not exist in the instance of hallucinations. There is a decided temporal distinction also between the two classes of phenomena, as illusions are the product of the immediate present and of its coincident peripheral stimuli, while hallucinations are chiefly evolved from the indefinite past and from its stores of sensorial residua. As the origin and nature of illusions varies with the special sense affected, it will be necessary to give a brief separate notice to visual, auditory, tactile, cœnæsthetic, gustatory, olfactory, and kinæsthetic illusions.

Visual illusions correspond to all objects anterior to the retinal expansion, and they may be entoptic and dependent on corneal opacities, muscæ volitantes, retinal pulsation, and circulatory blood-corpuscles, lenticular disease, or affections of the vitreous humor. Illusions of color may thus arise, and the size of objects may be magnified (megalopsy) or minimized (micropsy), and various illusive effects may spring from astigmatism, defects of accommodation, and existing pathological conditions of the visual apparatus. All external objects furnish material for illusions, especially in a dim light, so that, among the insane, twilight and moonlight are the fruitful occasions of the formal misinterpretation of the outer world.

To the diseased imagination of the insane patient looking out of the window in obscure light the bushes, trees, and all external objects are wont to assume the forms of living things or of human beings, which are interpreted in the special direction of the dominant emotions or delusions of the patient.

The anatomical basis of illusions is the pathological irritability of the cortical centres of memorial residua and of associative processes, and of the sensorial cells, which are aroused by the physiological stimulus of the peripheral excitation. There is a preparedness for a discharge from such pathological cortical centres, and the sensorial impression only determines, in a measure, the direction and the nature of the discharge.

The patient who thinks that he is constantly persecuted by those

about him sees in every movement of their features derisive or mocking expressions, or through some superficial resemblance he mistakes them for former enemies; or, if prepared by expectant delusion for the visit of friends, he mistakes them for old acquaintances.

Illusions of sight are sometimes fortified by illusions of other senses, as when a patient mistakes shrubbery swayed by the wind for movements of a human form, and the rustling of the leaves for the whispered voice of persecutors, and the odor of the shrub's blossom for the noxious gas with which his enemies afflict him at night. A patient with a flowering shrub near his window, and thus afflicted with combined illusions, might be temporarily relieved by a change of locality, but the morbid cortical centres would soon receive some other sensorial provocation to discharge, and new forms of pathological transformation of sense-impressions would result.

Auditory illusions arise from all external or internal causes of sound-waves which impinge upon the organ of hearing. Entotic illusions may spring from noises within the ear, from affections of the membrana tympani, of the labyrinth, of the semicircular canals, from arterial pulsation, from anæmic bruit, and from all forms of tinnitus aurium. Cardiac sounds, pulmonary râles, borborygmi, aneurismal bruits, stomachal succussions, tendinous and arthritic noises are all likewise occasional sources of auditory illusions, having an immediate source in the personal organism rather than in the external world. As regards the environmental source of illusions, morbid expectancy on the part of the patient has much to do with the localization and transformation of sounds proceeding from near or distant surroundings. The fearful and expectant patient, awaiting at night the coming of his executioners, will locate the most distant noises in his immediate vicinity, and transform the most dissimilar sounds into the sharpening of knives and the dragging of ropes, which are to be used in his destruction. In this state of fearful expectancy also there is a dislocation of near sounds, so that the creaking of the bed, or the fluttering of an insect on the wall, may be referred to the distance, and at the same time there is often a gross amplification of the sense-impression, which in rare instances may spring from actual hyperæsthesia acustica, but ordinarily is due to the effect of expectant imagination. The absurd disparity between the illusion and the reality was well illustrated in a case of acute melancholia, in this painful state of deluded expectancy, in which the falling of drops of water on the window-sill was mis-

taken for the repeated blows of a hammer in the making of a coffin for the patient's burial. This instance illustrates the general fact, also, that auditory illusions are sensorial presentations misinterpreted in keeping with emotional or intellectual phases of the mental disease. To the expansive paretic the most commonplace humming sounds are like the voices of the heavenly choirs, and to the suspicious patient listening to the conversation of those about him words which might possibly favor are mistaken for those fully in accord with his prevailing delusion.

Patients sometimes think that animals or birds or inanimate objects give forth articulate sounds, which convey distinct ideas, and, in listening to a language of which they are ignorant, they receive like definite impressions favoring their insane beliefs.

Unilateral auditory illusions are apt to be entotic, and in all cases of illusions of hearing the ear should be carefully examined.

Qualitative and functional variations in the sense of hearing have some modifying influence upon auditory hallucinations, for both intensification and diminution of hearing is found among the insane, and complete loss of the faculty does not exclude the possibility of entotic illusions. Hyperacusia is most common in hysterical and neurasthenic Insanity, and hypacusia is to be found in general paresis, organic dementia and terminal Insanity.

There is also a genuine paracusia in the insane independent of actual illusions. Patients with this form of paracusia complain that their own voices and the voices of their friends are strange, and that music and all customary sounds are unnatural. A patient with this perversion of hearing denied the identity of her brother because he had a stranger's voice. Delusion thus arising is different from similar false beliefs growing out of changes of conscious self-identity and the resultant strangeness of external things.

Tactile illusions follow in point of frequency those of sight and hearing among the insane. It is important to first mention changes in cutaneous sensation present in Insanity.

Diminution of sensation in the skin, known as anæsthesia, is found both in organic and paretic dementia, and in hysteric, epileptic, and toxic Insanity. Hemianæsthesia may also occur in hysteric and epileptic cases, and involve a loss of touch, of heat and cold, or of pain. Hyperæsthesia, which is less frequent, is sometimes a symptom of neurasthenic cases and of paretic Insanity in the early stage, and of alcoholic cases with spinal sclerotic lesions.

Increase of sensibility to pain (hyperalgia) is present in neurasthenic and hypochondriacal cases, and hypalgia is common to many forms of Insanity, while analgia is most pronounced in the terminal stage of general paresis, though occasionally characteristic of acute phases of mental disorder, during which extensive self-mutilations may be inflicted without pain. All those perverted sensations embraced under the general term paræsthesia are prominent symptoms of Insanity, especially of that which is toxic in origin.

All the foregoing pathological variations of sensibility in the insane are to be referred to increase or failure of attention and of conscious recognition, and to altered states of consciousness rather than to actual anomalies of the peripheral nervous system, except in those cases in which there are positive organic lesions of nervous structures.

Excitations of nerves are by force of habit uniformly referred to their periphery. This projection of subjective sensations is determined by irritation of any part of the sensory conductory tract or of the cortical representative centre. A familiar example of this outward projection of sensation is witnessed in feelings referred to hands or feet of limbs long ago amputated.

Tactile sensations in the insane are thus vividly projected, and at the same time misinterpreted to be electric effects, and the application of all sorts of ingenious mechanical devices designed for their persecution. These tactile illusions are sometimes described as foul air blown upon the body, or irritant gases, or magnetic currents, or, as some mysterious power of enemies by which the vital force of the body is drawn off through the pores of the skin, or the injection during sleep of poisonous fluids under the skin.

The sexual class of tactile illusions is important from its frequency and persistency. The consciousness of some patients is continuously flooded with sexual illusions due to perverted sensations arriving from the nervous periphery of the generative organs.

The tactile illusions of alcoholic Insanity and of general paresis fully developed are remarkable. In alcoholic cases the formication and crawling mistaken for insects, and the burning, pricking, and shooting pains are perversions of tactile sensibility due to sclerotic central lesions, and to changes in the sensory nerve-trunks, and the illusions may proceed from paralgic zones, and may assume the most intense forms of hyperalgia. The modification of tactile sensibility in these cases, known as polyæsthesia, belongs to the same order

of pathological sensorial disturbances as monocular polyopia in hysterical Insanity.

In full-blown cases of general paresis, with expansion of feeling, tactile illusions of an exaggerated character are sexually located, and also extend in most cases to the entire cutaneous periphery, and they furnish the raw material for many of the megalo-maniacal delusions of the second stage of the disease.

In this connection is to be mentioned a most important class of illusions located sometimes in the cutaneous periphery and at other times in the nervous sensory distribution to internal organs.

Clinically, there is an intimate relation between painful visceral and cutaneous sensations, though the central anatomical connection does not yet admit of demonstration. In mental disorder this numerous class of illusions, which shift interchangeably from internal organ to outward surface, and comprise at times the combined effects of visceral and cutaneous perverted sensations, are here embraced under the general term of cœnæsthetic illusions.

Cœnæsthetic illusions abound in acute forms of the psychoses, and they form the essential "materies morbi" in hypochondriacal Insanity. They are typical also as sensorial phenomena of the first stage of certain types of general paresis, and of some cases of confirmed epileptic and alcoholic Insanity.

In neurasthenic Insanity there is also a profuse illustration of the frequent vicarious character of cœnæsthetic illusions, which fluctuate from visceral regions to hyperalgic cutaneous spots, for which some definite law of nervous relationship may yet be discovered by future clinical research.

Gustatory Illusions.—Taste and smell are the emotional senses, as distinguished from sight and hearing, which are the intellectual senses. When illusions combine they ordinarily show this natural partition between the special senses, so that sensorial perversions of sight and hearing appear together, and illusions of taste and smell, too, are superimposed. As a physiological fact, tasting is smelling to a considerable extent, especially for the more delicate shades of gustation. The gustatory illusions of the insane have a painful emotional tinge in the vast majority of cases, and it is only in the most exceptional states that they have a pleasurable emotional quality. The agreeable gustatory illusions of the general paretic are real only in the first stage of the disease, and subsequently they are purely the effects of cœnæsthetic exaltation.

Among the insane the illusions are favored by increase or diminution of the gustatory faculty. Hypergeusia, or exaggeration of the gustatory sensations, is found in neurasthenic and hysterical cases. Patients afflicted with this unfortunate hyperæsthetic taste detect the most minute variations in food supplies, and the earliest preliminary changes of fermentation in meat, butter, milk, eggs, and vegetables, and from this real source of peripheral irritation they derive the most exaggerated gustatory illusions interpreted to match their delusive conceptions.

Hypageusia, or diminution of the sense of taste, is common in the acute as well as chronic stage of the psychoses. It is a frequent negative source of positive illusions, for the patients, finding that food has lost its natural taste, readily infer that it is mixed with foreign material, and they begin to supply imaginary substances which best fit their illusory idea, such as that the sugar is ground chalk, that the corn-meal is sawdust, that the butter is colored lard, and, as there is often a corresponding loss of smell, they soon become confirmed in their illusions.

Ageusia, or complete loss of taste, is found in some cases of organic and syphilitic dementia, and in the final stage of general paresis. Even in the second stage some paretics eat anything and everything with absolute indifference. Ageusia is occasionally present also in senile and in alcoholic dementia. Gustatory illusions have their origin often in alteration of the buccal secretions, in dry or coated tongue, in dental caries, in pharyngeal disease, in gastric disorder, in toxic states of the system, and in the resultant perversions of taste due to the administration of drugs.

Gustatory illusions may also proceed from central nervous lesions before the organic changes have resulted in ageusia.

The gustatory illusions with the most decided perversions of taste (parageusia) usually result in delusions of poisoning of food, which is also frequently declared to contain stercoraceous and other disgusting substances.

Gustatory illusions are somewhat more common than those of smell, and they have about the same, though probably somewhat less, numerical importance than tactile illusions.

Olfactory Illusions.—The sense of smell is occasionally much heightened in neurasthenic, hysterical, and epileptic Insanity, and is known as hyperosmia, while hyposmia, or diminution of this sense, is common in syphilitic, alcoholic, and paretic cases. Anosmia,

or loss of smell, is common in senile, paretic, syphilitic, and organic dementia.

Olfactory illusions are of painful character in most cases, and they are especially common in developmental and involutional mental disorders. The relation between sexual and olfactory illusions is of clinical frequency, though this close connection does not admit of any satisfactory physiological explanation.

Olfactory illusions may spring from nasal or pharyngeal disease, or from actual odors resulting from disease of internal organs, or they may be the simple transformation of external olfactory stimuli from any and all outward sources.

Illusions of smell are not infrequent in acute melancholia; they often lead to refusal of food and to delusions of poisoning. They are often associated with illusions of taste and of common sensation.

Kinæsthetic Illusions.—Kinæsthesis is the sense of movement, also termed the muscular sense. Through this sixth, or kinæsthetic, sense are perceived the various single and combined movements of the body and the extremities, and their relative position in space. Through this sense also is estimated the weight of bodies and the degree of muscular effort necessary to overcome the resistance of the same. It is probable that cutaneous, muscular, tendinous, and articular impressions are complementary to the kinæsthetic sense, which is also intimately associated in action with visual space-impressions.

The diminution and perversions of the muscular sense which lead paretic, syphilitic, and alcoholic insane patients to illusory perception of the movements of their extremities is due in some instances to anæsthesia of the articular surfaces.

In other cases there is a certain inco-ordination of movement due to disturbance of the kinæsthetic sense, independent of any anæsthetic conditions or of any interference with the spinal reflex mechanism.

In somnambulistic Insanity there may be increase of the kinæsthetic sense, which is also heightened in acute mania and diminished in acute melancholia and in choreic and paretic Insanity.

Kinæsthetic illusions in the insane may relate either to the special mechanisms of locomotion or of speech, and they are interpreted in various delusional directions, chiefly of a persecutory kind, such as that their persecutors misplace their limbs in bed and prevent them from having the customary use of their arms and legs.

Most of these perversions of the muscular sense among the insane are more correctly and technically to be classed in the category of kinæsthetic hallucinations, under which head some further allusion will be made to this type of perceptional disorder.

Hallucinations.—An hallucination is the vivid conscious revival of a sense-impression without a physiological peripheral stimulus.

There may be a pathological peripheral stimulus having a direct causative relation to the hallucination, as will presently appear. Hallucination may be further defined as a forceful representation of a sensorial image without a corresponding physical reality. While illusion is the distorted perception of a real object, hallucination is the real perception of an object which does not exist. Hallucinations are purely subjective, while illusions are partially objective in origin.

The perception of a picture on a wall which had no picture upon it would be an hallucination, and the mistaking of a real picture for some other object would be an illusion. A patient who hears music in the absence of all tones is the subject of hallucination, but he has an illusion if he mistakes common noises for music.

Hallucinations may exist in the various senses separately or simultaneously, and they are more common at night than in the daytime among the insane.

Visual hallucinations are more frequent among mankind in general than any other form, but in mental disorder auditory hallucinations predominate, and those of the other senses appear in the following numerical order: Gustatory, tactile, olfactory, and kinæsthetic. Space will not admit the mention of the numerous anatomical theories advanced to explain the origin of hallucinations.

All perception is dependent on a special sense-organ, a conducting nerve-tract, central ganglia, and a higher representative brain-centre. The anatomical origin of hallucinations may be pathological irritation (from any and every form of disease) of the special sense-organ, of the conducting nerve-tract, of the central ganglia (more especially of the thalami optici), or of the representative cortical areas. The essential point is the pathological instability of these higher nervous centres, the cortical areas which are the storage-regions of sensory images, so that it matters not through what conducting paths of association or through what special irritation these higher nervous centres are provoked to a discharge, or to an outward projection of the sensory image which is the hallucination.

The special irritation which arouses this morbid action of memorial and sensory cortical areas may proceed from any of the anatomical points mentioned, or may consist in toxic agents circulating through these cortical centres, or may come from diseased internal organs, or from general diathetic conditions, from qualitative and quantitative changes in the blood, from cœnæsthetic sensations, from reflex sympathy of the reproductive organs, or from the perverted activity of the special sense-organs themselves. The main pathogenic fact is that the sensory image is aroused in the higher brain-centres with such unnatural force as to be projected outwardly as an objective reality.

It is true that the hallucination is of varying degrees of conscious reality, that it is sometimes of a shadowy and fantastic character, which does not inspire firm belief on the part of the patient, but at other times it is invested with intensely real physical attributes of form and color, and startles the patient into the most sudden and violent demonstrations of feeling and action. This latter result is wont to occur when the hallucination is aroused by deep organic sensations, and springs from subconscious regions with sudden dramatic effect upon the stage of conscious intellectual operations, which are often disordered or suspended momentarily by the high-colored and fully fledged apparition. At such moments the patient often screams with terror, or attempts a suicidal or homicidal tragedy to escape from the horrors of the situation.

A few words will be said about each of the special types of hallucinations in the order of their numerical frequency in mental disease, viz., auditory, visual, gustatory, tactile, olfactory, and kinæsthetic.

Auditory Hallucinations.—The local pathogeny of aural hallucinations may be disease of the Eustachian tube, of the tympanum, of the bones of the ear, of the labyrinth, of Corti's organ, of the auditory nerve at any point of its course between periphery and central ganglia, and of the corresponding cortical sensory regions. There is also to be mentioned vascular variations in the parts above named, toxic effects, functional aural disorders, tinnitus aurium, after-vibrations, and morbid entotic conditions too numerous to name, as well as tumors and other intra-cranial diseases. The irritations thus peripherally or centrally initiated and acting on cortical sensory areas pathologically excitable determine the hallucination.

There is a purely psychical origin of auditory hallucinations

which correspond to an idea, which, through its morbid intensity, revives the correlative acoustic image. Normally, the peripheral stimuli of the organs of special sense arouse centripetal currents to sensory cells, and from thence to cortical areas of ideation, but pathologically there may be a reversal of this order with a centrifugal current from ideational cortical areas to sensory cells in which in this instance the acoustic image is revived. The auditory hallucinations in this case correspond directly to the ideas or emotions which precede them, and to the insane delusion which is uppermost in the mind of the patient. The patients subject to this type of hallucinations are surprised to hear their innermost thoughts mentioned by the hallucinatory voices, and they are thus soon confirmed in the delusion that people read their minds. Such patients sometimes, while reading or writing, hear some of the words repeated by the voices.

The ideational origin of hallucinations is proved by the close correspondence of the hallucinations to the customary habits of thought, to the level of intelligence, and to the special views and beliefs of the individual affected. To such an extent is this true that the account of hallucinations in ages past has truthfully reflected the main features of the intellectual life of the people, and especially of their current religious beliefs.

Sensitive hallucinatory patients are influenced by their reading and by conversation, and it is possible in this way to have hallucination by direct suggestion. There is a great difference not only in different persons, but in the same individual as to the ease or force of action of imagination in the production of sensory images of the various senses. The facility of fantastic imagery of any special sense depends largely upon the perviousness of that special sensory channel affected by the force of previous customary discharges. The painter is already prepared for visual and the musician for auditory hallucinations, and a patient with a dominant delusion in one sensory direction will eventually have a corresponding hallucination. Hallucinations and delusions, therefore, are reciprocally causative, just as the prevailing emotional tone and the hallucination may be the mutual offspring of each other, sometimes one and then again the other being the primary and parental phenomenon.

Auditory hallucinations are sometimes reflex and arise secondarily to perversions of some of the other senses, and they are combined with hallucinations of sight, in many cases, and with those of com-

mon sensation occasionally, and more rarely with sensory disorders of taste and smell. They are unilateral or bilateral. When unilateral, they are most frequently entotic. This one-sided kind of hallucination may possibly be due to one-sided brain-action, or to a pathological state of one cerebral hemisphere, to opposite cortical lesions, but it is also possibly occasioned through some defect in the process of localization of sound through disorder of the differential sensations of movement, and of the normal variance of sensory intensity in the two ears, for patients having an intact auditory apparatus persistently refer all hallucinations to the right or left of the median line. The hallucinations also come from behind rather than from in front, and from below more frequently than from above, and more exceptionally from within rather than from without the body.

Bilateral hallucinations may be double in character and have uniform differences in loudness and quality of sound on the opposite sides, and they may have dissimilar emotional associations, being agreeable on one side and disagreeable on the other, or the voices on the two sides may contradict each other. In this latter instance the repartee which patients often carry on with the voices is suppressed, and, through the patients' hallucinated concentration of attention, the voices reflect immediately in their consciousness their own silent argumentations, and it is only when the two-sided debate does not suit them that they make a loud interruption. Auditory hallucinations are most common in melancholia and in chronic delusional Insanity, and they are among the unfavorable symptoms, and when they are permanently organized in relation to delusions they are absolutely among the very worst prognostic signs. The epigastric voice and other distinctly located internal hallucinations are of decidedly bad omen.

Hallucinations having the worst prognosis are near in spatial relation, distinctly articulate, fixed in direction, and permanent in character and combined with delusion.

The less unfavorable auditory hallucinations are remote in distance from the patient, indistinct and inarticulate, shifting in direction, changing in character, and irrelevant to any fixed idea or delusional conception. Auditory hallucinations may simulate the voices of friends or strangers, and they may speak in foreign tongues and may also issue from animate or inanimate things, and may represent every conceivable sound known to the patient, or even new and strange combinations of sounds. They are most often painful, and

arouse strong impulsive tendencies to violence; and this point is to be borne in mind in practical dealing with hallucinated patients.

Visual Hallucinations.—A visual hallucination may originate in a morbid irritation at any anatomical point from the expansion of the optic nerve to the cortical visual centres—*i.e.*, in the course of the optic nerves, in the corpora quadrigemina, in the corpora geniculata, in the optic basal ganglion, in the optic thalamus, and in the optic radiations to the occipital and temporo-sphenoidal lobes.

Hallucinations of sight arise also from a pathological state of the visual cortical centres, due to the virus of infectious diseases, to inanition and anæmia, to toxic agents in the blood, and to extensive hemorrhages.

The bulk of visual hallucinations among the insane, however, are central rather than peripheral in origin. They are simply intense visual images revived through ideational or emotional associative paths by a morbid activity of memory and imagination. The abnormal state of consciousness in mental disorder prevents the differentiation through comparison and reflection of these memorial images from actual sense-impressions aroused through the customary channels by peripheral excitation of the special sense-organ.

These centrally initiated hallucinations may depend on diseased activity of the ideational cortical areas of the frontal lobes, or on pathological excitability of the sensory cells of the occipital visual areas, which may be provoked to discharge, not as in health, from peripheral ingoing stimuli, but from reverse stimulation from ideational centres. This latter origin of hallucinations from downward currents proceeding from ideational areas to sensory ganglia was clearly announced in 1868 by Maudsley, in his masterful treatise on the "Pathology of Mind," p. 266. Ziehen has recently elaborated a similar theory in accordance with the present knowledge of sensory cortical areas, the stimulation of which, by reverse currents from memorial centres, he holds to be the real source of hallucinations (vide "Psychiatrie," p. 32). Independently of all peripheral or central anatomical theories there are functional states of pathological action of the intellectual faculties which adequately account for hallucinations in Insanity.

There is the altered consciousness which causes all objects to seem strange; there is a disturbance of the association of sensory concepts and inability to compare them with past sense-data; there is further confusion from disordered memory; there is morbidly

heightened imagination, which causes entirely new sensory images; there is powerful and suggestive emotion; there is loss of voluntary control of ideas; and, finally, there is inability of calm reflection and of the power to differentiate between the imaginary and the real. These are the essential alterations of intellect which render hallucinations possible under any circumstances, and from whatever local source of irritation derived.

Visual hallucinations are sometimes entoptic and due to retinal shadows, retinal pulsation, and the movement of blood-corpuscles, pressure, and accommodation-phosphenes, muscæ volitantes, and to changes in the macula and in the refracting media. Entoptic hallucinations are apt to be more distinct when the eyes are closed, and they respond to the movement of the ocular muscles, and they have distinctions of color as well as of form. The hallucinated image due to spastic or paretic accommodation may appear magnified or minimized.

Hemiopic hallucination, which probably arises from disease of the sensory visual areas of the occipital cortex, is found in hysteric and epileptic Insanity, and it may also exist independently of hemianopsia.

Visual hallucinations are bilateral or unilateral, and for the latter there is the simple test of alternate closure of the eyes and the cessation of the abnormal symptom, with the exclusion of the affected eye. Unilateral hallucination may also be the result of expectant delusion, as when a patient has a fixed idea that one eye is diseased and keeps his attention focussed upon it until hallucination results.

Fixed delusion often determines the direction of hallucinations when they have been located, as to a particular object which can only be seen on one side of the position the patient habitually occupies. Thus, a patient always saw her imagined friend on a particular walk as she sat at the window, but never at any other time or place. Visual hallucinations may have definite or indefinite proportions; they may seem as on a flat surface or solid and rounded; they may have changing or fixed outlines, and advance or recede, or move across the field of vision; they may be colorless or have various prismatic tints; they may be larger (megalopsy) or smaller (micropsy) than life; they may be single or multiple; and they may even be of panoramic character.

Visual hallucinations sometimes disappear on closing the eyes,

or in the dark, and, on the other hand, these are precisely the conditions which, together with pressure of the eyeball, favor entoptic hallucinations.

Hallucinations, again, may be diplopic or polyopic and seen on a plain background, as on the water or the sky, or among other objects only, either superimposed, depressed, or in relief and cameo-like. The masklike hallucination is very real and leads patients to believe that their acquaintances change their features frequently.

Other forms of visual hallucinations are those of the dreamlike and hypnagogic states of the morphio-maniac, the aura of the epileptic, the phantasmagoria of the hystero-maniac, those of retinal origin, moving with the eye like visual spectra, and luminous after-images, or flitting in nystagmic cases, the processional array of animal forms of the alcoholic patient, the bright and complex visions of religious ecstasy, and the illumined outlines of kaleidoscopic objects in certain epileptic states.

The hallucinations of mental disease are painful or pleasurable usually in accordance with the dominant emotional tone, but exceptionally they are transformed to a directly opposite kind, for a brief period, favoring the inmost desires of the patient; just as a shipwrecked mariner sees ships of rescue, or the thirsty and heated traveller in the desert sees green oases and fountains of fresh water, so the patient persecuted with painful hallucinations may have an expansive change in them as well as in his delusions.

Visual impressions are, in the exhausted and toxic dream-states of Insanity, pathologically vivid, and they then persist after waking, as hypnagogic hallucinations. In fact, Insanity may spring directly out of the hypnagogic hallucinatory state, as well as out of the hallucinatory condition of artificial anæsthesia.

Visual hallucinations are common in the acute stages of mental disorder and in general paresis, and they are more frequent during the vital reductions of the night season than in the daytime; they are favored by perceptional disorder of the other senses, and they are not uncommon in eye diseases, and in hemianæsthesia are on the affected side, and they appear in the blind, and after entire removal of the eyes, and after atrophy of the optic nerve.

Visual hallucinations are less unfavorable than hallucinations of hearing as regards recovery of the mental disorder.

Gustatory Hallucinations.—Gustatory perception, strictly speaking, is confined to substances which are acid, saline, bitter, or sweet,

acting on mucous membranes supplied by the glosso-pharyngeal and lingual nerves. All the more delicate shades of taste dependent on odoriferous qualities are perceived by the olfactory organs.

As tasting, therefore, is smelling to a great extent, it is difficult to separate the pathological action of these two senses in hallucinations.

The anatomical limits of normal gustatory sensations are the tip, the edges, and the back of the tongue, the soft palate and the posterior hard palate, and the anterior pillar of the fauces, but these limits are considerably narrowed in most cases of acute mental disease through local affections of the membranes as well as from general toxic and diathetic states which influence these sensory parts. When a patient suffering from toxic Insanity complains that his food has a metallic taste, it is not easy to know whether it is reality or imagination—whether it is illusion, hallucination, or normal reaction to a poison actually in the system.

There is a like uncertainty as to anomalies of taste in the acute psychoses, with dry or heavily coated tongue, or morbid salivary secretions, or nasal or pharyngeal catarrh, or the various alterations of innervation of the parts in question known to exist in Insanity with syphilis, tubercle, and other cachexias. The administration of drugs also complicates the question of the nature of perversions of taste in the insane.

These difficulties of differentiation do not change the clinical fact of the frequency of gustatory hallucinations in Insanity from the major neuroses, in general paresis, in acute melancholia, and in hallucinatory monomania. The gustatory hallucination is emotional and arouses the resentment of the patient, and leads to refusal of food and violent delusions of poisoning, and it frequently arouses reflex hallucinations of the other senses, and the hallucinated substances will soon be seen as well as tasted in the food. In the convalescent stage gustatory hallucinations, like those of sight and hearing, become less distinct until they disappear, but it will be found that they usually survive the secondary and associated perversions of perception.

When a therapeutic or accidental toxic agent is in the patient's system the various nutrient fluids taken into the mouth, or even solid ingesta well mixed with saliva, produce a variety of chemically resulting combinations of morbid tastes which are to be taken into account in the diagnosis of gustatory hallucinations. Iodide and bro-

mide of potassium, in syphilitic and epileptic Insanity, act in this way, and in morphinism, cocainism, santoninism, plumbism, and other toxic states there are like chemical resultants in gustatory regions. It is worthy of note that the gustatory sense, which is a continuous source of pleasure in health, is almost invariably painful in the hallucinatory states of mental disorder.

Tactile Hallucinations.—Anomalies of touch in mental disorder take the form often of anæsthesia, hyperæsthesia, or paræsthesia, and it is difficult to distinguish between illusory and hallucinatory symptoms when patients complain that they have creeping, prickling, sticking, and burning cutaneous feelings, which are readily transformed into delusions of persecution by electricity and mechanical appliances devised by enemies.

Tactile hallucinations are most common in toxic Insanity, in general paresis, in hypochondriacal, hysteric, epileptic, neurasthenic, and climacteric cases. Thermic and algid sensations are associated often with the tactile hallucination, which may correspond to subconscious cœnæsthetic excitations in internal organs, to vasomotor cutaneous variations, or to morbid states of spinal and cerebral sensory centres determining the direction of the pathological action of imagination. Thus, skin diseases in Insanity give rise to illusions through misinterpretation of the conscious cutaneous sensations, but they may also be the physical substratum of a variety of tactile hallucinations, just as pruritus vulvæ may be the origin of sexual hallucinations as well as illusions. In abolition of sensation, as when a hemianæsthesic patient believes a second person to be attached to his body, the major part of the symptom is hallucinatory inference rather than illusion.

In the main, however, it is difficult to distinguish between hallucinations and illusions of touch, which merge indistinguishably and are complicated in many cases with perversions of the other special senses.

Tactile hallucinations from extensive loss of cutaneous sensation lead to delusions of changed identity or of altered material structure of limbs or other parts of the body. Tactile hallucinations in hypochondriacal patients are very numerous, and referred to visceral or cutaneous regions they become the source of the most extraordinary delusions. Sexual hallucinations are mainly a complex variety of the tactile order. Women especially are subject to them at the climacteric, and think that they are pregnant, that they bring

forth children, that they are shamefully abused by men at night, and they often accuse those about them of indecent conduct toward them.

Anæsthetics develop these tactile hallucinations of a sexual kind, and they have led not a few physicians and dentists to be falsely accused by women not insane.

Hypnagogic tactile hallucinations of this same nature are very common among the insane, and, as they have a tendency to recur, they soon establish a corresponding delusion of nocturnal outrages usually recounted in detail in the most realistic manner. They are extremely real to the patients, who occasionally resort to the most ridiculous and elaborate means for local protection of the genital regions at night, using sheets and towels, or even having special guards constructed for the purpose.

Tactile hallucinations, like those of all the other special senses, may constitute the epileptic aura.

Olfactory Hallucinations.—The normal stimuli of olfactory perception are infinitesimal particles reaching the rod-shaped cells of the nasal membranes by inspiration through the lower and upper nasal chambers, and the specific sensation is derived from the olfactory nerve, while the fifth nerve supplies common sensation to the membranes.

Abnormally, chemical or mechanical stimulation of the olfactory nerve may cause hallucination, which has been known to have been persistent in connection with tumors causing pressure and final destruction of the nerve, abscess in temporosphenoidal lobe and coarse brain lesions, necrosis of the bones of head or face, dental caries, and nasal and pharyngeal diseases. The fact that illusions of smell are peripherally initiated does not exclude the possibility of hallucination from the same source, though it complicates the differential diagnosis. After atrophy of the olfactory nerve in senile Insanity, and disorganization of the bulbs in general paresis, there may be hallucinations of smell of cortical origin. Intra-cranial pressure from syphilitic tumors or any other cause may occasion anosmia or even parosmia.

Olfactory hallucinations are common in involutional and evolutional Insanity. The evolutional type, as in pubescent cases, is associated often with masturbation; and hallucination with involution, as at the climacteric, is related to disease of the uterus or its adnexa.

The intimate connection between the perversions of the olfactory

sense and disease of the reproductive organs is only a clear revelation of man's latent and evolutionary animal nature, for, in the lower animals, smell is the direct excitant of the sexual appetite, and originally the olfactory sense, which was specifically differentiated from the primordial sense of touch, was very largely perfected in animals through sexual incitations.

Olfactory hallucinations are intensely emotional in character in many cases, and painful with few exceptions, and they often produce great delusional excitement. This fact only corresponds to the powerful physiological action of odors, which are overwhelming sometimes, and may even cause syncope in susceptible persons. The powerful odor of the epileptic's aura is hallucinatory.

Olfactory hallucinations are found both in acute and chronic cases, and they are frequent in general paresis, in toxic, epileptic, hysteric, neurasthenic, and syphilitic Insanity, and they are ordinarily elaborated in keeping with the dominant delusion.

Kinæsthetic Hallucinations.—The perception of movements performed takes place through the kinæsthesis, or muscular sense, and the centrally registered kinæsthetic sensations come largely from the joints, though also from the cutaneous and muscular periphery.

In the absence of all muscular action there may be a false perception of movement, which constitutes a kinæsthetic hallucination. This hallucinatory feeling of movement leads patients to declare that they feel themselves during the night wafted in the air; that their limbs move when they do not will it; that the influence of their invisible persecutors compels them to strange movements and positions of their head, body, and extremities. These false sensations of movement are centrally initiated in cortical centres and are the product of a morbidly intense imagination. Kinæsthetic hallucinations relate not only to such past movements as admit of revival in memory, but embrace such new combinations of muscular action as a diseased fantasy may suggest. Thus sometimes general paretics, and epileptic, hysteric, neurasthenic, and toxic cases, in the acute stages, complain of the most remarkable distortions of their limbs and body, of gyrations, of flight through the air, and precipitations while revolving. Heightened kinæsthetic sensations add to the exaltation in acute mania and the early stage of general paresis before the actual hallucinations of movement arise.

Any of the more highly specialized muscular actions, such as speech, handwriting, gait, playing upon musical instruments, may

form the material of the kinæsthetic hallucinations, and the patients may fancy that they speak or write words or play upon the violin or the piano.

Even in normal ideation there are always nascent and correlative motor impulses of speech, and it is the intense revival of these latent motor elements of thought which gives rise to the kinæsthetic hallucination of speech in the insane.

Kinæsthetic hallucinations of the ocular muscles lead to false conceptions of direction and of the spatial relations of objects, and of required movements to reach them, and may modify, in a measure, the co-ordination of muscles. Kinæsthetic hallucinations are also intimately related to impellent ideas, which are nascent motor impulses aroused with such morbid force as to issue at once in action, which may be both involuntary and irresistible. Kinæsthetic hallucinations, therefore, may have such pathological intensity as to be transformed directly into impellent ideas or irresistible impulses, and they thus have a certain clinical and also medico-legal importance.

Having now considered the chief disorders of *perception* in Insanity, there are next to be described the changes in *consciousness* which mark the progress of mental disease.

Consciousness.—It is best for the practical purposes of psychiatry to consider consciousness, not metaphysically, but physiologically, and as the concomitant of the action of the physical environment on the nervous structures of the human organism.

The action of an environmental stimulus on the peripheral nervous system is attended by tactile sensation, which is the simplest state of consciousness. If a sound-wave follow immediately and impinge on the tympanum, there is instantly an acoustic sensation and a corresponding change in the state of consciousness, and at once, if the reflected light of some object strikes upon the retina, there is another sensation and another change in the state of consciousness. All consciousness is likewise constituted of a continuous series of active states of feeling and of passive states of change, alternating so that every state of feeling is followed by a state of change and every state of change by a state of feeling, and this alternation continues *ad infinitum.* The states of feeling vary in length chiefly according to the intensity of the excitant, but states of change are so brief as to have no appreciable duration, though the transition from one state of feeling to another is always noted in consciousness, however rapid the change.

The states of feeling are as diversified as the infinite combinations of the various special sense-impressions, but the states of change are only of two kinds, such as connect similar and such as connect dissimilar states of feeling. The conscious recognition of the relation of similarity or dissimilarity between states of feeling is thought, and when two states of feeling are thus for the first time juxtaposed and consciously recognized as similar or dissimilar, it is reasoning by comparison, and when the same recognition of similarity or dissimilarity between the same recurrent states of feeling is repeated it is memory.

The continuous succession of states of feeling, of which consciousness is thus composed, corresponds to processes in the nervous structures provoked by correlative influences in the physical environment. States and changes of consciousness never occur but as the reflection of corresponding changes in nervous structures, so that the nervous system co-ordinates all parts of the human organism and its bearings to the physical environment, and determines the relations of states of consciousness in this sense, that they never can arise except in connection with active processes in the nervous centres. The active nervous process, which is the physical counterpart of the conscious state, takes place in the cortical centres of the brain, but it may have been elaborated in lower centres prior to its arrival there, and the entire nervous system is in some way subservient to consciousness, though Meynert held that the fore-brain was the essential organ of consciousness, and this is largely the truth, though probably not the whole truth.

The active nervous processes occurring for the first time are attended by vivid states of consciousness, which become less and less vivid, and finally cease, after prolonged repetitions of the same nervous processes. Thus the nervous process of co-ordination of new modes of action is painfully conscious at first, but is finally unattended by consciousness when the action becomes automatic, as in the musician. The active processes attended by vivid consciousness are supposed to be the opening up of new channels of communication in the higher nervous structures, and in automatic actions the flow of nervous energy is presumed to be through the old and well-worn channels. Thus, in the course of long generations, habitual actions become organized in the nervous system and are not only unconscious and automatic, but instinctive. All nervous processes are not attended by conscious states, therefore, for, in the evolution

of the race certain nervous activities have become permanently organized and are on an unconscious basis, such as those which preside over all the trophic, vascular, and vital functions, and co-ordinate the relations of muscular, glandular, and nervous systems. The more permanently organized activities are those of the spinal cord, medulla oblongata and cerebellum, and basal ganglia, and the more recent and highly evolved are those of the brain cortex, which is for this very reason the chief seat of consciousness. It follows, therefore, that there are going on in the various levels of the nervous system nervous processes of all degrees of newness or habitualness, and of intensity or levity, attended by conscious states of corresponding degrees of feebleness or vividness. There is the vast aggregate of sensations from muscular, cutaneous, vascular, osseous, visceral, and other organic sources, which constitute cœnæsthetic consciousness. Any decided change in this continuous form of organic consciousness, as in hypochondriacal Insanity, is attended by a change in the higher form of intellectual consciousness.

It has been claimed that during sleep consciousness is broken off, or that for about one-third of existence there is a complete interruption of consciousness. The truth is, that consciousness is an unbroken continuity throughout life, but that it is carried on at different levels, and during sleep it is preserved at the level of cœnæsthetic consciousness. It is only after profound anæsthesia by artificial means that an intelligent and introspective person experiences for the first time the shock of an actual break in his conscious existence. The dawn of consciousness takes place "in utero," and there can be no doubt that, if not microkinetic, at least adaptive, movements of the embryo in the last months of gestation are, in a measure, conscious. Infantile consciousness rises to a higher level than embryonic consciousness within a few days after birth, on account of the greater variety and complexity of the environmental influences acting upon the nervous structures and arousing corresponding states of feeling, so that consciousness is rapidly educated, so to speak, but it is essentially a cœnæsthetic consciousness for the first few months. It is then conducted at higher and higher levels, until there has been a complete evolution of personal identity. In old age, again, there is a decline of consciousness as to the environment and as to self, and a reversion even to the level of childhood, or of cœnæsthetic consciousness in senile dementia. In apathetic and terminal dementia, and in low forms of idiocy also, the total life is carried on at the level of cœnæsthetic consciousness.

Among the insane sleep is at a lower or higher level often than that of cœnæsthetic consciousness and partakes of a semi-comatose nature from exhaustion or of the dream-state, during which there is association of ideas and fantasy, with hypnagogic hallucinations.

There is a disorder of consciousness, not infrequent in Insanity, consisting in somnolence prolonged for weeks at a time, and, as often as reawakened, the patient relapses into this state of partial abolition of consciousness.

In somnambulistic states there is a partial eclipse of consciousness and of special sensations, though there is an exaltation of the muscular sense, and there is most elaborate automatism.

A more total eclipse of intellectual consciousness takes place in the automatic states of epileptic Insanity, during which the patient may appear to others fully conscious and may commit violent deeds of which he has subsequently not the remotest memory.

Artificial hypnotic states represent various degrees of abeyance of consciousness, and they have this characteristic, that during their continuance the contents of consciousness may be varied by suggestion.

In the hypnagogic states of the insane occasionally suggestion may act in like manner, even in those who have not been somniloquists.

Another change and partial loss of consciousness occurs in mental disorders in catalepsy, with impaired sensibility and muscular rigidity, and the latter symptom usually becomes marked in proportion to the degree of impairment of consciousness.

In ecstatic conditions there is limitation of consciousness within certain delusional and hallucinatory spheres, to the exclusion ordinarily of all other peripheral or central impressions, and the emotional tone is highly agreeable.

Another kind of disorder consists in a limitation of consciousness to some frightful delusion or hallucination, with inhibition of mental activities and reduction of all the vital functions, as in melancholia attonita, or primary dementia. There are other sequential states of stupor from exhaustion of the higher nervous centres, with feeble consciousness and weakness of all the psychic processes. There are also the gradual reductions of consciousness in the transition to terminal dementia in all the incurable forms of Insanity.

In all acute states of mental depression there is a circumscribed and concentrated consciousness which seldom passes the limits of a circle of painful delusions and false sensory perceptions.

In states of mental exaltation, on the other hand, there is a diffusion of consciousness, due to the rapid influx of sensorial impressions and the loss of voluntary attention, so that consciousness is incessantly changing with the multitude of peripherally and centrally initiated excitations. In the initial stadium of Insanity the great changes in the cœnæsthesis force themselves into consciousness and arouse distressing presentiments of loss of reason or of impending dissolution. At a later stage continuous changes in cœnæsthetic consciousness lead to the belief of complete change of identity.

The most remarkable of all the changes of consciousness in Insanity are these transformations in personality, and, before their description, some analysis of personal identity is required.

It would seem to be a simple matter that a child should learn to distinguish its own body from other objects, and that with advancing years he should have a clear recognition of habitual physical and mental states known to be his own, and that he should feel his united physical and mental being to be his own self, and that this conscious feeling of personal identity should remain firmly fixed so long as life endured.

Personality, however, is a complex psycho-physical compound, which readily undergoes dissolution in mental disease.

The component elements of personality are as follows:

1. Cœnæsthesis is the central substance of conscious personality, which is based on the sum of all sensations from every organ and every tissue in the body. Cœnæsthesis varies widely in different individuals, and in two persons of very different constitutions, if there could possibly be during sleep a substitution in the one of the cœnæsthesis of the other, there would probably be, on awakening, a complete failure of self-recognition. Disorder of the cœnæsthesis in Insanity is a cause of changed identity.

2. A simultaneous nucleus of ideas, emotions, or volitions at the actual moment of realization of self-identity must exist. A nuclear delusive idea, to which all memories and incoming impressions are referred, causes alteration of personality in mental disease. The immediate nucleus of consciousness, which is the present link binding old memories and new impressions, and the inner man and the outer world, embraces the individual's relations in time and space, and when this suddenly drops out of the immediate contents of consciousness there is confusion of identity, as often witnessed in mental disorders.

The present nucleus, or immediate contents of consciousness upon which the mental vision is focussed, is in reality the only clear and illumined consciousness which man possesses, and it is ever undergoing instantaneous changes and is never absolutely the same at any two successive points in time. Psychologically speaking, personality, *as a synthetic whole,* is never brought completely within the focus of illumined consciousness at any one moment of an individual's existence.

3. The mnemonic residua of all concepts, sensations, emotions, or actions which have been experienced during the whole life and admit of recall in the mind of the individual. Amnesic disorder, as favoring change in personality, will presently be described.

4. Recognition of the relations, interactions, and motives of conduct between self and the environment. There is ordinarily much confusion among the insane in this field of conscious life.

5. The emphatic reference to self of any of the above components, which more especially associates the individual with any new event. The normal strong and positive feeling that it is *my* bodily being which is affected, *my* immediate ideas which are concerned, *my* past experience which is in question, my relation to surrounding events which is at issue, is often so feeble as to be a contributive cause of change in identity in Insanity.

This analysis of the component elements of personality shows that the latter is not a simple, but a complex, affair, and there has from this fact resulted a variety of explanations of the phenomena of double personality witnessed in Insanity. No theory thus far advanced by authors on the subject explains satisfactorily all cases of this distinct cleavage of self-consciousness, which takes place in the following different ways, according to the writer's opinion.

In original monomania it is the second component of personal identity above mentioned which is immediately concerned in the evolution of a new personality. It is the immediately conscious nucleus of morbid feelings and delusive conceptions about which, by gradual accretions, a new personality is formed. It is the nuclear delusion and the central fixed idea which is the backbone of the second personality in the transformation stage of monomania. This is an evolutional phenomenon, and differs from the dissolutional change of identity in the secondary vesaniæ. In secondary monomania the most decided change is in the third component, in the mnemonic residua, part of which have been lost through amnesia,

and the rest changed in their relations by new habits of association with diseased concepts and fixed ideas, which come finally to constitute also the persistent and immediate contents of consciousness. There is also a partial alteration of the cœnæsthesis and a change in the fourth component of identity, which is in this instance a complete loss of the recognition of the relation between self and the environment, and of the normal motives of reaction to environmental influences. In the above forms of mental disorder there is, for a time, a struggle for existence of the two forms of personality, and the morbid and secondary form finally survives as the fittest under the circumstances.

There is seen, as a rare exception in Insanity, a double self-consciousness with somnambulism.

The component element of identity, which consists of mnemonic residua, is distinctly different in the two states of consciousness, and the memories of the somnambulistic condition recur only with this condition and never in the more permanent state of consciousness. This is the only real basis of a claim of double personality in this instance, for the remarkable muscular co-ordinations and the whole series of perfectly adapted actions are only such as have been previously acquired and are executed under the guidance of heightened muscular sense and hypnagogic ideas.

The most perfect examples of double personality are found among epileptics, in whom there is complete amnesia, in the more permanent state, of the occurrences in the secondary state of consciousness. The whole conduct of the secondary state may to the onlooker appear to be that of a person in full possession of his faculties, as the special senses are active, the motor adjustments are perfect, and all the actions are in complete accord with surrounding circumstances.

This secondary morbid state, during which the second personality is said to exist, may continue for days or weeks together, and it is nothing more nor less than an elaborate instance of epileptic automatism. Explained in the terms of the analysis of personal identity, the secondary personality is simply the primary personality minus the second component, *i.e.*, consentaneous ideas in full focus of clear consciousness essential to attention and memory, which therefore fails of all the events of the automatic condition.

It happens occasionally in mental disorders that in certain recurrent phases of the same attack there is an apparent change of per-

sonality. The patient has the same ideas, feelings, and actions in each of the recurrent phases, of which no clear recollection is retained in the regular course of the disease. Thus, in melancholia with maniacal exacerbations the patient may be subjectively and objectively an entirely different person during the exacerbations. The mental change here rests on a physical basis, and it is the uniform and recurrent change in the cœnæsthetic consciousness which underlies the temporary change in personality.

In mental disease a prominent symptom often is a confusion as to time, place, and identity of persons, which is usually considered to be a disorder of consciousness. This symptom is more frequently due to deranged association of ideas and amnesic disorder, except in cases with complete transformation of personality.

Having completed the study of perception and consciousness, attention will now be directed to the disorders of the representative faculties of memory and imagination.

Memory.—Memory is the mental revival of things recognized to have previously occupied a place in consciousness. The physical condition correlative to memory is a fundamental quality of nervous tissues which are supposed to retain a permanent trace of impressions once experienced. The physical substratum of memory is more especially the brain cortex upon which presumably are impressed images of all sensory presentations, which may subsequently be revived in consciousness by suggestion or by voluntary effort, and in the latter case the process is termed recollection.

Readiness of recollection depends on the strength of the first impression and the number of times it is repeated, and the extent and character of its associations.

Cerebral localization has led to the belief that the various cortical sensory areas are concerned in the registration of the mnemonic images of the special senses, and this theory is applied in the explanation of partial memories and their loss in disease. Space will only permit a review of the chief disorders of memory in Insanity.

Amnesia, or loss of memory, is very common among the insane, and in some cases the remembrance of past events, during certain periods, is only partial, and in others it is completely lost.

In epileptic Insanity the complete loss of memory may be for periods of a few hours or of some weeks.

In the cases of somnolence, mentioned under consciousness, there may be total amnesia for certain periods.

In delirium acutum there is total amnesia, often not only for the acute stadium but for the first part of the convalescent stadium.

In general paresis there may be total loss of memory in the terminal stage, and temporary but total loss of memory following the epileptoid seizures.

In apathetic and terminal dementia the amnesia is practically total in character, though there may be recurrences to states of partial restoration of memory.

In acute mania, in profound melancholia, and in primary dementia there are sometimes complete lapses of memory for hours, days, or weeks at a time. In sequential stupor and in toxic and diathetic Insanity, with extreme exhaustion of vital powers and malnutrition of cortical structures, there may be not only actual amnesia, but positive loss of organic memory, of the possibility of the registration of sensory impressions in molecular tissues.

The alternate memory of double personality, which Ireland ascribes to unequal or alternate action of the cerebral hemispheres, is to be here mentioned, as well as the alternations in natural and induced somnambulism. Finally, there is the total amnesia of diffused cortical lesions, and of coarse brain disease in organic dementia and of the atrophy of senile dementia. Partial amnesias are also common in mental disease, and they may involve the memory of sight, hearing, touch, taste, smell, or of the muscular sense, and they are due to cerebral lesions which may be located with a certain definiteness.

Aphasia, which is common in organic dementia, may consist in loss of the memory of written words or musical notes, so that reading is impossible, and this is word-blindness, or of the meaning of spoken words, which is word-deafness, or of the motor memory of words as articulated, which is termed aphemia.

All forms of ataxic and amnesic aphasia are to be met with in mental disorders.

Agraphia, or loss of the images of the co-ordinated movements of writing, is also common in many forms of Insanity. In the progressive forms of amnesia the more recent acquisitions of knowledge and of motor skill first disappear, and the older and more permanently organized memories and motor attainments, which have become automatic, are the last to disappear.

Hypermnesia is not as rare in mental disease as has been supposed, and the history of the patient not infrequently embraces an

account of remarkable activity of the memory at some early period of the alienation.

In hysterical, neurasthenic, and maniacal cases there is not very uncommonly hypermnesia, which is also found in the initial stadium of the toxic insanities and of the psychoses from infectious disease.

Partial hypermnesia may also arise in connection with the action of the virus of infectious disorders in Insanity, or it may be due to intense and localized cortical hyperæmias, as in general paresis. It is well known to exist to a surprising degree in states of arrested mental development, either in idiots or imbeciles, who become known as mathematical or musical geniuses.

There is an apparent partial hypermnesia in demented patients, whose memory is almost a blank, except that they recollect the best modes of play at games like chess or cards, which phenomenon admits of no easy explanation, though it is more likely cerebral automatism than partial hypermnesia.

Paramnesia, which is a term applied to illusions of memory, is sometimes to be witnessed in paretic and alcoholic cases, who mistake revived sensory impressions for the actual experiences of life. A paretic recalls a champagne dinner and enjoys it in imagination, and is positive that he has enjoyed it in reality; or from some revived resemblance mistakes the place and the people about him for a part of his past experience, and he mistakes a present sensory impression for a recollection.

When the imaginary experience has absolutely no basis in the past facts of the patient's life, it is, more properly speaking, an hallucination of memory, but, when a real and correct perception of a present reality is transformed, by the addition of fantastic reminiscences, until it is mistaken for an actual part of the patient's past experience, it is perhaps more correctly to be termed an illusion of memory.

Imagination.—The revival in consciousness of mnemonic images which are combined in some new way is imagination.

Past sensory impressions form the plastic material out of which imagination constructs the new forms which stand out so lifelike in consciousness.

In the higher forms of constructive imagination, as in the painter or musical composer, there is a certain voluntary element in the selection of the plastic material, and a clear recognition of the final product, as a creation of the imagination, but among the insane there

is no realization of the source or nature of the imaginary product, which springs full-formed into consciousness and is therefore mistaken for a substantial reality. In some patients the auditory, and, again, in others the visual, mnemonic residua present themselves most promptly and abundantly for the plastic operations of imagination, and it is probable that this fact determines, in some measure, the character of the hallucinatory phenomena. Some persons, in sanity or Insanity, are so neurally constituted that the revival and recombination of sensory residua do not take place vividly, and, being practically without imagination in health, they remain without hallucinations in mental disease.

The true creative imagination of genius is absolutely different from the low forms of imagination displayed in Insanity. The modern idea that the constructive imagination of genius is akin to madness is a travesty of scientific truth. Great genius always rests upon the solid foundations of brain-structures of rare assimilative qualities, which register with absolute truthfulness to nature, of the exact and voluntary reproduction in consciousness of these rich stores of memory, arrayed in order and correspondence with past external realities, of great power of discrimination and comparison of the internal combinations and external bearings of these data of memory, which are held with an extraordinary grasp of attention in the full illumination of a consciousness of great intensity, until there is a clear perception of their new and inspiring relations—an actual revelation of genius.

Such physical and psychical conditions as these never exist in their totality in Insanity, in which there is only a pathological susceptibility of the reception and revival of ideas under the diseased activity of imagination.

The display of imagination in mental disease is almost exclusively of the lower form, more correctly termed fantasy.

Fantasy is the inco-ordinate reproduction in consciousness of loosely combined sensorial images. There is probably some physical reason for the disorderly combinations of sensory images in mental aberration, and that there is some law of uniform cause and effect in the fantastic display is seen in toxic Insanity, in which alcohol, for instance, calls forth a certain array of reptiles and insects with almost uniform certainty. States of extreme inanition also have characteristic phantasmagoria, which may spring from visceral and cœnæsthetic sources, as from gastric and sexual regions, and there

can be no doubt but that in Insanity the fantasy largely reflects organic sympathies.

In acute mania there is one continuous play of fantasy, and in many states of mental disorder patients live in a world of their own fantastic creation, which reflects the prevailing emotional tone, whether sad or gay, and often the delusional contents of the mind. In general paresis, especially, it is difficult to distinguish between hallucinations and delusions, and the incessant working of fantasy in the early stage of the disease.

Hysterical and hypochondriacal patients indulge in fantastic reveries, and paranoiacs have a sort of a dream-life for months together, and the outcome in chronic mania is a steady play of fantasy, and the senile dement reverts to a childish action of fantasy, which disappears, however, in the terminal stage of dementia.

Fantasy often survives the decay of the other mental faculties, and becomes the final flickering light in the extinction of intellectual life.

Having now summarily surveyed the chief anomalies of memory and imagination, it will be necessary, in order to complete the subject of disorders of intellect, to consider the disturbances in the rational processes of thought and reasoning.

Thought.—Thought, logically considered, consists in a triple process of conception, judgment, and reasoning.

General concepts are formed by analogical inference, by the comparison of objects sensorially presented, or imaginatively represented in consciousness.

Judgment consists in the comparison of general concepts, in the detection of similarity between them, and in the statement of their points of agreement in propositional or syllogistic form.

Reasoning is the derivation of inferences from the comparison of judgments.

Thus thought, in the inverse order of its complex elements, is resolvable into reasonings, judgments, and general concepts, and the latter are in turn resolvable into mnemonic images and sensations. Sensation itself, as the basic element of mind, is not such an ultimate fact as to defy further analysis, for the sensation of a single musical note must correspond in some measure to the compound nature of the simultaneous vibrations of the fundamental tone and of the harmonic over tones, which compose the note, and a like idea is true of visual and tactile sensations.

The pathological nature of thought in mental disease is due to the defects of formation of concepts or judgments, or to disturbance in the reasoning processes.

The formation of clear concepts depends upon attention, which is the concentration of consciousness upon a particular object, which act is effected by voluntary effort, or involuntary through force, novelty, or other quality of the object itself.

In mental disease there is failure of attention from preoccupation of the mind by dominant ideas or feelings, or from exhaustion of cortical centres, or from the rapid flight of ideas in excitement, which renders attention impossible, or from original cortical defects, as in idiocy. In terminal dementia there is complete failure of attention and of the formation of new concepts, as well as an obliteration of past concepts, so that thought finally ceases completely for want of crude material.

The force, novelty, and persistence of certain emotional concepts in the insane fill consciousness to the exclusion of all other ideas, for days or weeks together, and some term this a reduction of consciousness from the general to the particular.

As voluntary attention diminishes and passive attention prevails the patient becomes a prey to all sorts of sensorial impressions and incongruous notions, and there is disorder in the association of ideas, which become incoherent.

Judgment is deranged through the detection of strange and fanciful similarity in concepts, and hence arise odd conceits and insane conclusions.

Through the feebleness of some concepts and the undue force of others, and the disorder in the association of the same, the first terms of comparison, on which judgment rests, are falsified, and the inferences become the evident product of an insane mind.

In mania there is first an accelerated flow of concepts, which lead to facilitated and even brilliant thought, but later there is a tumultuous flow, which neither voluntary effort nor the most powerful impression can arrest, and the result is entire incoherence of thought.

In melancholia the opposite condition of a retarded series of concepts is present, and the succession of ideas may be so tediously slow as to become a cause of incoherence of thought. There is also the constant repetition of a single concept, which leads to verbigeration, which is the monotonous repetition of words or phrases, and, if it is a motor concept as to some particular action, it leads to con-

stant repetition of the same. There is also a form of verbigeration associated with extremely rapid and incoherent thought, with repetition of words having some similarity of sound. The form of incoherent thought with tendency to rhyming is not rare, and is dependent entirely on similarity in the sound of words without regard to their sense, which is the direct antithesis of onomatopœia. Thought is carried on in mental disorder largely under the influence of prevailing emotions, hallucinations, or delusions. The character of the thought does not create in this instance the emotional tone, but is determined by it. It has been supposed that rapid thought-rate creates expansive feeling in mania, but both are the outcome of common conditions of disease. There is a rapid thought-rate with painful emotional states in certain hypochondriacal and hysterical cases, and in some paretics with expansive tone of feeling there is a greatly retarded thought-rate, which also exists in some ecstatic conditions.

Greatly increased or retarded thought-rate renders recognition difficult, and the mistakes in persons and things in acute mania are chiefly due to such rapidity of thought that the comparison of the present with past concepts is impossible. The disturbance in the association of concepts and general incoherence of thought leads to like defects of recognition, and to the mistakes in time, place, and identity so common among the insane.

These failures in recognition are distinct from similar disorders of recognition mentioned under perceptive and mnemonic disturbances. The inhibition of thought through the force and persistence of emotional concepts has already been mentioned, and it is only necessary to add that when a frightful concept takes the hallucinatory form it may give rise to inhibition of movement as well as of thought, so that the patient becomes statuesque and falls into a stuporous state, which is not organic stupor, which has a wider basis of physical disorder. In these states of inhibited thought there is a slow and labored formation of judgments, which are correct in the main, and this fact distinguishes this sort of stupor from actual dementia, in which no judgments can be formed, as the material for the same has faded from the memory.

Incoherence, which, as regards thought, may be due to tumultuous ideation, to violent emotions, to amnesic defects, and to changes in thought-rate, also affects the movements of the body and limbs, and of the special mechanisms of speech, gait, and handwriting in

the insane. The flighty thought leads to flighty action, and the absence of clearly purposive and definitely directing ideas leads to incoherent and contradictory speech, looks, and acts—to pseudo-paraphasia, paramimia, and parapraxia.

Reasoning.—The power of reasoning is almost constantly affected in Insanity, for, as the highest evolution of intellect, it is naturally the first to suffer in disease. The mode of reasoning peculiar to the individual in health is the same in kind, though not in degree, in mental disease. Thus some more naturally reason by the detection of a relation of likeness between the differing things compared, and others by discerning the difference between things generally alike. But whether the latter analytic method or the former synthetic method be the habit of the patient's mind, the disorder of reasoning comes about in much the same way.

In the first place, the mnemonic residua may have been falsified by disordered perception, or the general concepts which they compose may be unnaturally grouped from defects of association, or the nexus of ideas forming the immediate contents of consciousness may be illusory, so that the unlike terms between which a relation of similarity is to be discovered already contain the source of error, and the premises being false the conclusion must be erroneous.

False reasoning in mental alienation may proceed not only from imperfect registration of impressions, from weak memory, poverty of general ideas, and lack of association of the same, but also from the immediate influence of strong emotion, and controlling insane ideas. The bias of preconceived and expectant ideas is sufficient to warp the processes of reasoning in some cases, and in others ratiocination is impracticable from amnesic failure of words, from retarded and inhibited mental action, or from too rapid and tumultuous ideation.

This study of the rational processes in mental disorder leads naturally to the consideration of those false inferences of the insane known as delusions.

Delusions.—The belief in a state of things which does not in reality exist is by no means confined to the insane. The erroneous beliefs which have guided the actions of mankind form one of the most instructive and humiliating chapters in human history.

Wise men have been mistaken for fools, great geniuses for lunatics, benefactors of the race for impostors—scientific truth has fought its way continuously against erroneous belief firmly en-

sconced in high places—the most abominable wholesale persecutions, the most terrible revolutions, and the most cruel wars have been carried on under the influence of delusions.

The active conflict of business relations and of social life is conducted in no small measure under false beliefs of the motives of action of others, and the attempts of immediate adjustment of people to their personal environments is often a comedy of errors. Sane delusions are of varied origin, and they result from ignorance, superstition, personal prejudice, national, political, social, religious or scientific bias, and they are in some instances direct heirlooms.

This general liability of mankind to delusions is a prototype of the same liability in the insane mind still active, though diseased, and sane and insane delusions are sometimes derived from exactly the same sources of error by the same mental processes, and in these instances they admit of no practical distinction except the coincident fact of Insanity.

In the vast majority of instances, however, the nature and origin of the delusion and the insane mental process whence it is derived are to be traced, and the derivation of delusions in mental disorder will now be the immediate subject of inquiry.

An insane delusion is the belief of a diseased mind in a state of things which does not exist.

This simple but comprehensive definition is applicable to false notions as to internal states of mind or body, as well as to all other erroneous conceptions.

When the delusion relates to things of the external world, a definition like the following is widely appropriate:

An insane delusion is the belief in a relation between self and one's surroundings which is unreal and unjustified under the circumstances.

If it be desired to emphasize the fact that the patient does not admit of conviction of the falsity of the delusion, the following definition may be adopted:

An insane delusion is a false belief resulting from brain disease, and contrary to existing facts and incapable of correction by adequate proof of its falsity.

As regards the latter point, the rule is that insane delusions do not admit of removal by appeals to reason, but it is a common mistake to suppose that this is always the case. There are delusions which appear above the plane of consciousness from organic sources and disappear again with the rise and fall of the tide of nervous

energies, just as delusive views may arise during the rhythmical reduction of nervous force at night and be recognized as absurd on awakening in renewed vigor.

The physician may arouse the patient from anenergy and delusive collapse by a strong appeal to his feelings and better judgment, and stimulate nervous currents to the point of activity essential to the correction of delusion. Well-planned and well-timed stimulations of this sort in the convalescent stage may abridge the duration of delusions, and they are not to be contemned at certain other strategic points in the combat with the disease, as will be described under the head of treatment.

It is to be noted that delusions spring from fluctuations in nervous force as well as from organic lesions. In the latter instance the delusions are more apt to assume the form of permanent reality, but in the former case they vary in distinctness in every degree, from mere psychic shadows to real mental substances. In the acutely melancholic consciousness the same delusion may be substantial to the point of suicidal incentive in the small hours of the morning, or shadowy to the degree of doubtful existence in the fuller flow of nervous energy in the evening hours.

The duration of a delusion may be momentary, like the illusion from which it springs, or of the gradual growth of a lifetime in original monomania.

In the main, delusions vary greatly in duration in states of mental exaltation and in states of mental depression, so that in the former hours, and in the latter weeks, may be taken as the average unit of measure of duration.

The derivation of delusions from hallucinations and illusions is very frequent, and the process is in the nature of suggestion.

The fearful melancholiac has an hallucination or illusion of footsteps in his room at night, and at once has the delusion that his enemy has come to kill him, or he has an illusion of taste and believes that his food is poisoned, and the alcoholic patient has a complete array of frightful delusions, all of direct sensorial origin.

When the hallucinations are multiple the delusion attains irresistible force, for the melancholiac not only hears the footsteps, but sees his enemy approach, and may even feel his grasp, or he may smell and see, as well as taste, the poison in his food, and the alcoholic patient may hear, see, feel, and smell the frightful objects about him.

A delusion, from whatever source derived, can never occupy consciousness as a reality but for the briefest period, except there be loss of discriminative power. This loss may be due to amnesic disappearance of standards of comparison, or disordered association of the past concepts required for the correction of present error, or to enfeebled attention and failure to grasp the terms of relation by which the delusive idea is to be tried in judgment.

The basis of delusions among the whole class of imbecile insane is the organic feebleness of the representative and discriminative powers, and among idiots the sensorial falsifications do not rise to the dignity of delusions.

It is to be borne in mind that delusions may evoke hallucinations, and through the prime belief of poisoning the corresponding hallucination of taste of the toxic agent may arise, and this is true of perversions of all the special senses in their mutual relations to delusions, so that either class of phenomena may be primary and causative as regards the other.

Delusion may arise, apart from the association of past ideas or of present impressions, from subconscious regions and fill the field of consciousness. Delusions springing up thus fully formed in the mind, though recognized as strange, may still greatly influence conduct, and they sometimes strike the patient as directly imposed by some higher power, or as immediate revelations for the guidance of their actions. Such delusions often reflect the inner tendencies and deeper impulses of the patient, and hence they are more readily accepted as realities, though they have never been challenged by attention at the gate of consciousness, like other incoming impressions, and have never undergone customary critical examination and assignment to temporal position among mnemonic residua.

Another class of false beliefs originating outside of the limits of conscious and attentive discrimination are hypnagogic delusions. A dream often repeated or of great vividness is accepted by the patient as a reality. A mother longs to see her son; she dreams intensely that he comes to see her and is denied the privilege, and the next day, under the full force of delusion, she accuses the physician of preventing the visit which her son came to make her. Hypnagogic delusions are not all thus simple, and they may be enlarged by subsequent dreaming, and what is of peculiar interest is that they may embody the substance of dreams habitual in the precedent state of health. Thus a patient had for years dreamed of falling down

precipices, and when he became insane had frightful delusions of this same precipitation.

Cœnæsthetic delusions are also of a subconscious origin, and they proceed from all parts of the periphery, and more especially from visceral sources. They constitute the prevailing symptom in hypochondriacal Insanity, and they are often permanent and incorrigible. They may correspond to actual organic disease of some internal organ, and then a very elaborate delusion may be constructed out of the morbid and constant sensations.

Many delusions arise under the organic influence of the reproductive organs at pubescence and the menopause, and they not infrequently have a strong religious tinge of unpardonable sin, or of ecstatic certainty of divine favor.

These delusions, involving two of the deepest elements in human nature, the sexual and religious feelings, are apt to incite violent actions. Thus many cases have come under the writer's care having attempted or accomplished sexual mutilations to improve their morals, or from like motives, and following the Scriptural text, "If thine eye offend thee, pluck it out," had literally carried out the injunction. One unfortunate creature conceived some guilt of immodest feeling on her part in contemplating the figure of the Saviour on the cross, and not only plucked out her right eye, but bit off part of her tongue as another offending member, because it had repeated the sacrilegious feeling which she fancied she had entertained.

An important general division of delusions is into those which are the outcome of depressed or of expansive states of feeling.

There is no question but that the fundamental emotional tone determines, to a great extent, the character of the delusions. This view is sustained by the vast majority of all delusions in states of depression and exaltation, for the acute melancholiac rarely has an expansive, or the acute maniac a depressive, delusion, and the character of the delusions only alters with the change of the emotional ground-tone.

When the dominant key of emotion has once been changed, delusions tend actively to swell the new tone of feeling, and the fact that they thus heighten pleasurable or painful states has led to the idea that they create such states which are primarily based solely upon the cœnæsthesis.

The expansive delusions are in general more sudden in origin

and more changeable in nature than the depressive ones, and they correspond more directly to sensorial impressions. They abound in all maniacal states, and in general paresis they take the form of delusions of grandeur, and in monomania also they are sometimes of the megalo-maniacal type, which is very common in imbecile mania, as a reflection of the exaggerated boastfulness of imbeciles in general. They relate to superior powers of mind or body, to the possession of great wealth, or to any and all ideas which favor the importance and general welfare of the individual.

The depressive delusions are more gradual in development and more permanent in duration and more completely systematized ordinarily.

They include delusions of suspicion in which the general attitude of the whole world is inimical and personal conspiracies abound, delusions of persecution, which take every imaginable form and are confirmed by hallucinations of the various senses, and delusions of sinfulness and self-accusation, and endless varieties of painful notions of every conceivable relation of self to one's surroundings.

The importance of this division into expansive and depressive delusions lies in its correspondence physically to states of ill-being and well-being, and mentally to states of pleasure and pain.

A psychological division of still greater importance is into systematized and unsystematized delusions.

A systematized delusion consists of a central fixed idea around which is grouped a whole system of other secondary delusions by a logical process of inferences. This dominant delusive idea is fortified by all the possible coincidences of the patient's life, which can by the most strained construction be brought to sustain it, and it finally becomes the controlling principle of the patient's motives and actions.

Some delusions are very much more systematized than others, and the degree to which a delusion is organized depends simply on the strength of the imagination and of the logical powers. For this reason, in all the chronic terminal insanities, systematized delusions are not found, except as remnants of former delusions, while they may exist in any kind or stage of mental disorder in which the rational processes are still performed, and they are found in their most elaborate form in original monomania.

Systematized delusions in the first stage of their existence most frequently accord with the general emotional tone, but later they

are modified by the evolution of changes in the personality of the patient presently to be mentioned. They ordinarily originate with a depressive ground-tone of feeling, as shown by the usual inimical and persecutory attitude of the environment, and later there is a complete transformation of delusions of persecution into delusions of grandeur.

This transformation takes place with the change in personality by logical efforts of explanation and by the natural antitheses of thought, so that the patient comes to think that if he is treated as insane it is because he is a genius, if regarded as inferior it is because he is great, if hated it is because he is so esteemed as to be an object of envy, and if confined as a pauper lunatic it is to prevent his just claim to a great estate or his marriage to a lady of title and wealth. During this transformation the fittest expansive and depressive delusions survive and undergo mutual readjustment, and the active phase of this psychic process is then at an end.

The unsystematized delusions exist in forms of Insanity in which the thought-rate is too rapid to admit of logical comparisons, as in acute mania, or where the raw material of judgments is lacking, as in the amnesic failure of general paresis or in melancholia with inhibition of rational processes and greatly retarded thought-rate, and in all secondary states with permanent logical deficiency.

The unsystematized delusion is an isolated phenomenon without any particular relation to other delusions, and without special logical bearings of any kind, and it ordinarily appears in connection with some expansive or depressive feeling or sensorial perversion, and it is seldom of long duration and is readily supplanted by some other delusion.

Delusions which arise in connection with changes in personality are of considerable importance. Under the head of consciousness the chief forms of changes in personality were described, so that it is only required to record here some additional particulars of the manner of alteration of the component elements of self-identity.

In health the incoming impressions are discriminated by comparison with past experiences, and they are then stored in memory and may serve in turn as standards of comparison, if they have been correctly perceived and truly registered in accordance with external relations. But in Insanity the incoming impressions are subject to great sensorial perversion, but they are registered in memory as if they corresponded to actual realities, so that in time the mnemonic

residua are largely falsified, and a most important component of personality is thus altered and new and false standards of comparison are substituted, and by them all the current experiences are judged, and a host of delusive concepts are formed completely at variance with the real external relations of the patient.

While this pathological change in mnemonic residua is going on there is an alteration of cœnæsthetic consciousness, and these two new and morbid components are the basis of the second personality, while the remnant of the sound memory and understanding represent the old personality now rapidly fading from clear consciousness. The old and the new personalities may alternate, each with its own set of delusions, or may even exist simultaneously. Finally, however, the new personality, with its attendant delusions, survive as the fittest to the pathological state of things.

It is at the time of this metamorphosis of personality that the transformation of delusions of persecution into delusions of grandeur, as above mentioned, usually takes place.

Before the old self has been supplanted by the new self, and while they exist simultaneously, the patient may cease a habit of monologue, and talk aloud to himself in dialogue, the old personality answering to the new in argumentative form. When the new self has prevailed the old self seems very vague, like a thing of the distant past, and, finally, like a very old memory, it may only be revived at rare intervals with diminishing distinctness. It sometimes happens that the old personality is replaced by an abortive personality, defective in physical or mental parts, without certain internal organs, or one-sided only, or composed in part of some other material than human structures, or devoid of memory and having different senses, so that everything looks, sounds, feels, and tastes differently, or, finally, cadaveric, the patient insisting that death has taken place, and that the apparent body is only a corpse. In the latter instance the nihilistic delusion may extend to the whole environment, the patient ignoring the existence of self and of the whole world, and disclaiming the reality of the objects presented to his senses.

Delusive states of doubt are very common in the degenerative insanities, and they usually run a chronic course and are of a very annoying nature. The patient doubts what is said or done by others or by himself, doubts his recollections, doubts his senses, looks at a thing and turns to look a second and a third time to see if it is really

as it appears, does a thing and returns to see if he has done it, and still doubts if there be not some mistake about it. These states of doubt are in one sense delusions, for to doubt the very recent contents of one's consciousness or the evidence of one's senses is to disbelieve prime facts, which is equivalent to a false belief, since disbelief is as positive a symptom as belief.

These delusive states of doubt are ordinarily of a painful character, and they are not to be mistaken for amnesic or paramnesic conditions, nor are they analogous to normal states of suspended judgment due to real difficulties of inference, but they are of the pathological nature of impellent ideas and of morbid impulses.

Delusions may relate to the past, present, or future. When they are referred to the past they may spring from perverted memories largely embellished by morbid imagination, and when projected in the future they often embody the fears or desires of the patient.

It is possible to engender delusions by suggestion, particularly in states of suspicion, and delusions also arise by contagion, by inoculation with the false beliefs of other patients.

History furnishes instances of widespread epidemic delusions. Delusions are of medico-legal importance and they are commonly regarded as crucial tests of Insanity. The precise form of the delusion is not of such importance as its origin, its influence on the thought and actions of the patient, the degree to which it is systematized, the length of time it has existed, the ratiocinations by which it is retained and defended, and the persistency with which it is held in the presence of adequate proof of its falsity.

Insanity may exist without delusion, and delusion may exist without Insanity. When delusion alone constitutes the symptomatic gravamen of mental disorder, a diagnosis without a most searching inquiry into the circumstances of the case is unjustified, since, to avoid medical error in such a case, it is essential to exclude the possibility of a basis of facts for the delusion. In such a case, also, it is to be borne in mind that illusions and hallucinations of memory exist in sanity as well as in Insanity, and that a great many persons of lively imagination continue to repeat and embellish an account of certain occurrences, until they finally come to believe that which is absolutely untrue.

The natural course of all delusions is that they lose, with lapse of time, their original intensity, their emotional connections, and their influence over the actions of the patient, and, with the cortical

disintegrations of the terminal stages of Insanity, they fade completely from consciousness. The patient is then once more at rest and at peace with himself and the imaginary world, as these perturbing spectres of a deluded mind

> "Fold their tents like the Arabs,
> And as silently steal away."

Section II.—Disorders of the Emotions.

Emotions are pleasurable or painful modes of consciousness resulting from diffused discharges of nervous energy through brain structures specifically integrated and molecularly modified by individual or ancestral experiences.

It is probable that the ancestral and racial transmitted tendencies are more important in determining the general trend of the emotions than the immediately acquired individual experiences. The racial differences of emotional manifestations are as great in Insanity as in health, but space will not permit their study here.

As regards mental disorders, it is of the first importance to consider the physiological basis of the prevailing emotional mood which in turn exerts a general modifying influence over the emotions. In states of mental exaltation the resultant of the cutaneous, muscular, vascular, glandular, and other organic sensations is highly agreeable, while, on the other hand, it is painful in states of mental depression, and of a negative character in states of mental weakness, especially in those known as terminal dementia.

Now, this aggregate of organic sensations from every external and internal peripheral source, excluding the current sum of the special sense-impressions, constitutes the cœnæsthetic consciousness, which is the physiological basis of the prevailing emotional mood in mental disease.

This, then, is the rationale of the fundamental emotional tone, which is agreeable in states of exaltation, painful in states of depression, and negative in dementia; and it is a clinical fact in all these forms of Insanity that the emotions are agreeable, painful, or absent, in correspondence with the general organic tone of feeling here mentioned.

This division of emotions in Insanity into pleasurable and painful, according to the prevailing states of cœnæsthetic consciousness, is the widest primary grouping possible.

Emotions may be further divided according to their degree of complexity.

Thus various agreeable or disagreeable feelings may attend the organic sensations of activity and repose, of hunger and thirst, and of changes of temperature.

The emotions connected with the olfactory and gustatory senses are simple relatively, and are very numerous and much perverted in mental disease, since taste and smell are the emotional senses. The emotions arising from the intellectual senses of sight and hearing are more complex, and are likewise subject to great alterations in Insanity, corresponding to anomalies of these senses described under perception. Then there are endless varieties of emotions springing from revived experiences, as to which sense-impressions do not act in their direct renewal in memory, and, being largely ideational, are still more complex in nature, and they are pathological in keeping with all the morbid alterations mentioned under the head of memory in mental disease. The more numerous the ideational elements which enter into emotions, the more complex they become. The more abstract and complex feelings are termed sentiments, and some of them are more highly intellectual than others, as, for instance, the sentiment of justice.

These higher intellectual sentiments are the first to suffer derangement in Insanity, not only because disorder of feeling uniformly precedes that of intellect, but because they represent the most highly evolved forms of feeling. Thus patriotic, æsthetic, benevolent, and the higher moral feelings very seldom fail to disappear in mental alienation at an early period.

Then, again, there is in mental disorders the spasmodic liberation of emotions from cortical disease in acutely maniacal and toxic states and in general paresis. These emotions are independent of sensorial impressions and of the laws of the association of mnemonic ideas, and they may be contradictory of the general law that emotions accord in character with the prevailing emotional tone. Thus the acute maniac or paretic, with a dominant expansive and agreeable tone of feeling, will have occasional spells of spasmodic liberation of mixed emotions, shown by laughing, crying, anger, and other antithetical feelings, which subside in a few minutes or hours, and leave the patient again in his customary emotional mood.

The spasmodic and automatic display of emotions is often mistaken for highly co-ordinated and intellectual feelings. Thus the

busy social performances of the maniac, or the profuse and incoherent generosity of the paretic, who gives with one hand and steals with the other, are in no sense evidence of the higher social or benevolent sentiments, and even the appropriate words accompanying these social demonstrations are in many cases automatically associated and absolutely insignificant of deliberative intent or of intellectual sentiment.

The emotion which is spasmodically liberated with the greatest frequency and force in Insanity is anger, which is attended by decided changes in respiration and circulation and secretion, with incoordination of ideas and actions at the height of the feeling. There is arterio-spasm of cortical arteries, and the resulting cerebral anæmia may end in syncope, and in the meantime the patient may have blindly vented his fury on things animate or inanimate.

There is also a prevailing angry mood, which, in a minor degree, is manifested in a continuous tone of irritability, which consists in an extreme readiness of reaction to disagreeable impressions. All these emotional symptoms are especially frequent in the degenerative insanities.

In the early stage of mental disease there is sometimes a general increase of emotional excitability, so that the simplest sensations or ideas are morbidly pleasurable or painful, and there is an emotional shading of every passing event, even of the most commonplace occurrences of life. In the later stages of mental disease there is often a general decrease of emotional excitability, even to the point of complete apathy and entire absence of all emotions.

There is also an antithetical perversion of the emotional reaction, so that pleasurable impressions are painful, and normally disagreeable feelings become agreeable.

This is very different from another anomaly witnessed in Insanity, by which, through habituation, disagreeable emotions become agreeable, so that patients come finally to cradle their most frightful feelings of persecution because it gives them morbid delight.

Paranoiacs and maniacs and paretics in the initial stage unquestionably derive pleasure in creating imaginary situations and in making voluntary surrender to emotions. These histrionic performances are often carried on for hours in the patient's room at night, with boisterous demonstrations of song and laughter, and, when called to account, the patient may answer that he is amusing himself, and may cease the performance. A paretic minstrel used to reply on

such occasions that he was having a show, and a circus actor used to relate stories to imagined audiences, and applaud and laugh at his own stories.

The most characteristic emotional alteration in mental disorders is the concentration of conscious feelings upon self, and the entire disregard of all other external relations except those which concern the prevailing selfish and narrow circle of feelings. In other words, the egoistic emotions abound and the altruistic emotions are excluded. The incubatory stage is marked by loss of interest in friends and family, and later there is complete disappearance of affectionate feelings for the nearest relatives, and, finally, there may arise antithetical feelings of hatred instead of love for parents, children, husband, or wife. Melancholiacs thus remain concentred in self throughout the attack, and the harbinger of recovery is a renewal of normal emotions toward their family.

The absence of altruistic sentiments is a rule with very few exceptions in mental alienation. There is seldom any sympathetic response for the sufferings of other patients in melancholia, or, indeed, reaction to any new painful idea, not even to death in the family of the patient. On the other hand, the anti-social emotions of suspicion, hatred, and fear abound.

In the later stages the narrowing of consciousness to self sometimes takes the form of an exaggerated feeling of self-importance, so that self seems at all times to fill the whole field of mental vision.

Emotions are evoked and in some measure determined by delusions and hallucinations, especially those of a fearful character.

The generic group of emotions based on fear is more prominent in Insanity than any other class of feelings.

Psychical disintegration is the prime factor in this group of emotions. Some patients in the incubatory stage become clearly conscious of the impending mental disaster, and early fall into a state of dread, while most patients only have a vague foreboding of evil, but still become anxious and fearful. In a few highly intelligent and susceptible individuals the fully conscious feeling of psychical disintegration ends in extreme panic, which readily passes into maniacal excitement. In all the active forms and stages of Insanity fear, as a reflex of the instinctive feeling of self-preservation, in some of its multitudinous forms, is the predominant emotion, which is reflected in the majority of insane delusions, particularly in states of mental depression.

There is a state of extreme anxiety and acute anguish with distressing epigastric sensations and cardiac irregularities of action, known as *precordial anguish.*

This precordial anguish is of cortical origin, but only as the reflex conscious expression of deep-seated cœnæsthetic disturbances, and it varies greatly in intensity. The milder form is confined to vague fear, anxiety, restlessness, and epigastric distress. The full attack of precordial anguish presents the additional symptoms of spastic arterioles and capillaries, rapid cardiac action, accelerated respiration, great motor restlessness, painful emotions, and not infrequently violent or suicidal impulses and acts.

As in the milder forms, the anguish and the painful emotions are without physical accompaniments, the phenomenon is ranked among the disorders of feeling, though in certain cases, with great vascular disturbance, it might with equal propriety be classed as a vasomotor symptom.

In paranoiac, hysteric, neurasthenic, and degenerative insanities generally, there are to be found cases in which there is no definite emotional tone based on a depressed or expansive cœnæsthesis, but there is a pathological state of fluctuation of emotions occasioned by slight sensorial or ideal provocation, so that the patient may pass through the whole gamut of the emotions in the course of a few hours.

This susceptibility and changeability of the emotions may continue for weeks at a time, but depth of feeling is wanting, and corresponding delusions are rarely formed. Other emotions common in mental disorders are self-reproach and remorse for imaginary crimes, disgust at hallucinatory objects of loathing, revenge for persecutions, vanity, pride, exaggerated hope, excessive religious feeling, perverted sexual feelings, suicidal and homicidal feelings.

Disordered emotions precede, attend, and follow mental disease. The return to a normal state of feeling being a necessary accompaniment of recovery, it is to be understood that there are residua of morbid emotions attached to remnants of former delusions, which do not disappear at once on restoration of a right mind, but they recur from force of inertia and habit, and only fade out completely with course of time; but it would be an injustice to allow them to exclude the diagnosis of complete recovery, as they may persist in memory without credence or influence on conduct for many months after perfect mental equilibrium has been restored.

Section III.—Disorders of Volition.

It is not the intention here to touch upon the momentous question of free will, to broach mechanistic theories, which explain all mind in terms of motion, or to enter into idealistic hypotheses which pose the will as the supreme principle of mind and the prime reality in the universe. It suffices, for psychiatric purposes, to suppose that things are what they appear in the realm of volition, that man has a will of his own, and that the modes of its manifestation are altered in mental disease.

To assist in the study of disorders of volition in Insanity it is well to resolve the act of volition into psychical components. The volitional process, "in toto," is composed as follows: 1. Attention to ideas differing in degrees of pleasure or pain. 2. Deliberate comparison of such ideas. 3. Fixation of choice upon one of the ideas which is the conscious edict of will. 4. Recall of motor images for execution of the idea.

It will appear a little later to which one of the terms of this volitional process certain defects of will in mental disorders are to be more especially referred.

As the will is chiefly concerned in the active adjustment of the relations of the human organism to its environment, its chief manifestations are co-ordinated movements consciously adapted to some special purpose.

When these voluntary movements have been repeated a sufficient number of times they become involuntary and automatic. In health the number of acts which are thus automatic and performed with unconscious facility are very numerous, and they are the cause of the perfect freedom and readiness of actions as adjusted to all the external relations of life.

In mental disease many of these acts cease to be automatic, and have again to be performed with voluntary effort, and the restriction and awkwardness in customary actions thus arising are often attributed to loss of will power. There are various other instances in which the essential elements of will, desire, and choice tend to a definite action, which is not performed from defects in the nervous mechanism, and here again the failure is falsely attributed to volition.

There are undoubted disorders of volition, however, in mental disease, and they will be considered chiefly under the heads of abulia, hyperbulia, and parabulia.

Abulia is impairment or loss of will, and it is due to defects in some of the components of will, not to any uniform failure in any one of the essential antecedent conditions of volition. In health it is the pleasurable or painful quality of the ideas arising in consciousness which attracts attentive comparison and leads to a choice, but in melancholia the ideas have sometimes lost all pleasurable quality, and are all equally indifferent or painful, so that they no longer incite to a choice of action, and there is then a defect in the first component of the volitional process, which is attention to ideas differing in degrees of pleasure or pain.

In a case of degenerative Insanity constant suspicion and doubt often prevent the third step in the volitional process, the fixation of choice, and absolute indetermination is the impairment of will. Such patients, before deciding the simplest action, are in a painful state of doubt and hesitation, and a cold perspiration may reveal the agony of an edict of will on their part. There is no failure in these cases in attention, in the painful or pleasurable qualities of the ideas, or in the comparison essential to a choice, but there is a decided impairment of will.

In toxic maniacal states with tumultuous actions and ideation the failure is precisely in the impossibility of deliberate comparison of ideas essential to a choice of action, and hence no distinct volitions are formed, and all the actions are automatic in response to sensorial stimuli or incoherent ideas and emotions.

There is the same failure in the element of comparison in the cœnæsthetic exaltation of the general paretic, who has no motive for choice, since all courses of conduct are equally pleasurable and everything is rose-color, and it is like a choice between colors on the part of a color-blind patient. Hence comes the impaired volition, and the childish and fickle conduct varying with every passing impression in the exalted paretic.

In certain cases of severe mental depression there is loss of clear conceptions of spatial relations of objects, and of the ideal reproductions of movement, and the resulting impairment of will is due to a failure in the fourth factor of the volitional process, the inability to clearly recall the motor images for the execution of the idea. A like failure in the volitional actions attends the loss of the muscular sense in mental disease. In organic dementia the loss of volitional speech and writing is well known to be due to ataxic aphasia, and all the organic lesions, which prevent the transition from volitional fiat to the performance of the action, are too numerous to mention here.

In some cases of melancholia there is no manifestation of will-power because there is absence of such emotions, desires, or sentiments as are the mainspring of conduct.

In all states of dementia will is greatly impaired from loss of attention, memory, and discrimination, so that neither a comparison nor a resolve is any longer possible.

In states of great exhaustion following the acute stage of mental disorders there is impaired volition from sheer want of nervous energy, essential to this highest form of psychic action.

In other cases of Insanity there is an intense emotion or dominant painful delusion, which prevents the action of volition. In neurasthenic and other forms of Insanity the emotion of fears in its various special forms inhibits volition, and it is not necessary to name here the endless varieties of phobias to which special names have been given.

There are numerous temporary states in mental aberration in which the will is overwhelmed by the number and force of the emotions, which completely dominate the actions of the patient for the time being.

The will is seriously impaired also during the prolonged periods of mental inhibition in certain states of mental depression and in all conditions of profound stupor, and in primary dementia and melancholia attonita volition is practically abolished, as well as in terminal dementia.

Hyperbulia is an intensification of the volitional process, and it has been supposed by some writers to exist in Insanity. There is certainly a crude display of wilful conduct in mental disease, but the brutal force of the maniac's action, or of a patient impelled by powerful delusion or emotion, is by no means a sign of heightened will-power. The highest power of will is that which restrains, co-ordinates, and inhibits ideas and actions, and it is precisely this exercise of volition which is wanting in those cases which have the appearance of great force of will.

The deluded patient may make the most persistent and determined efforts to injure himself and others, and he may require the combined force of several nurses to prevent his violence, but the automatic epileptic will act in the same way, and in both cases it is the manifestation of disease and not of increased strength of volition.

The nearest approach to hyperbulia is in the initial stadium of mania, but the inhibitory element of will is slightly impaired, though

ideation and emotion may be intensified, so that it must be concluded that in mental disorders a positive increase of volitional power does not exist.

Parabulia is a designation for perversions of will, and under it, for want of a better general term, will be described a variety of morbid manifestations, which in appearance are directed by will, but in reality escape volitional control.

It is to be considered that will does not exist in the child, that self-control is a gradual attainment, and that the highest form of inhibition of ideas and feelings is only evolved at maturity. The normal adult can inhibit one group of sensory stimuli and its associated ideas by fixing attention upon an opposing set of sensations and concepts, and in this way can control the direction of his conduct, for all sensations and ideas tend to issue in actions of some kind. As often as ideas clearly present themselves in consciousness they arouse faintly or vividly the motor-images and impulses necessary to their execution, and when a special idea has greater force and persistence than others it will certainly be expressed in action if not voluntarily inhibited.

Impellent ideas are precisely those which have such morbid intensity and persistence as to escape inhibition and issue in actions, which are not willed, and they are common symptoms in the degenerative insanities.

These intense impellent ideas arouse equally vivid motor-images and impulses, which issue immediately in action, and by their extreme rapidity or great force they escape or overcome impaired volition. They impel the patient to make a certain motion, to touch a certain object, to speak a foolish word, to do a silly act, to shout, to strike or to break something, and they result in all kinds of absurdity or violence of conduct. Sometimes they are associated with or suggested by other ideas, and then they may be manifested in ideational or emotional as well as in motor directions.

These impellent ideas are to be distinguished from morbid impulses which spring from the appetites and instincts.

Morbid impulses are powerful tendencies to actions without any adequate motives, and they differ greatly in their nature and origin.

In acute mania the inhibitory control of actions is absent, and the sensorial and emotional incitives to action are intense, and the result is extreme impulsiveness of conduct.

The mental reflex excitability and the strength of the sensorial

stimuli explain the morbid impulses, which are constantly changing in character and lead to destructive and violent acts for which there is no motive.

Morbid impulses abound in alcoholic Insanity. It is known that alcoholic cases are subject to convulsive seizures ; and some of the morbid impulses are the psychical equivalents of such seizures, and in general the sudden and irresistible impulses of alcoholic patients may be regarded as the result of cortical discharges. There are, however, violent impulses attending in these cases the withholding of the customary stimulus, and they are connected immediately with the artificial appetite, and are akin to those springing from inanition or thirst.

In acute melancholia the irresistible impulses are related to a frightful delusion or hallucination, or they are the outcome of precordial anguish, or of the perversion of the instinct of self-preservation, and they then take the suicidal form.

Irresistible impulses in epileptics are merely manifestations of the general convulsibility, which may express itself in co-ordinate just as well as in inco-ordinate movements, in adapted actions as well as in convulsive motions.

The cœnæsthetic impressions, embodying the systemic needs of hunger, thirst, and the sexual appetite, rising to cortical representative centres, are at once liberated spasmodically in the most brutal forms of violence in these epileptic cases.

It is to be remembered that the appetites in mental disorder are almost inconceivably intensified, and that the brute ferocity of a hungry animal is only a normal degree of a feeling, which in disease may reach the height of absolute frenzy, and that which is true of hunger in Insanity is equally applicable to all the other appetites.

Thus an epileptic patient in a state of appetitive frenzy may violate a woman, and after homicide partially devour the body, and such cases are on record also in other forms of mental disorder.

Anthropophagy is therefore to be regarded in such cases as one of the symptoms of the Insanity.

It is necessary to say something here of the appetites and instincts in their basic relations to will and of their perversions in Insanity.

The appetites are the crude source of almost all desires, which in turn become the chief motives of conduct, for volition in general follows the desire for things pleasurable or the desire to avoid actions painful in results. Parabulic symptoms in mental disorder

therefore have their ultimate genesis in the perversion of the appetites in very many instances.

The appetites, or organic cravings for activity and repose, for food and drink, in health are proportionate to the actual needs of the system, and by heeding these physiological warnings the nutritional balance is preserved, but in mental disease there may be increase, decrease, or absence of these feelings of systemic need.

Thus there is a morbid increase of the need of activity, which leads to ceaseless movements, or absence of normal desire for action and complete inertia.

The need of repose may be increased so that the patient feels tired constantly without having exercised, or it may be so decreased that the normal feeling of fatigue is absent after hours of maniacal violence of action. Thus the patient, though exhausted to a dangerous degree by incessant activity, feels no need of rest, and may die for want of it if it is not enforced.

Somnolence and insomnia are common symptoms, and they continue for weeks together.

Bulimia is an intensification of the need for nourishment, and it attains to an incredibly morbid height in certain phases of mental disease, and it bears in part a direct relation to the extensive and rapid waste of tissues.

In epileptic, paretic, senile, and maniacal cases there is often an excessive appetite for food and drink, termed, respectively, polyphagia and polydipsia. There is also loss of appetite for food known as anorexia, and for drink, adipsia, and also active dislike for nourishment, termed sitophobia, which is often a very troublesome symptom. There is also active perversion of the appetite for food which leads the patient to devour even the most disgusting substances. The milder forms of this perversion of appetite seen in hysterical, climacteric, pubescent, and puerperal Insanity are termed pica, and consist in the eating of chalk, earth, plaster, and similar things, but the more decided forms are the devouring of insects, worms, carrion, and not infrequently human excrement, to which latter symptom the word coprophagy is applied. There is not only a loss of natural disgust for offensive things, but there is a diseased craving for them.

The artificial appetites in Insanity, therefore, are readily acquired and have an abnormal force and persistence. Patients become addicted to stimulants and all kinds of drugs, quickly learn the tobacco-habit, and are fond of strong condiments, and they are greatly dis-

turbed when deprived of the gratification of their artificial appetites.

All these morbid appetites become the basis of abnormal desires, and of perverted volitional attempts to gratify them, and insane conduct is thus largely the outcome of diseased cravings and impulses.

The changes in the sexual instinct are in this regard of great importance. In maniacal states the sexual appetite is often increased, while it is diminished in states of depression. In toxic Insanity it is ordinarily increased in the early stage, and diminished or lost in the later stages. Sexual anæsthesia is frequent in hysterical Insanity, and is almost universal in terminal dementia after severe attacks of mental disorder, and it is also found in idiots and cretins occasionally, as well as in all states of great exhaustion in Insanity.

Sexual hyperæsthesia is an occasional symptom in most forms of mental disease, not excepting senile dementia, in which there is not infrequently a final flame of passion before the last extinction of the appetite.

When the sexual desire attains the height of open indecency and entire loss of control, it is termed nymphomania in women, and satyriasis in men, and this symptom is not very uncommon in acutely maniacal states.

Sexual paræsthesia is also a symptom witnessed occasionally in mental disease, and it assumes a variety of forms.

In one kind of perverted sexual appetite the gratification is sought in many partial or unnatural ways, and it may be attended with brutality and violence toward the object of lust.

In another form there is sexual passion for the same sex, taking the shape of Lesbian love in women, or the specially beastly direction of pederasty in men.

All these perversions of the sexual instinct are necessarily attended by very decided volitional anomalies, and by conduct markedly insane in proportion as self-control is lost. The same sexual abnormalities may exist in persons not insane, and may be inhibited, so as not to become irresistible impulses, and if the intellectual sphere is not otherwise involved, they do not in themselves constitute mental alienation.

Also the gratification of other artificial appetites, to the extent of debasement of the physical or moral being, can only be regarded as proof of Insanity when volitional control of ideas and actions results, so that the patient is manifestly irrational in speech or con-

duct, for the majority of persons, in some degree, impair health by indulgence of natural or artificial appetites.

It is of clinical importance, as regards diagnosis and prognosis, to have a knowledge of the volitional sequelæ of mental disorders.

It is a discouraging fact that, in cures deemed perfect, a close study in most instances will reveal a permanent sequel as regards volition, which remains impaired in the highest forms of inhibition of emotions and of ideas. If the patient be highly intelligent he will probably recognize that he no longer can direct by force of will attentive studies of difficult questions, that he does not control as formerly the general current of thought by volitional selection of objects of attention, that emotions invade more decidedly his mental life, that voluntary choice is less prompt, and that there is a larger element of irresolution in conduct. These volitional sequelæ in many patients lead to a permanent loss of self-confidence and to a certain air of indecision in emergencies calling for self-assertive action, and to a ready persuasion against one's will, and to a yielding to emotional desires and instinctive propensities which were formerly easily inhibited.

It is but natural that volition, as the supreme force of mind and the culmination of psychic evolution, should present these residual changes, which, in the degree above mentioned, are not to be regarded otherwise than customary sequels of mental disease.

Finally, to conclude this chapter on psychic symptomatology, there remains to be noticed certain abnormal and peculiar traits of mind found in persons of a neurotic and degenerative type, and associated ordinarily with anomalies of bodily structures termed stigmata, which reveal a congenital tendency to mental instability and aberration. The bodily stigmata will be described in the next chapter, and only the psychic stigmata will be here enumerated. They do not in themselves constitute mental disorder, but they show the innate tendency, and in doubtful cases they furnish cumulative evidence which aids in diagnosis.

The psychic stigmata degenerationis are : 1. Precocity, or retarded evolution of intellect and of the instinctive propensities. 2. Emotional changeability and irritability. 3. Exaggerated conscientiousness or absence of moral sense, with fanatic religious zeal, or great depravity. 4. Intense egoism, selfish disregard of others, and cruelty to animals. 5. Morbidly heightened imagination and tendency to confuse the real and unreal. 6. Eccentricity of ideas

and of feelings, odd conceits and novel emotions. 7. Extravagant, capricious, and cranky motives and desires. 8. Disproportionate development of mental faculties, one-sided talents, display of fantastic genius, and defect of higher rational processes. 9. Loss of the higher forms of inhibition of ideas, emotions, and actions. 10. General lack of harmonious co-ordination of the intellectual, emotional, and volitional elements of mind.

Some other degenerative traits and tendencies, such as vivid dreaming, night-terrors in children, and somniloquism in adults, and the numerous psychic anomalies of the imbecile and feeble-minded classes might be mentioned, but the foregoing are the chief psychic "stigmata degenerationis."

CHAPTER VII.

SOMATIC SYMPTOMATOLOGY.

Section I.—The Osseous System.

Among the anomalies of the osseous system, associated with defects or disorders of the mind, the most important are changes in the dimensions and conformation of the cranium. In idiocy the cranium on the average is smaller than normal, but there are great extremes in size above and below the norm, and also extraordinary shapes of the head.

Microcephaly exists when the head measures less than sixteen inches in circumference, and it is uniformly attended by diminished intelligence. The convolutions of the brain in microcephaly have the main sulci and gyri, though showing gross morphological defects and asymmetries, and even brains with the most rudimentary arrests of development are still distinctly human and not simian in type. The chief loss of size is in the hemispheres, though all parts of the brain, and often the spinal cord as well, are diminished as the result of inflammatory, trophic, and vascular disorders, increased pressure from cerebro-spinal fluid, and premature closure of cranial sutures.

The microcephalic cranium is greatly contracted in the frontal regions, with narrow and retreating forehead, and is cone-shaped or oxycephalic.

The cranium in idiots may be enlarged frontally and occipitally and have an increased antero-posterior diameter, and scaphocephaly then exists, and brachycephalic and dolichocephalic conformations with partial asymmetries are also common.

Macrocephaly arises in idiocy from chronic hydrocephalus with enlarged temporal regions and a globular shaped cranium, and from hypertrophy of the brain with a square shaped skull, said to be enlarged chiefly above the superciliary ridges. Rickety shapes of the skull, calvaria smaller on the side of hemispherical atrophy, trau-

matic asymmetries from mechanical violence in delivery, cretinoid malformation from premature synostosis basilaris, spinal caries, and curvatures, anterior and lateral, are to be named among the osseous anomalies.

Dr. Clapham, in Tuke's "Dictionary of Psychological Medicine," reports some unexpected conclusions from the measurements of several thousands of insane heads, which he found larger than among sane individuals of the same class doing a certain amount of brain-work. Including all classes of the insane, together with idiots, the average size of head was smaller than among the sane, and as regards the relation of diameters the type was in general that of Broca's sub-brachycephali. Chronic mania had the highest and idiocy the lowest average skull value, and epilepsy ranked next to chronic mania in this regard of size. As to the shape of the head, the special insane type was considered that having the largest diameter in the anterior third of the circumferential outline, though the majority have the largest diameter in the middle third, just posterior to the median transverse line, and females had more symmetrical heads than males, and imbeciles had the most symmetrical heads of all the classes of the insane. The majority had the left side of the head larger than the right side, and the right half of the skull was generally pushed forward in advance of the left half.

Sepilli also reports a volumetric increase of the insane over the sane cranium both in males and females.

There are also facial osseous malformations and disproportions between the size of the head and face, and asymmetry between the two sides, and deflections of nose and chin, prognathism, abnormalities of dentition; large, small, double, deformed teeth; cleft, dome-shaped, flat, median-ridged and uneven palate, and other peculiar shapes of palatine vault; wide separation of the orbital cavities, great prominence of malar bones, variations in frontal sinuses, excessively large or small inferior maxillary bone. The skeleton as a whole may be small and variously deformed, as in cretins, or there may be scrofulous or rickety malformations, or there may be giantism as well as dwarfism.

"Fragilitas ossium" is a common symptom in Insanity, and it accounts for the facility of fractures of the ribs in general paretics and other patients. It is due to trophic disorder and to absorption and porosity of bony structures, and it is not confined to the ribs but may exist in the vertebræ, giving rise to curvature of the spine.

"Mollities ossium" also exists, not as an osteoporosis, but rather as a decalcification of bone, which approaches a genuine osteomalacia, and also results frequently in injuries from the weakness of the various parts of the bony framework.

There are both false and true ankyloses in rheumatic, syphilitic, and hysterical Insanity, thickening of the joints in neurasthenic cases, arthritis deformans in general paresis, and necrosis of bones in the toxic and diathetic Insanities.

It has already been said that there are in idiots, imbeciles, criminals, lunatics, and highly neuropathic individuals generally certain signs of degeneration, consisting in abnormities of mental and physical organization, and the psychical stigmata have already been mentioned, and it is thought best to group here the somatic stigmata rather than to isolate them in the sections of this chapter.

Occurring singly, these somatic stigmata are of no special significance, but when a number of them are well marked in the same individual they afford cumulative evidence of a degenerative taint, especially if there are corresponding psychic stigmata.

Like other scientific novelties, they have excited in some minds too great credulity, and as tests of mental disease they are not decisive of any diagnostic point further than the fact of individual origin from a degenerative source, and they do not even warrant this conclusion unless the structural anomaly has attained such a degree as in some measure to impair the functional activity of the organ or part in question. Men of vigorous minds and great talent often have some stigmata with asymmetrical heads and faces, while imbeciles not infrequently present a singular symmetry of cranial and facial conformation, so as to furnish an actual type of physical beauty.

There is no intention to underestimate the value of the stigmata degenerationis, which have not yet been studied comparatively on a sufficiently large scale among different races and classes of men in health and disease to warrant any broad conclusions, but it is very essential for the student of mental disorders to know and to weigh well these signs of degenercy.

The somatic stigmata degenerationis are as follows: *The whole stature* excessive or diminutive, giantism or dwarfism; spinal curvatures, lordosis, scoliosis, spina bifida, prolongation of coccyx; thoracic malformations; pigeon-breast; disproportionate length or breadth of stature.

Lower extremities excessively long or short, great volume of limbs (megalomelus), splay-foot, or club-foot, absence of part of limb (phocomelus).

Upper extremities abnormally long or short, congenital luxations, fingers grown together (syndactylism), or missing (ectrodactylism), or supernumerary (polydactylism), or club-hand.

Cutaneous abnormalities, atrophy and hypertrophy, deep wrinkles, adipose hypertrophy or absence of subcutaneous fat, pigmentations, hirsuties, absence of hair on genital and other regions, canities.

Anomalies of general nervous system and of its motor and sensory functions, defects of co-ordination, tremors, convulsive tics, general convulsibility, asymmetrical innervation of face, late acquisition of gait and speech, and permanent peculiarities of the same; perversions of general sensibility, anæsthesias, neuralgias, pavor nocturnus, migraine and hemispastic, hemiparetic and other vasomotor affections, reversional appetites and instincts.

Cranial and facial deviations, microcephaly, macrocephaly, hydrocephaly, brachycephaly, dolicocephaly, scaphocephaly, asymmetry of facial bones, prognathism, recession of lower jaw, very large or small mouth, and negroid lips.

Ears too large or too small, too long, short, or wide, placed too high or low, too far front or back, too close to the head or lop-ears; large, small, absent, adhered, or deformed lobule, helix, antihelix, tragus or antitragus; reversional ear with Darwin tubercle on helix, and ears with greatly enlarged or contracted concha, and difference between the ears.

Eyes congenitally defective in function, albinism, congenital cataracts, Daltonism, astigmatism, congenital blindness, coloboma iridis, nystagmus, strabismus, ptosis, misshapen pupils and unlike color of irides.

Anomalies of the buccal cavity, macrodontism, microdontism, absence of second dentition, widely separated and misplaced teeth, canines and incisors misdirected, macroglossus and other lingual peculiarities.

Palate too short from before backward, too flat, broad, high, or narrow, ridged in the middle, dome-shaped. Cleft palate and harelip, and deviations in size, shape, position, and motor innervation of soft palate.

Abnormities of reproductive organs, retarded puberty, impotence, false hermaphroditism, epispadias, hypospadias, microrchidia,

monorchidia, anorchidia, cryptorchidia, very small or large penis or scrotum, phimosis, varicocele, hernia (congenital), azoospermia, absence of sexual appetite, rudimentary or hypertrophied labia, clitoris, or mammæ, polymastia, absence of vagina, double vagina, vaginal atresia, absence of uterus, infantile uterus, uterus bicornis, amenorrhœa, sterility, and hypertrichosis partialis in form of beard in women, and masculinism.

The foregoing are the principal somatic stigmata degenerationis, though in cretinoid degeneracy, atrophy, or absence of the thyroid gland, is to be included among the stigmata.

Section II.—The Muscular System.

The manifestation of mind is made by movements of some part or organ of the body, and the muscular system is the means of the expression of mental states and of the adjustment of the human organism to its environment. When the nervous system which controls the muscles becomes diseased in mental disorders there is a corresponding derangement of the intricately combined movements by which mind is normally manifested. The maniac has a disorderly series of movements, of gestures, bodily contortions, strained attitudes, purposeless acts, and a wild play of features never seen in health; and every type of Insanity finds some form of expression through muscular channels. Muscular disorders are therefore an important part of the semeiology of mental disease, and they will be considered at some length, as they are also of practical importance in diagnosis and in prognosis.

There is in acute mental disorders a change in the nutrition of the total muscular system, which largely accounts for the rapid loss of total weight, and in special muscles this trophic disturbance assumes different forms presently to be described.

It happens, also, that there is an abnormal reaction to external stimuli, so that slight blows upon the body of muscles cause unwonted contractions, or there may be loss of normal reaction to mechanical stimuli.

The mechanical muscular excitability is sometimes increased and at other times diminished in epileptic, hysterical, and paretic cases, and in phthisical Insanity a slight tap on the body of a muscle may cause continuous contraction.

There is sometimes a change in the electric reactions of muscles in Insanity.

The electro-muscular excitability is diminished in melancholia, with stupor occasionally, and also in dementia of toxic origin, and it has sometimes a unilateral variation in epileptic and hysterical Insanity and in organic dementia. It is in some cases of alcoholic dementia with lateral spinal sclerosis at first increased and finally lost, while it is retained in all the pareses of general paresis of cortical origin.

The electro-muscular excitability is at times increased in melancholic, neurasthenic, and hysterical cases, while it may be lost in epileptics, and it is frequently absent in idiots and in profound stupor and dementia.

The reaction of degeneration is sometimes present in toxic Insanity, and especially in alcoholic cases. The sensibility to pain from electric stimulation may be increased or impaired, and in neurasthenic and hysterical Insanity the electric sensibility for the galvanic current may be retained while it is impaired for the faradic current.

In all the paralyses of the various forms of Insanity the electro-muscular reactions are, as a rule, normal, except in cases with peripheral neuritis or degenerative muscular atrophy with reaction of degeneration.

The dynamometric tests are not in certain cases of much reliance, but, by repeated and careful trial, the relative degree of failure of muscular power can be determined in most instances. In general paresis there is an early failure of muscular power, and the loss of strength will be found to increase continuously in most cases, and it is often unilateral from the very beginning, and the relative difference continues into the third stage. There is also marked unilateral variations in hysterical and epileptic cases, and the average-test for the evening hours shows a higher rate of innervation than that of the morning hours in melancholia, while the reverse is true in mania. The average dynamometric tests are below the norm in Insanity, but there are temporary maniacal states and conditions of precordial anguish in which the muscular innervation and the actual effort put forth are far above the normal degree of power.

The dynamographic tests are probably more reliable, upon the whole, in reflecting the variations of muscular innervation in the different forms of Insanity, and in determining the rhythm and force of the efferent impulses.

The hyperkineses are among the most common disorders of the voluntary muscular system in Insanity.

In acute mania there is a heightened muscular sense, an irresistible tendency to muscular action and a general hyperkinesis which may attain almost the degree of general convulsibility seen in hysterical Insanity.

Spasms, clonic or tonic, are to be mentioned under this head.

The grinding of the teeth, so often observed, is a bilateral masticatory spasm of muscles supplied by the motor branch of the trigeminal nerve, and it is found in general paresis chiefly in the final stage, and also in the choreic insanity of children, in organic dementia, in syphilitic and epileptic cases. The result of this spasm is wasting of the teeth by friction, and sometimes wounding of the tongue or membranes of the mouth.

In alcoholic Insanity there is a hyperkinetic state of the mimic facial muscles, which twitch spasmodically, and wrinkles and contortions of the features result. In these cases also there are fascicular contractions and spasms of separate bundles of muscular fibres in the flexor groups of the extremities chiefly, and they are generally due to local irritation and to peripheral neuritic processes.

In neurasthenic and hysterical cases there are also continuous and rhythmic fibrillary spasms in facial or fore-arm muscles for weeks together, and ceasing only during sleep, and these twitchings, like the isolated fibrillar spasms in general paresis, are probably due entirely to irritation of cortical motor cells.

Automatic spasmodic action of the facial muscles, established as a chronic hâbit of grimacing, is an unfavorable symptom, as is also nictitation, divergent strabismus, and nystagmus arising late in the course of the mental disease.

On forced attempts to interrupt insane mutism the only result is often a series of clonic spasms of orbicular and facial muscles, and any unusual emotion in states of painful inhibition may provoke spasmodic muscular action as the only mode of escape of the nervous discharge.

Subsultus tendinum and painful spasms of the gastrocnemius and sternoclidomastoid muscles, and various convulsive tics are common in Insanity. Clonic spasm of the diaphragm is found in organic dementia, and it sometimes presages death in general paresis.

Tonic spasms of muscles supplied by the external branch of the spinal accessory nerve are common, and œsophageal and gastric

spasms sometimes cause vomiting and interfere with artificial feeding. Pharyngeal spasm and blepharospasm are especially frequent, as well as the tonic contraction of the corrugator supercilii and of the orbicularis oris, and laryngeal spasm premonitory of general paresis has come within my observation, and saltatory cramps in acute delirious mania, and tonic pedal spasms in alcoholic dementia, are also to be witnessed.

The pareses in mental disease have a varied etiology. They appear in monoplegic form in hypochondriacal cases from fixed delusions, or in hemiplegic form in hysterical Insanity, at first from emotional or delusional inhibition, and later as the result of habit, which can only be interrupted by some powerful psychic influence.

Hysterical hemiplegia is rather in the nature of a paresis also, and may disappear suddenly with a change in the mental disease, such as a maniacal exacerbation. The hysterical aphonia and aphasia are less permanent also than in persons not distinctly insane

In neurasthenic and hypochondriacal Insanity the pareses of the palatal, pharyngeal, and laryngeal muscles are apt to escape observation. Prolapsed and deviated palate, feeble voice, and dysphagia are common from this cause, and in states of secondary exhaustion, as well as in neurasthenic conditions, the functional defects of speech may be mistaken for those springing from organic lesions. Indistinct or faulty articulation is sometimes the result of enfeebled cortical centres to evolve the motor impulses of speech, and this paresis of the muscles of speech is seen in the stadium debilitatis after severe acute stages in mania or melancholia. Pareses from force of imitation are to be seen in epileptic and hysterical cases, and in the historical epidemics of Insanity all forms of muscular disorder were from the contagion of example prominent symptoms.

Paralyses in mental disorders arise from organic lesions in cortical regions, in internal capsule, in pyramidal decussation, in cells of the anterior cornua or spinal nerve-roots, or in the spinal nerves and their distribution to peripheral regions. They are chiefly due to encephalitic processes in idiocy, to gross brain lesions in organic dementia, to peripheral neuritis in the toxic insanities, to cerebro-spinal sclerotic processes in alcoholic dementia, and to basal gummata in syphilitic Insanity in which the cranial nerves are involved.

Thus there are hemiplegias in epileptic and paretic dementia, monoplegias in organic dementia, paraplegias in hysterical and alcoholic Insanity, and a combination or succession of these paralytic affections occasionally in general paresis.

Contractures occur from the predominant action of the flexors, adductors, and pronators over the extensors in mental disease, and from flexed posture habit and disuse of limbs as the result of which tissue degeneration occurs, and the final outcome is permanently fixed positions of the extremities.

There is contracture from tetanoid action of the muscles for weeks at a time, until the fixture of the limb becomes permanent, and the final appearance is practically the same as in posture habit contractures. The fingers may be buried in the palms of the hands and the arm bent, or the legs firmly flexed upon the abdomen.

In hysterical and epileptic cases there are characteristic contractures of limbs, and in organic dementia structural contractions result from descending degenerations of the motor tracts, and a like result follows in alcoholic dementia from sclerotic spinal lesions. In paretic and rheumatic Insanity contractures are occasionally secondary to arthritic affections, and in toxic cases they may follow multiple neuritis.

Atrophy of muscles is an important symptom in Insanity.

The most widespread atrophy of the voluntary muscular system in the psychoses is due to disease of trophic centres, and in delirium acutum it happens within the brief space of a few days, and in the acute melancholic and maniacal conditions it is to be observed to some extent. In toxic, and especially alcoholic Insanity, it arises in some cases from sclerotic degeneration of the motor cells of the anterior cornua of the spinal cord, and also from polyneuritis. In rheumatic cases it may be secondary to arthritic disease, and it is not seldom a sequel of myositis, which is a relatively frequent symptom among the insane.

Premature muscular atrophy is found in senile Insanity with or without neuritic degenerations, and it also results from accidental trauma and from forced positions long retained through delusions, and as the direct result of the paralyses already mentioned.

Muscular inco-ordination is found in general paresis and delirium acutum from organic lesions of cortical regions.

In alcoholic and tabetic cases the muscular inco-ordination is of spinal origin, and in ascending cases of general paresis it is chiefly the sequel of the degenerative changes in the posterior columns of the spinal cord.

In toxic and syphilitic cases the inco-ordination may be the combined result of cerebro-spinal and cerebellar sclerotic processes

and vascular degenerations. Muscular inco-ordination may also result from a loss of the kinæsthetic sense, and, further, from a loss of the clear conceptions and of the motor images of movements, and also, as in acute delirious mania, from an active incoherence of the motor representations of adapted movements.

There is in exhausted states and in neurasthenic Insanity muscular inco-ordination from failure of the motor centres to generate adequate motor impulses essential to uniform action of groups of muscles, and this type of inco-ordination is seen in the special mechanisms of speech and gait, and it is often mistaken for that which springs from organic lesions of an incurable nature, as it gives rise to static ataxia as well as to locomotor unsteadiness.

There is a species of inco-ordination of this character from unequal and deficient innervation of facial muscles witnessed during the emotional play of the features, and, as a consequence of their unequal action, there are strange expressions of countenance.

The muscular tone, which is the physiological and permanent tonicity of muscles which are never in a state of absolute repose, is increased in states of exaltation and diminished in states of depression, and lost in profound stupor and the final stage of general paresis.

The tonus muscularis of facial regions in apathetic dementia may be so far lost that the countenance becomes a perfect blank. Further instances of loss of tone of muscles will be described in the section on vascular disorders.

Tremors are coarse or fine, constant or interrupted, and they usually cease during sleep, and their pathogenesis varies greatly in the different forms of Insanity.

In general paresis there is a fine and rapid tremor, a coarser and typical intention-tremor, and a gross tremor especially manifest under emotional excitement, and a variety of fibrillar tremors in lingual, facial, and manual muscles, and in some cases like tremulations are to be detected in the larger voluntary muscles, and they all spring from the active progressive lesions of cortical motor centres.

In alcoholic Insanity there are fine and rapid oscillations of facial and brachial muscles from defective generation of nerve-force or from increased resistance of nerve-conduction; also tremors from sclerotic lesions of nerve-centres of a coarser kind, and general muscular tremors of the extremities or of the whole body, simulating, in some instances, convulsive seizures.

In all the toxic and in many of the diathetic insanities there may be tremors, varying somewhat with the special poison causative in the case, that of mercury extending from facial to manual regions, that of lead affecting the unparalyzed muscles of the arm, that of arsenic implicating the flexors in extensor paralysis, and otherwise assuming a general character of fine and quick oscillation of muscles, while that of nicotinism is more evident in the hands, and that of narcotics in general is like the tremor of general debility, and is increased on intentional efforts.

The asthenic tremors form a complete group, and are present in the stadium debilitatis, and in all states of great exhaustion of vital powers in post-febrile and diathetic Insanity, and a similar tremor may exist in the Insanity of childhood and in states of mental arrest of development.

There are also the tremors from complications with tabes, paralysis agitans, chorea, insular sclerosis, exophthalmic goitre, and cerebellar tumors.

Hysterical Insanity has a variety of tremors, both coarse and fine, and some are emotional and others are distinctly of the intentional type, and greatly exaggerated on voluntary effort.

Tremor is found in organic dementia, and may be post-hemiplegic in nature or due to descending degeneration of pyramidal tracts, and there are tremors in epileptic Insanity, with hemiplegic symptoms; also in the epileptic maniacal states and following the status epilepticus. There is also a tremor of auto-intoxication, of the puerperal state, of acute delirious mania, of precordial anguish, and a coarse tremor of delusional origin.

The tremor of senile dementia visible in the hands on attempts at specialized acts, such as writing, may extend to the head and become constant on all intentional efforts, and it is then of very bad prognosis, pointing to an extension of organic atrophy in cortical centres or to degenerative changes in spinal regions.

Ataxic states are more general conditions of muscular inco-ordination than the affections already described under the latter head. Thus, in alcoholic Insanity, the gait which is generally paretic may be distinctly ataxic, and there may be a decided static ataxia in these cases, and from inco-ordinate action of facial muscles there may be remarkable facial distortions.

In general paresis the ataxic state attains its height, and the failure in all the highly purposive movements is ataxic. As the rapid

degeneration of the motor cortex advances the defects of speech, due to decline of cortical impulses, become very decidedly ataxic in nature, and so remain until descending lesions involve bulbar regions and facial and hypoglossal nuclei. The true paretic gait is essentially ataxic from disease of cortical motor cells, and it is only when the posterior or lateral spinal columns are later involved that the tabetic or spastic gait appears.

There is a sudden and fully developed ataxic state in delirium acutum, and in Insanity from acute infectious disorders, and in occasional cases of acute mania of toxic origin.

The pseudo-paralytic states are characterized by the appearance and disappearance of various forms of paralysis of voluntary muscles, not to be confused with those already described, and for which organic lesions exist in many cases, for the pseudo-paralyses here in question are doubtless chiefly functional, as they are often of very brief duration.

In hysteric and neurasthenic Insanity these pseudo-paralyses abound as crural or brachial monoplegias, or even as paraplegias, and occasionally facial or ocular muscles will be affected for the brief period of a few hours or days. These pseudo-paralyses also appear in epileptic cases, and it is probable that they are then not purely functional, as they follow severe congestions of the brain, being post-convulsive ordinarily. They are found likewise in alcoholic and paretic Insanity, either sequent to or independent of, convulsive seizures, and they may disappear completely within a few hours, and are probably due to intense and brief irritative or congestive states of spinal centres, or to purely functional defects of innervation. They seem sometimes to be due to the frightful delusions and hallucinations, which may relate immediately to the part affected, and in hypochondriacal cases these pseudo-paralyses are apt to be of a more continuous kind, on account of the permanency of the delusions. In female pubescent Insanity there is often a fully developed pseudo-paralytic state, with rapid variations in the loss of muscular power in the various extremities and parts of the body, even the spinal muscles being involved, so that the erect posture may be an impossibility for the time being, and in these cases the pseudo-paralytic state may give place suddenly to a maniacal exacerbation with increased motility of the affected parts, which, in this instance, it is reasonable to presume, may have been under intense inhibition from painful delusion. A plausible supposition,

also, to explain these brief pseudo-paralyses is vasomotor spasm of cortical motor regions.

Cataleptoid states are characterized by cutaneous and muscular anæsthesia, by impaired consciousness, and by a general state of the voluntary muscles known as "flexibilitas cerea," by which they retain, for a considerable time, the positions in which they may be placed. There is a loss of the natural sense of fatigue, and, contrary to the law of gravity, the arms extended or placed in constrained attitudes may remain in the unnatural positions longer than it is well to continue the experiment.

There would appear to be a loss of the kinæsthetic sense, or of the normal innervation of antagonistic muscles, and the frontal cortical regions are evidently involved, as shown by the impaired consciousness. The pathogenesis is probably not always the same; and, in states of stupor with capillary stasis, cold and livid extremities and greatly impaired consciousness, the cataleptoid state is probably due to brain-œdema, increase of fluid in ventricles, and intracerebral pressure. The cataleptoid state may be slightly or fully developed and have a duration of hours or months together, and there is every degree of impairment of consciousness and of rigidity of muscles. There is sometimes a transition from the cataleptoid to the tetanoid states, and when the rigid fingers or limbs on displacement spring back to their original position, instead of retaining the new position given them, Krafft-Ebing terms the condition "catalepsia spuria," as distinguished from "catalepsia vera." The cataleptoid state is an epiphenomenon in hysterical paretic, epileptic, stuporous, melancholic, and maniacal Insanity, or it may constitute one of the phases of circular Insanity. Although it is an intercurrent symptom in states of sequential stupor, it differs from it and also from primary stupor, in which consciousness is concentrated on painful delusions or hallucinations instead of being largely suspended.

The ecstatic state also is a concentration of mind upon highly elating delusions rather than a suspension of active attention and consciousness, and thus differs also from the cataleptoid state. The cataleptoid states are also to be differentiated from the lethargic states and from states of prolonged somnolence.

The tetanoid states are marked by some limitation of consciousness and by the permanent rigidity of the flexor, adductor, and pronator muscles, which obstinately retain the positions in which they are found. In the complete tetanoid state the extremities and

head are bent upon the body, which is in turn bent upon itself, and the utmost force is required to extend the limbs, which return to their original position when released. In genuine tetanus consciousness is not impaired as in true catalepsy, but in the tetanoid states it is disordered variably, according to the form of Insanity, but it is not ordinarily so much obscured as in the cataleptoid states. There is every degree of incompleteness of the tetanoid state, and often the head alone may be firmly bent, or the fingers of one hand pressed into the palm of the hand, but even in these partial states there is a certain stiffness and passive resistance of the muscles to imposed movements of all kinds. The eyes are often firmly closed and the eyeballs rotated upwards and convulsively moved on forced efforts to separate the eyelids.

The tetanoid states are common in mental depression, and in stuporous conditions of all kinds, and in alcoholic, epileptic, and paretic cases, and their duration is from a few hours to many months.

A mild tetanoid state often precedes the cataleptoid state, which it also follows in the same cases. When the tetanoid state is attended with dementia it usually points to deep-seated central organic lesions and is of bad prognosis as regards mental recovery.

Jacksonian Epilepsies.—In paretic and alcoholic Insanity, and occasionally in organic and syphilitic dementia, there are convulsive seizures, which are not to be ranked as epileptic, inasmuch as they occur without loss of consciousness in most instances.

These Jacksonian epilepsies begin as spasms ordinarily in the fingers and hand and extend to the arm and then to the face and to the leg on the same side without loss of consciousness, and they may recur very frequently in the same case during the day. They may cross to the opposite side of the body, and consciousness may at last be lost, but they differ in toto from genuine epilepsy, in which consciousness is abolished at the onset of the seizure.

These localized convulsions are wont to observe a certain order in their recurrence in syphilitic and paretic dementia, but in the latter affection the customary order of protospasms is apt to be interrupted.

Hughlings Jackson attributes these seizures to discharging lesions in the lower or in the middle level of the nervous system, and it is only when the higher level becomes involved that there is finally loss of consciousness.

These Jacksonian epilepsies are to be differentiated from the

true epileptiform and apoplectiform seizures in alcoholic, syphilitic, and paretic dementia.

The Muscular Reflexes.—The changes in the muscular reflexes are of great diagnostic importance in Insanity, and they are present in most of the psychoses.

The changes in the iridial and ciliary muscles are first to be considered.

Inequality of the pupils may be due to unilateral contraction or dilatation, or to abnormal smallness of one and largeness of the opposite pupil.

Paralytic mydriasis (dilatation of pupils) is found in general paresis, in phthisical Insanity with basilar meningitis, and in syphilitic Insanity with basal gummata, and in organic dementia with cerebral hemorrhage. Mydriasis is also an occasional symptom in acutely maniacal and melancholic states, and it is then probably of the irritative and spasmodic variety.

The cycloplegia of general paresis is unilateral and appears in the third stage, and it is also present in the final stage of some cases of organic dementia.

Myosis (contraction of the pupils) of the paralytic form is found in goitrous and paretic Insanity, especially when complicated with locomotor ataxia, and in the latter case the Argyll-Robertson symptom of loss of light-reflex and reaction to accommodation may be found.

Spasmodic myosis is to be seen in acute maniacal conditions, and in the early stage of alcoholic, paretic, and syphilitic Insanity, and is generally unilateral. The permanent inequality of pupils in mental disorders is a most unfavorable symptom, and prolonged and extreme myosis (pin-head pupils) is also a very bad sign.

Very slow reaction to light is also of evil augury when permanent, as in paretic and syphilitic dementia, in which there is occasionally complete loss of the light-reflex.

The reflex closure of the eyelids on the sudden approach of an object is lost in stuporous conditions, and the test for this reflex should be made, as it may lead to the discovery of hemianopsia. The conjunctival and corneal reflex may be lost in post-epileptic stupor and in hysterical somnolence, and in various semi-comatose states following paretic and toxic convulsions.

The palatal reflex is lost sometimes or greatly diminished in hysterical and paretic Insanity. *The epigastric, testicular, and cremaster*

reflexes may be absent in paretics, and the cutaneous reflexes generally are greatly diminished in all states of stupor, and often in the early stage of general paresis. The cutaneous reflexes in neurasthenic and hysterical cases may be greatly exaggerated.

The plantar reflex is frequently diminished in the functional psychoses, and it may be lost on one side in hysterical and paralytic cases. It is generally absent in stuporous states.

The knee-jerk is diminished often in states of depression, and not infrequently exaggerated in states of exaltation.

In general paresis the knee-jerk is usually increased in the early stage, then diminished, and finally lost. At the time of the increase of the knee-jerk in general paresis there is often abolition of cutaneous reflexes, and generally there is an inverse relation between the superficial and deep reflexes in general paresis.

The knee-jerk is often lost in tabetic and syphilitic dementia, and in toxic Insanity with multiple neuritis. One-sided difference of the knee-jerk is found in organic dementia with descending degenerations of the pyramidal tract, and in alcoholic and epileptic cases with some loss of power on one side.

The knee-jerk is absent in some cases of stupor and in epileptic somnolence, and in the comatose states following seizures, and in severe states of collapse. It is exaggerated sometimes in cases of organic dementia with internal capsular lesions, and in paretic cases with irido-plegia and descending spinal lesions.

Automatic Acts and Characteristic Attitudes.—The muscular activity of Insanity is largely automatic. In cretins, idiots, and imbeciles there are many oft-repeated movements of a purposeless character, and bearing the outward appearance of awkwardness corresponding to the inward deficiency. There is the inco-ordinate motion of the arms and hands wandering aimlessly over the body and face, the clumsy lateral movements of the body, the festinating gait on the balls of the feet, the rolling of the eyes and head, and many other insignificant and automatic acts. The Insanity of childhood, independent of choreic complications, is marked by muscular automatism and active disorder of muscular movements in seventy-five per cent. of all cases. These persistent movements are largely a reversion to the microkinesis of infancy, and a maniacal child displays only more exaggerated microkinetic motions with such automatic acts as have been fully acquired. In chronic mania and terminal dementia, not of the passive type, there are simple, com-

plicated, or rhythmical automatic acts (the remnants of those acquired by habitual delusion or hallucinations), which persist during the entire waking hours for months or years together. Purely automatic acts in these cases are the rotary movements of the head and body, and the to-and-fro motion of the same, the friction of some part of the body or clothing, the constant rubbing of the hands or scalp, the change of weight from one foot to the other while stationary, the rocking step forward and back or from side to side, the advance and retreat with numbered stride of two or three paces without turning, the progression which turns at right angles or walking in a circle, and rhythmical gestures and time-beating, and other motor manifestations devoid of definite purpose. These instances of active automatism are simple as compared to the highly co-ordinated and special acts performed in epileptic cases. In post-epileptic automatism the whole conduct of the patient may be perfectly adapted to circumstances, and yet unconscious and unattended by subsequent memory.

In acutely maniacal conditions there are automatic ideation, and incessant movements of the sensori-motor type. Inhibition of thoughts and motions is absent, and there is a prompt succession of motor responses to all sensorial stimuli, and the central motor mechanism reacts automatically to every passing impression. The movements at the height of the excitement not only are incoherent and conflicting, but there may be also automatic laughing and crying and other automatic emotional antitheses.

The characteristic attitudes are, many of them, instances of passive automatism. Thus, in dementia the predominant action of the flexors and pronators determines the bent position of the head and body, which may be retained for years.

Some unusual postures are with the forehead held in one hand and with the elbow supported by the opposite hand, or with the fingers interlocked over the knee, or with one foot flexed and sat upon, or with the face buried in the crossed arms, or with one foot crossed under the opposite knee and held by the opposite hand, or with one hand thrust between the crossed legs and held with the clasped fingers of the opposite side.

These are attitudes often persistent for months, for a whole attack of Insanity, or for the life-time of the patient.

Disorders of Speech.—The movements which give expression to ideas and feelings through oral channels are variously modified in

Insanity. The defects of oral expression are not muscular alone, and the intellectual source of speech-disorders will necessarily be embraced in this description of the anomalies in question.

The speech-rate is greatly increased in maniacal states from a rapid flight of ideas. The heightened muscular sense favors rapid articulation, and a rate of nearly three hundred words per minute may be attained, but, as the surging tide of ideas rises faster than possible utterance, there results elliptical speech, which may convey to the listener the impression of incoherence of ideas, which does not exist. Finally, there may be fatigue of the vocal organs and imperfect articulation of words, consisting in the omission of final syllables or the partial pronunciation of a word before the rapid passage to another. In delirium acutum there is first logorrhœa, and finally a complete jumble of words and of syllables; and in all acute inflammatory conditions of brain-membranes and cortical regions an incoherence of the motor-images of speech movements and a correspondingly confused articulation arises.

Speech-rate is greatly retarded in stuporous, demented, and melancholic states. The greatly retarded speech of the melancholic patient is due to painful inhibition, while the drawling utterance of the demented proceeds from feeble ideation as well as from slowed motor impulses, and the delayed response of stupor comes from preoccupation by active delusion or frightful hallucination, or from the impaired state of the automatic speech reflexes.

In epileptic dementia and in the dementia of imbeciles there is remarkable retardation of speech-rate, so that in some cases not more than twenty words in a minute may be pronounced in a coherent phrase.

In post-febrile cases and in secondary states of great nervous exhaustion the delay of response to questions is due to absence of cortical energy essential for the formation of phrases, and after visits from friends there are temporary states of this kind induced by the loss of nerve-force, which leaves the patient in a pseudo-aphasic condition.

Insane mutism is of importance from a diagnostic point of view, as it is one means of the feigning of Insanity. The possibility of deaf-mutism, and of idiotic or imbecile mutism, is to be remembered in judging a case without a history.

Insane mutism is often due to extreme inhibition of ideas in acute melancholia, or to the loss of the motor conceptions of speech

movements in dementia, or to amnesic aphasia in organic dementia, or in the final stage of general paresis to motor aphasia.

Mutism also exists in cataleptoid, tetanoid, ecstatic, and hysteric states, and in the latter instance there may be paralytic aphonia.

Hypochondriacal patients are mute from delusions, and emotions, if very powerful and prolonged, as in Insanity, may be the cause of mutism, which is also present in all those states of impaired consciousness which do not admit of consecutive thought.

There is in many cases a prolonged state of whispered voice, which is scarcely audible, and the words uttered are so few that the symptom is practically a form of mutism.

The timbre of the voice reflects the melancholic or maniacal tone, and also the various intercurrent emotions, and, in a measure, the predominant delusion. It is subdued and indistinct in melancholia; loud and harsh in mania; husky in boisterous cases; nasal or muffled in advanced paresis; a grave monotone generally in chronic Insanity; imitative of animals in lycanthropy, or of some personage in exalted change of personality; pitched in foreign accents or highly artificial tone in invented language; almost universally lowered in relative pitch and in musical quality and inflection. This absolute loss of musical tone through the disappearance of the harmonic overtones of the sustained vowel sounds is highly diagnostic, but the rhythm of speech is retained both in speech and song, and the accent of syllables and of sentences is correctly placed long after the most severe disturbances of articulation have occurred. Occasionally there is a certain dramatic intonation sustained for weeks together, and exceptionally a brief display of histrionic effort which is truly pathetic and even remarkable. There is the rhyming tendency and the chanting and intoning which is continued for hours together; the mysterious tone adopted toward hallucinatory persons in paranoiac dialogue; the prayerful and sermonizing tone, and the extremely trivial and childish intonation, as well as the pompous voice of the weak-minded megalomaniac.

The use of old words in new senses, or the creation outright of new words, is common among the insane. Such new words are used continuously for the same thing, or they are displaced by still more recently coined words and then forgotten. Other patients merely pronounce a long series of strange syllables having a general similarity of sound, terminating usually with a vowel, and pretend that they are speaking a foreign tongue, but they attach no clear idea

to the jargon which is differently improvised on each occasion. The new words are sometimes agreeable to the ear and have a certain orotund quality, and are retained for years and often repeated by the patient, who is pleased with the sounds to which he assigns no meaning.

The insane not infrequently invent names for their persecutors, or for the strange feelings which they have, or for the imaginary and mysterious influences exerted over them. Among imbeciles there are childish words (such as are peculiar to children of one family), or, like some chronic insane patients, they speak of themselves in the third person (akataphasia).

There is also the repetition of words spoken in the presence of the patient termed echolalia, which is purely automatic, or the monotonous repetition for hours of the same phrase ordinarily accented in some peculiar manner, and this is verbigeration.

Patients sometimes make the same answer to every question, or respond affirmatively or negatively to every interrogation, or they repeat the question asked before giving the appropriate reply, or they never answer except by asking another question.

Involuntary exclamations of an obscene or profane character (coprolalia), under the influence of impellent ideas, are to be witnessed, and there are hallucinations of the motor images of speech which result in automatic vocal utterances. There is also, in senile dementia, a correct series of well-worded answers often when consecutive thought is impossible, and this is a purely reflex and automatic phenomenon; and a mistaken estimate of the degree of intelligence remaining is often made, owing to this automatism of speech in various forms of Insanity.

The incoherence of the insane relates to the ideas, which are without natural sequence and contradictory of the laws of the association of ideas, or to the separate words of the sentence. Verbal incoherence denotes a deeper degeneration than the loss of logical sequence in thought. Ignorant and uneducated persons are even in sanity often disconnected in speech, and the grade of education is to be considered in judging of the degree of incoherence in any case of Insanity.

There is a whole chapter of anomalies of speech connected with psycho-motor hallucinations, which impel the patient to repeat aloud certain utterances or to attach a peculiar meaning to words. In other instances the revival in consciousness of the nascent motor

impulses of the images of words leads to their pronunciation aloud without volitional effort, and the patient then declares that words are put in his mouth by his persecutors. If the nascent motor impulses issue in the automatic and unconscious pronunciation of the words, the patient often comes to believe that an internal voice speaks the words. In other cases of deluded self-absorption the patient utters an idea aloud, and the sound dies from his ear, but the auditory memory of the words is, a few moments later, so forcibly revived that he hears the words distinctly repeated, and he then declares that he hears his thoughts read aloud.

Other disorders of speech in mental disease are due to lesions of the nervous system.

The degeneration of cortical cells and nerve-fibres causes the ataxic disorder of speech in the first stage of general paresis, and later the bulbar lesions give rise to loss of motility in speech-muscles and to the more decided defects of articulation. The nasal tone comes from paresis of the soft palate, the husky and lowered tone from imperfect innervation of the vocal cords, and the vibratory voice from intention tremor of the same, and later from motor failure in the expiratory muscles. There is great retardation, also, and, finally, amnesic and aphasic defects of speech from cortical disease, and forms of balbuties and paraphasia.

In a word, therefore, disorders of speech in Insanity are due to defects of memory and of the association of ideas, to loss of the motor images of words, to the immediate effects of hallucinations and delusions, to impaired consciousness, to cortical and bulbar disease, and to derangement of the motor mechanism of speech.

Changes in gait and other highly specialized acts are among the motor anomalies of Insanity. These muscular disorders arise from psychical and physical causes.

The gait varies with the exaggerated or depressed delusions and hallucinations, and it reflects the ruling emotions. In hypochondriacal cases hemiparetic gait exists sometimes purely as the result of delusion, and intention-pareses are to be seen from the same cause in such cases, and also crural monoplegia.

In hysterical Insanity there is the dragging gait, the exaggerated tremulous gait, and forms of affected locomotion, all of psychical origin. In dementia there is an awkward shuffling gait, and in senile cases short steps greatly retarded in depressed moods or taken in confused haste to no purpose in melancholia agitata. The

free, elastic, and at times bounding or dancing gait of the maniac is in striking contrast to the restricted and labored progression of the melancholiac. There is backward walking, the rhythmic step, the oblique progression, the mincing gait, the walk with inverted or everted toes, the sidelong advance with one leg extended, the festinating gait on the balls of the feet, the walking zigzag or with complete bodily rotations, and other oddities of gait too numerous to mention in the various types of Insanity, and due to insane caprice.

Then there are the changes in gait from physical lesions of the motor mechanism.

There is the tremulous gait of alcoholic cases from sclerotic processes, and of senile dementia from cortical atrophy; the spastic gait in the same cases from lateral sclerosis of the cord, the ataxic gait from affections of the posterior columns in syphilitic dementia and in ascending cases of general paresis, inco-ordinate locomotion in toxic Insanity from cerebro-spinal lesions, various forms of paralytic gait from gross brain disease in organic dementia, and the stiff and resisting walk of patients with bulbar sclerosis.

The true paretic gait is ataxic from degeneration of the cortical motor regions and of the association of fibres to the pyramidal tracts and from descending spinal lesions.

In general paresis, also, locomotor ataxia and tabetic gait may be an epiphenomenon, and spastic gait from sclerosis of the lateral columns of the spinal cord is another complication. The tetanoid and hemiplegic states attending the seizures modify, to a great extent, the locomotion of the patient in the later periods of the disease.

The loss of the kinæsthetic sense and of the motor conceptions of complex movements, as well as organic lesions, lead to the disappearance of the aptitude required in the highly specialized acts of playing upon instruments. The manual dexterity of mechanics is likewise lost, and acrobats, dancers, and singers detect an early failure of their special skill in their highly co-ordinated acts. In maniacal states there is a form of motor incoherence from confusion and a rapid flight of the motor images of movements to be performed, just as there may be inco-ordination in depressed states from restriction of the muscular elements of thought and great retardation of the nascent motor impulses, which are not fused, therefore, into associated movements. Hence changes in highly specialized acts are a part of the muscular disorders of Insanity.

The chirography of the insane undergoes some modifications of practical interest, as they precede often the speech defects and have diagnostic bearings. The handwriting is altered from psychical disorder or from physical disease, and it reflects, accordingly, the mental phases or the motor disturbances of the psychosis.

The writings of the insane reveal, therefore, delusions, dominant feelings, morbid impulses, and dangerous intentions, but more especially they are an index to the state of the memory for the construction of language, and give an insight into the general condition of integrity or decay of the mental faculties. The same phases of the mental disease are shown often in recurrent attacks, both in the incubatory and convalescent stages, by the written compositions of the patient, and they may thus serve as a warning of the approaching danger as well as a sign of recovery. Space will not permit a description of the peculiarities of handwriting corresponding to the incoherence of ideas, the amnesic failure, the grandiose feelings, or the fantastic conceits of the various types of Insanity. Patients not only forget the motor images of chirographic movements, but they have an incoherence of the kinæsthetic impulses essential for writing and misplace letters in words apart from amnesic failure for orthography.

The alteration of handwriting from physical disease is seen chiefly in the form of tremor and muscular inco-ordination, which exist in acute mania, melancholia, and in all states of great nervous exhaustion at any time intercurrent in mental disorders.

The tremor in senile, alcoholic, syphilitic, and paretic dementia may be so similar that the handwriting will not serve any purpose of differential diagnosis.

The chirographic inco-ordinations occur also in acute and chronic forms of the various types of Insanity, with cortical, bulbar, or spinal lesions, and they have such common points of resemblance that they serve no differential purpose of diagnosis as regards the form of psychic disorder, but they are valuable indices of the degree of functional muscular disturbance referable to organic lesions of nervous centres.

Even in general paresis, tremor, and inco-ordination of specialized movements, like those involved in handwriting, spring from cortical, bulbar, and spinal lesions in varying order in different cases, and the amnesic failure is equally variable in its appearance, so that no uniform statement as regards the handwriting is possible.

Ordinarily the degree of degeneration of the motor and sensory cortex determines the relative and corresponding defects of chirography, and when, through cortical disease, the motor images of letters and words are lost, writing becomes impossible.

The handwriting in aphasic states shows, to a considerable degree, the nature of the psychic defects, as well as the lesions of muscular innervation.

Mirror-writing, from right to left, and often left-handed, is very exceptionally present in degenerative forms of mental disease. The cross-writing, fanciful flourishes, odd marks and cabalistic signs are trivial distinctions of insane handwriting, except that they usually characterize the writings of chronic degenerations of mind.

The physiognomy of Insanity is a positive phenomenon easily perceived but difficult of description. The modifications of the countenance in mental disorders are most decided and numerous, and they spring from very complex causes, both mental and physical. Certain modifications occur so frequently that they may be termed types of insane physiognomy, but the individual variations are so multiform that only general pathological traits of countenance can be here described. Although the general rule is that great changes in the facial appearance occur, there are exceptional cases so free from derangement of expression that the most skilful expert could detect no insane traits of countenance, and the physician who pretends to invariably diagnose Insanity from outward appearances has very limited experience or unlimited self-confidence.

In a large percentage of insane cases the features have some of the actual "stigmata degenerationis," and unilateral asymmetries and defects of innervation and congenital peculiarities pointing to a degenerative origin.

There are also tremors, spasms, pareses, and paralyses of orbicular and facial muscles, from a diversity of causes, modifying greatly the countenance and completely interrupting natural expressions of face.

As a first type of insane physiognomy the countenance of the acute maniac furnishes an interesting study. The face may be flushed, but it is more often pallid, with wide pupils, the facial muscles are extremely mobile and quickly respond to the rapid succession of feelings of joy and sorrow, anger and mirth, laughter and crying, and there are mixed expressions of these antithetical feelings, which are more swift than muscular movements, and hence

arise the paramimic effects and the momentary blending of opposite emotional manifestations very strange to behold and very characteristic of acute mania.

The direct contrast to this is the physiognomy of acute melancholia, with immobility of countenance, dull, sunken, downcast eyes, slightly convergent; bent head, forehead with vertical central wrinkles and occasional horizontal folds, corners of the mouth depressed, eyelids partially closed, eyebrows downwards inclined at the outer angle, compressed lips, and a generally pinched and painful expression of face.

Another type in states of mental depression is the countenance under the inhibition of some frightful delusion or hallucination, as in melancholia attonita or primary dementia from fright. The head is fixed and slightly inclined forward, the eyes are open wide and stare intently in one direction, the occipito frontalis acts so as to cause central and horizontal lines in the forehead, the nostrils are slightly everted, the lips are a little separated, and the lower jaw may drop a little, the eyebrows are overarched in the centre, and the whole physiognomy is immovably set in dull but painful outlines.

The type of the terminal dement is a common form of facial appearance in Insanity. The lines of the face are obliterated, and the physiognomy is a complete blank, the jaw sometimes droops, the eyes are dull and the axes parallel, the orbicular muscles of the eyelids relaxed, the naso-labial folds effaced, the features are gross, and the whole countenance is lifeless and stupid.

There is another type of physiognomy in states of stupor. The face is pale and sometimes swollen in appearance, the lower jaw relaxed, and, from the open mouth, saliva drools; there is slight action of the occipito frontalis with fine horizontal wrinkles, giving a dull forehead; the long-drawn face is immobile, the eyes are closed, but they respond to light reflex when the lids are opened, the partially dilated pupils contracting and thus distinguishing the state from sopor, in which the contracted pupils dilate when the lids are separated and the patient aroused.

The physiognomy in tetanoid stupor furnishes another type. The facial muscles are in a spastic state, the forehead has central vertical wrinkles, the chin is firmly drawn downward and inward, the lips are pressed together and the corners of the mouth retracted, the naso-labial fold is well marked, the eyelids are firmly closed

and when forced apart there is spasmodic oscillation of the eyeball, the nostrils are firmly set, and the general expression of countenance is that of discomfort and tension.

There is another spastic type of countenance in ecstasy. The fixed and upturned face, the widely opened eyes focussed upon the hallucinated object, the elevated eyebrows, the lips slightly parted but actively innervated, with gentle elevation of the angles of the mouth, all point to the intense but pleasurable preoccupation of mind.

There are facial types, also, not connected with the clinical forms of mental disease, but purely the reflex manifestation of constitutional disorders, or of the primary causes of the Insanity.

The diathetic and toxic factors thus leave their special imprint on the countenance, and the neuroses as causes permanently mould the face, and in epileptic Insanity there is ordinarily a distinct facies epileptica. In alcoholic dementia there is the "facies potatorum," which is blank and expressionless. In organic dementia the obliteration of the lines of expression is confined more especially to the lower zone of the face on the side opposite to the brain-lesion.

There are a series of progressive changes in the countenance of the general paretic. After the first stage, in which the face reflects in the main the maniacal or hypochondriacal tone of feeling, there is unilateral variation in the frontal wrinkles, in the angle of the mouth, and in the orbicular and corrugator supercilii muscles, and, finally, the naso-labial folds and all the chief lines of the physiognomy are obliterated and the whole countenance becomes an inert mass of flesh devoid of all intelligent expression.

Paramimia is occasionally witnessed in general paresis, as the manifestation of joyful feeling by tearful facial expression, and a like phenomenon is found in other states of great mental weakness.

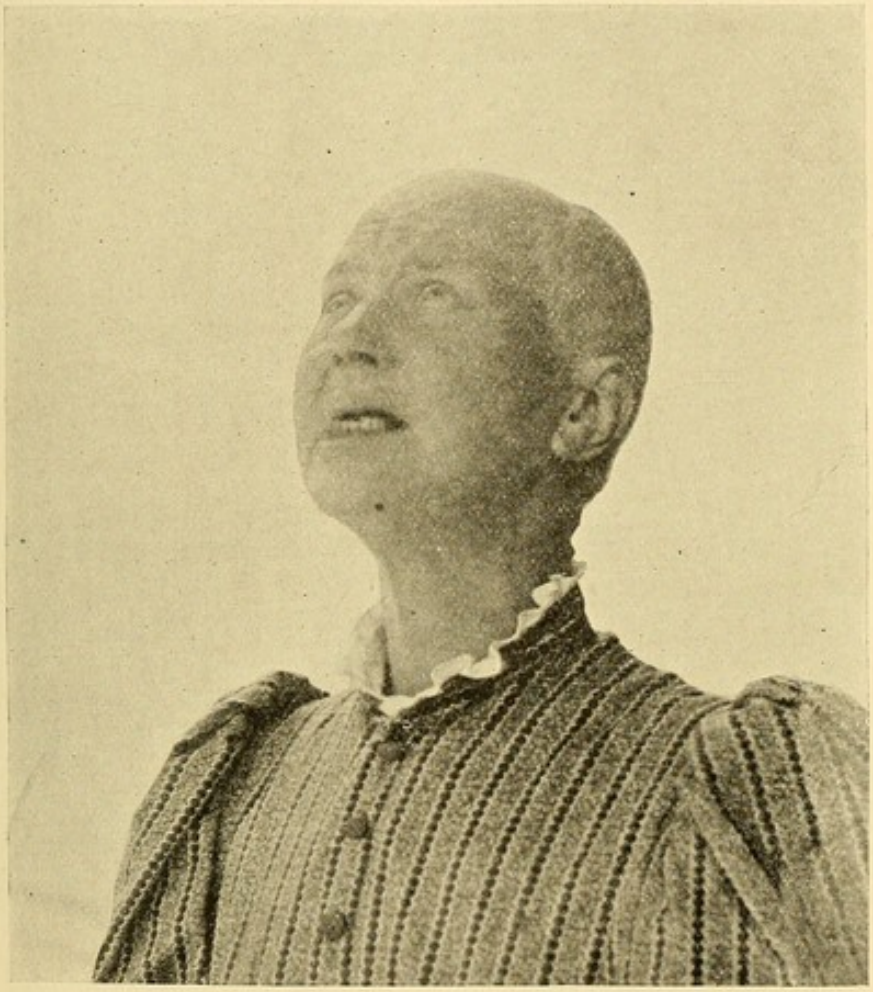
There is a superannuated appearance in many cases of Insanity; ugliness is almost a universal trait, and the return of good looks is one of the sure signs of recovery, and the change for the better is so great that the patient may be hardly recognizable.

The old and anxious type of countenance from a painful cœnæsthesis is common in the Insanity of children, and also in the diathetic insanities.

In terminal forms of mental disorder there are to be witnessed the after effects of strong emotional delusions, usually of a frightful or disagreeable kind, and the corresponding habitual expression of

countenance becomes permanently organized and may remain as long as the patient lives.

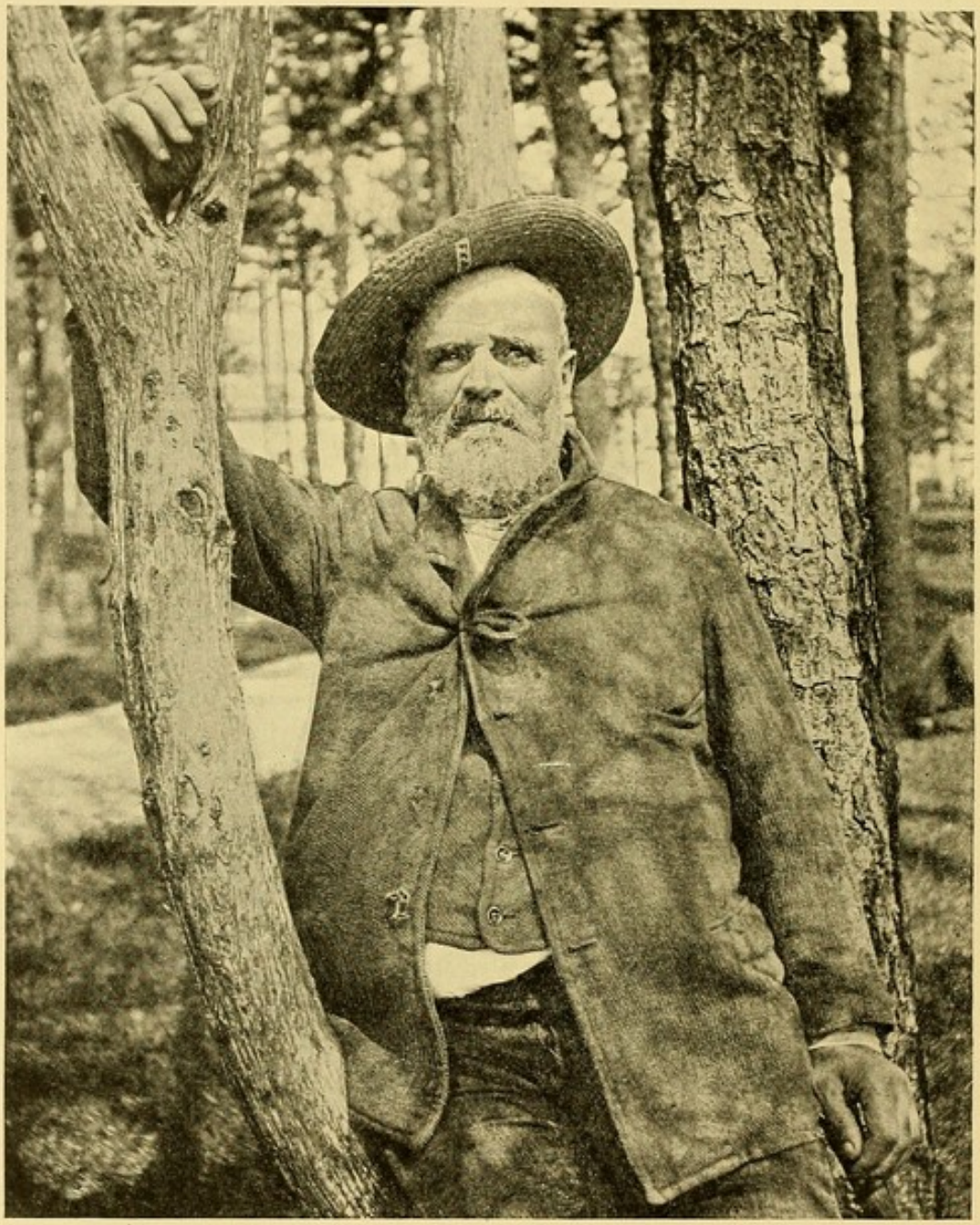
It is important to know that hereditary types of expression are wont to appear at certain ages, and the history of a case of Insanity should embrace the fact of any peculiar family cast of countenance.



PHYSIOGNOMY No. 1.

This represents terminal dementia after twenty-four years of Insanity. The accidental attitude of upturned eyes might suggest some emotion which in fact does not exist. It illustrates an automatic remnant of devout expression, which has absolutely no intellectual counterpart, and similar automatic traits of facial mobility are not uncommon in dementia.

Chronic types of insane physiognomy represent feelings of pride, disgust, anxiety, mock benevolence and condescension, hatred, and brutal ferocity, and there are unquestionably animal-like reversions of physiognomy to be detected when the more human forms of expression have been effaced by disease.



PHYSIOGNOMY No. 2.

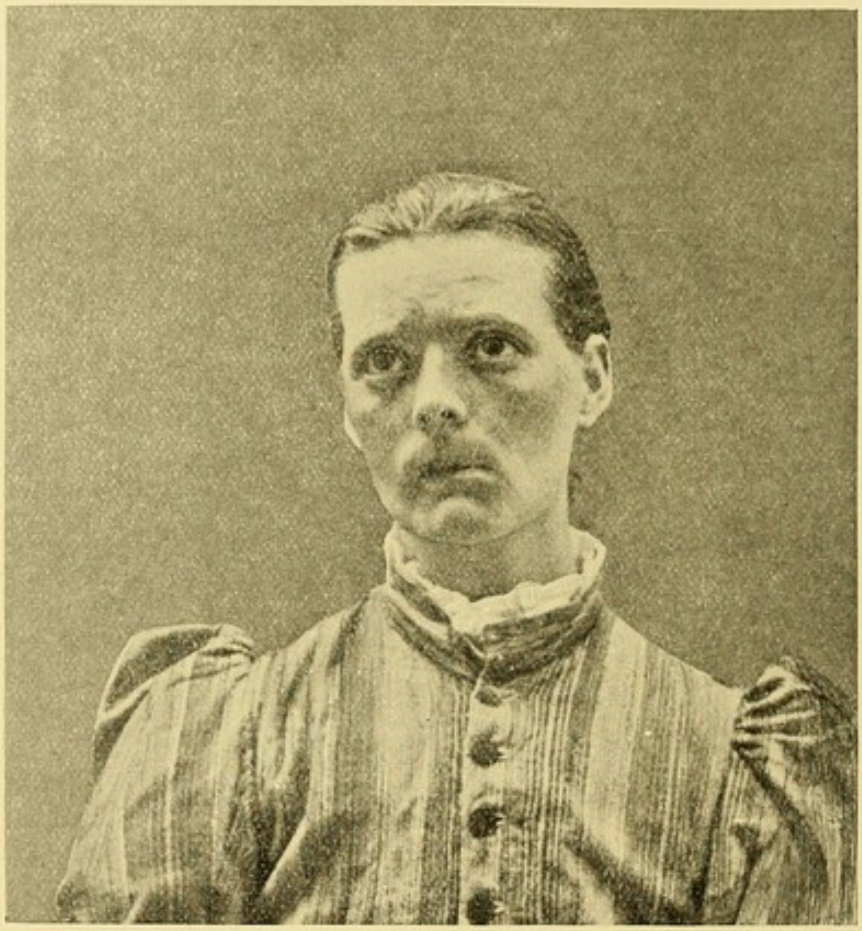
A type of chronic mania is here illustrated in a very confirmed mood of suspicion and angry excitability, with vituperation of enemies whom delusions and hallucinations led him to suppose were about him on all occasions. The expression is characteristic of this type of chronic mania.



PHYSIOGNOMY NO. 3.

This is illustrative of chronic mania of many years' duration, with prevailing expansive delusions, and pleasing emotions with paramimic expression. The paramimia is so decided that the laughing might be mistaken for crying.

The composite type of physiognomy is not uncommon in the psychoses, and it is not a question here of asymmetry between the two sides, but of complete disparity between the upper, middle, and lower zones of the face. This disparity may consist in permanent passive phases, which are incongruous, or in active differences, such



PHYSIOGNOMY NO. 4.

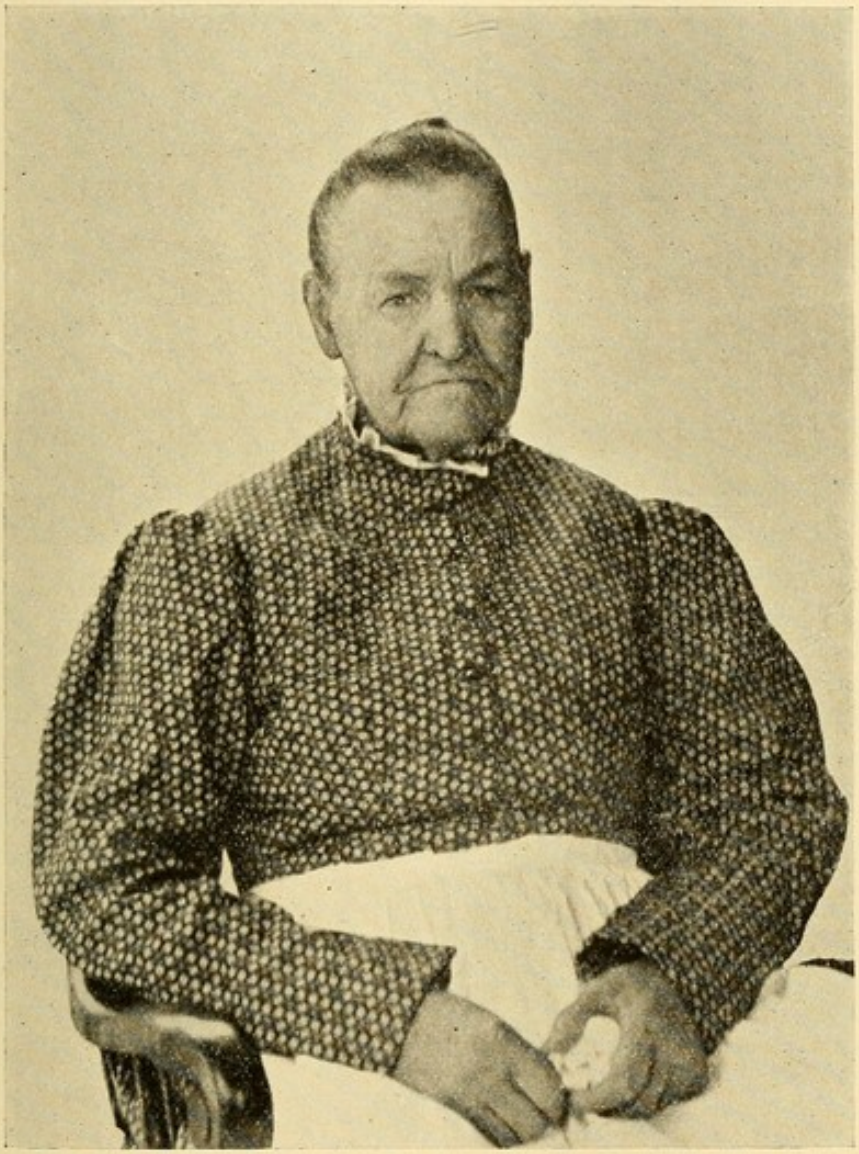
This was a case of acute melancholia reaching the grade of stupor eventually. The painful tension of melancholia is here blended with a certain stuporous fixity of countenance, which accords with the actual course of the symptoms.

as frowning wrinkles in the upper zone and a continuous grimacing smile in the lower zone.

All coarse brain disease is manifested chiefly in the lower zone of the face, and this is especially true of unilateral lesions, and in syphilitic, paretic, and organic dementia there are repeated instances of this fact.

The knowledge of insane physiognomy is acquired by the expert

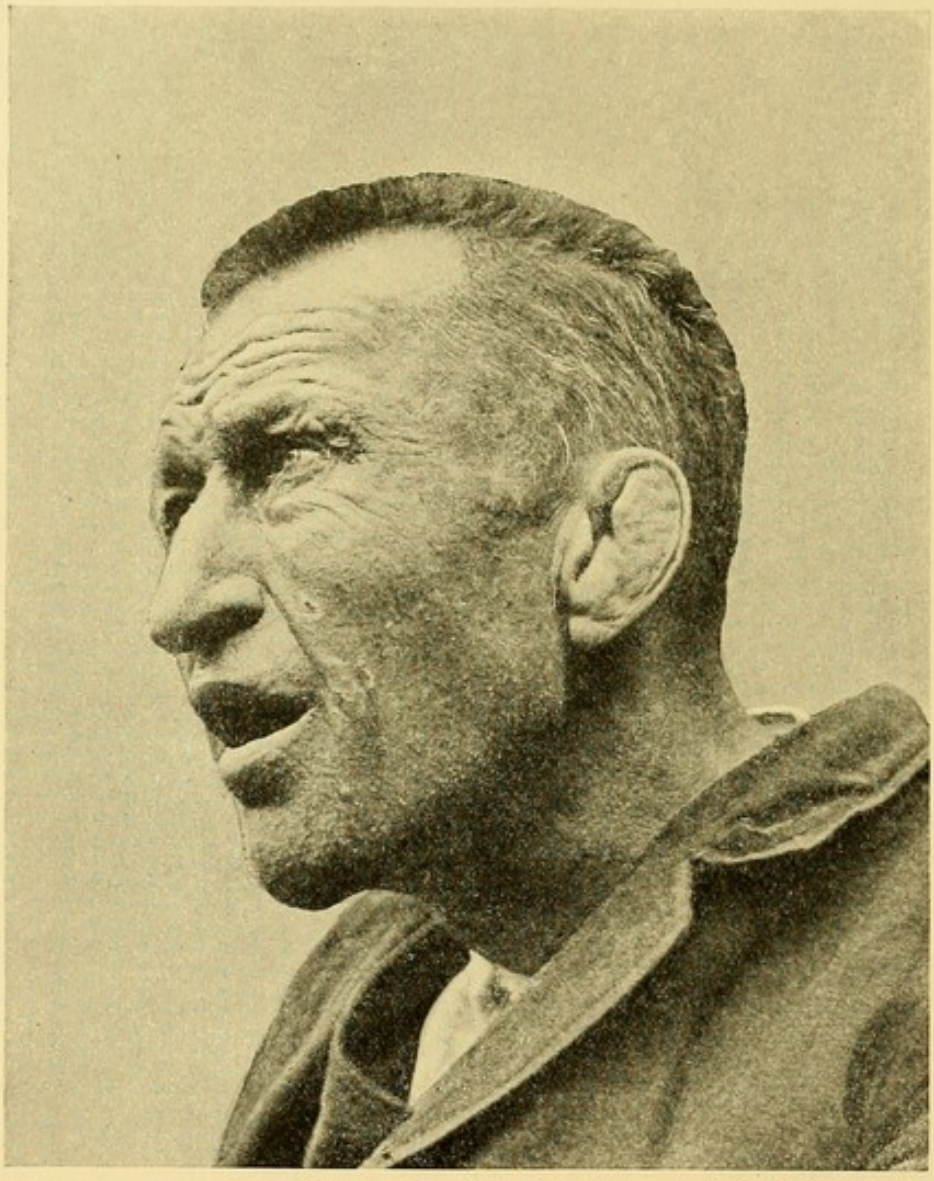
alienist after long years of close observation of many cases as they pass through the successive stages of the disease, and the student



PHYSIOGNOMY NO. 5.

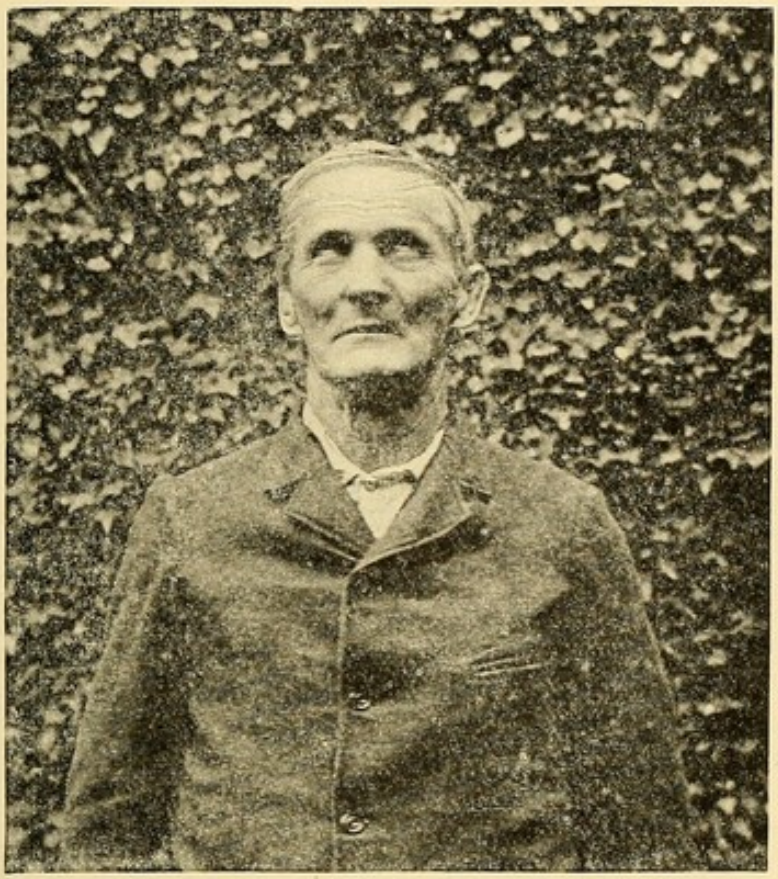
The type here shown is terminal dementia of the active form, with occasional exacerbations of excitement. The vestige of mental activity is revealed in a certain resistive determination of countenance, and was further illustrated during the exacerbations by actions.

of this branch of psychiatric symptomatology must not be content with photographs and descriptions, but he should seek occasion to study carefully the facial outlines and the peculiar expressions of many cases of mental disorder. In the absence of such an opportu-



PHYSIOGNOMY NO. 6.

It would be difficult to conceive of a more typical insane physiognomy than is here presented. The case is one of chronic mania of twenty years' duration, with hæmatoma auris on both sides. The forward inclination of the head, the open mouth, the deep frontal lines, are all characteristic of terminal mental deterioration. And still there was considerable automatic activity of mind and body, comical speech and action, and occasional excitement.



PHYSIOGNOMY NO. 7.

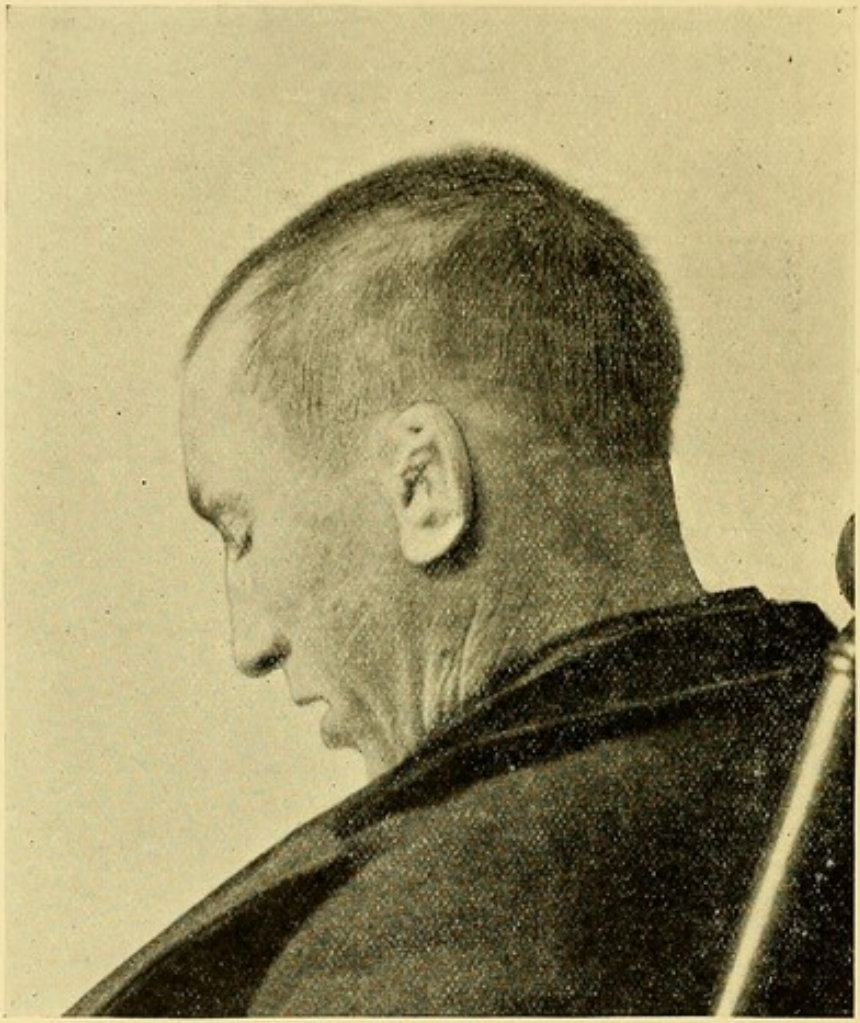
This was a case of acute mania attributed to religious excitement. The momentary pose here shown likely corresponded to some passing devout emotion, and contrasted with his usual maniacal actions.

nity the above descriptions and the accompanying photographs may serve as an introduction to the subject of the physiognomy of Insanity.

Section III.—The Vascular System.

The serious disturbances of the vascular system in Insanity are to be viewed in the light of causes, symptoms, or sequels. A weak vascular mechanism predisposes to mental disorder, which in turn tends to develop vascular disease, which clinical observation shows to be of unusual frequency among the insane, in whom vascular degenerations also form permanent sequels, and sometimes lead to a fatal termination.

There are congenital defects of the vascular system in states of arrested development of mind, such as contraction of the cerebral vessels from narrowing of the cranial foramina, anomalies in the



PHYSIOGNOMY NO. 8.

This illustration of acute mania is given more especially to show the hæmatoma auris in the third month of its appearance. It may be compared with hæmatoma in Physiognomy No. 6 of this series.

structure and distribution of the carotid and vertebral arteries, and in the heart itself patency of the foramen cvale.

In cretins, too, with premature synostosis basilaris, there is narrowing of the lumen of vertebral and basilar arteries, and great dilatation of venous and lymphatic vessels.

In degenerative insanities there are sometimes native vascular deficiencies in the calibre or in the coats of vessels, or thin and feeble cardiac walls.

The proportion of deaths from heart disease is greater among the insane than among the sane, and it varies, according to reports of hospitals for the insane, from five to fifteen per cent. Out of eleven

hundred and twenty-two deaths in the Willard State Hospital, heart disease was the assigned cause in a fraction over nine per cent.

Heart disease is unquestionably more frequent in chronic Insanity than in sanity. Some form of cardiac hypertrophy is to be found in at least twenty per cent. of the insane, chiefly on the left side, and sometimes atrophy and fatty degeneration is present, and pericardial adhesions, and various microscopic alterations of cardiac fibres. In toxic Insanity, and especially in alcoholic cases, there is compensatory hypertrophy of the left ventricle, and in maniacal cases exceptionally right-sided cardiac hypertrophy.

Fatty heart is more common in terminal dementia, and degeneration of cardiac muscles and general venous stasis often follows attacks of pericarditis and endocarditis in the diathetic and toxic insanities.

Both aortic and mitral lesions are frequent, but the latter are the more common. In general, valvular aortic disease is found to be associated with maniacal and mitral valvular lesions with melancholic conditions, and in organic and coarse brain disease there are often both aortic and mitral deficiencies and resulting dementia.

Dilatation of the heart and aorta, and degeneration of cardiac muscles and atheroma of the aorta, are ordinarily attended by states of mental depression or of mental weakness.

It has also been observed that mitral regurgitation is more apt to be associated with depression, and aortic regurgitation with exaltation, but the emotional tone is more often determined by the diathetic or toxic state of which the heart disease is a sequel. The rheumatic, phthisical, podagrous, syphilitic, alcoholic auto-toxic, and general toxic influences are to be borne in mind in this connection, and the essential causative relation is the degree of cardiac insufficiency which results in imperfect supply of nutrient fluid to the brain.

The determination of organic lesions of the heart among the insane is rendered more difficult by the fact of frequent functional disorders of the heart, such as loud second sounds of heart-beat from overaction of aortic valves in chlorotic cases, and aortic bruits in maniacal cases without lesions of valves, and violent palpitations and rhythmic irregularities.

The degenerative changes in the vessels in Insanity are very important. Atheroma of the aorta and of the large arteries, and especially of the cerebral vessels, is a common symptom. In alco-

holic Insanity the increase of the muscular coat of arteries, which are thus greatly narrowed, is accompanied by atheromatous and fatty changes in the intima. There is in toxic Insanity generally a tendency to arterio-sclerotic degeneration, and this arterio-sclerosis is more marked in the cerebral vessels, and is most frequent of all in the internal carotid.

These degenerative changes are present in most luetic, alcoholic, senile, and paretic cases, in which the vessels become tortuous, narrowed in calibre, and there result aneurismal dilatations, thrombosis, embolism, rupture and hemorrhages into brain-tissues.

The involutional changes in the entire vascular system account for many of the symptoms, not alone in senile dementia, but in climacteric cases and in premature senescence, and in women the vascular alterations are often fully initiated at the time of the menopause.

The part of the mechanical problem of the circulation which concerns the distribution of blood within the cranial cavity is of the utmost importance, for states of cerebral anæmia and hyperæmia have the most intimate relations to mental disorders which arise when the variations of blood-pressure within the cranium are so great that the brain is not properly nourished or depurated of its waste products.

The medullary and cerebral vaso-constrictor and vaso-dilator centres control the blood-supply to the cortex cerebri, and, as a greater quantity of blood enters or leaves the cranium, there is a corresponding decrease or increase in the intra-cranial amount of cerebro-spinal fluid, which normally amounts to two or three ounces, and intra-cerebral pressure is thus uniformly regulated. The cerebro-spinal fluid is displaced into the lymph spaces and cisterns, which are in communication with the cerebral ventricles and with the basal cisterns, which connect with the larger spinal spaces.

The variations of intra-cerebral blood-pressure shown by symptoms of intense cerebral hyperæmia and anæmia are among the important vascular phenomena of mental disorders. They are found in all acute stages and in some chronic conditions of alienation, and they may even attain the extreme forms of syncopal or apoplectiform attacks, as well as of delusional and hallucinatory manifestations.

Local variations of blood-pressure from tumors and cortical apoplexies and cerebral hemorrhages may or may not derange mental functions, but, acting as sources of irritation, they usually determine some symptoms of mental disorder.

The disturbances of the vasomotor system in Insanity are prominent symptoms. The cortical hyperæmias and anæmias which underlie maniacal and melancholic attacks are often of vasomotor origin. The sudden intercurrences of acute excitement in many cases of mental disorder, and even mania transitoria as an independent affection, may be attributed to vasomotor spasm or paresis of cortical vessels, and, in general, cerebral angioneuroses are common in Insanity.

The cerebral œdematous conditions in states of stupor are largely the result of vasomotor paresis, and the defects of brain nutrition in chronic Insanity arise from permanent damage to the vasomotor centres, and in all the degenerative insanities anomalies of vasomotor innervation are to be witnessed. "Raptus melancholicus" and certain kinds of precordial panic are due to vasomotor spasm. Angiospasm of peripheral capillaries accounts for the increased blood-pressure in melancholia, and angioparesis for the diminished arterial pressure in mania.

Meynert attributed the maniacal and melancholic phases of circular Insanity directly to variations in vasomotor innervation. In hysterical and paretic cases unilateral angiospastic and angioparetic conditions are common, and also local cutaneous anæmias and hyperæmias.

There are large numbers of stuporous and demented patients with cold and livid extremities from defective vasomotor innervation, and there is also in paretics the striking symptoms of dermatographia and well-marked cases of digiti mortui occur exceptionally.

The most rapid fluctuations in vasomotor innervation are seen in hysterical Insanity, which is more common in women, who naturally have an increased excitability of the vasomotor nervous system, as shown by blushing and fainting, and at the menopause the disturbances are largely referable to the vasomotor system. Space will not permit the description here of vascular symptoms of pneumogastric origin, which were set forth at some length in a paper on "Frequent Disorder of Pneumogastric Functions in Insanity," read May 17, 1894, before the American Medico-Psychological Association, and published in the "Transactions" of the Society. A mere word of mention must be given to local cortical anæmias and hyperæmias which occasion hallucinatory and other sensorial phenomena, to capillary stasis in limited cutaneous areas, to very frequent varicosities, to hæmatoma auris, when of vasomotor origin,

to the abnormal pulsations in large veins, and in the abdominal aorta and in other large arteries, to cyanosis and œdema of the extremities, to capillary spasm and local asphyxia of cutaneous tissues, even to the point of gangrene in pellagrous Insanity, and to the sudden and sometimes syncopal spasm of cortical vessels following a severe emotional shock.

Among vascular disorders the anomalies of the pulse are of sufficient clinical importance to require special description, and for fuller particulars than the present limits will permit reference is made to "The Pulse in Insanity," a paper read by the writer before the American Neurological Association, June 5, 1895.

The following table of pulse frequency is taken from a study of 2,172 patients under the writer's charge at the Willard State Hospital, and they were of all ages and forms of mental disorder.

The records in this table are arranged by decades of frequency, beginning with that from 40 to 50 beats per minute, and ending with that from 130 to 140 beats per minute.

Pulse Frequency by Decades in 2,172 Patients.

	DECADES.										Totals.
	40 to 50	50 to 60	60 to 70	70 to 80	80 to 90	90 to 100.	100 to 110.	110 to 120.	120 to 130.	130 to 140.	
Women.....	—	9	96	307	344	217	103	33	21	2	1,132
Men	3	14	120	365	294	150	70	12	12	—	1,040
Grand totals ..	3	23	216	672	638	367	173	45	33	2	2,172

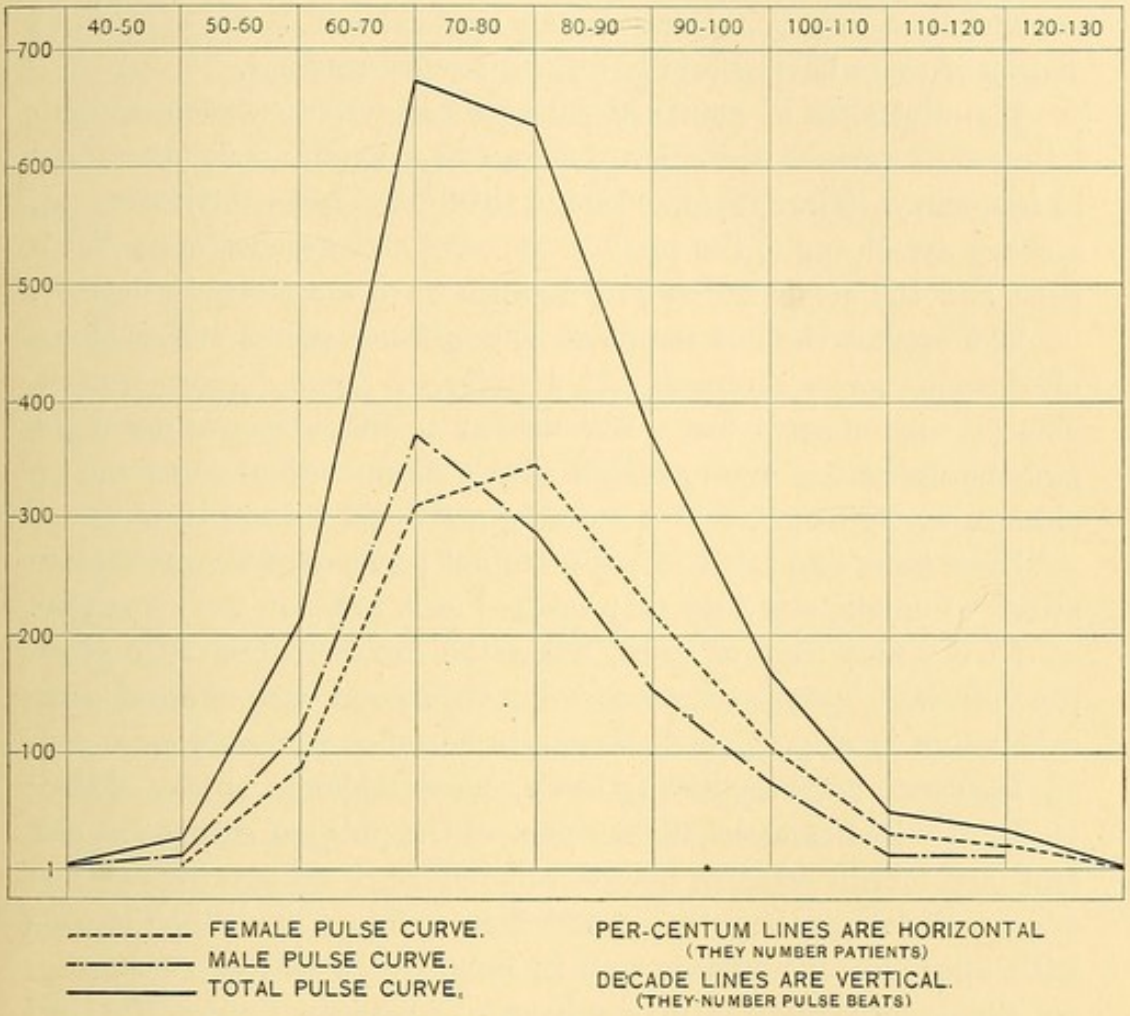
It becomes evident from this table that a very much larger proportion of women than men had a pulse record in the decades above 80 beats per minute, that there are contained in the decade of frequency 70 to 80 thirty-five per cent. of the men and only twenty-seven per cent. of the women, while, on the contrary, in the decade 80 to 90 there are thirty per cent. of the women and only twenty-eight per cent. of the men.

It also appears that for both sexes the percentages contained were relatively larger in the four decades immediately above eighty than in the four consecutively below it.

The male, female, and total pulse curve by decades of frequency

is graphically shown in the following diagram for the whole number of 2,172 patients:

Diagram Showing Pulse-curve and Frequency in 2,172 Patients.



The total average pulse-rate in the 1,132 women examined was 84.8 per minute, and the total average pulse-rate for the 1,040 men was 80.8, and the grand total average pulse-rate for the 2,172 patients examined was 82.8 beats per minute.

Admitting the average normal pulse-rate in adult males to be seventy-two and that of females to be seventy-eight, the above study of pulse-frequency shows that there is a decided average increase of pulse-rate in Insanity amounting to 6.8 beats per minute for females and 8.8 for males.

Some of the chief sphygmographic characters of the pulse, as studied among the same patients, are now to be enumerated, and several of the tracings taken with a Marey's sphygmograph are shown on page 240 et seq.

It is to be affirmed, in general, that it is upon the physical constitution of the patient, the etiology of the case, and the stadium of the mental disorder, rather than upon the form of the Insanity, that the sphygmographic type of the pulse is to be predicated.

The division which is most widely applicable in mania is into two classes of cases having totally different pulse-tracings.

The first class of maniacal patients has active cutaneous circulation with warmth and color of skin, and the pulse is about normal in frequency. The sphygmogram in these cases has a vertical ascent, a sharp apical angle, the predicrotic wave and notch almost disappear, and the aortic notch and dicrotic wave are strongly marked.

The second class of maniacal patients has pallor and coolness of the cutaneous surfaces, and a pulse of much higher tension. The percussion-wave has a less sudden ascent, a less acute angle, and the descent is more gradual with a distinct tidal wave and an obscure aortic notch, and a scarcely perceptible dicrotic wave.

Even these two types of pulse are not permanent throughout an attack of mania, and they may succeed each other in the same case.

In the first class of cases, when the excitement is very great, the pulse may become tricrotic, and in the second class of cases, when exhaustion is very decided, the pulse becomes monocrotic.

Puerperal maniacs, having lost a considerable percentage of their vital fluids by hemorrhage, may present the pulse of empty arteries, and post-febrile maniacs may have subnormal temperature and an exaggerated tricrotic pulse. Anacrotism is found in alcoholic mania with atheromatous arteries and in mania with Graves's disease.

The toxic manias ordinarily have a high-tension pulse, the tidal wave rising to form a plateau with the apex of the primary wave.

In phthisical cases the relation between pulse and temperature may be lost, or there may be a typical pyrexial pulse-tracing, and, as mental disorder is often most active when pulmonary disease is stationary, there may be a high-tension pulse and dicrotism only on advance of the pulmonary lesions.

In auto-intoxications there is usually a pulse of high tension with a sustained rectangular apex formed by the blending of the percussion and predicrotic waves, while the dicrotic wave disappears and the smaller diastolic elastic vibrations may be present.

Melancholia is, in the majority of cases, attended by hypertrophy and high-tension pulse. The ascent is not high, there is an early tidal wave, and the descent is gradual, with scarcely a perceptible trace of the aortic notch or dicrotic wave.

In great physical depression, with feeble systole, the percussion-wave is small and the catacrotic elevations completely disappear. In senile melancholia the high-tension pulse is due to atheromatous changes rather than to spastic states of the arterioles, and in alcoholic melancholia the sphygmographic signs of peripheral resistance arise from arterial degeneration rather than from angiospasm.

Melancholia from cerebral exhaustion and of neurasthenic origin or hypochondriacal in nature, gives a pulse-tracing of low tension, and a dicrotic tracing also characterizes tubercular melancholia with basal meningitis.

Melancholic anguish and precordial panic present a small, frequent pulse of high tension with low ascent and sustained descent with elastic vibrations, or a slight percussion-wave and complete disappearance of catacrotic elevations.

In stuporous and cataleptoid states a similar tracing is often found with loss of the diastolic features and the substitution of a simple line of descent, as in slowed pulse from pneumogastric irritation.

In the demented and in terminal forms of Insanity with cirrhosed liver, granular kidneys, and peripheral obstruction to the circulation from vascular disease there is apt to be a pulse of high tension, either dicrotic or monocrotic. The ascent is gradual and below medium height, the apex is rounded or formed in variously sustained shapes by the help of an early and imperfectly developed tidal wave, the descent is gradual and shows some wavelets, but no distinct aortic notch or dicrotic wave. One cause of the gradual line of descent in the tracings of dementia is permanent exhaustion of the sympathetic nervous system and resistance from venous stasis, as shown in the cyanotic extremities. There is early high tension in paretic dementia. The pulse is sometimes tricrotic in the first stage, but there is rapid failure of systolic force, and angioparesis begins in the second stage, and capillary stasis offers sufficient resistance to cause forms of high-tension pulse, which may also arise from endarteritis, so that the percussion-wave is usually low with rounded apex, and the descent has numerous wavelets and vibrations peculiar to the disease.

The apex in other tracings is rectangular, the plateau being formed by help of the tidal wave, and the aortic notch and dicrotic wave do not appear. With rise of temperature after paretic seizures the tracings may be dicrotic or even hyperdicrotic. In the final

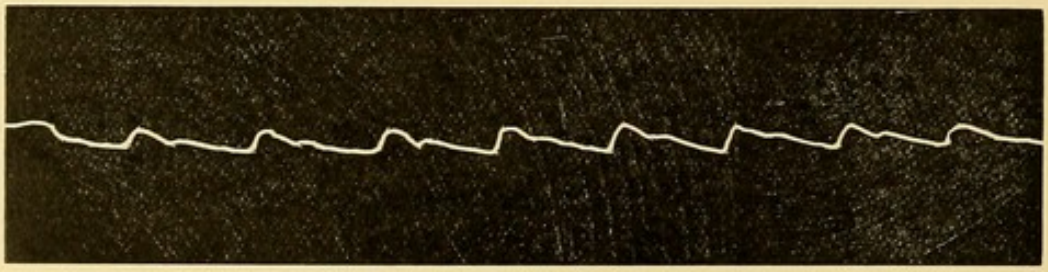
stage of general paresis the monocrotic type of pulse prevails, though bedridden cases sometimes give anacrotic tracings, and variations are due also to the way in which the cerebral vasomotor and the pneumogastric centres are involved by the progressive lesions. In ascending cases the tracings continue to show high tension even to the final stage.

Accidental features in the sphygmograms of the cases examined were due to cardiac abnormities, and the cardiac affections actually diagnosed in the 2,172 cases of Insanity may be briefly summarized in the following percentages: There were irregularities of the heart's action in five per cent., intermittance of heart-beat in two per cent., heart murmurs and valvular lesions in eight per cent.

The general conclusion as to the abnormal sphygmographic tracings is that they are to be observed at some stage of the disease in the vast majority of cases of Insanity, and that they are occasioned by the cerebral, bulbar, and spinal organic lesions, by anomalies of the vasomotor system, by pneumogastric disorder, by central and peripheral vascular changes, by disease of internal organs, by toxic and auto-toxic and diathetic influences, and by actual organic cardiac lesions.

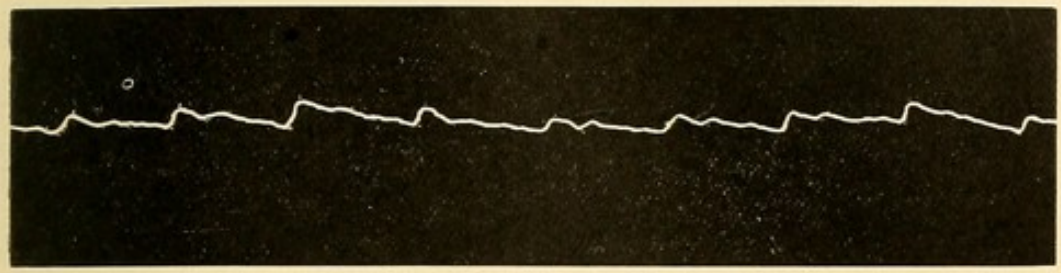
These abnormal tracings vary much in different kinds of Insanity, and in variously constituted individuals suffering from the same form of mental disorder, and they are best classified according to the actual physical status of the patient, the special etiology of the case, and the stadium rather than the nosological form of the mental disease.

The following sphygmograms represent a few of the more common types, and they were among many others taken with a Marey's sphygmograph among the writer's patients:



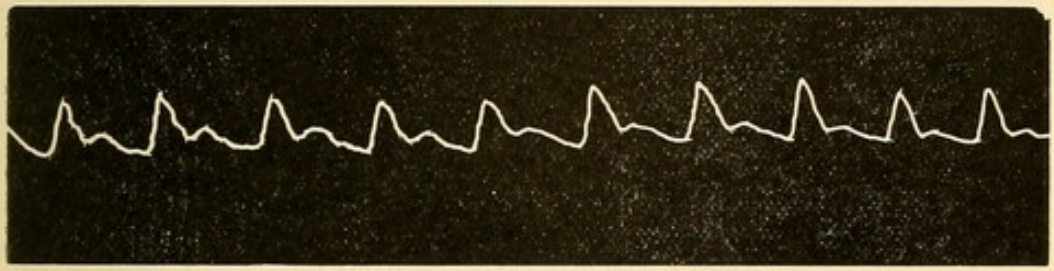
SPHYGMOGRAM NO. 1.

This is a tracing in acute melancholia with a pulse-rate of 72 per minute and a pressure of two ounces. It shows the vascular hypertony of melancholia with corresponding tension of pulse. The line of ascent is not high and the descent is gradual, with scarcely a trace of the normal aortic notch or dicrotic wave.



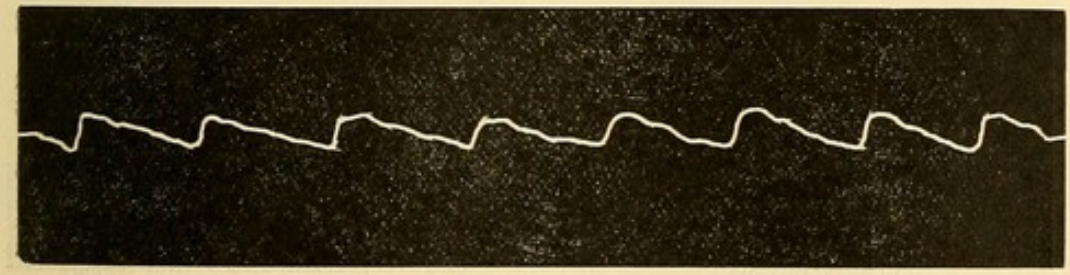
SPHYGMOGRAM NO. 2.

This is a tracing in chronic melancholia with a pulse-rate of 78 and a pressure of three and one-fourth ounces. It indicates feeble heart action, and peripheral resistance and high tension. There is a low ascent with a sustained descent, with slight elastic vibrations. It is not unlike certain tracings in precordial panic.



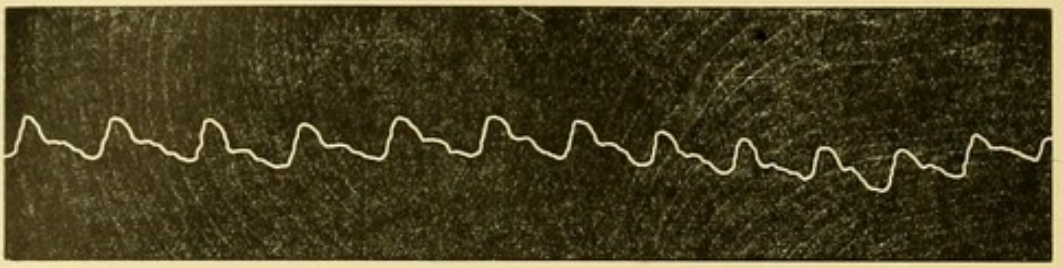
SPHYGMOGRAM NO. 3.

This tracing in an epileptic imbecile with a pulse-rate of 84, pressure three and one-fourth ounces, shows low tension and cardiac irritation, and the tracing is similar to some found in delirium acutum. There is a vertical line of ascent, a sharp apex, and a rapid descent to the level of the aortic notch.



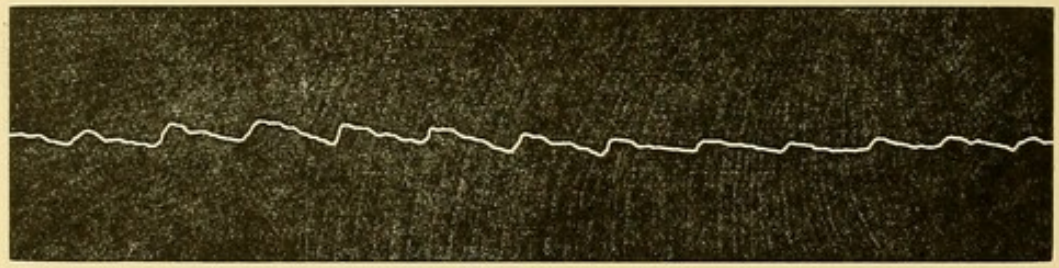
SPHYGMOGRAM NO. 4.

This tracing in epileptic dementia, pulse 72, pressure three and one-fourth ounces, is the more common type in the physical deterioration of epileptics, in which the pulse is slower and the tension higher from capillary stasis. Here the line of ascent is less vertical and there is a rounded apex, and there is a long-sustained line of descent.



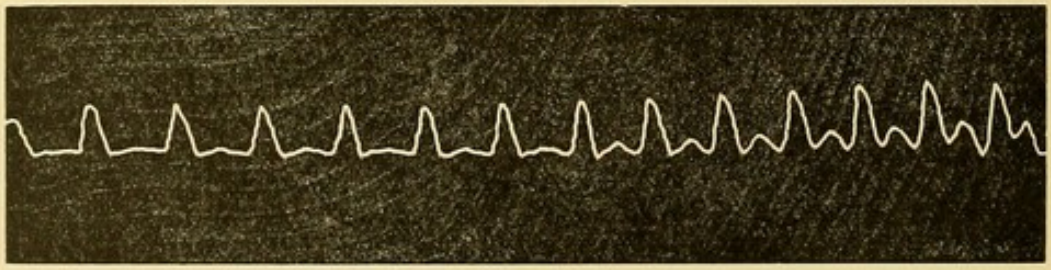
SPHYGMOGRAM NO. 5.

This tracing, taken in the second stage of general paresis, pulse 90, pressure four ounces, shows a full-length line of ascent, with an apex approaching a plateau, and a rather rapid descent to the aortic notch, and the pulse is one of considerable tension from obstructed flow in the arterioles.



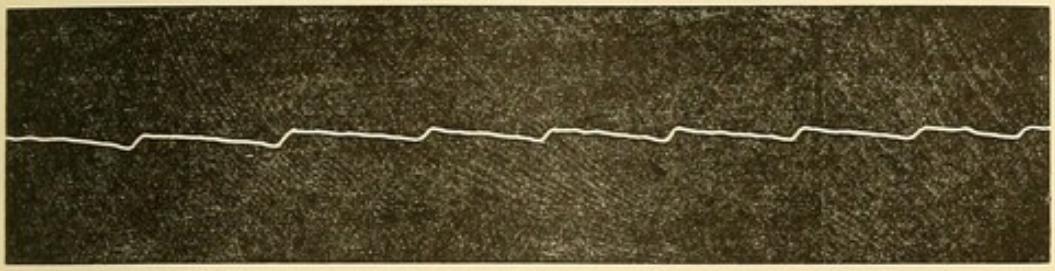
SPHYGMOGRAM NO. 6.

The pulse-rate in this instance was 72 and the pressure two ounces. It was a case of chronic mania with tension of pulse, often present in this form of mental disorder. There is a low percussion-wave and a descent with all the usual features obscured, and still it is a tracing very common in chronic mania.



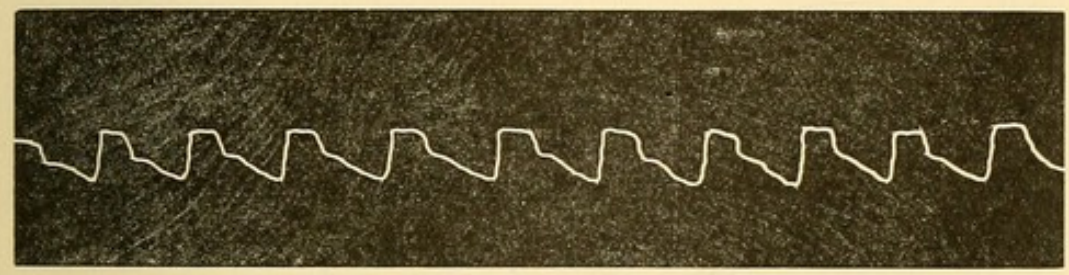
SPHYGMOGRAM NO. 7.

This tracing in epileptic mania, with a pulse of 120 and two-ounce pressure, illustrates an interesting variety of low-tension dicrotic pulse with vertical ascent, acute apical angle, rapid descent, and dicrotic wave, often found in both epileptic and acute delirious mania.



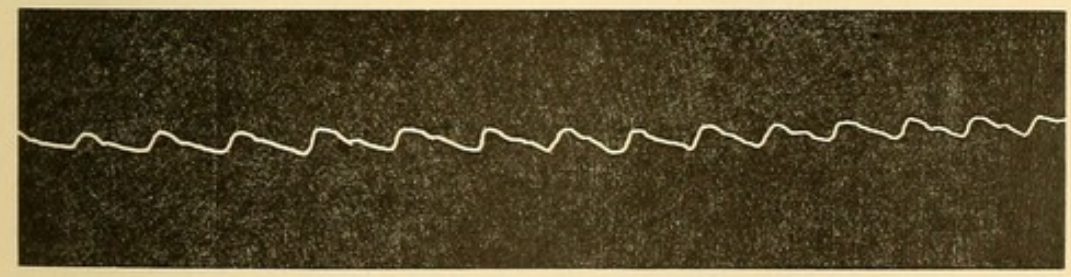
SPHYGMOGRAM NO. 8.

As a contrast to the preceding tracing here is one taken in epileptic dementia, pulse 72, pressure two and one-half ounces, with high tension due to peripheral obstruction, a very slight percussion-wave and a sustained line of descent without any other features. This is characteristic in degenerative forms of dementia.



SPHYGMOGRAM NO. 9.

A tracing in chronic mania with exophthalmic goitre, pulse 90, three-ounce pressure, illustrates a type of pulse found in chronic alcoholic or other toxic states. With the vertical line of ascent a distinct right angle is formed at the apex, and the arterial tension is considerable.



SPHYGMOGRAM NO. 10.

This sphygmogram is taken in fully developed general paresis. There was a pulse of 100, and three ounces pressure were employed in tracing. It shows a slightly oblique line of ascent, the tendency to form a plateau at the apex, a certain degree of tension from obstructed outflow through capillaries, and a frequent type of tracing seen in general paresis.

Section IV.—Changes in the Cutaneous and Other Epithelial Structures.

It is natural that the cutaneous and epithelial structures should reveal the general defects of nutrition and circulation common in mental disorders.

Pigmentation of the skin is due to erethism of the papillæ and to angioparesis of the special papillary vessels and to qualitative changes in the blood. In toxic and diathetic Insanity, especially in syphilitic, cancerous, and malarial cases, the deposit of pigment may occur in internal organs as well as in cutaneous regions. The brown patches in facial parts are very extensive and permanent in arsenious, pellagrous, and malarious cases, and in the latter there is sympathetic paresis of splenic vessels and great increase of pigment with enlargement of the spleen and pigmentation of vascular as well as glandular tissues.

Pigmentation of skin is very common in melancholic states, and unquestionably painful emotions are sometimes causative in these cases, as their dystrophic effects are well known, and pigmentation is often a trophic disturbance.

Climacteric cases and all other instances of involutional defects of nutrition are subject to this symptom of discoloration of the skin, which is most marked in the senile dementia of women.

Yellow and icteric pigmentation is not so frequent, though occasional in alcoholic and syphilitic cases.

Bronzing is also rare, though fully developed Addison's disease does occur, both as a concomitant and as a sequential symptom.

Extreme pallor and waxy skin is not infrequent in diathetic Insanity, and Spitzka (" Insanity," p. 78) records a case of bleaching of the skin in patches in a negro. Congenital discolorations and pigmentary nævi are found among the physical stigmata hereditatis.

Desquamations are partial in the acute psychoses of toxic origin, and sometimes general in mental disorder from acute infectious diseases.

In post-febrile Insanity there is often extensive desquamation.

This is a symptom which readily escapes observation, and in many cases of melancholia there is abnormal and furfuraceous desquamation for months together, and pityriasis is a part of the process.

Atrophy of the cutaneous tissues is not uncommon. The "panniculus adiposus" early disappears, and the skin becomes extremely thin, and, as a result, abrasions are apt to occur. This tenuity of the skin is so great in senile dementia that the rupture occurs, as if in wetted brown paper, upon the slightest force exerted in the handling of the patient, and unjust blame may be attached to the nurse in these cases.

Cutaneous eruptions most frequently observed are prurigo, eczema, herpes zoster, urticaria, psoriasis, and pemphigus, and they are evolved chiefly under the direct influence of a diseased nervous system. Herpetic eruption sometimes follows violent emotions as a direct sequel, and artificial urticaria may follow mechanical irritation of the skin in certain neurasthenic cases. Pemphigus is most often seen in general paresis and psoriasis in syphilitic dementia. Furunculosis is common in alcoholic dementia, and carbunculosis is found in various toxic and diathetic insanities.

Acute decubitus is a troublesome complication in bedridden dements, and it arises, without regard to neglect, as an independent and sudden affection of trophic origin, and involves the cutis vera in extensive sloughs, which may prove fatal even under skilful treatment.

Gangrene of the skin, and cellulitis, and scorbutic and purpuric effusions and cutaneous hemorrhages with abscesses are also encountered frequently among insane patients.

Unilateral and local ischæmias and hæmic stigmata have been seen in hysterical Insanity.

Œdema of the extremities is a common symptom in stuporous cases, with cold and livid skin from angioparesis, and there is in rare instances a violet shade of the cutaneous surfaces and also local erythemas in facial regions.

Cutaneous excretions are more abundant in mania than in melancholia. In the latter the skin is often dry and harsh, and in the former it is most frequently moist.

Anidrosis is found in stuporous as well as in melancholic conditions, while hyperidrosis is a common symptom in maniacal states. Hemianidrosis and hemihyperidrosis are to be witnessed in epileptic and paretic and hysteric cases, and also chromidrosis and hæmidrosis, though the latter symptom is rare. There is a distinct effluvium from the perverted cutaneous excretions, which, with the increased seborrhœal secretion and macerated epithelium, undergo rapid chem-

ical changes, giving acid, rancid, musty, and indescribable odors. There is in acutely maniacal patients a sexual odor, a menstrual odor, and an axillary perspiration in women, which stains the clothes and is very offensive, especially if they be suffering from obstipation, and in negroes at such times the effluvium is so powerful as to be perceptible at some distance. Seborrhœa is frequent in pubescent and other kinds of Insanity, and acid hyperidrosis in rheumatic Insanity causes a miliary eruption, which in warm weather is common in maniacal cases from the same cause. There is also increased diaphoresis in diathetic Insanity, and also suppression of perspiration in toxic cases, and emotional influences and spinal affections common in Insanity modify considerably cutaneous excretions.

Other epithelial structures also occasionally present various anomalies.

The hair in acute melancholia is dry and bristling, and may fall out in places or become much thinner, and it may become gray in part.

The hair often turns gray in places, and in rare instances over the whole head, but the sudden bleaching of the hair is so exceptional that few authenticated cases are on record from reliable sources.

There is an erection of the hair from emotional influences in Insanity, and also a permanent state of partial erection of the hair in chronic states of mental disorder, as well as an actual increased growth of the hair which tends to stand out irregularly from the head.

The natural color of the hair may be restored on recovery, but this is rarely the case when the hair has turned completely gray during a prolonged attack of Insanity.

Hirsuties appear not only as a stigma degenerationis but as an intercurrent symptom during Insanity of chronic course, and it is also found in climacteric cases in women, and occasionally in pubescent cases there is a failure of growth of hair on customary parts of the body, and premature baldness is common among male patients, and also alopecia in syphilitic Insanity.

Bald spots are common from the habit of friction of the scalp, and the hair-follicles may be thus permanently destroyed by the mechanical violence. Bald spots also come from the constant plucking out of the hair, and even complete baldness will occur in this way if the patient is not prevented from the constant picking, which becomes automatic finally, and may result in lesions and permanent cicatrices of the scalp.

There are, perhaps, some relations between temperaments, color of the hair, and depressed or exalted forms of mental disorder. It has been claimed that forms of mental depression are more prevalent in persons with dark shades of hair, and some statistical observations sustain this view.

The nails are also subject to alterations in mental disease. They may be large, thick, and incurvated, or thin, small, and brittle. They are frequently bitten off to the very quick by the patient, or they may be thickened by constant friction. There are troublesome forms of hang-nails and of ingrowing toe-nails; also very frequent onyxia, with furrowed, ridged, and variously deformed nails indicative of trophic disorder.

The cutaneous reflexes are generally increased in states of excitement and diminished or lost in states of stupor and of severe mental depression. They are often heightened in alcoholic cases and lessened in senile dementia.

In general paresis and epileptic dementia they may be lost on one side, and there is also a unilateral difference in some hysterical cases. In neurasthenic Insanity there is often a considerable increase of all the cutaneous reflexes.

The cutaneous sensory disturbances consist in a loss of the sense of temperature, loss of tactile discrimination of points touched, or of the linear direction of an object drawn across the skin, loss of the sense of weight or pressure and of the position of the limbs in space, and absence of response to tickling. Cutaneous anæsthesia may be confined to limited areas, or it may be unilateral in epileptic, paretic, and hysteric cases. Hyperæsthesia is found in pressure-points, supra-orbital, infra-orbital, sternal, intercostal, dorsal or coccygeal, and in hyperæsthetic zones over ovarian and other cutaneous regions.

Paræsthesia is a symptom in most acute stages of Insanity, and it may relate to almost any part of the cutaneous surface, and it is the constant source of delusions of persecution.

Superficial temperature changes have not been very thoroughly studied in mental disorders, but they are so frequent as to be noticed upon casual observation. The cold extremities of melancholic and stuporous cases, the heated skin of some maniacs, the high cutaneous temperature in paretic seizures, and in the flushed faces of climacteric patients, and in some hysteric cases, are very evident symptoms.

The cutaneous temperature varies on the two sides in some paretics, and there is a similar unilateral variation in some epileptic cases.

Thermometric tests have determined that there are decided differences of temperature in the scalp, and that powerful emotions cause a rapid rise, and that in general the frontal region has a higher degree of warmth than the middle region, which is in turn warmer than the occipital region.

Apart from variations of temperature from extreme cerebral activity there are in the scalp those due to lesions of the sympathetic, so common among the insane, in whom one side of the face is often seen to be highly flushed, and the patients complain sometimes of these irregularities of temperature, which reach their greatest extreme in paretic dementia and in delirium acutum. On the other hand, algid cutaneous conditions are found in stuporous and exhausted states following severe acute stadia both of mania and melancholia.

Section V.—Splanchnological Disorders.

The affections of thoracic and abdominal viscera in mental disorders are frequent from general malnutrition, impaired innervation, and special causes about to be described.

Pulmonary diseases are vastly more common among the insane than the sane, and in all large hospitals for the insane they constitute the chief factor in large mortalities. The most frequent of these diseases, phthisis pulmonalis, is found in the ratio of three to one in the insane as compared with the sane, and this is due to lowered vitality, and to the general trophoneurosis, and to defects of pneumogastric innervation of pulmonary tissues, which present a soil in which bacilli readily thrive and multiply. There is also a hereditary relationship between phthisis pulmonalis and Insanity, which appear vicariously in successive generations.

The mental disease may appear a year or two before the lung complaint, or the latter may cause the former, or the two affections may progress in cyclical order, first one and then the other furnishing the predominant symptoms.

Sometimes the pulmonary symptoms are latent until the close of life, and then develop rapidly as the direct cause of death. The objective signs of the lung disease are often absent, even when the lesions are far advanced, and a fatal termination is then reached without cough or expectoration, and the customary variations in temperature are also sometimes wanting.

Asthma is associated with Insanity sometimes as a cause modify-

ing the type of alienation, and as an intercurrent affection. There are also observed pseudo-asthmatic attacks, with labored breathing, in hypochondriacal and neurasthenic cases.

Pneumonitis is an epiphenomenon in alcoholic dementia, to which it often puts a rapid lethal termination, and typho-pneumonia is a frequent cause of death in states of acute exhaustion from mental disease.

Pneumonitis is an accidental result in the artificial feeding of patients more often than is supposed, and also from the escape of food into the air-passages while eating, and this arises from paresis of the muscles of deglutition and from defects of sensory innervation of pharyngeal membranes.

In bed-ridden dements and other very feeble patients there is a hypostatic pneumonia, which not infrequently brings about the fatal end, and gangrene of the lungs is not very rare among the insane.

Œdema of the lungs is another common symptom and a frequent cause of death among old and debilitated patients.

In the status epilepticus and in prolonged paretic seizures there is vasomotor paresis of pulmonary vessels and an œdematous infiltration of the lungs, which is the customary cause of death on these critical occasions. The autopsical examination in these cases shows that the infiltration is not pneumonic, and the rise of temperature is antilethal and points to involvement of heat centres by central lesions and not to pulmonary inflammation.

There is in epileptic, alcoholic, and paretic dementia a special type of œdema of the lungs caused by pneumogastric lesions. The physical signs are moist râles and dulness on percussion, extending rapidly upwards from the lower lobes of the lungs, with rapid respiration, but only slight rise in temperature. The auscultatory signs of pneumonia are wanting, and death results with unexpected suddenness, and bloody serum with rarely a few pus-cells is found throughout the lung-tissues, which are not hepatized. This form of œdema is due to failure of pneumogastric innervation, and actual degeneration of the nuclear origin of the nerve will sometimes be found.

Pulmonary crises, with painful and labored respiration lasting for some hours, are to be witnessed in tabetic, alcoholic, and paretic cases, arising from the advance of degenerative changes in the pneumogastric and accessory nuclei.

Modifications of respiration in the insane are so frequent that they demand some special description.

Respiration is more frequent in states of mental exaltation and less frequent than normal in states of mental depression. The frequency of respiration may range as high as forty or fifty per minute in maniacal exacerbations, and as low as eight or ten in melancholic attonita, and in some stuporous conditions, and in hysterical somnolence it may sink still lower, so as to be scarcely perceptible.

The depth of the respiratory movements is inhibited in melancholia in striking contrast to the freedom of respiration in maniacal cases. In ecstatic and cataleptic states there is superficial respiration, which becomes deep and full under the influence of strong emotions. There is a voluntary inhibition of respiration under the control of delusions, which may continue for hours together, so that the patient only breathes when absolutely necessary; and, on the other hand, in delirious mania, very rapid blowing at hallucinatory objects may continue to the point of complete exhaustion of the patient, and there are few acutely maniacal patients in whom some modification in depth or frequency of respiration does not occur.

In epileptic, hysteric, and paretic Insanity there are frequent changes in the rhythm of respiration, with prolonged or shortened expiration or inspiration and undue pause between the respiratory acts.

In paretics there may be rhythmical variations consisting in rapid breathing for a few minutes and then retarded respiration continuing for about the same length of time, and this phenomenon may last for several hours following paretic seizures. Typical Cheyne-Stokes respiration is occasionally present in the "status epilepticus" and in fatal cases of delirium acutum. In cataleptoid states there is momentary suspension of respiration, which is continuously retarded, and this symptom persists for days together.

Prolongation of expiration is present often during the sleep of the insane, who also voluntarily prolong the expiratory movement in shouting and whistling, thus preventing the return of venous blood from the brain and causing passive cerebral congestions and chronic laryngeal troubles, and after the patient becomes too hoarse to make an audible noise the expiration continues prolonged with panting muscular effort.

Automatic laughter is a spasmodic expiratory modification of respiration, which escapes the control of the patient and may continue for hours. It sometimes begins as an emotional reflex partly under voluntary control and then becomes automatic, but usually it

springs from active pathological changes in encephalic centres, and it is more in the nature of a convulsive action in epileptics, in whom it may be vicarious of a seizure. The latter seemed to be the case in a young male epileptic under the writer's care, in whom the automatic laughter was followed by such stuporous exhaustion as is the frequent sequel of convulsions. *Crying-laughter* without hilarious expression and with free lachrymation is common in organic and paretic dementia, and laughter with closed lips, and violent explosive noises after efforts to suppress laughter, are to be heard. Paramimic laughter, as above mentioned, renders it difficult to tell when the patient is crying or laughing.

Sneezing, ordinarily caused by excitation of the nasal distribution of the fifth nerve, appears as "sternutatio convulsiva" among epileptic and hysteric insane, like the spasmodic cough in women as a uterine reflex, or like the barking cough of chorea. Dry and exaggerated spasmodic cough is common in men as well as women, and the fact of laryngeal anæsthesia and absence of cough in walking cases of pneumonia is to be observed among the insane. There is also a cough of delusional origin in hypochondriacal cases and a suffocative cough in the final stage of organic dementia. The modifications of respiration should not escape clinical notice during hours of sleep in which there is a diurnal reduction of vital force, diminished oxidation, and suspension of cerebral inhibition.

The exhaustion of motor and emotional excitement in the insane is followed by deep sleep, during which the jaw drops, mouth-breathing and various forms of snoring occur, with labial vibrations pointing to a pathological depth of somnolence. The sleep of general paretics in the dorsal decubitus from prolapse of the palate and of the base of the tongue gives an alarming obstruction of respiration, which is sometimes increased by the collapse of the alæ nasi, and even the vocal chords in some cases furnish the obstacle to breathing, and their spasmodic adduction may result in vibrations and a variety of inarticulate sounds.

In the soporous condition of epileptic and paretic patients positive stertor is present, and the sleep always has a pathological character.

The singultus of the insane often presents, not atmospheric closure of the vocal chords on diaphragmatic spasm, but spasmodic glottic closure with loud inspiratory sound, and the whole phenomenon is often prolonged for hours from pneumogastric irritation occasion-

ally, though ordinarily from excitation of the phrenic nerve. In tabetic and paretic cases this phrenic irritation arises from cervical spinal lesions involving the roots of the nerve.

In toxic Insanity hiccough probably springs from direct toxic effect on the respiratory centre. It is often a fatal symptom in organic dementia and in the final stage of general paresis. In one case it lasted three days, and the autopsy revealed thrombotic occlusion of the basilar artery and no other cerebral lesion to account for the symptom.

Oscedo in the insane is sometimes attended by exaggerated action of the extensor muscles of the trunk and limbs, and the yawning may finally pass beyond voluntary control in hysterical hypochondriacal and paretic cases, and in paralytic cases certain tremors attend the act. In hysterical Insanity chasmus hystericus may be as purely spasmodic as globus hystericus, and it sometimes continues for days together.

Sobbing sometimes takes the place of crying among the insane. It is a spasmodic noisy interruption of inspiration, and during the pathological liberation of intense emotions it becomes very difficult to arrest except by powerful sedatives, and it may continue day and night if not brought under artificial control. These sobbing seizures usually continue until the patient sinks exhausted into a deep sleep. In tabetic cases imperfect abduction of the vocal cords gives rise to labored inspiration, and a like difficulty in paretics springs from sclerotic changes and irritation of the laryngeal branches of the pneumogastric. Finally, there are dyspnœic modifications of respiration in the acute psychoses for which there is no assignable pathogenesis, and those disorders of respiration which attend the diathetic forms of mental disease will be noticed in the clinical part of the work.

Gastro-intestinal symptoms are almost universal in the acute psychoses. The gastro-intestinal secretions are diminished in melancholia and more abundant in mania. In melancholia also there is absence of normal peristalsis, as well as lessened excretions, and the result is obstinate constipation. The impaction of fecal masses in the large intestine is a very troublesome and at times dangerous symptom, and in dementia there is also sometimes the most persistent obstipation, and when the rectum is completely impacted mechanical delivery may become the only means of relief.

Irritative or destructive lesions of spinal reflex centres, through which the intestinal tract is innervated, lead to a variety of symp-

toms. Thus, paresis of the muscular coat of the intestines increases obstipation, or there may be spastic action of the muscular coat and greatly increased peristalsis with pseudo-diarrhœa and borborygmi and false tympanites through spasm of abdominal muscles.

Quantitative and qualitative changes in the gastric juice occur, and there is frequently continuous gastro-intestinal catarrh, and indigestion is seldom absent in the acute stages of Insanity. The tongue is heavily coated and the breath is offensive, and there is anorexia, or absence of the feeling of satiety. Gastric dilatation and sarcinous fermentations, regurgitations, pyrosis, loud eructations, and vomiting are frequent. Emesis is sometimes due to gastric spasms without nausea, and also to pneumogastric irritation, and to hypochondriacal delusions. The most violent spasmodic affections of the stomach are found in hysterical and paretic cases, and gastralgia and other sensory troubles are among the symptoms to be noted.

Gastric crises are found in general paresis, and in mental disorder in connection with locomotor ataxia.

Merycism in congenitally feeble-minded and in the chronic insane is not very rare, and the food may be repeatedly regurgitated and remasticated either voluntarily or automatically as in true rumination. Some insane patients have, or acquire, the power of completely emptying the stomach at will, and this gastric control renders artificial alimentation almost an impossibility, and deliberate starvation almost a certainty. Imperfect mastication is the rule among the insane, who are apt to bolt their food in large masses and also to swallow all sorts of substances, so that gastro-enteritis is not infrequent. There are also ulcers of the stomach, hæmatemesis, intestinal displacements and involution, hernias, and inflammatory affections of the gastro-intestinal tract.

The chief significance of these gastro-intestinal disorders is the fact that they heighten the impairment of nutrition of the nervous centres, and sympathetically influence to a surprising degree the intellectual disorder, which in hypochondriacal cases is often due directly to the disease of the primæ viæ. There are occasionally the further influences of helminthiasis, of stasis of the portal vein, and extensive hemorrhoids, of tubercular peritonitis, and of cancerous disease of the stomach or rectum, and of other severe organic diseases of the primæ viæ.

Genito-urinary symptoms demand attention, and they spring from diseases which may be causative, concomitant, or consecutive

as regards the Insanity. Their importance is great on account of the direct reflex sympathy between the genito-urinary organs and the cerebrum, as shown not only at puberty and the menopause, but throughout life and during the phases of mental disorder.

Both organic and functional uterine disorders are present more frequently among insane than sane women, and they modify the mental disease, which may sometimes be best treated by a relief of the local affection. Uterine displacements, tumors, and chronic discharges, and inflammatory conditions are especially common at the climacteric. Amenorrhœa is the rule in the acute psychoses, and it may continue after recovery, but the return of the catamenia is ordinarily one of the signs of convalescence or of transition to a chronic stage of the mental disorder.

Masturbation, pruritus vulvæ, the passage of foreign bodies into the vagina, sexual mutilation, furor uterinus, irresistible impulses of sexual origin, and suicidal attempts from sexual delusions, and false accusations, and even homicidal attempts from the same source, are not uncommon symptoms.

Delusions of pregnancy, childbirth, and of nightly assaults upon virtue are favored by genital paræsthesia and by spasmodic vaginal and uterine affections, or by other local diseases.

In men masturbatic strictures, and self-inflicted injuries of the sexual organs, and chronic inflammatory states of the membranous portion of the urethra, with pollutio diurna and sexual hypochondriac symptoms, are found with paræsthesia and neuralgic genital affections, which become the fruitful source of sexual delusions. Impotence or satyriasis may exist, but the ordinary symptom is sexual anæsthesia in melancholic and stuporous states, and sexual hyperæsthesia in maniacal conditions.

Coitus may be painful, or there may be long-continued erection and erethism without orgasm, and various forms of sexual perversion.

Vesical symptoms are of clinical importance, and they require active attention. The bladder often becomes enormously distended and there is then incontinence of urine with overflow. There is also retention of urine with vesical paralysis in organic and paretic dementia.

Paresis of the bladder is also found in epileptic, syphilitic, tabetic, and hysteric cases. There are irritable and spasmodic vesical states and frequent vesical catarrh and nocturnal incontinence of urine. The latter symptom can be overcome in a measure by habitual

education of the patient. The cerebral inhibition of the spinal reflex control of the bladder and rectum is completely lost in many cases, and there is then involuntary passage of the contents of the bladder and rectum, and this also occurs from hebetude in dements, and in tabetic and paretic cases from paresis of sphincter muscles.

When the above conditions do not prevent, it is possible to establish automatic habits of attention to personal needs, even in dements. In hysterical cases, more especially, there is temporary anuria and polyuria, and in epileptics vesical spasm, and the passage of urine is often a part of the convulsive seizure.

Voiding urine involuntarily is also in some epileptics a precursory symptom, or an automatic sequel, or an equivalent of the seizure.

Biliary, splenic, and pancreatic affections have sympathetic relations to mental disorders. *Liver disease* is sometimes the cause of melancholia, and the ancients were not altogether wrong in their black-bile theory of this form of mental disease. Hypochondriacal Insanity also springs from hepatic disorder. Abscess of the liver has been known to cause great mental depression, which has been relieved by operative procedure. In hypochondriacal cases there is duodenal catarrh, occasionally extending to the bile-duct and leading to partial occlusion of the same and to mild forms of icterus and increase of the melancholy. Hepatic calculi are common, especially in women, and are found post-mortem of unusual dimensions, and their passage constitutes a painful intercurrent symptom. In alcoholic and syphilitic Insanity there are organic lesions of the liver. Fatty degeneration and cirrhosis are the most usual forms, and the latter is often followed by ascites and progressive emaciation, which render the prognosis of mental recovery hopeless.

Atrophic processes are also found in the liver in chronic Insanity, and Bucknill and Tuke ("Manual of Psychological Medicine," p. 594) report some instances of shrunken and flabby liver resembling splenic tissue.

The spleen in chronic cases of mental disease is often atrophic, but in malarial Insanity it is greatly enlarged. In toxic Insanity there is often distinct atrophy of the spleen, and in diathetic Insanity there is sometimes hypertrophy and secondary atrophy. Functional hypertrophy is by no means rare, and the extended limits of the organ can readily be recognized on percussion, and pain located over the organ is an accompanying symptom in some of these cases. The extensive pigmentations in the insane, not alone of cutaneous regions, but of

internal organs and of vascular tissues, are attended sometimes with splenic disorders.

The pancreas has been found altered in size and in its tissues in Insanity, and the loss of ability to digest fats is a very common symptom among the insane, and it is doubtless in part due to disorder of pancreatic functions.

Finally, biliary, splenic, and pancreatic affections modify the cœnæsthesis and the prevailing emotional tone in mental disorders.

Section VI.—Nutritive, Secretory, and Trophic Disturbances.

Changes in the total weight of the body in Insanity correspond to the pathological fact that the psychosis is only an expression of a general tropho-neurosis. Loss of weight often begins in the prodromal stage and progresses rapidly during the acute stage, and is greatest at the full height of the mental disorder. There is then a stationary period during the stage of secondary exhaustion, and then the weight increases suddenly during convalescence beyond the average of health, and as the cure hardens there is again a slight contraction of total weight to the physiological and normal average of the patient in health. This is the course the curve of bodily weight pursues in the simple psychoses, with a rapid fall and a rapid rise at the beginning and end of the acute attack.

But in Insanity with the major neuroses and in strongly degenerative cases the weight-curve, after a rapid initial decline, often oscillates irregularly beneath the norm and rises more gradually to the customary height on recovery; or it rises to the full norm of health during remissions of the mental symptoms, and sinks again during exacerbations. In the hereditary form known as circular Insanity the weight sometimes rises nearly to the average during the maniacal period, and sinks rapidly during the melancholic period.

The actual full gain in weight upon recovery may range from twenty to twenty-five per cent. of the normal total weight in women, and from fifteen to twenty per cent. in men. In puerperal mania with great loss of vital fluids it may attain as high a figure as thirty per cent. There is also a gradual and exaggerated gain in weight upon the passage of the Insanity from the acute to a chronic and incurable state, and increase of weight without a corresponding mental improvement is always a bad symptom.

Loss of weight in the terminal forms of mental disorder almost

always precedes the fatal end, and there is extreme malnutrition in the final stage of toxic and diathetic cases, and excessive emaciation in melancholia, and some cases of refusal of food in spite of forced alimentation.

Disorders of secondary assimilation exist in those insane patients who eat voraciously and apparently are free from digestive disorder, and still continue to grow more and more emaciated. The whole muscular system diminishes in size and in contractile power, the internal organs appear atrophied post-mortem, and the central nervous system partakes in the general atrophic process. This marasmus is found in both acute and chronic cases of mental disease, as well as in senile cases and in instances of premature senescence.

The essential defect would seem to be in secondary assimilation, in the inability of the tissues to appropriate that which is essential to their renewal. The result of this trophic disturbance is progressive emaciation, which may finally attain to the most extreme degree in the absence of any diathesis or acute disease, and while the appetite is good and the amount of food consumed more than normal.

Auto-intoxications are found in puerperal cases with reabsorption of septic material, and also in those forms of puerperal Insanity with uræmic blood-poisoning.

In all cases with chronic nephritis mental disorder from uræmic intoxication is liable to occur.

Diabetic auto-intoxication gives rise to another form of mental derangement, and several of the diatheses, such as the podagrous and the rheumatic, are attended by mental disorder from auto-intoxication.

Myxœdematous Insanity in connection with degeneration, or surgical removal, or abnormal growths of the thymus gland is probably due to retention in the system of substances which should be eliminated, and it is nearly related to, if not actually to be enumerated among, the auto-intoxications.

There is no longer room for doubt that putrefactive alkaloids exist in the human system through the action of bacteria on organic matter, that these ptomaïnes are highly poisonous, that basic substances formed from metabolic changes in the bodily tissues, known as leucomaïnes, may act as autogenous poisons, and that in insane patients with generally perverted secretions and excretions auto-intoxications are of frequent occurrence. For fuller details than present limits will permit reference is made to an article by the

writer, on "The Toxic Origin of Insanity," *Journal of Nervous and Mental Disease*, October, 1892.

The blood in Insanity undergoes changes in quantity and quality. It may be diminished from profuse hemorrhages in puerperal cases, or charged with uric acid, biliary constituent, specific virus, toxic agents, and autogenous poisons. The proportion of serum fibrin and globules may vary in the diathetic and toxic insanities, as chlorotic, anæmic, and leucocythæmic conditions prevail.

Variable points in the composition of the blood in Insanity of special importance are the number of red blood corpuscles, the proportion of white blood corpuscles and the amount of red coloring matter (hæmoglobin) in the various forms of mental disorder.

In mania it is exceptional to find any great deviation in the relative quantity of the white or red corpuscles or hæmoglobin. In maniacal women the proportion of white corpuscles is greater than in men.

In melancholia there is a considerable diminution in red blood corpuscles and in hæmoglobin, and a slight increase in specific gravity.

In the epileptic insane there is a still greater deficiency of red corpuscles and of hæmoglobin and a higher specific gravity.

In terminal dements there is a very great decrease in the hæmacytes and also in the red coloring matter, and a decided increase in specific gravity of the blood. The deterioration is usually more decided in women and those advanced in years. In general paretics the blood is sometimes more deteriorated in males, however, and there is a diminution, both in red blood corpuscles and in hæmoglobin and a small increase of specific gravity, and a leucocytosis which steadily advances to the terminal stage of the disease. Paretic remissions are characterized by a partial restitution of healthy conditions of the blood.

In malarial Insanity the blood contains pigment granules in large amounts, so that pigmentary obstruction of capillaries may occur. In some of the toxic insanities the proportion of white to red blood corpuscles is increased, but the rule is in the simple psychoses that there is no abnormity in this particular.

The quality of the blood returns to a normal standard upon complete recovery, or it deteriorates still more decidedly as Insanity passes into an incurable state.

The urine in mental disease presents a variety of changes from

the normal standard in quantity, specific gravity, reaction, and chemical constituents, but investigators do not agree as to the special abnormities in the separate forms of Insanity. The composition of the urine varies in the same type of mental disease according to the quantity of fluid and solid ingesta, the degree of mental excitement, the amount of muscular effort, the condition of the vasomotor innervation, and the state of the central nervous system.

The problem of the determination of the abnormal variations in the chemical composition of the urine is very complex, but there are some general facts which may be considered as sufficiently determined.

The quantity of urine excreted in twenty-four hours is diminished in melancholia and in secondary dementia, and in mania with excessive perspiration or excitement, but in other cases of mania it is normal.

In general paresis the quantity of urine is increased in the first stage, except when it is one of depression, and diminished in the demented stage, but there may exceptionally be bulbar lesions giving rise to continuous polyuria. The latter symptom is present in epileptic and hysterical Insanity occasionally, and also in luetic and organic dementia. In neurasthenic cases there is both oliguria and polyuria arising from changes in psychical influences.

The specific gravity of the urine is a little above the norm in melancholia, somewhat increased on the average in mania, and decreased in terminal dementia rather than increased, and slightly above the normal figure in general paresis, upon the whole, but subject to many fluctuations.

The specific gravity is increased in hysteric oliguria and diminished in epileptic polyuria following convulsive seizures. In general, the solid constituents are increased according to the degree of emotional perturbation and muscular activity.

The urine is usually high-colored in the acute stages of mental disorder and light-colored in hysteric and epileptic polyuria, and with less than normal color in dements in a quiescent state.

The reaction of the urine is acid in melancholic and maniacal states, and especially so in the latter during great muscular exertions. In dementia it is less decidedly acid in reaction, and when the urine is long retained it often gives in dements an alkaline reaction.

Urea is relatively increased in acute mania and melancholia,

though in the latter form with anorexia and refusal of food it may be diminished. It is in excess in the early stage of general paresis, and evidently diminished in terminal dementia.

The excretion of urea is increased, as a rule, in most of the diathetic and toxic insanities in the early stage, and diminished in the terminal demented stage.

Uric acid fluctuates above and below the norm in mental disorders. It is often increased in paretic, epileptic, and acute toxic Insanity, and diminished in diabetic Insanity and in some chronic diathetic mental disorders.

Albumin is occasionally present in the urine of the insane in the absence of kidney disease. Albumin is found in states of great excitement in mania and melancholia, in the acute delirious mania of alcoholic cases, in delirium acutum, and in general paresis.

Albumin also exists in the urine following epileptic convulsions, and apoplectiform and paretic seizures, and also in cases with organic diseases of the kidney, especially in alcoholic and syphilitic Insanity. It is found that peptonuria occurs in general paresis and in states of great motor excitement. Peptone may be found in the urine even in the terminal stage of paresis, and acetone is reported to be present in the urine of epileptics and paretics, and also in states of inanition.

Sugar is not confined to diabetic cases, but appears in connection with gross brain disease in organic dementia, and also is frequent in syphilitic and paretic Insanity, and it also attends tumors or other lesions in the neighborhood of the fourth ventricle.

Phosphoric acid appears to be excessive in states of extremely active excitement and to be diminished in chronic brain diseases with Insanity.

Casts, epithelial cells, mucus, pus-globules; leucocytes, and hæmaturia are occasionally to be found in the urine of the insane.

Through inadvertence, or under the influence of delusion, or as the result of spasm of the neck, or paralysis of the muscular coat of the bladder the urine is long retained and ammoniacal decomposition may occur. In hysteric and paretic cases there may at times be considerable escape of blood from the mucous coat of the bladder and various forms of vesical calculi are occasional symptoms.

Saliva is secreted in abnormal quantity and quality in Insanity. It is either thin and watery, as in the idiotic and feeble-minded class, or it is thick and tenacious, under the influence of the sym-

pathetic, as in states of maniacal excitement, in which the active movements of the mouth and lips produce, mechanically, a foam out of the viscid saliva, and this is the explanation of the popular idea that madmen foam at the mouth. Excessive flow of saliva may occur in any form of Insanity as an intercurrent symptom, and it sometimes indicates the beginning of terminal dementia, and in other cases it is a critical sign of approaching convalescence from depressed or stuporous conditions, pointing to more active cortical innervation and circulation.

Ptyalism may proceed from organic lesions of cerebral centres, from bulbar disease, from cortical affections, from disease of the facial or sympathetic nerves or of the salivary glands, and from emotional influences, and it is conjectural in many cases of mental disorder to which one of these factors the increased flow of saliva is due. In organic dementia ptyalism is to be attributed to the central brain lesion, and organic lesions of nervous centres usually determine it in syphilitic, paretic, and alcoholic dementia. Ptyalism is more apparent than real in depressed and stuporous states in which the lower jaw falls inert and allows the saliva to dribble from the mouth. In these cases there is inhibition of all motion or absence from hebetude of mouth-closure and customary deglutition, and the escape of saliva is not to be mistaken for actual increase of the same. In other cases of this class there is mouth-closure, but not deglutition, and the saliva accumulates in large quantities in the mouth and undergoes a species of decomposition from admixture of epithelium, mouth germs, dental decay, and macerated food particles, and it then becomes very offensive.

Saliva is not swallowed, and may be retained in the mouth under the influence of hallucinations or delusions, which in other cases cause a constant spitting, which may be mistaken for real salivation.

Sialorrhœa may reach an astonishing degree, as in acute delirious conditions of toxic origin, and also in typhomania, alcoholic mania, and epileptic and paretic cases in which the flow of saliva may be almost incessant.

There is actual diminution in the amount of saliva secreted in some acute maniacs, with dry and parched lips and tongue, and also in many cases of acute melancholia in which all the secretions are diminished.

In some idiots the escape of saliva comes not from an open-mouth habit, but from real ptyalism.

Trophic tissue changes have already received considerable notice under the various sections of this chapter, but there are certain points yet to be described.

In organic dementia there are trophic changes in the joints of the paralyzed side, such as thickening and inflammatory effusion, giving rise to albuminous crepitus; and in hysterical Insanity there is pseudo-ankylosis from subinflammatory joint affections with contraction and partial atrophy of tendons and muscles. In hysterical cases, also, the paralyzed limbs, which pit on pressure, present the peculiar symptom which has been described as "blue œdema." There is also cutaneous atrophy in senile dementia and a tendency to death of tissue, so that troublesome ulcers may form upon the lower limbs, the heel or sole of the foot, or at the elbow. In general paresis there is increased trophic activity in the early stage and unusual facility of the healing of wounds and abrasions, but in the final stage there is a loss of trophic function and open sores, and deep-seated abscesses and decubitus, which may extend to the bone in spite of every surgical or antiseptic measure.

In neurasthenic Insanity complicated with neuralgia, herpetic blebs arise in the region of the cutaneous distribution of the nerve, leaving a superficial abrasion, and in climacteric Insanity the paræsthetic symptoms are in part due to actual trophic changes in the skin.

Changes in the marrow of bones in the insane are of a trophic nature and are more common than is supposed, and are yet to be fully investigated. The trophic changes in the teeth are more easily studied, and consist in falling off of the enamel, ulcerations at the root, alveolar abscesses, tartarous concretions extending under the gum toward the root of the teeth, which are painful and very troublesome and require extraction in these cases, and also loosening and falling out of the teeth before actual decay. The latter affection occurs without scorbutic taint and the patients often pick the teeth out with their fingers.

Beard first called attention to the premature loss of teeth in neurasthenic cases.

The excessive formation of adipose tissue and the deposit of rolls of fat about the neck in dements and imbeciles, and the general fatty degenerations of the visceral and vascular systems in Insanity, are to be regarded as trophic changes, and in the same category are to be included the general malnutrition of the terminal forms of

mental disorders and the fatal marasmus of melancholia and dementia. The atrophy of internal organs so generally revealed post-mortem in chronic dements is a trophic result, and the general relation of tropho-neuroses and psychoses is shown in the extreme frequency of scrofula in idiocy, and of phthisis in mental disorders.

There is the symptom of the insane ear, which is sometimes of trophic origin, and it is therefore to be described in this connection.

Hæmatoma auris is a tumor formed by the effusion of blood between the cartilage of the ear posteriorly and the perichondrium of the ear anteriorly. The blood escapes from the rupture of perichondrial arterioles, and then a cyst is formed of sero-sanguinolent fluid contributed by the cystic surface of the perichondrium. The tumor forms rapidly within a few minutes or hours, and lasts for several weeks or months, and then disappears, leaving the ear shrivelled and contracted in bad cases with a loss of one-fourth of auricular dimensions.

The tumor varies in size from a marble to a hen's egg, and generally occupies the helix and schaphoid fossa, but it may extend over all the fossæ and cartilaginous portions of the ear and occlude the meatus externus, but the lobule of the ear is not involved. The skin over the tumor is livid or reddish, with purplish veining, and, when tense, is shining in appearance; and spontaneous rupture anteriorly through the perichondrium and its cutaneous coverings may take place in one or more places, allowing the escape of bloody serum. The cyst thus partially empties itself and refills, or it continues to ooze a fluid composed of serum, fibrous and cartilaginous flakes, leucocytes, and red blood corpuscles, until there is an adhesion of the cystic walls by a new formation of fibrous and cartilaginous tissues. If incised it pursues much the same course as after spontaneous discharge, refilling and, if much pressed, rupturing vessels anew and prolonging the natural course of cure.

The symptom of hæmatoma auris is most common in acute mania and melancholia and in general paresis, but it is also found in epileptics and cases of chronic mania, and in all cases with violent excitement and cerebral congestion. The tumor may occur simultaneously or successively in the two ears, but it is far more frequent on the left side, and more often met with among men than women. It occurs in the sane among boxers and gymnasts, circus clowns and contortionists, and in all specially subject to mechanical violence to the external ear, but it is far less frequent than among the insane.

The chief cause of hæmatoma auris in paretic, alcoholic, syphilitic, and chronic maniacal cases is a trophic degeneration of the auricular vessels of the ear, and in some instances, also, trophic changes in the cartilaginous tissues which lose their normal flexibility, and the result is that the most trifling mechanical impressions upon the ear occasion rupture of vessels.

The vasomotor theory of disease of the cervical sympathetic is probably the true explanation in some instances of hæmatoma auris, as it accords with local hyperæmias of vasomotor origin in various parts of the system among the insane.

Mechanical violence is an undoubted cause of hæmatoma auris in the falls of epileptics, and in violent maniacs who beat their heads with their fists or against the wall, or receive injuries during violent assaults upon others, or rub the side of their heads vigorously against the bed at night, or pull their ears, under the influence of delusions.

The mechanical theory, however, is totally inadequate to account for all cases of hæmatoma auris, which arises in quiet bedridden cases under the constant supervision of trustworthy nurses and independently of all violence.

Temperature in mental disorders by classic teaching is supposed to be normal, but, as a clinical fact, it is subject to very frequent changes.

In able-bodied patients of full habit the bodily temperature is increased as often as there is great mental excitement and motor activity. This rise in temperature may be counteracted by continuous perspiration and evaporation in maniacs. In acute exacerbations of mental and motor excitement in epileptic, alcoholic, and paretic mania there is a customary increase in temperature of one or two degrees. Even in acute exacerbations of excitement in melancholia there is a rise in temperature.

There is an increase of temperature attendant upon emotional, hallucinatory, and delusional excitement, without regard to the amount of muscular effort put forth, and, though it is most evident in cranial areas, it is also appreciable in axillary regions, though it seldom surpasses one degree Fahrenheit.

Slight functional disturbances of internal organs in the insane give rise to abnormally great fluctuations of bodily temperature, varying from 2 to 3° F. in bronchial, gastric, or intestinal catarrh, or obstipation in women, or menstrual irregularities, or slight cutaneous affections. High temperature in hysterical Insanity is com-

mon without inflammatory disease of any kind, and it may be of a few hours' or days' duration, and there is a similar symptom in epileptics. In general paresis there is often an evening rise of temperature, or there may be consecutive days during which the bodily heat is above the normal. Attending or following the paretic seizures the temperature may rise as high as 106° F. In epileptic convulsions there may be a rise of temperature and it may reach a high degree in the status epilepticus.

There is an enormous increase of bodily heat in some cases of acute alcoholic mania and in delirium acutum. Occasional high temperatures are found in organic dementia and in the acute stage of toxic Insanity. There may be a marked difference between the two sides of the body, both in cutaneous and axillary measurements of the degree of heat in paretic and organic dementia.

The cases in which there is a reduction in bodily heat are still more numerous in Insanity.

The temperature of maniacs, who lose heat by respiration and cutaneous evaporation while very active, is kept about normal, but after prolonged muscular exertion, as exhaustion sets in, there is often a decided reduction of bodily warmth from one to three degrees, and the fall in temperature in cases of complete prostration may considerably exceed this limit.

In states of great mental depression or stupor the bodily temperature is habitually subnormal for weeks at a time. Also, in terminal dementia there is subnormal temperature in many cases.

The most extreme reduction in temperature is found in the terminal stage of general paresis, in which there are exceptional algid conditions with surprisingly low records of temperature. In puerperal cases of Insanity, after extensive post-partum hemorrhages, there are also very low temperatures, which may also be observed as antelethal symptoms in cases of exhaustion from acute mental disorder. There is also an antelethal rise of temperature in paretics and cases of organic dementia.

The variations of temperature here mentioned are all independent of inflammatory affections of internal organs. The intercurrent changes of temperature in the diathetic, toxic, and infectious diseases which give rise to Insanity are too numerous to be noted in this connection, but they will be separately mentioned under the separate forms of mental disease.

Section VII.—Diseases of the Cerebral, Spinal, and Peripheral Nervous System.

Diseases of the nervous system are more common among the insane than among the sane, and they precede, accompany, or follow the mental disorder.

The nervous disease and the Insanity may occupy to each other the relation of prodroma or of sequel, or both affections may be but the common symptoms of a general diathetic or toxic disorder, or the common result of mechanical injuries or of widespread pathological tissue changes in nervous centres.

It is not the intention to name all the nervous affections which are encountered among the insane, which would be equivalent to a review of the whole domain of diseases of the nervous system, but it is proposed to point out the immediate symptomatic relations of certain nervous diseases and certain forms of mental disorder.

General paresis presents tremors, spasms, pareses, convulsions, trophic affections, angioneuroses, and a host of nervous maladies which are symptomatic of the progressive cerebro-spinal lesions characteristic of this type of mental disorder.

Syphilitic Insanity is often accompanied by neuritis, paralyses of cranial nerves, hemiplegia, convulsive seizures and spinal nervous affections.

Alcoholic dementia is marked by tremors, spasms, multiple neuritis, paralyses, and sensory nervous anomalies.

Cerebral tumors, abscesses, hemorrhages, and other gross brain lesions which cause organic dementia are also attended by hemiplegia, optic neuritis, epileptic seizures, paralysis of cranial nerves, and other nervous diseases.

The major neuroses, epilepsy, hysteria, chorea, and hypochondriasis may be symptomatic as well as causative as regards Insanity, and this is true also of exophthalmic goitre, which is nearly allied to the neuroses. The latter affection sometimes recurs with successive attacks of mental disorder.

Cerebral traumatism may give rise to mental disorder and to a simultaneous train of nervous affections, both motor and sensory, which persist as prominent symptoms throughout the whole course of the mental alienation.

Severe forms of neuralgia are both causes and symptoms of mental disease, and the same is true of epilepsy following trauma capitis.

Locomotor ataxia sometimes precedes and at other times follows as a symptom of general paresis. It is probable that the mental disorder due to the cortical lesions, and the locomotor ataxia, are to be regarded as having a common relation, and as symptomatic of a general trophoneurosis, which may be manifested first by either the tabetic or the mental disease. In regular cases of general paresis the mental symptoms always precede the spinal, but in ascending cases the reverse is the order of symptoms.

Insanity not of the paretic type may also follow tabes dorsalis.

In toxic Insanity of alcoholic origin there may appear the sensory and motor symptoms of ataxia when the leptomeningitis involves the posterior nerve-roots, and secondary sclerotic lesions occur in the posterior spinal columns, and in some cases complete ataxic paraplegia results.

In the same class of cases there may be pareses of the upper extremities, and atrophic wasting of the muscles secondary to lesions of the anterior cornua of the cord.

In toxic Insanity there is interstitial sclerosis of spinal columns in a large percentage of all cases, and the spastic gait in these cases is due to sclerosis of the lateral columns, and paralyses also arise in connection with multiple neuritis, and cramps, amaurosis, and convulsions are further symptoms of disease of the nervous system in this form of Insanity. A case of Insanity in which arsenic was the toxic factor came under my care, and had multiple neuritis and loss of muscular power confined to the lower extremities.

It is true that in toxic Insanity multiple neuritis is relatively rare, but it would be a mistake to suppose that it does not occur among the insane. It is, of course, not a coincidence, but a natural sequence, that Insanity should result chiefly in those cases in which the central and not the peripheral nervous system is attacked by the toxic agent.

Labio-glosso laryngeal paralysis is another nervous disease having symptomatic relations to Insanity, and also paralysis agitans, and hereditary chorea, and disseminated cerebro-spinal sclerosis. Cerebral tumors and thromboses modify the Insanity which they cause, and give rise to symptomatic anomalies of the nervous system, according to the sensory or motor cortical areas which they involve by pressure, reflex irritation, or secondary inflammation.

Finally, it becomes evident, from the study of mental disorders and of the array of diseases of the nervous system so constantly associated with them, that both classes of phenomena have in most cases a common pathogenesis, and that the point of symptomatic attack is always the hereditary or acquired point of organic weakness. Thus the selective points of attack in the human organism exposed to the toxic effect of alcohol or the ravages of the syphilitic virus may be the kidney, the liver, the vascular system, or the cerebral centres, according to individual immunity or vulnerability. This view has some explanatory value in its application throughout the entire field of the somatic symptomatology of Insanity.

CHAPTER VIII.

PATHOLOGY OF INSANITY.

Section I.—The Pathogenesis of Mental Disorders.

The present theories of the pathogeny of mental disease are based on the scientific belief that mental manifestations arise from physical changes in nervous structures, and that in man the encephalon is the material seat of all intellectual activity.

Physiological facts and pathological records not only support the theory that the brain is the organ of the mind, but they show a corresponding and constant relation between mind and brain in normal evolution and in pathological decline.

First there are the broad physiological facts of the origin of mind in the evolution of species, showing that throughout the whole animal kingdom the nervous system increases in complexity with the corresponding rise in intelligence, that there is a correlative differentiation among the higher animals of special faculties and of cerebral structures, and that the maximum of complex brain-conformation is attained in man as the most supremely intelligent animal.

Ethnological studies of past and present races of mankind, as well as of teratological and individual degeneracies, confirm the fact of a constant relation of degrees of intelligence to perfection or failure of brain development.

Naturally the physiological and psychological facts, that mind and cerebral structures advance in complexity together, and that every psychical process is attended by a corresponding change in the physical substratum of mind, precede the further facts, confirmed by experimental methods, that certain parts of the brain subserve certain mental activities, and that the motor and sensory elements of mind have in some degree been localized in cortical areas. Then there is the further order of facts, that as the nervous structures of the brain degenerate, from whatever cause, there is a pathological decline of intelligence; that when vascular occlusion limits the morbid process

to definite cortical areas there may be corresponding limitation of mental function in verbal or sensorial directions.

In a word, physiological experimentation and pathological observation sustain the present theory, that the mind and the brain have inseparable correlations in health and in disease, and that no mental derangement exists without corresponding cerebral disorder.

In view of these facts the pathogeny of Insanity is limited directly to those factors which give rise to organic or functional cerebral disorders.

In the first place, then, a word must be said about the positive and inherent differences of brains and of nervous constitutions with which classes of individuals are natively endowed, and which determine largely the nature of the pathological result when the brain is subjected to such factors of disease as are supposed to cause Insanity.

The inherited insane diathesis exists in every degree of imperfect or full development, and it is to be recognized by the presence of the physical and psychical "stigmata degenerationis," which were described under the head of symptomatology.

It is an undoubted fact that some individuals are endowed with such stably constituted brains that the ordinary factors of mental disorders produce no lasting effect on their cerebral functions, and that others have inherited such instability of nervous centres that slight inimical influences cause cerebral and mental derangement of a permanent type, and to this latter class belong those who have the inherited insane diathesis. The structural defects of cerebral mechanism found in idiots and imbeciles are not encountered in this class, nor are the physical stigmata just alluded to always present, but, on the contrary, as in the higher order of imbeciles, there may be an exceptionally symmetrical conformation of face, body, and brain.

The inherited obliquity reveals itself through psychical channels, often in connection with a considerable degree of unbalanced talent displayed spasmodically in various directions, without well co-ordinated efforts, which lead to any decided results. Such individuals usually have great egotism and intense imagination and much vain ambition, and they make and lose friends, take and abandon positions, turn from one business or profession to another, and they have many disappointments in life and become misanthropical and suspicious, and finally insane. The inherited insane diathesis also shows itself in those who pass for eccentric in manners, dress, and modes

of thought and speech, in those noted for one-sided talents, and in the numerous class known as odd, peculiar, and "cranky."

This inherited insane diathesis is found in families in which epilepsy, hysteria, chorea, consumption, and nervous diseases generally abound, and it appears vicariously with these affections in the course of generations in the same family, in which some members are found to be insane, others epileptic, and others eccentric, and others a prey to neuralgias, neurasthenias, and a host of minor nervous complaints.

Apart from those who inherit unstable brains are those born sound in mind and body, who acquire instability of nervous centres.

The acquired neurotic constitution may develop at any period of adult life as the result of mechanical, thermal, or chemical injuries to the nervous system, or as the sequel of acute infectious diseases, or of prolonged illness from any cause.

The acquired neurotic constitution differs from the inherited insane diathesis through the absence of physical and psychical stigmata, and in the fact that it is much less liable to be transmitted to offspring, or to assume the form of the major neuroses. It is characterized on the other hand by weakness and instability of nervous centres, by neuralgic complaints, spasmodic muscular disorders, and minor nervous diseases, and diminished resistance to the causative influences which directly develop Insanity.

In the study of the pathogenesis of mental disorders it is of prime importance to bear in mind the pathological categories of individuals here described, since they constitute a large contingent of all who become insane, whatever the immediate exciting cause may chance to be.

Functional brain-exhaustion is a common source of mental disorder. Men may be worked to death as well as other animals, and when a man breaks down from over-work he gives out in his weakest organic point, which may chance to be the brain. All brain activity takes place at the expense of waste of cerebral tissue, and if time is not given for repair brain-exhaustion must result. Sleep restores and repairs the worn cerebral tissues, but the intense activity of the brain leads to hyperæmia, which is inimical to sleep, and so much blood and energy go to the brain that digestion and nutrition suffer. An ill-nourished and over-worked brain has already lost its potential equilibrium, and Insanity will follow this brain-exhaustion if rest, which for the brain means sleep, is not quickly procured.

Brain-work never produces Insanity so long as the balance be-

tween waste and repair is maintained, and provided ordinary routine work, however long the hours may be, is interrupted by reasonable length of sleep. But original brain-work and unaccustomed mental occupation demanding close attention and active thought, and the discharge of functions of great responsibility much disproportionate to the actual ability of the individual, may readily produce brain-exhaustion, which also is apt to result when excessive mental labor is combined with emotional strain.

Powerful emotions, painful anxiety, bitter disappointments, financial losses, and domestic misery are additional factors of brain-exhaustion, and they suffice to sunder mental fibres which are not firmly knit. The strain which the mind will bear varies precisely with such inherited or acquired strength or weakness as has already been described, but even in the most firmly constituted individuals there is a limit of human endurance, which cannot be surpassed by a cumulative weight of miseries without a severance of the normal ties which bind the mental functions in co-ordinate relations. Witness the inco-ordination of thought and action of the man upon whom a series of calamities has fallen, the veritable distraction which is the precursor of an acute psychosis.

Behold the dreamlike confusion, the staring and vacant look, the vacillating gait and mien of the financier who has suddenly lost his entire fortune. He may recover from the blow or he may suffer from brain-exhaustion and Insanity. It is the suddenness and the severity of the shock which form the chief danger in the latter instance. The commotio cerebri in such a case is as real as if it had been inflicted by direct physical violence, and the sequence of symptoms not infrequently resembles that of trauma capitis, or of spinal concussion, as regards confusion of ideas, loss of memory, and insomnia.

It becomes evident, therefore, that brain-exhaustion, from whatever source it proceeds, plays an important rôle in the pathology of Insanity.

The earliest nutritive lesions and biochemical cerebral changes constitute the prime pathological departures in incipient mental disease.

The first lesion is a defect of nutrition in brain-cells, which results in a change in their chemical and molecular composition. It may be a trophic excess, decrease, or perversion by which the brain-vessels become surcharged with detritional products. After prolonged emotional strain it is probable that excessive cellular metabolism ac-

counts for this surcharge of effete material, which accumulates more rapidly than it is removed, and in other cases there is an arrest of retrograde metamorphosis and a retention of tissues which should be renewed, and in a third and important class of cases there are perverted biochemical changes in cerebral tissues, and the cellular waste may have irritant or even toxic properties. It is true that autotoxic products are ordinarily conveyed to cerebral cells through the circulation from distant systemic parts, but there is reason to presume that there may also be a genuine cerebral auto-intoxication.

By reason of these perverted biochemical changes there is irritation and increased flow of blood to cerebral tissues, and finally stasis of the circulation of lymph, which becomes acid in reaction and charged with toxic waste material and irritant to cerebral tissues, which soon take on a subinflammatory condition. The result is obstruction to circulation in cellular capsule and in perivascular lymphatics, with deposit of pigment, leucocytes, and epithelial debris, and, finally, cellular degeneration.

Insanity from circulatory disorders of the brain arises chiefly in intense hyperæmic or anæmic forms. The cerebral supply of blood is under the control of a complex vascular mechanism regulated by vasodilator cerebral centres and by a vasoconstrictor medullary centre.

Meynert taught that the brain-cortex itself has inhibitory and vasomotor influences; and the direct supply of vasomotor nerves to the cerebrum is from the cervical sympathetic ganglia, and the distribution is to be the adventitial and muscular coat of arteries, and also to the veins and capillaries. Quantitative variations of blood within the cranial cavity and relative changes in pressure are regulated largely by the entrance and escape of cerebro-spinal fluid from the cranium. The displacement of the cerebro-spinal fluid is primarily into the lymph-spaces as the volume of the cerebrum is increased under intense hyperæmia. There is also, under pathological conditions, a direct vasoconstrictor or vasodilator influence locally exerted on arterioles by the lymph charged with toxic exudates, and as often as venous, capillary, or lymphatic stasis results from too great intra-cranial pressure, there is impairment of cerebral nutrition.

Cerebral hyperæmia, of such severity as to cause Insanity, may be of sudden origin from emotional shock, or of gradual development, and it may be due to influences above enumerated or to vascu-

lar degenerations, though the latter are usually sequels of the hyperæmia. The congestion of the brain may be so intense that acute maniacal delirium and death may result, but the more common sequel of chronic hyperæmia is a series of degenerative changes in cells and vessels and a terminal form of Insanity. Autopsical records show evidences of chronic inflammatory engorgement of cerebral vessels in confirmed forms of mental disease in about thirty-five per cent. of the cases, irrespective of the lesions of general paresis and of syphilitic dementia.

Cerebral anæmia is the cause of the nutritional impairment which ends in melancholia, both acute and chronic, in very many instances.

The brain is deprived of its nourishment, and there is general organic depression of vegetative as well as of intellectual functions. There is a species of arrest of all vital processes as the direct result of the diminished trophic energy and reduced vitality of cerebral centres, which are no longer able to preside over nature's feast by which all the organic tissues are daily nourished to satiety. The result is disordered digestion and assimilation, reduced metabolism, rapid wasting of tissues throughout the organism, the abeyance of motor and sensory functions, and, in fine, melancholia fully developed.

If the cerebral anæmia is intense and prolonged, the brain-starvation ends in degenerative changes both in the vascular and nervous tissues. It is true that the circulatory defect does not precede the nutritive disturbance in all cases, and that in some states of mental depression the cerebral malnutrition may be the antecedent condition and causative of the anæmia, or the two factors may coincide and contribute to the final pathological result. The distinction between the two classes of cases is sufficiently marked, however, in many instances in which the Insanity evidently has its pathogenesis in the circulatory disorder of the brain.

Qualitative changes in cerebral blood-supply, as well as the quantitative alterations just mentioned, have pathological relations to mental disorders.

The qualitative changes of the blood in the different types of Insanity were described under symptomatology. They appear often in the earliest stages and even prior to the mental disease of which they are the nearest pathological factor in some undoubted cases. It is a physiological axiom that brain function is dependent on a supply of blood proper, in quality as well as in amount, and it must

be admitted that blood greatly altered in constitution, acting on hereditarily unstable cerebral centres, may cause mental disorder. Blood surcharged with biliary constituents may give rise to melancholia, or when loaded with uric acid it may determine an attack of gouty mania.

Blood deficient in corpuscles and in hæmoglobin in cancerous and malarial cases, and not only deteriorated but conveying direct to cerebral tissues icherous and poisonous material, micro-organisms, and pigment in large amounts, may derange cerebral functions. The profound qualitative alterations, as well as the presence of micro-organisms in the blood in pellagrous, tuberculous, syphilitic, and other diathetic cases, have pathological relations to the mental disorder.

Toxic states are to be mentioned in this connection, and in them is to be sought the direct pathogeny of a considerable percentage of all cases of mental disease.

The toxic agent may enter the system in gaseous, liquid, or solid form by the lungs, skin, or primæ viæ. It may be animal, vegetable, or mineral, taken voluntarily as stimulants or drugs, or appearing as a necessary evil attending certain occupations, or entering into the accidental adulterations of foods, or an admixture in a staple article of diet of large classes of the community, as in ergotism and pellagra in Europe.

The toxic principle, again, may be engendered in the organism, as in the auto-intoxications, or it may consist in the specific germs of the infectious diseases. The virus of the acute exanthemata may give rise to disordered intellection before the appearance of high temperature or of the eruption. The post-febrile psychoses are to be attributed less to toxic influence than to profound anæmia and nutritional anomalies.

The morbid anatomical changes which take place in the vessels and nervous strictures of the brain in the toxic states will presently be described in detail under the head of microscopic changes, which in this instance constitute the organic lesions of the psychosis.

There are two toxic principles alone, which in their direct and indirect pathogenic relations account for thirty-three per cent. of all cases of Insanity. One of these is alcohol in its immediate and remote causative effects, and the other is the luetic virus, including its etiological bearings to general paresis.

Lesions of cerebral, spinal, or sympathetic nervous system are of importance in the pathogenesis of mental disorders.

Diffused lesions of cerebral structures and those which involve the cortical associative and intercellular fibres are especially effective causes of derangement of intellection, while disease at a lower level affecting the projection system of fibres is of minor importance. Hence disseminated sclerosis, widespread atrophy of cortex, and periencephalitis are highly efficient factors of mental disease, involving at once cortical cells and associative fibres, which are the relational elements of mind.

Focal brain diseases may disturb intellectual processes through pressure, or by acting as a centre of reflex irritation, or by exciting extended inflammation and secondary degeneration of cerebral structures.

Tumors of the brain may exert such pressure as to disturb the circulation and nutrition of cortical centres, or they may cause epilepsy and then Insanity. Extensive intra-cerebral hemorrhages are not infrequently the cause of dementia, which also may proceed from a great variety of coarse brain diseases, such as abscesses, encephalitic processes, cysticerci, hydatid cysts, aneurisms, and thrombosis. As regards local softenings from embolic and thrombotic affections, the middle cerebral artery and its areas of distribution are the most often involved, and then the posterior and anterior cerebral in the order named. Secondary inflammation and œdema are superadded to the primary focal disease, which may modify largely the nature of the mental disorder, which usually is characterized by sensory disturbances and amnesic failure, and great emotional irritability.

The disseminated atrophy of senile involution being a widely diffused lesion of the cortical organ of the mind, is naturally attended by a general impairment of all the mental faculties which may attain the degree of absolute fatuity.

Softening of the brain is found in some degree, post-mortem, in more than one-half of all chronic cases of Insanity, and unquestionably it exists at a relatively early stage in a certain proportion of cases.

Atrophy of the brain is one of the most universal of chronic lesions among the insane. It is sometimes limited to the special areas of terminal arterial distribution, and in other cases it is general as regards cortical regions, though, when thus widely diffused, it is never entirely uniform in degree in different localities.

Lesions of the spinal nervous system precede or follow mental disorders, to which in some instances they stand in immediate pathological relation.

Thus locomotor ataxia may be the initial degeneration which is destined to end in mental disorder, and there are other extensive organic spinal diseases which may be viewed in the same light. The broadest pathological view, however, is to regard descending cerebral lesions, ascending spinal lesions, and mental disorder in tabetic and paretic cases as common symptoms of a general trophoneurosis without regard to the order of appearance of the morbid processes.

Lesions of the sympathetic nervous system probably play an important rôle in the pathogeny of mental disorders, but there is an element of obscurity yet to be removed by further research before positive statements can be made as to the pathological relations of the sympathetic diseases to Insanity.

That the vasomotor system is under sympathetic control accounts for some of the vascular disturbances which are recognized as factors of mental disease.

In melancholia attonita as the immediate result of a sudden emotional shock, or in primary dementia from a like cause, the pathological nervous process is best explained when the sympathetic nervous system is recognized as immediately involved in the stasis of the cerebral circulation which is the direct sequel of the violent excitement. The prime symptom of syncope in such cases from angiospasm is a sympathetic phenomenon. Cerebral angioneuroses, however, in relation to Insanity, have yet to be thoroughly studied.

Reflex or sympathetic Insanity from disease of internal organs deserves a mention in pathological connections, and, in the opinion of former writers, it held a very prominent place in the pathology of mental disease.

Whatever theories may be held as regards the subject, the clinical fact remains that Insanity is a direct sequel of inflammatory affections of viscera, of heart disease, of gastro-intestinal disorders, and of affections of the reproductive organs.

For full particulars under these heads reference is made to the chapter on etiology. The pathology in these cases may be indirect, as in rheumatic inflammation of the heart, giving rise to cerebral embolism and softening and dementia, or in other acute inflammations of viscera resulting in vascular disorder and malnutrition of cerebral centres. But in other cases the psychosis follows the visceral affection so directly that its reflex origin would seem to be the only pathological explanation, especially as recurrences of the two affections may coincide, and the relief of the mental disorders

may follow directly upon the cessation of the disease of the internal organ.

Epochal systemic changes are active at the age of puberty and at the grand climacteric. The epoch of the development of the reproductive function and of its attendant mental and moral changes is especially critical for those having hereditary predisposition to Insanity. This pubescent Insanity is more common in women, and adolescent Insanity, which is also a developmental type, occurs more frequently in men at a somewhat later period in life.

The epoch of the menopause in women also calls forth any latent tendency to mental disease, and here again, occurring at a more advanced age, is an involutional type of Insanity in men, presenting usually vascular degenerations and slight atrophic cerebral processes, such as initiate the senescent period.

The forms of mental disorder proceeding from the epochal systemic changes are ordinarily termed involutional and evolutional Insanities. These epochal systemic changes must be included, therefore, in this general pathological review.

Cerebral traumatism, thermic, chemical, or mechanical, holds a positive place in the pathogenesis of mental disorders.

Thermic traumatism may arise either as insolatio, from the direct heat of the sun, or from artificial heat of a high degree, to which some are necessarily exposed by their occupations.

In either case, if the heat is sufficiently extreme and the exposure long continued, pathological lesions of cerebral centres follow, as the direct result, or as a remote sequela, and Insanity or death may likewise be an immediate or indirect result.

Chemical traumatism is most surely and suddenly produced by the inhalation of toxic gases, which are conveyed in the blood directly to cortical centres, which may be thrown by the shock into permanent functional disorder.

The inhalation of illuminating gas and of various poisonous fumes in chemical works may determine this form of cerebral traumatism, which may also be occasioned by the prolonged administration of anæsthetics, which have caused a large number of cases of Insanity.

In one case of this kind which came under the writer's care the patient passed directly from the anæsthetized state into acute mania of some weeks' duration. It is true that the anæsthetic in probably all of these cases is only an efficient cause when there is great instability of cerebral centres.

Mechanical traumatism may occur in a great variety of forms. The injury may implicate cranial bones, or membranes, or the cerebral substance.

Commotio cerebri without laceration is common from falls or blows upon the head, or from "contre coup," the violence being transmitted in some cases by the spinal column.

The Insanity may follow the cerebral concussion in a few hours or at distant intervals. In certain cases of trauma capitis the mental disorder is the instantaneous product of the violence, so that the patient is literally, as expressed in common parlance, "knocked crazy."

Ordinarily, trauma capitis leads to mental disorder through a series of chronic secondary lesions of vascular and nervous structures dependent in nature on the original site and character of the injury. Progressive cortical atrophy as one of the sequels may give rise to a train of symptoms like those of general paresis. The cerebral lesions more often involve the gray than the white matter, and the disintegration of cells and fibres is of the most varied nature, and there are not infrequently descending system-fibre degenerations.

In one class of cases the psychosis is secondary to the epilepsy caused by the trauma capitis.

The severity of the traumatic injury does not determine the probability or the serious nature of the ensuing Insanity, which may be a sequel of relatively trivial accidents.

Surgical traumatism may be followed by Insanity, and the hereditary tendency to mental disorder is to be taken into consideration in all capital surgical operations. Even minor surgical operations in alcoholic cases may evoke maniacal symptoms. This is a rare source of mental disease, but it is not without real importance. It is also to be recognized that the traumatic origin of Insanity embraces the whole nervous system, and is not confined simply to injuries of the head.

Emotional traumatism includes all the repeated moral "shocks that flesh is heir to," which may disturb the functional equilibrium of the mind. If severe emotional vibrations are frequent they may derange nutrition and the molecular structure of the brain. The pathogenesis of Insanity is often found in violent passions and overwhelming emotions.

The most decided instance of emotional traumatism is the power-

ful passion, the anger, which transports the sufferer into the realms of rage, or into a maniacal paroxysm, or the horror which transfixes the person and paralyzes muscular and intellectual action at one blow. The paralysis of intellect may be instantaneous and complete, and the patient may pass through the stages of primary dementia before recovery.

Reference is made to the chapter on Etiology to avoid the repetition of much which was there said of the ætio-pathology of mental disorders, and after this general survey of the chief pathological factors, attention will now be directed to the morbid anatomy of Insanity.

Section II.—The Pathological Anatomy of Insanity.

The macroscopical changes will first be described.

The cranium has congenital malformations, volumetric variations, and asymmetries, which were described in the chapter on Somatic Symptomatology.

The bones of the skull in some cases are greatly thickened by an increase and rarefaction of the diploë, as the result of inflammatory action, and they are still relatively light in weight. There are chronic adhesions of the dura mater to the inner table with local points of osseous thickening from the oft-repeated vascular engorgements. In other cases the diploë is encroached upon by the thickening of both the outer and inner tables of the skull-cap, which is exceedingly dense in structure and of great weight. The osseous sclerosis and the extent of the thickening in some cases is remarkable, especially in shrinkage of the brain from early encephalitic processes with compensatory thickening of the calvaria. This type is common in chronic cases of Insanity.

The cranial bones in other instances are extremely dense, but not of unusual thickness. This is the eburnated type of skull also found in terminal forms of Insanity. The skull-cap may be extremely thin and even diaphanous at the vortex. The osseous hypertrophy is most common in frontal regions, and exostoses are rare. The vascular channels of the vitreous table are more frequently deepened than obliterated, and the Pacchionian depressions are often exaggerated.

Spiculæ of bone and osteophytes are exceptionally found. The calvarium in senile Insanity often shares in the general atrophic

processes, and is usually thin in advanced cases, and it is also modified by toxic and diathetic influences, with exostoses or necrosis in syphilitic cases. In general, hypertrophic processes of cranial bones are twice as frequent as atrophic anomalies.

The brain among the insane presents post-mortem vascular microscopical appearances according to the mode of death, the cadaveric position of the body, and the order of autopsical examination.

Thoracic obstructions to the return of the venous cerebral supply intra vitam favor venous congestions post-mortem, as does also a lowered recumbent position of the head, while the opposite effect is produced by the opening first on autopsy of the large thoracic vessels, which deplete the cerebral regions of fluid.

In about twenty-five per cent. of all cases there are adhesions of the pia mater, so that minute ragged bits of the external cortical layer are removed with the pia, exposing in the torn cortex pin-point and bleeding lumina of severed vessels. In other instances there are bright-red hemorrhagic patches of irregular size and outline, indicative of a certain grade of inflammatory action.

Extreme vascularity of the brain is not as common as the opposite state of anæmia. In a certain proportion of perhaps one-third of the autopsies the brain is found greatly congested, the puncta vasculosa well marked (though they are not a reliable index), and general signs of inflammatory engorgement. In about one-half of the cases there is every sign of cerebral anæmia, which is heightened in diathetic, and especially phthisical, disease. The surface of the brain is then extremely pallid, and the whole substance may have a water-soaked appearance. This exsanguinated look may be present whenever there is great ventricular distention or intra-cranial pressure from foreign growths or from hemorrhages, or any other cause of exclusion of blood from the peripheral cerebral parts. Local hyperæmias and anæmias dependent on occlusion of cerebral vessels, and the various stages of the resulting inflammation, œdema and softening, are to be seen.

Cerebral atrophy is the most constant pathological change found among the insane. It is present in some form in about two-thirds of all cases, and both the cellular and medullated structures are affected, and, in fact, the atrophic process is general rather than local, and it extends even to the central ganglia. It may result from vascular degenerations, from connective-tissue proliferation and

subsequent contraction, or from trophic cellular degenerations. It is usually a sequel of acute Insanity, but in its most extensive form it may follow early encephalitic processes, and in other instances it is only an exaggeration of the involutional changes of senescence.

The frontal lobe of the brain suffers most uniformly in atrophy, and the convolutions have a flattened appearance, especially when compressed by compensatory effusions. Organic, senile, and paretic dementia, in the order named, afford the most decided degrees of atrophic diminution of brain-weight. Local atrophies of cortical areas from embolic or thrombotic affections are common, and Bevan Lewis reports the order of frequency of localized atrophies to be as follows: Postero-parietal lobule, central gyri, frontal gyri, operculum, temporo-sphenoidal gyri, occipital gyri.

Softening of the brain is a frequent result of Insanity, and it is found in about one-half of those dying insane. It arises from inflammatory affections, especially of the vessels, and from œdema, or intra-cranial hemorrhages, or senile fatty degenerations of cerebral tissues.

On the removal of the brain from the cranial cavity there is evidence of œdema, often, and the whole brain feels limp and devoid of normal firmness, and it flattens out, by its own weight, in whatever position it is placed, and the sulci are separated and the tissues may rupture, especially the commissures, which are also softened in many instances.

There are various degrees of softening, which may be general, or partial from vascular occlusions, especially of the middle cerebral artery. When much softened the medullated substance yields to slight pressure of the finger and washes under a stream of water, falling a few inches, and the corpus callosum tears as the hemispheres fall apart when the brain is placed on its base. Some parts of the brain may be cream-like in consistence, and the basal ganglia and the medulla, in exceptional instances, are involved.

Inflammatory degenerations of vessels give rise to hemorrhages and softening, but the latter follows thrombosis more frequently.

Ganglionic softening, according to Bevan Lewis, is most frequent in the following order: Intra-ventricular nucleus, optic thalamus, lenticular nucleus, and external capsule.

Circumscribed softening about tumors, hemorrhages, and thrombotic clots is the result of inflammation excited by the focal disease, and it is especially common in organic dementia.

The most diffused cortical softening is found as the result of periencephalitis in general paresis, in which it is most marked in the frontal lobe.

As regards pathological lesions of cortical regions among the insane, it would seem that the frontal lobes suffer most, and then the parietal and the occipital, and this is especially true as regards atrophic processes. The convolutions most often involved in localized softenings from focal disease are the superior temporo-sphenoidal and the occipital. The posterior portion of the inferior frontal convolution is frequently diseased in organic dementia.

As to the central ganglia, Charcot long ago called attention to the frequency of lenticular hemorrhage, and Bevan Lewis has found that the intra-ventricular nucleus suffers most frequently from focal disease among the insane, and lesions of the basal ganglia are supposed by some to be pathological factors in choreic Insanity.

The nerve-fibre systems are degenerated not infrequently in toxic, diathetic, tabetic, and paretic cases.

The centrum ovale is sometimes softened, and at other times it has a firmer consistence than normal. It is frequently the site of miliary sclerosis, and also of focal lesions.

The ventricles are often greatly distended with fluid, and they sometimes contain hemorrhagic effusions, and their lining membranes are granulated, and this pathological change is common on the floor of the fourth ventricle in epileptic and chronic cases of Insanity.

The pons Varolii is occasionally implicated in the diffused lesions of toxic Insanity.

The medulla oblongata may suffer in either descending or ascending lesions of brain or spinal cord, as in paretic or tabetic cases. It is also the seat of softening and of tumors in exceptional cases. The bulbar lesions which determine in part the speech defects in general paresis are relatively constant. The softening in the floor of the fourth ventricle will occasionally be found associated with atheroma and thrombosis of the basilar artery and pathological lesions in this locality often occasion sudden death in Insanity.

The membranes of the brain are very generally involved in the pathological processes.

The dura mater is normally adherent to the calvarium at the basal foramina, but in about twenty-five per cent. of the autopsies made among the insane some abnormal adhesion exists apart from

sutural and foraminal connections. The adhesions may be unilateral, but they are more frequently bilateral and partial, being most frequent over the greatest convexity of the frontal and parietal bones and at sutural points. Occasionally the adhesions are very general, and so firm that great force is required to tear the membrane from the bone, and in rare instances the separation is impossible.

Many of the severe neuralgic pains of the head among the insane are doubtless due to inflammatory exudation and compression of the dural filaments of the fifth and twelfth nerves, an affection first pointed out by Duret, as quoted by Bevan Lewis (" Mental Diseases," p. 435).

The dura mater is occasionally thickened in cases of adhesions, and it is sometimes the seat of chronic internal pachymeningitis with formation of new vessels and adventitious membranes, and in rare instances it presents points of ossification.

The pia mater, macroscopically viewed, is thickened and opaque in the majority of chronic cases of Insanity. The opacity is chiefly over vertical regions, and it is most marked along the course of vessels, and it points to previous inflammatory conditions whenever accompanied by adhesions to cerebral substance, but in senile cases it would seem to occur as the natural result of repeated congestions and of involutional changes. The pial vessels are often lengthened, dilated, and varicose in appearance, and distended with blood, pigment, and débris. The pial adhesions which give the eroded aspect to the surface of the brain after the removal of the membrane have already been mentioned. The choroid plexuses are sometimes enlarged and contain cystic dilatations.

In general paresis the pia mater is ordinarily deeply implicated in the pachymeningitis interna hæmorrhagica, and likewise in syphilitic and alcoholic dementia it is the seat of chronic inflammatory changes.

The arachnoid is thickened by chronic inflammatory processes in many cases, and the arachnoidal space is distended with fluid. The opacity and œdema are most marked in vertical regions, and the amount of the subarachnoid fluid is often very great.

There are also arachnoid cysts, in paretic cases, which have usually been regarded as of inflammatory origin, but Bevan Lewis thinks they are hemorrhagic in nature. The Pacchionian bodies are sometimes enlarged in alcoholic cases, and at other times they are dimin-

ished in size without relation to morbid processes in other parts of the arachnoid. When large they may indent the skull.

The ependyma is often thickened in chronic Insanity, as well as in cases of congenital mental defect. There are sometimes granulations to be seen in the lateral ventricles as well as in the fourth ventricle.

In epileptic Insanity this granulation of the ventricular ependyma is very marked, as well as in alcoholic and paretic cases.

Cerebral anæmia is the most common naked-eye appearance of cerebral tissues in those dying insane. Few vessels are to be seen, puncta vasculosa are not apparent on section, and both the cortical and medullated tissues are pallid. Hyperæmia, on the other hand, is striking in some cases in which the gray matter is highly colored and the white substance pinkish on section, and the puncta vasculosa extremely numerous.

Cerebral atrophy is also readily appreciated by macroscopical appearances. The convolutions in extreme cases are plainly wasted, the cortical gray is very thin, the sulci gape, and there is compensatory effusion of fluid, and the ventricles are often found distended, and there are alterations in the firmness of cerebral tissues, which may be either harder or softer than normal, and there are also changes in color in both gray and white substance. Apparent cerebral hypertrophy, due to extreme congestion of the brain, is a state which exists before and after death in Insanity. The whole brain appears too large for the skull-cap. The convolutions are pressed and flattened against the bony walls, the sulci partially obliterated, and superficial vessels may be emptied of their contents by the intra-cranial pressure, though cortical layers often appear extremely congested, as well as the entire white substance. *Connective-tissue hypertrophy* in epileptic Insanity is very exceptional, and in imbeciles it is more often found. The brain, when removed, cannot again be contained by the skull-cap, and the general appearances are such as those just described, except that the superficial vessels are uniformly anæmic in appearance, as well as the gray and white matter, through expulsion of the blood by pressure.

Œdema of the brain is a sequel of atrophic and inflammatory processes, and it may be evident in the gray or the white substance following vascular engorgement. The tissues, on section, have a watery and shining appearance and are reduced in consistency. There are also local œdemas about focal lesions.

Inflammation of the brain among the insane usually affects limited portions about embolic lesions, or tumors, or hemorrhagic effusions, but in paretic and some toxic cases it may implicate extensive cortical areas, and in traumatic Insanity there may be a wide extension of the inflammatory process from the original seat of injury.

Sclerosis of medullated tissues exists in a disseminated form in toxic Insanity, but the most frequent type of miliary sclerosis will be noticed later.

Abscesses are exceptionally found in the brain, and they may be present in organic dementia.

Tumors are often surrounded by inflamed or softened tissues, and they can usually be distinguished by the unaided eye from normal brain-structures; they are common in syphilitic Insanity.

Hemorrhages into cerebral tissues are not infrequent among the insane. They may occur from rupture of capillaries or of arteries, and the effused blood may occupy the most various localities.

Blood sometimes escapes into the ventricles or into the cavity of the arachnoid. Secondary hemorrhages, from the rupture of newly formed vessels, is also common in cortical membranes in pachymeningitis among general paretics.

The cerebral vessels are more frequently diseased in the insane than in the sane. The general vascular system may appear normal while the cerebral arteries are clearly diseased. The vertebral and the internal carotid arteries are very frequently affected. Fatty degeneration and atheromatous changes are the most frequent lesions of the cerebral arteries. The basilar artery is also involved in many cases, as well as parts of the circle of Willis, in which a glance or a touch will often reveal atheromatous patches.

The coarser forms of embolism, thrombosis, and aneurism are to be detected on macroscopical examination, and the expert pathologist will also, by skilled sight and touch of dissected vessels, surmise, with a certain accuracy, the degree of arteriosclerosis and of atheromatous degeneration of arteries in syphilitic, alcoholic, and paretic cases. For the middle cerebral artery most frequently affected, the areas of distribution most often invaded by embolic and thrombotic softening are, according to Bevan Lewis, in order of precedence of the arterial branches involved, as follows: Parieto-sphenoidal, ascending frontal, ascending parietal, external and inferior frontal arteries.

The spinal cord often presents morbid appearances.

The membranes are sometimes the evident seat of inflammatory action and are thickened and adherent to each other or to the cord with serous and hemorrhagic effusion. There may be opacity as well as thickening of the arachnoid, and local firm attachments of the membranes to the cord, especially posteriorly.

Descending system-fibre lesions of the cord are doubtless determined somewhat by the cortical areas primarily degenerated, though they may arise through vasomotor influence as well as by direct contiguity of pathological processes, in toxic and paretic cases. In some instances the presence of disease in spinal regions may be recognized upon autopsy by the naked eye.

Atrophy and sclerosis, and even softening, are to be encountered. The posterior and lateral columns are the most often affected, and the pyramidal tracts furnish the most common instance of descending system-fibre degeneration. The spinal cord in toxic, tabetic, and paretic cases may be the primary seat of pathological changes, and there may then be ascending lesions by direct extension of the morbid processes or by the propagation of the disease under vasomotor influence.

It is not unlikely that the point of greatest vulnerability and of first attack of pathological changes is determined by personal idiosyncrasy.

It is not impossible, even when the trophoneurosis is fully developed, that the point of its first manifestation may be decided by relatively fortuitous circumstances, such as cerebral exhaustion in brain-workers, or spinal exhaustion from specially laborious occupation, combined with sexual excess.

The Microscopical Changes.—The cortical cells in different forms and stages of Insanity undergo various disintegrations, which are to be recognized upon fresh frozen sections, or in those prepared from brain-substance preserved and hardened by various reagents. In the description of morbid changes the term neuron is synonymous with axis-cylinder process and its medullated prolongation, and dendron is applied to the subdivisions of all other processes, which end in arborization more or less complete.

The order of disintegration of individual cells and of the cellular layers of the cortex varies much in different types of Insanity, but in general it may be said that the larger cells are the first to suffer, and that the processes and the protoplasmic body of the cell degenerate before the nuclei and the neurons. As an exception to this

observation, in epileptic Insanity, more especially, there may be a primary fatty degeneration of the nuclei of cells, and, as in some way the nucleus is supposed to exert an influence over the nutrition of the entire cell, it is possible that often primary change, not readily recognized, takes place in the nucleus before further disintegration of other cellular parts. There are certain modes of disintegration relatively important and distinct in their nature.

One is a trophic disintegration, beginning primarily in the cellular elements, as an intimate disturbance of nutrition.

Another is secondary to vascular disease, through which the nerve-cells are deprived of due nourishment.

And a third form of disintegration follows an excessive proliferation of connective-tissue elements, leading to the final destruction of the nerve-cells.

It is not improbable that there are originally defective cells, which have such native imperfections of constitution that even severe functional strain suffices to cause their disintegration.

The apical processes of cells not infrequently undergo granular degeneration before the basilar processes, which in turn usually disappear before the nerve-fibre process is affected. One of the most deferred changes is that by which the neuron is deprived of its medullary sheath.

The nucleoli of the large cells may disappear, while the nuclei still remain *in situ*, and this exceptional change has been observed in the pyramidal cells of the cortex.

The granular degeneration of cells is one of the most constant pathological changes in Insanity. The whole body of the cell and the larger processes first become enlarged, and may even present an œdematous appearance, and their angular outlines disappear and they assume a rounded contour. The protoplasm of the cell is replaced by minute granules, which are also to be seen in the apical process, and the nucleus of the cell-changes shapes and gradually disappears as the cell-body shrinks, and, with the general reduction in size of the cell, the processes diminish and fade from view, and all that remains to be seen finally is a rounded collection of granules with the basal process devoid of medullary covering. In some specimens the nucleus, much degenerated, is still to be detected in the midst of the granules representing the cell, and spread out in loose and irregular outlines. The smaller cells as well as the larger undergo this form of disintegration.

Fatty degeneration describes more accurately the morbid state in which the cells are found, in some instances filled with fat-granules, while the vessels have also undergone fatty degeneration. Even the nuclei of cells suffer this fatty change, especially in alcoholic and epileptic cases, and even fat-emboli may be an associated condition.

Pigmentation of nerve-cells is another common pathological appearance.

The normal pigment of cortical cells sometimes disappears completely in granular forms of degeneration, but in the present affection there is not merely an increase of the normal pigment, but an active invasion of the protoplasm of the cell by yellowish or brownish pigment, which may be found to vary much in color and amount at different stages of the morbid process.

Pigmentation would seem to be a sequel of vascular congestions and excessive brain activity, and it is found in various confirmed types of Insanity, in alcoholic, epileptic, and paretic cases.

The first change is a swollen and rounded appearance of the larger cortical cells, which most distinctly show the invasion of pigment. The nucleus of the cell is displaced and deformed, and may itself be pigmented and diminished in size. The processes disappear, with the exception of the apical and basilar, which may be both pigmented and atrophied. The non-pigmented protoplasm of the cell about the nucleus is clearly demarcated from the invaded portion. As a final morbid change, the granular pigment is replaced by a light-refracting fatty material and the cell wastes into a granular débris.

Vacuolation of cells is another frequent pathological change, which may be imitated readily by artificial means of chemical and mechanical treatment of specimens, but it is also an undoubted product of disease. It appears most uniformly in connection with granular degeneration in senile and alcoholic and other forms of toxic Insanity. Various experimenters have by toxic agents produced this lesion in the nerve-cells of animals.

Vacuolation is the appearance within the cell of oval or rounded fatty particles, which disappear and leave in the cellular protoplasm minute openings having the size and contour of the particles mentioned.

One or several vacuoles may be present in the same cell, and the protoplasm of the larger cells may present numerous punctures of

this nature. In epileptics vacuolation also occurs in the small cells of the second cortical layer as described by Bevan Lewis, who, in general, attributes vacuolation to " the accumulation of hydrocarbon in the tissues from defective oxidation."

J. Batty Tuke and Woodhead mention the occurrence of vacuolation in idiopathic mania in connection with both pigmentary and granular degeneration.

The vacuolation of the body of the cell is more common in the motor areas of the cortex and in the anterior cornua of the spinal cord, in which locality it has been produced by artificial experimentation also in animals.

There is also a nuclear vacuolation in which fatty deposit first takes place in the nucleus of the cells.

The nucleus disappears, leaving in the cell a puncture of its own size and shape, and this change also appears in connection with pathological conditions of the entire cell, which ultimately degenerates.

Colloid degeneration is found in the brain or spine among those dying insane, and the morbid change is closely allied to miliary sclerosis, and it has been reported in cases of traumatic injury of the nervous centres.

It consists in the presence of small oval or rounded bodies, which are translucent, colorless, and scattered through medullated tissues of the brain, medulla, or cord. It is a degeneration of nerve-fibres, and it has an inflammatory origin, or may be due to the loss of the trophic influence of the cortical cell over the fibre. J. Batty Tuke connects it directly with " change occurring in the hyaline sheath," and reports the presence of colloid bodies beneath the visceral pia and the epithelium of the ventricles in senile dementia.

Whatever may be the origin of colloid bodies, they are found intimately connected with the axis-cylinders and nerve-fibres, and are a trophic lesion often present in chronic Insanity.

Miliary sclerosis is a common lesion of the medullated structures of the brain and spinal cord of the insane. It appears as white, shining, lobular granules, irregularly distributed amid the fibres or aggregated in sclerotic patches found most often in the lateral spinal columns, in the pons, medulla, or white substance of the brain.

Its intimate nature, according to J. Batty Tuke, who first described it, is " altered myelin exuded in droplets from the medullated tubes," and the idea is accepted in view of researches by Bevan

Lewis, who pointed out this mode of origin, which he attributed to vascular implication and exudation, causing swelling of the myelin and rupture of the surrounding sheath.

The sclerosis would appear, therefore, to be secondary to chronic inflammatory vascular changes with proliferation of connective-tissue corpuscles, known commonly as Deiter's cells. The axis-cylinders are displaced and in some instances ruptured as the result of the miliary sclerosis.

Moniliform change in medullated fibres is present, consisting in uniform constrictions of the neuron, giving to the fibre a knotted appearance, which, in speaking of the basal nerve-fibre process, Lewis describes as "spherical masses of medulla strung upon the axis-cylinder like beads upon a string."

Phagocytes are connective-tissue cells concerned in removal of waste-tissue products or of degenerated nerve-substance. They are represented as actively consuming such effete material or of transforming it and conducting it into vascular channels.

Thus, in all established forms of Insanity with chronic vascular inflammation and obstruction of lymph circulation, there is a proliferation of connective-tissue cells which, acting as phagocytes, remove the degenerated nerve-cells.

It would seem that these protoplasmic glia-cells, as Andriezen terms them, are not the only brain-phagocytes, as J. B. Tuke reports that leucocytes have played a phagocyte rôle toward the large motor cells of the cortex.

If nerve-cells, which are the ultimate organic elements of mind, are liable, when diseased, to be fully destroyed or removed in toto by overaction of phagocytes, it is plain that these scavenger cells are of the greatest pathological importance in many forms of Insanity. Hence it becomes desirable to consider at some length the elements of the neuroglia in their pathological relations.

The smaller cell-elements of the neuroglia, described by Andriezen as the fibre-cells, are of two kinds. The fibre-cells found in the first layer of the cortex send smooth, long, and fine fibrils downward into the subjacent layers of gray matter. These same cells also send out long lateral fibrils, which would seem to be without anastomotic or vascular connections. The other minute fibre-cells are situated in the white matter and have fine, long fibrils, radiating in all directions, but without vascular attachments.

The most important neuroglia elements are the protoplasmic

glia-cells which abound in the cortex of the brain and are rarely present in the medullated substance upon the confines of the deepest cortical layer. These protoplasmic glia-cells, from which, in all directions, extend branching processes, are regarded by Bevan Lewis as a "lymph-connective system," and they are always found in abundance in the immediate neighborhood of vessels, and they have at least one large process which ends in a protoplasmic expansion on the lymph-sheath of a blood-vessel. Any stasis of the lymph-circulation in the cortex of the brain is attended by a rapid proliferation of these cells, especially when the obstruction to the escape of perivascular lymph has had an inflammatory origin.

The important phagocyte-action of these cells has already been alluded to, and the chief point is that they complete the destruction of diseased nerve-cells, which might otherwise have been regenerated. It is true that this only occurs when the protoplasmic glia-cells have excessively multiplied and taken on pathological activity.

But there is a further destructive action exerted by these cells, which, after multiplying at the expense of surrounding tissue, seize upon nerve-fibres and minute vessels by means of their fine processes, and finally come to occupy the position of the higher elements of nervous structures.

These connective-tissue cells, accordingly, in severe chronic cases of Insanity, partially replace the cellular elements, the neurons, and dendritic expansions, and thus a permanent and hopeless pathological change is established. The lateral processes of the nerve-cells, the arborization of the dendrons, and the nerve-fibres which unite the nerve-cells in their associated activity, are those first implicated, and hence arises the special significance of these protoplasmic glia-cells in the pathogenesis of mental disorders.

The protoplasmic glia-cells, after throwing out innumerable fine fibrils and fully undergoing fibrillation, pass through a fatty degeneration and the body of the cell thus disappears.

Changes in the commissural association, and projection nerve-fibres, are chiefly due to thrombotic and atrophic processes, or to the pressure of tumors, or to intra-cerebral hemorrhage, or other gross brain disease, as in organic and syphilitic dementia. In traumatic Insanity also there is destruction of nerve-fibres from mechanical injury and descending lesions.

In general paresis, after degeneration of cortical cells, there is a secondary atrophy of projection fibres. There is colloid change and

miliary sclerosis of fibres, as already described, and in toxic Insanity there are descending sclerotic lesions of nerve-fibres.

The most important nerve-fibre degenerations are, first, that of the apical processes of cells by granular or pigmentary change; second, that of the arborizations of the dendritic processes by the action largely of protoplasmic glia-cells; and third, the destructions of the neurons after the loss of the myelin-sheath.

The cerebral membranes in Insanity present, under microscopical examination, many morbid appearances. The dura mater shows the engorgement of its minute vessels, and the effusion of plastic material and the nuclei of osseous formations. The pia mater reveals the formation of new vessels, the proliferation of epithelial cells, the multiplication of connective-tissue corpuscles, by which it is bound to the cortex, and the plastic exudates of inflammation along the most minute vessels, and not infrequently leucocytes, pus-corpuscles, and capillary hemorrhages.

The cerebral vessels are distended, engorged with blood, atheromatous, distorted and variously bent, varicose or with aneurismal dilatations. Proliferation of the nuclei of the sheath, hypertrophy of the tunica muscularis, the escape of leucocytes through the vascular tunics, epithelial and pigmentary collections in the minute arterioles, and the transudation of inflammatory material are to be observed.

The perivascular lymph-spaces are occluded by cellular and fatty débris in the chronic inflammatory states of Insanity. There is a nuclear proliferation and a distention of the perivascular lymph-channels, and also an invasion by the processes of the rapidly multiplying Deiter's cells already described.

The cellular degenerations of the spinal columns may arise as a system disease of the cord in tabetic cases, in which the posterior columns, more especially, are involved and the posterior root-zone is one of the first points of attack, but in pseudo-tabetic cases it may escape, while the columns of Goll are more especially implicated, or the lateral columns may also become involved in the diseased process. The lesions in combined paretic and tabetic cases are much varied and by no means typical, as in uncomplicated tabes dorsalis.

The primary pathological process is ordinarily in posterior commissural regions, consisting in inflammation of membranes and engorgement of vessels with exudation and adhesions, and a great pro-

liferation of connective-tissue cells, which interfere with conduction in nerve-fibres by pressure. Later there may be a genuine sclerosis and destruction of nerve-fibres in posterior columns.

In ascending cases of general paresis bulbar symptoms become more evident as the lesions advance, but in many cases of paresis in which there is pronounced disease of other parts of the cerebro-spinal system the bulbar symptoms remain in abeyance.

In alcoholic and some other toxic cases the lateral columns of the cord are diseased, even to a greater extent than the posterior columns. There is meningitic disease in many of these toxic cases. There is effusion of fluid and partial adhesions along the median raphe, great increase of connective-tissue corpuscles, leucocytes, and sometimes formation of new vessels, and hypertrophy of the tunica muscularis of arteries, and sclerosis involving both posterior and lateral columns.

The degenerations are not continuous, but are at irregular intervals and heights in the cord, and implicate even the anterior cornua in some regions, and unilateral deviations in the pathological processes are common. The posterior nerve-roots may be affected, and in alcoholic cases this may be a sequel of the multiple neuritis, but it is more likely that both the latter and the spinal lesions are common symptoms of the toxic state.

Sensory and spasmodic affections of the muscles may indicate whether the cervical or lumbar regions are especially involved.

After fatty and atheromatous disease of vessels and sclerosis of nervous elements in toxic cases there may be extensive atrophy of nerve-cells and fibres in the columns of the cord, and in some instances amyloid degeneration. In alcoholic cases, however, all the lesions would seem to be secondary to vascular changes, which only express the general trophoneurosis induced by the presence of the toxic agent throughout the system. The action of the syphilitic virus would seem to be primarily not confined, like alcohol, to vascular tunics beginning with the intima, but of a more general nature, extending to the nervous elements at an early day and inducing a more general and diffused pathological process, chiefly of a sclerotic nature.

General principles explanatory of microscopical lesions in the genesis of Insanity may be briefly summarized.

All diffused lesions which involve the protoplasmic body of cortical cells attack the immediate centre of intellectual activity, and

they are, of all others, the most immediately destructive of intellectual existence.

Degenerations which involve the intercellular association-fibres and fibrillary network, the dendritic arborizations and the protoplasmic lateral extensions of cortical cells are likewise subversive of co-ordinate mental function when they implicate extensive areas of the fronto-parietal cortex.

Involutional atrophic processes which widely involve all the cellular elements of the fore-brain directly effect a general diminution of intelligence.

Developmental insufficiencies and early encephalitic and sclerotic disease of cortical cells and of medullary substance perpetually limit the degree of intelligence.

Atrophy of cells or fibres limited to the area of anatomical distribution of single cerebral arteries are much less liable to produce disorder of mental functions.

Embolic and thrombotic softening of limited areas likewise are of secondary importance in the pathogenesis of Insanity.

Toxic agents which enter the blood and are carried directly to the cortical centres, though causing only slight granular changes in cells, are effective causes of mental disorder in that they simultaneously attack the ganglionic elements of the brain as a whole, and the same principle is explanatory of the acute outbreaks of Insanity from the action of the virus of infectious diseases in which the only microscopic lesions to be detected may be slight granular pigmentation of cortical cells.

General proliferations of the protoplasmic glia-cells, which, through fibrillation, finally fail to remove the detritional products of cortical cells and interfere with the nutrition of nervous structures, are among the frequent pathological alterations which give rise to mental disease.

Diffused vascular degenerations of cortical regions and fatty epithelial and pigmentary obstructions of the perivascular lymph-spaces, which prevent the nutrient supply of plasma to the ganglionic cells and the escape of lymph, and produce prolonged stasis in the cerebral circulation, are also pathological factors of mental disorder.

CHAPTER IX.

THE DIAGNOSIS OF INSANITY.

Technical Difficulties and Legal Responsibilities Involved.—In about a third of the cases to which medical aid is summoned for mental trouble, the disease has so far advanced that friends or near relatives have already recognized the nature of the affection, and only a perfunctory duty falls to the physician in the confirming of the diagnosis. In another third of the cases the general practitioner, without much experience in mental disorders, will, by careful and methodic study, be able to avoid gross error in the diagnosis and to determine the fact, if not the form, of the Insanity, though he will act wisely in calling expert advice to share the responsibility. In a final third of the cases there will be great technical difficulties to which medical experts alone are equal, and in the solution of which the full height and breadth of psychiatric science is barely sufficient.

The technical difficulties reside in the infinite variety of the phases of the human mind, both in health and disease; in the fact that the true state of the inner mind is only revealed by words and actions for which the motive is not always apparent, and hence becomes a matter of inference; in the discontinuous nature of the mental symptoms, which are not always manifested at the visits of the medical examiner; in the further fact that the diagnosis must rest in part in some cases on evidence which requires judicial as well as medical skill for its interpretation, and is liable to be ignorant or prejudiced.

The physician must bear in mind the complete possibilities and worst frailties of human nature, such as are daily revealed in courts of law, for the first case to which he is called may constitute the exception and not the rule. He must not forget that intense personal feelings and financial motives may prevail among near relatives, whom he will often find completely divided in opinion as to the existence of the suspected Insanity.

The attitude of the patient toward the physician is often that of suspicion, readily converted into open hostility, and subjective symptoms will then be concealed rather than communicated, thus heightening the inherent difficulties of the case.

The physical signs of the disease may be thus, in a measure, inaccessible through the refusal of the patient to submit to a physical examination.

The responsibilities in diagnosis are still greater than the difficulties mentioned.

In vain do medical men inculcate that mental disease is like any other disease, and not an opprobrium; for, in the public mind, the dread and the stigma of Insanity will ever remain an ineradicable idea. To pronounce the diagnosis of Insanity is to affix this stigma of popular prejudice to the individual, and to the family indirectly. The individual may recover his mental health and the confidence of his near relatives, but he will never be fully reinstated in the same public estimation, nor in positions of professional responsibility and business trust. Incipient and mild cases of Insanity judiciously treated and cured as cases of neurasthenia escape this opprobrium.

The sufferer to whom the physician is called may be technically and medically in the initial stage of mental disorder and yet not legally insane. Should the physician commit such a patient to a hospital for the insane, and recovery follow without any further development of symptoms, the physician might find himself involved in a suit for damages, which it might be difficult for him to defend. Several cases for the commitment of patients to hospitals for the insane have of late years been decided against physicians, who have acted in good faith, but have still been mulcted in damages. A mistake outright in the diagnosis of Insanity, of course, renders the physician liable the same as in cases of malpractice in general.

The present law of commitment of the insane in New York State has in some degree shifted the responsibility of the deprivation of personal liberty from the physicians to the judges who approve of the certificates of Insanity ordering the confinement of the patient.

In other cases the patient may have been indicted for capital crime, and the diagnosis, once pronounced, may carry with it the responsibility of life and death.

There are also many minor offences committed by the insane, and the physician may have in these instances to protect individual rep-

utation and family honor by pointing out the diseased source of the derelict action.

The medical man, then, must approach the diagnosis of cases of Insanity forewarned and forearmed as to the difficulties and responsibilities involved.

The Essential Elements of Diagnosis.—In mental disorders, as in general diseases, the elements of diagnosis are, first, the previous history; and, second, the present symptoms of the malady. The difference in Insanity lies in the fact that the previous history, on account of the chronic course and gradual development of the affection, must often extend over very prolonged periods, and the present symptoms include a double order of phenomena, on the one hand most essentially psychical, and on the other somatic, but so general as to involve motor, sensory, and trophic functions of the entire organism.

The first element, therefore, of diagnosis in a case of Insanity becomes virtually a life history of the patient, and the second element is an epitome of all the physical signs of existing bodily disorder, embracing not only the motor, sensory, and trophic, but also the special sensorial disturbances.

The first element of diagnosis or the complete history of the case is to be obtained from different relatives or members of the immediate family of the patient; and, in order to save valuable time, the physician must have a definite formula for questions to be answered, and he must thus elicit information quickly upon essential points, which are very numerous, but they can all be passed in review promptly if the system of categoric replies is adopted in some definite and comprehensive order.

When the complete history has been obtained in its full medical outlines, it is then well to hear at length what the different members of the family have to say about the case, especially if there be differences of feeling and belief in regard to the patient's Insanity.

The History of the Case Antecedent and Subsequent to the Attack.—The first element of diagnosis resolves itself into two distinct parts, which are the history of the case antecedent to the Insanity and the full account of the case subsequent to the attack.

These two parts of the history are radically distinct, in that one relates to a period of sanity and the other to a term of Insanity—one is supposed to accurately portray the life, habits, and character-

istics of the individual in health, and the other to record all the changes wrought in the patient by the mental disease. If both parts of the history are well drawn the departures from normal modes of thought and feeling will stand out in bold relief as salient points in the diagnosis.

Both the antecedent and the subsequent history as regards the attack is to be obtained, as far as possible, before the patient is seen, and a great advantage will then be gained to the physician at his first visit, which may thus be abridged so as to spare the patient unnecessary length of examination and fatigue. It is rare that any portion of the history should be taken from the patient directly, and yet, if the patient be relatively intelligent, the information thus furnished, especially as to the symptoms of the attack, is not always to be ignored, for past subjective feelings may be revealed to the physician and not to the family.

It is true that in many cases a momentary and informal examination may show that the patient is insane, but there are other points besides the mere fact of Insanity to be determined by the diagnosis, and even in a self-evident case the physician should not dispense with a systematic mode of diagnostic procedure and a complete study of the case, which may assume a new phase in a short space of time, to the surprise of the physician, who should keep a full written memorandum of all patients examined, and more particularly of the dates and results of the personal examination of the patient.

The Medical Lines of Inquiry and the Laws of Evidence Involved. —It has been pointed out thus far that the essential elements of diagnosis are a personal history and a personal examination—that the former consists in a history previous and subsequent to the attack, and that the latter is composed of the determination of the psychical and the physical condition. It now becomes necessary to show fully the medical lines of inquiry, first, in the direction of the personal history, and, second, in that of the personal examination, and to develop all the essential points as to which it is the duty of the medical examiner to inform himself.

To begin with, the physician must first go to the parental source of the patient and learn his inherited nature, which is the foundation of the individual. The first line of medical inquiry, therefore, is that of *parental history.* The object of the inquiry must be to determine the nativity and age of the parents, their general mental and physical status, and, if not surviving, the disease of which they died.

One of the first questions will naturally be whether the parents have suffered from any form of mental disorder, or from brain disease of any kind; whether they have been subject to any disorder of the nervous system, and, if such be the case, whether it was previous or subsequent to the birth of the patient. This line of inquiry as to heredity is to be carried, both in direct and collateral directions, to grandparents and to uncles and aunts on both the paternal and maternal side. It is important, also, to embrace in the inquiry all diseases supposed to be hereditary in the family, instances of intemperance or drug habit, suicides, and depravity or eccentricity among near relatives, and the question of consanguinity of parents.

Having completed the parental history, the medical examiner is ready to enter next upon the direct line of inquiry of the personal history of the patient, and here, too, he must begin at the beginning. The fœtal life of the patient and exposure to injury through mechanical or psychic traumatism of the mother while bearing the child in utero; then the crisis of birth, which may have been multiple or with instrumental delivery and cranial damage, are the first lines of inquiry. Then infancy, with the question as to dentition, convulsions, precocity or delayed mental development, is next in order, and then should follow the history of childhood, with its infectious diseases, accidents, and injuries to head or spine, the premature or imperfect expansion of the mental faculties, and the record in school.

Puberty and its evolutionary changes in mind and body, sexual vices and menstrual irregularities, choreic or other nervous complaints, one-sided talents or eccentric tendencies, retarded or excessive growth, spinal curvatures or other physical deformities, are to be ascertained in this natural order of the personal history.

Adult life is then in regular sequence, and the inquiry is first as to the customary bodily condition of the patient and the state of the various vital organs and organic functions in what is deemed the ordinary and normal condition of the patient. Then all the diseases, bodily injuries, peculiarities of physical conformation, and the history of reproductive activities in married women are to be recorded, and mental or nervous disease in the children of the patient is to be noted as possibly circumstantial evidence of heredity.

Then the natural character, disposition, habits and mental endowments of the patient are to be made the object of the most searching inquiry, which must also include all the damaging mental

influences to which the patient may have been exposed, such as business worry, financial losses, over-work and worry, domestic grief and prolonged anxiety of every kind. If there have been fully developed attacks of mental disorder, their date, duration, symptoms, and supposed causes, treatment and manner of complete recovery are to be fully ascertained.

This is the general scope of the antecedent history, and then comes the history subsequent to the beginning of the Insanity, with a detailed account of all the psychic and somatic symptoms in the order of their occurrence.

The earliest changes in character, manner, and speech which excited suspicion as to Insanity are to be the first object of inquiry, as they sometimes indicate a much longer duration of the complaint than that marked by an open outbreak of the disease. The date at which the Insanity was clearly recognized by the friends, however, is also important.

The prevailing emotional tone, whether expansion or depression; or, of like importance, the fact of apathy or stupor is to be learned.

Then the personal habits and tendencies, such as noisy, untidy, destructive, violent, or suicidal symptoms are to be sought for with close questioning, as they are not always readily revealed by the relatives, who are often less inclined to state simple facts than they are to give their interpretation of occurrences.

The question of the delusions which the patient may have had, and of the hallucinations and illusions to which he has been subject, requires very skilful investigation, and the physician will often be surprised at the conflicting testimony given on this score by the different members of the family, and at the not infrequently puerile nature of the testimony furnished in this regard.

Other psychical symptoms to be sought for are confusion or incoherence of ideas or speech, defects of memory for recent or old events, changes in personal identity, the state of consciousness as to the Insanity itself, and the general changes in the feelings of the patient toward his near relatives.

The somatic symptoms are to be ascertained by repeated interrogations as to loss of sleep, appetite, or weight, as to the state of the skin, pulse, respiration, digestion, condition of the bowels and of menstruation, and of the sexual functions or their perversions.

Research must be extended to the muscular system, to the question of tremors, spasms, convulsions, defects of gait, speech, or of

other highly specialized mechanisms. The chirography and the ability to play on musical instruments, or the mechanical skill required in manual occupations, may have been impaired.

Finally, the supposed causes of the disease and the manner in which it has been treated, as to the use of drugs, restraint, confinement, or moral influences, are to be made the subject of close inquiry.

The fact as to any improvement or continued failure or stationary state of the mental condition is also to be recorded, and in some cases still further lines of medical inquiry will have to be followed out, but the above are the essential ones to be pursued by the medical examiner.

In gaining the above facts of personal history the physician must have a practical knowledge of the laws of evidence—he must be able to weigh the credibility of the testimony given, and to judicially interpret the value of the facts alleged by parties whose feelings and interests are often at variance, and who are not giving evidence under the solemnity of an oath. It is well to examine the members of the family separately when there is conflict of feeling and statement in regard to the symptoms, and then to listen to mutual discussion of the question by the various parties after the completion of the history of the case.

Ordinarily, older persons are more reliable than the younger, who know little in general about disease or the motives of conduct or the affairs of life. The physician will discover that delusions are common among the sane as well as the insane, and that they arise from ignorance, prejudice, and self-deception, and, as before intimated, he must skilfully weigh the evidence adduced to prove the patient's delusions. The psychology of the family as well as of the patient will be a part of the problem to be solved in not a few instances, and the study of the relatives will often throw a clear light on special phases of the patient's mental malady.

If the physician have a knowledge of mankind in general, and of women and children in particular, he will arrive at the true facts of the history of the patient by tactful questioning, but if he be not gifted with great knowledge of human nature, and also disregards the laws of evidence, his personal history in many instances will be of little value when completed, and he will have to rely on the personal examination, which may be inconclusive as to the Insanity of the patient.

Complete Outline for the Record of Histories.—It is deemed well to give here a complete outline for the record of the history of cases of Insanity, but the details, it is thought, will be suggested readily by the leading headings of the outline, which does not pretend to be exhaustive, by any means. It is purposely not technical, but simplified in form and language, such as may be of most practical use in gaining information by questions from relatives of the patient.

Outline of History in Cases of Insanity.

A. Personal Description.

Name	Sex.....	Age .....
Color of hair and eyes....	Height....	Weight .....
Education	Religion...	Occupation....
Civil condition	Nativity ..	Residence .....

B. Parental History.

1. Nativity of parents—native or foreign grandparents.
2. Age of parents. If parents are not living, the cause of death.
3. If father, mother, grandparent, uncle, aunt, brother, or sister has been insane, relate all that is known of the date, duration, cause, and termination of the Insanity.
4. Special tendency to diseases of brain, lungs, heart, kidneys, or other organic affections, scrofula, rickets, spinal disease, cranial deformities, epilepsy, idiocy, deafmutism, chorea, or hysteria.
5. Intemperance in alcohol or drugs.
6. Cases of suicide or criminality.
7. Consanguinity of parents.

C. Personal History.

I. Fetal Life.—1. Severe illness or bodily injury or great mental strain of parents a year or so before the birth of the child.

2. Sickness, trauma, or emotional shock of the mother while bearing the child.

II. Childbirth.—Premature or multiple birth, mechanical delivery, cranial injury.

III. Infancy.—1. Infantile diseases, first dentition, convulsions.

2. Age of walking, talking, precocity, or delayed mental growth.

IV. Childhood.—1. Diseases of childhood, sequels of infectious disorders.

2. Nature and history of convulsions at this age, chorea, night-terrors, incontinence of urine at night, somnambulism, hallucinations at night, delirium upon slight rise of temperature.

3. Physical development and bodily functions. Second dentition.

4. Mental development. Studies in school. Precocity or arrest of mental functions.

5. Mental shock, fright, or severe injuries to head or spine.

V. Puberty.—1. Early or late puberty, unusual physical or mental states at this epoch, sexual vices, menstrual irregularities.

2. Diseases of the nervous system at this age, chorea, hysteria, convulsive tics, night-talking or walking, convulsive seizures.

3. Retarded or excessive growth and general bodily function, spinal curvatures, cranial or other malformations.

4. Mental status, one-sided talents, eccentricities, success in school or business.

VI. Adult Life.—1. Customary bodily condition, fat or lean, muscular or thin, strong or weak, state of the vital organs and vegetative functions, endurance in work.

2. Diseases of adult life, nervous affections, fevers, toxic or specific disorders, gastro-intestinal troubles, bodily injuries, deformities of head, chest, spine, or limbs, defects of special senses, loss of teeth, hernia, varicocele, or sexual peculiarities.

3. In women, menstruation, uterine diseases, age and number of children, miscarriages, duration of lactation, date of last pregnancy.

4. The natural mind, character, and habits of the individual, the disposition and prevailing mood, whether cheerful or gloomy, the relative intelligence to educational advantages, industry and success in business or profession, habits, tastes, likes and dislikes, social or anti-social tendencies, oddities of conduct or speech, peculiarities of manner and dress, desires and appetites, natural or artificial.

D. History and Symptoms of the Insanity.

1. The earliest changes in character, manner, or speech which excited suspicion of Insanity, and the date of the first decided symptoms of mental disorder recognized.

2. The mental symptoms in the order of their occurrence. Illusions, hallucinations, change in identity, incoherence of ideas, loss of memory, nature of the delusions.

3. Emotional disorder, the prevailing mood of depression, expansion, or apathy, or stupor.

4. Loss of self-control, suicidal, homicidal, violent or destructive tendencies, morbid appetites, alcoholic excess, or sexual vices.

5. Loss of bodily weight, wasting of muscles, muscular tremors, spasms, contractions, changes in gait, handwriting, in facial innervation and expression, abnormal muscular reflexes.

6. General circulation, changes in the pulse or temperature, rush of blood to the head, or paleness and fainting, state of the heart, palpitations.

7. Eruptions and discolorations of the skin, turning gray of the hair, cold and blue extremities.

8. Disorders of digestion, constipation or diarrhœa.

9. Asthmatic attacks, consumption, diseases of the genital organs, especially in women.

10. Delirium, convulsions, loss of consciousness, choreic or epileptiform symptoms, loss of power of limbs, changes in the pupils or in the special senses.

11. General course of the Insanity, tendency to improvement or the opposite.

E. Treatment of the Disease to Date.

1. General treatment of the Insanity to date of this history.

2. Home treatment or institutional treatment, dates.

3. Medicines employed, hygienic or hydrotherapic measures used, restraint, if employed, forced feeding, seclusion.

4. Surgical measures employed, cups, blisters, local applications in women, electricity, operations.

The above outline for the personal history in cases of Insanity will be found not only highly suggestive, but fully adequate for the clinical use of the medical practitioner, who can dispense with any portion of it in cases of a chronic type and of a foregone conclusion.

The Personal Examination of the Patient.—Having now fully dealt with the historical elements of diagnosis, the remaining lines of medical research are confined directly to the existing mental and bodily condition of the patient, to be determined by personal examination.

The physician must have a clear idea of the scope of the personal examination which he is about to make. He is to discover the true

state of all the physical and mental functions, so that he may be able to state those which are normal and those which are abnormal. He will necessarily traverse some of the points already considered under the personal history, which he is now to confirm by personal examination, and to record additional points on his own responsible observation. Relatives can no longer be of any service, and the physician is now thrown entirely upon his scientific resources. It is now a contest between science and the great difficulties to be overcome, and often the cunning of the patient to be circumvented by fair superiority of knowledge, and not, as some have suggested, by trickery, rude shocks, prolonged espionage, or personal examinations carried to the point of complete exhaustion of the patient. Such devices are unworthy, unless it be to expose the feigning of convicted criminals. The contest is to be open, gentlemanly, and humane, and this necessitates, on the part of the medical examiner, perfect familiarity with the line of investigation to be pursued, so that his full presence of mind and tact may be devoted to the emergencies of the occasion.

The bearing of the physician toward the insane should be the same as toward any other sufferer from disease, sincere and intelligently sympathetic, with the firm resolve of professional duty to be performed, and a perfect equanimity not perturbed by the diseased irritability or even open abuse by the patient. In any patient presenting special difficulty of diagnosis there will be a quick perception of subterfuge on the part of the physician, as well as an appreciation of honesty and kindness shown by him during the personal examination. The medical examiner has no new rôle to play or character to assume, but he is simply to employ his entire knowledge of human nature, to rise to the full height of the situation, to have his wits about him, to be prompt to decide and act, and in some instances his physical courage may be put to the test, and he may recall with practical effect the scriptural saying, "A quiet answer turneth away wrath," especially if it remain accompanied by a quiet and self-possessed mien. An attempt to overawe the insane by severity of looks, as wild animals are supposed to be kept in subjection by the human eye, would in most cases result in disaster to the medical examiner for practising a popular theory. The insane, enraged and dominated by delusions and violent impulses, know no fear and are deterred by no threat of punishment.

If the patient to be examined be strong and homicidal or violently

inclined, the physician is culpable if he risk an assault upon himself, or expose the patient to the force he might have to exert to resist an attack without the presence of a sufficient number of persons to control the patient. The regular order of the personal examination will have to be varied according to the nature of the case. It often happens that the physical examination serves as a good introduction to the more trying mental probing, which may so disturb the pulse, respiration, and temperature as to be an obstacle to later physical observations, but the converse is sometimes true. If there is evident perturbation it is well to suspend the examination until the heart is quiet and there is a return of self-control.

It often reassures the patient to examine the presumably healthy organs first, and to announce the favorable facts as the examination progresses. Pent-up nervous feeling is most quickly relieved by muscular effort on the part of the patient, who may be asked to walk briskly a few times across the room, to stand on one foot with the eyes closed, and while so standing to describe a circle on the floor with the toe of the free foot, to grasp the physician's hand with full force, first with one and then the other hand, to walk backward with closed eyes. The physician will know the real value of these tests of muscular strength and co-ordination better than the patient, who may doubt their serious nature, and the physician may then encourage the performance by first executing the movements himself. The dynamometer and æsthesiometer may be employed in this connection, and when it is evident that the mental tension is somewhat relieved the thoracic organs may be examined, and for some reason this part of the research is often very trying to the patient, so that the examination should be as quickly performed as practicable, and indeed, this should be the rule throughout this ordeal, which is not to be dispensed with except for good reasons. The physical examination helps often to determine the form and the pathology and the indications for treatment of the Insanity. It may seem ridiculous to the members of the family to see the physician feeling a patient's shins to determine the nature of his mental trouble, but this humble act may reveal more than the whole history derived from the combined knowledge of the relatives, for, if tibial nodes are found, the syphilitic origin of the case and the nature of the treatment are indicated. In mental depression the former may be obscure until the physical examination clearly shows the paretic nature of the disease. It is rare that the physician can do justice to him-

self or the patient without a physical examination, but the nature and extent and order of the same will vary in different cases.

It is the object to indicate here the full extent which the examination may have to take in all essential directions, and to leave to the medical examiner to select from this necessarily lengthy outline the points most directly indispensable in individual instances. As the expert morbid anatomist will within a half hour perform a complete autopsy and examine every organ of the body as to their macroscopical appearances, so the expert medical examiner can pass in review all the essential points of the physical and mental condition as here noted within the space of an hour in cases presenting no unusual obstacles. The physician must renew his visits, if need be, until he has satisfied himself as to the true physical and mental status of the patient.

The physical examination must cover the following main lines of inquiry:

The bony frame-work, as the solid basis of the individual, is the first object of attention. The conformation of the chest, spinal curvatures, rickety formations, the state of the long bones and their relative length to the trunk, exostoses and mollities ossium are to be ascertained. Cranial circumference and diameters, asymmetries and traumatic injuries and the relative size of the cranium to the stature are to be determined, and excessive or defective total growth of body is to be observed.

All the "stigmata degenerationis" described under somatic symptomatology are to be here noted.

The general muscular development is to be considered and tests as to the muscular functions are to be applied. Some of these tests have already been mentioned as to strength and co-ordination. The electric reactions are to be tested in disease of the muscles as an aid to diagnosis.

Muscular tremors, spasms, atrophy, contractures, and other disorders are to be detected, as well as cataleptoid and tetanoid states. The muscular reflexes are important, and the deep, if not the superficial, should always be examined. The most significant deep reflexes are the patella-tendon reflex, or knee-jerk, and the ankle clonus, and in some cases the wrist, elbow, and chin reflexes should also receive attention, together with the superficial reflexes, the plantar, cremaster, epigastric, and abdominal. The gait and its alterations, disorders of speech, especially those of a paretic nature,

changes in hand-writing, in manual skill in various occupations and in the playing of instruments, characteristic attitudes and gestures, movements of the tongue and deflections of the palate are all points to be observed. The physiognomy, the youthful or aged look, the prevailing expression, laughter or crying or an indiscriminate mingling of both, defects of facial innervation, and the absence of all expression, are to be noted.

The heart and vascular structures, valvular lesions, the state of the arteries and veins, the pulse and its variations, indicated by the sphygmograph in some cases, are to be examined.

Observation is to be extended to the skin, to eruptions, œdema, cyanotic conditions of extremities, pigmentations and excretions, and to the state of the hair and nails.

The internal organs come within the examination, the lungs, the stomach, liver, spleen, kidneys, and reproductive organs and their disorders form a part of it.

Special attention is to be given to the nutritive, secretory, and trophic functions, to the changes in total weight of the body, to excess of adipose tissues or emaciation, to the secretions and excretions, to the state of the blood, of the urine, of the saliva, to temperature changes, cranial, axillary, and oral. The state of the nervous system is to be examined as to brain diseases, spinal affections, disorders of the sympathetic and peripheral nerves.

In the presence of diseases of the nervous centres all the customary tests, including electric reactions, are to be employed.

The Psychical Examination must Embrace the Following Points.—Perception and the special senses of touch, taste, smell, sight, hearing, and the muscular sense are to be tested. Taste and smell will naturally be tested together, but delicate and brief tests of smell first used do not impair taste, but after the use of salt, sweet, sour, and bitter solutions for testing taste, odors may not be normally perceived. If special instruments are not at hand, some substitutes can be improvised to deliver a minute portion of the solution to different parts of the tongue.

Touch is best tested by the æsthesiometer, or, in its absence, by sharp-pointed scissors or a hairpin, and by tracing letters or figures on the skin, by the direction of lines drawn lightly on the skin, and by the locating of points touched. The muscular sense for weights and for the position of the limbs is to be tested, and also the temperature and pain-sense. It is well in this connection to have

the patient identify objects touched with his hands behind his back, to test promptness of recognition and the association of ideas and sensorial impressions.

The simpler tests of vision and of the action of the ocular muscles are to be made. The presence of strabismus, arcus senilis, color-blindness, and especially anomalies in the pupils and their reflexes are to be noted.

Hearing, as to promptness, distance, cranial conduction and the recognition of objects by sound, is to be carefully examined. By moving objects and executing movements behind the patient's back and requiring him to tell what is done, the association of ideas and of acoustic impressions can be readily determined, and also, if the patient is in a familiar room, his memory of objects and their customary location, and before beginning this test it is well to blindfold the patient or have him seated at one end of the room with back turned.

Hallucinations and illusions of all the special senses are to be diagnosed, if present.

The state of consciousness, impairment or epileptic loss of the same, changes in identity, and double consciousness are to be ascertained.

Memory and its partial or complete loss for recent or past events may be tested in various ways by comparing the patient's knowledge with dates given in the personal history for past occurrences, and for recent ones questions at the close of the examination as to things done in the early part of it may be used. The degree of education must be considered in the questions, which may embrace the repetition of the alphabet, of the days of the week, and of the months of the year and the number of the days in each, followed by more and more difficult tests in arithmetic, geography, and simple English branches of study. The chronological order of events already learned in the history will furnish tests on this score, as to places and dates of residence, and changes in occupation, and other events of the patient's life. In case of a woman, the names and ages of her children and the birthday of each is a fair test-question, which is relatively more difficult for men, who, without any real loss of memory, often fail to tell the day of the month on which their children were born. A surer test for men is their memory of financial matters in which much loss of memory usually points to serious impairment of mind, and yet even here business men are relatively more accurate

than professional men. The medical examiner must be able to gauge the value of the tests according to the individual and the general fact that people do not remember that to which they pay no attention and in which they have no interest. There is a great natural difference of memory as to names, places, and numbers. Some intelligent persons do not always remember the names or the street appearance of their friends well enough to recognize them. Laboring men often know their house by its location in the block and by its outward appearance, and do not know its number, especially if it happens to be a large one. Facts are remembered, but their order, in time, is not impressed upon the memory very clearly in many persons, who cannot tell without considerable reflection when any particular event of a few weeks previous occurred. Only thorough, all-round tests of memory, therefore, are reliable.

The thought-rate, association of ideas or incoherence, the attention and presence of mind, confusion of time, place, or persons, the appreciation of present surroundings and of patient's personal relation to the same, and self-knowledge of the patient's rights and duties in general are to be examined, and also his consciousness of his own mental trouble, and, above all, his delusions.

There are also to be determined the fundamental emotional mood, the ruling emotions, likes and dislikes, personal animosities, disposition as to his own family, and altruistic and egoistic feelings in general. Constancy or alternation of depression, exaltation, apathy, or stupor is to be noted.

Volitional control of ideas and actions, homicidal, suicidal, irresistible impulses, destructive habits, anomalies of appetites or instincts, sexual perversions and impellent ideas are to be closely investigated.

For a tabular outline of the personal examination of patients, reference is made to the close of this chapter, but the foregoing are the main points in both the physical and psychical examination.

Diagnostic, Psychic, and Somatic Symptoms.—There are some symptoms which are much more highly diagnostic than others, and the mental and bodily signs which have special, if not pathognomonic, value are now to be mentioned.

A fundamental mood of depression or of exaltation, when prolonged and out of proportion to any external events or causes in the life of the patient, is highly diagnostic.

Cœnæsthetic depression from physical and temporary suffering

or prodromal of infectious diseases or sequential of the same is to be excluded, as well as the normal fluctuations in the tenor of the emotions from over-work or untoward circumstances of life, and also the temperamental variations of brief but extreme degree in certain individuals.

Even when there has been an occasion and a real motive for the emotional change, if the latter be disproportionate to the actual cause and remain greatly exaggerated, the significance of the symptom continues still as regards diagnosis.

The presence of a delusion in spite of evidence of its falsity, provided the conduct of the individual is unreasonable as the result of the influence of the false belief, is a diagnostic symptom.

Actions speak louder than words, and some persons express extraordinary false beliefs, which they never put in practice, and which, in truth, are not a vital part of their mentality, but when the delusion is carried out in disregard of the conventions of society, exposing the person to resultant penalties, it is proof that it is a constituent of the inmost life of the individual. A man might declare the amount of clothing worn in the heat of summer to be a foolish convention, and he might have a belief that it would be more healthful and a better adaptation to the environment to remain like the savage in the summer months, and if he put this belief in practice, even in the limits of his own household, remaining in a state of nature during the summer, it would be symptomatic of Insanity to the same degree as a more irrational belief professed but not practised. Sane people have delusions in great variety, but they also have a sane amount of inhibition, which prevents the practice of anti-social beliefs and a sane appreciation of their obligations to society, and of the severe punishment of violation of conventional usages. The delusion which crowds out all these considerations and becomes the guiding motive of conduct, and is not inhibited, is highly diagnostic, and, in fact, pathognomonic of Insanity.

Irresistible impulses to perform destructive or violent acts, when arising irrespective of ordinary motives of conduct, are highly diagnostic psychic symptoms. The question of motive and of the mode of origin of the irresistible impulse is of great importance in this connection. It is known to be within the limits of normal psychology for a man moved by the deep passions of love or revenge to destroy life or property, and there are occasionally aggravating circumstances under which these motives attain a force irresistible,

except to those schooled to life-long self-control. There are also in young persons lacking the full realization of the gravity or nature of their acts, and deficient in the self-control brought by age and experience, examples of overt acts from the irresistible contagion of example or from the over-firing of the imagination, as witnessed among youths after reading of noted highwaymen, whose lives and adventures they proceed to imitate, usually in some foolish attempt at highway robbery.

Exclusive of all like instances, there are impulses which arise irrespective of all sane motives and of all normal reactions of mind to external influences, and these are pathognomonic of a diseased mind. Of like kind, but not of the same degree of diagnostic importance, are *impellent ideas*, which lead the sufferer to the performance of aimless or absurd acts, which may even be of an illegitimate nature.

Conduct widely different from that customary in the individual, provided it is not in the nature of an adjustment to some actual change in his environment, is diagnostic of Insanity. Some persons show their mental disorder in their acts rather than in their words, just as others are rational in conduct and evidently insane in conversation, while others still reveal their mental alienation only in their writings. There are even patients who cunningly inhibit the issue of their Insanity through any of these channels, and are still betrayed by an insane physiognomy. In judging of the conduct of a person in this relation the class, profession, degree of education, and previous habits of life have to be taken into consideration.

If a man, reared in wealth and having abundant means, were to suddenly adopt the petty economics of a person brought up in relative poverty, it would raise doubt as to his sanity; or if a clergyman were to assume the attire or freedom of conduct of a layman it would excite suspicion; or if a highly educated and refined man were to show the ignorant and coarse conduct which might be normal in a laborer, the question of alienation might arise; or if a person were to at once ignore the habitual polite usages of the society in which he moves he would furnish grounds for belief in his mental derangement.

In all very large cities are sectional differences of class, wealth, education, and race, so great that if the standard of the habits and life of one of these quarters of the city were suddenly to appear in the other it would be so out of adjustment to the environment as to

signify Insanity. These and other like considerations are to be taken into account in judging of the change of conduct which must be independent of motive or provocation furnished by unusual and novel alterations in the environment.

Double consciousness and changes in personal identity are diagnostic symptoms, and usually indicate a deep and permanent mental deterioration.

Among the somatic symptoms the progressive inco-ordination of speech and gait and of other specialized movements, if combined with gradual diminution of mental power, is diagnostic of general paresis. Or, in the absence of disturbance of special muscular mechanisms, if there be gradual impairment of intellect without any active disorder, the loss of the patella tendon reflex and of the pupillary reflex to light are not only diagnostic, but pathognomonic of general paresis, provided the presence of locomotor ataxia is first excluded.

In the absence of all mental symptoms the concomitance of fixed pupils, loss of knee-jerk, and tremulous hesitancy of speech are pathognomonic of general paresis.

There is a characteristic intonation combined with tremulousness of the vocalized sound which, in the absence of the other physical and mental symptoms, is still pathognomonic of general paresis, but any exact knowledge of this sign cannot be conveyed in words, but when it is once acquired by experience of the ear it is unmistakable. It is well to know that this highly diagnostic somatic symptom may, with long familiarity and practice, be perfectly feigned, so as to deceive even an expert.

The symptoms of gross brain disease, when followed by diminution of mental powers, are diagnostic of organic dementia. If there be failure of various kinds of memory alone after gross brain lesions, without diminution of the other powers of mind, the diagnosis of Insanity is not to be made.

Standards of Comparison in the Determination of Insanity.—All things about which there is any question are tested by some unit of measure or tried by some standard of comparison. All persons have general similarities of physical organization, and yet no two persons are exact physical counterparts, and in the same way no two persons are precisely alike in mental constitution, and yet such is the general conformity to a universal standard that it is possible to formulate general laws of mind and conduct, to which there may

be numerous individual exceptions. It is possible, therefore, to know, ninety-nine times out of a hundred how persons will react to certain influences, and yet the hundredth case reacting in an eccentric way might not be insane, but the individual exception which is ever occurring in the world of organized beings. There are, therefore, two standards of mind and conduct: one is the general average standard of mankind, and the other is the particular standard of the individual, and both of these terms of comparison must enter into the general conclusion as to the Insanity of a person under given circumstances and modes of reaction to environmental influences. The student of history and of the human mind is struck with the fact that the general mental standard of mankind has varied widely at different periods of time and in distant parts of the world, and that various factors greatly influence the present wide differences, which it is well to consider for a moment, in both the general and individual mental standard.

The Average Sane Mental Standard of Mankind as Affected by Historic Epoch, National Crises, Degree of Civilization, Race, Caste, Occupation, and General Environment.—If an ancient Egyptian, Greek, or Roman could be revived for comparison, there would be found an anachronism and a total disparity between the man and the age, between the adjustment and the environment, between the individual mental standard and that of the people about him. Even at the present day the average mental standard varies greatly among different races, and, if a physician were to determine the mental condition of a Turk by the average American standard of thought, feeling, and action, there would be room for great error, and the same wide difference of character and conduct exist between many other nationalities.

The average sane mental standard of mankind at national crises, and during wars and epidemics of emotional ideas, has betrayed some remarkable fluctuations, such as was seen at the time of the pilgrimages, when hundreds of thousands started on foot for the Holy Land without any means of supporting life by the way, and perished by the thousand like migrating animals, or as witnessed during the pandemoniacal scenes of the French revolutions in Paris, or during the witch-hanging epoch in America.

At the present day the degree of civilization makes the most general differences of sane mental standards, which thus have wide geographical demarcations, as existing between civilized, barbarous,

and savage nations. In India, caste, and in civilized countries in general, degree of education, makes the most marked variation in the average sane mental standard of mankind. Racial differences, as between the colored and white in the United States, the effects of general extremes of environment as between the serfs and the nobles in Russia, widely divergent occupations as that of the cowboy and of the university professor, affect the code of morals and of conduct and of manner of reaction to given influences and events in every-day life. If one of the standards above mentioned were suddenly to be exchanged for the other, even under like circumstances, it would be a manifestation of mental derangement rather than of mental adjustment to the environment. If the learned college professor, enjoying his vacation on his summer-place, were to mount his horse in reckless abandon, rifle in hand, pursue some thief who had driven off one of his cows, and shoot him dead at sight, he would likely be deemed insane. If a cowboy performs likewise while in pursuit of his occupation, he simply reacts in a customary way, and the question of Insanity would never be raised, and his courage would more probably be called in question if he failed to take the law in his own hands.

The average sane mental standard varies, therefore, with factors above indicated, and the skill of the psychologist must accurately weigh the force of environmental circumstances in this regard.

The Sane Mental Standard of the Special Individual.—The diagnostic value of a comparison of the person supposed to be insane with his former self is very great, for there is nothing more characteristic of Insanity than a prolonged departure from the individual's customary modes of thinking, feeling, and acting. It is essential, therefore, to know what his usual standard in health has been in these respects. Some persons are naturally cheerful, hopeful, or even enthusiastic in temperament, with social and communicative habits, while others are apathetic or even gloomy by nature, looking on the dark side of things, hoping little and doubting much, and having no social tendencies. If these individual mental standards were suddenly to be exchanged without any adequate external causes, both classes of these persons would furnish grounds of suspicion of their Insanity. It is to the medical examiner of such importance to know the individual standard that he will be without it unjustified in making a diagnosis in difficult cases, whatever may be his wide knowledge of mankind in general.

Even when the habitual mode of mental being of the special individual is known, it is still further to be considered that there may be brief fluctuations within physiological limits in the mental status, and that an observed departure is only pathological when prolonged or disproportionate to the exciting cause. It is necessary also to eliminate changes from great emotion and functional exhaustion, and the cœnæsthetic alterations of the incubatory stage of all acute bodily diseases.

Conditions of Unusual Difficulty of Diagnosis.

Childhood.—The fact that in childhood the general mental standard has not yet been attained, and even an individual standard of mind and character has not been fully developed, makes the diagnosis very difficult. The child is then to be compared with the average sane mental status of children born and reared under like circumstances of life. The wide individual differences in the rapidity or tardiness of mental development are to be taken into consideration. The degree of instability of nervous centres, which would result in mental disorder in the adult, is more apt to reveal itself in muscular disorders or in convulsions in children, and delusions and other fully developed symptoms, as in grown persons, are seldom present in like degree, and the diagnosis is to be made in their absence in most children. The diagnosis in young children must rest on symptoms like the following: Night terrors, hallucinations of sight and hearing, inattention to what is said or done and to sensorial appeals, irritability, prolonged anger, which may end in syncope, general dislike shown to all persons, including nurse and mother, prolonged spells of crying and violent actions, loss of interest in all objects or in playthings or in other children, unprovoked change of emotions, signs of fear, facial distortions, spasmodic muscular affections and convulsive seizures. In older children there will be found other diagnostic signs, such as great boldness or shyness, extremes of vain pride or absence of self-esteem, loud mirth or silent sadness, general wickedness or painful over-conscientiousness, heartless cruelty or crying pity, disobedience, impudence, lying, destructive habits, filthy ways, precocious or perverted sexual tendencies, impulses to steal or to do bodily violence to others or to self, or to burn or destroy property, brief attacks of uncontrollable rage or fright, night-walking and talking, nocturnal enuresis, ne-

glect of natural needs, loss of sleep and appetite, convulsive tics and loss of weight. A special difficulty in diagnosis will be found in the variability of the symptoms, and in the fact that there are often remissions and recurrences in the mental disorder of children.

Senility.—The age of the natural decline of all the mental functions presents the difficulty of diagnosis between involutional and pathological mental changes.

There may be premature old age or the senile involution may be sudden instead of gradual, or family peculiarities not necessarily indicative of Insanity may appear by force of hereditary tendency late in life. There are numerous personal oddities of manner and expression, which do not make their appearance as transmitted bodily or mental traits until the decline of life, and there are usually few living to identify them with common features possessed by ancestors, and these peculiarities are hence mistaken for new developments of disease, whereas they are ancestral tendencies which have been latent or have been inhibited during life, and occasionally they are atavistic in nature.

The psychology of old age, like that of early childhood, is seldom specially studied by the medical examiner, who feels an uncertainty when called upon to diagnose the mental state of an old person. Loss of memory, indifference to people and events, egotism, penuriousness, garrulity, slovenliness, and selfishness are common traits in senility, even in those who have possessed opposite traits in early life, but the transition to these lower characteristics is normally gradual. If the above traits, then, appear suddenly, and, above all, if they are accompanied by an outbreak of scandalous immorality or dishonesty in one previously having led an exemplary life, they become diagnostic of mental alienation as well as of mental failure.

In proving loss of testamentary capacity in old age, perversion of affection for children or some other near relative is often alleged as a proof of Insanity. It is to be remembered that the possession of property and the right to bestow it is often all that commands respect and obedience toward these very old persons, who punish cruelty, neglect, or other wrongs by cutting off the offender from his share of property, and the charge of insane antipathy is to be, in these instances, admitted as a genuine symptom of mental disorder only after the most careful inquiry. As to the somatic symptoms, also, the diagnosis is difficult, for loss of weight, impaired digestion, and insomnia are very frequent accompaniments of senility.

It is necessary to learn the parental history as to the age of senile involution, and the general manner in which the changes are wont to occur at this epoch in the family. In some families the somatic involution is the more rapid, and in others the mental decline is first in order and most marked long before even arterial degeneration is to be detected.

Concern about property and the apprehension of its loss is common among the aged as the result often of their experience or observation in life, and the fear that they may yet be deprived of their possessions through some unexpected turn in fortune, is not always evidence of delusion, unless, indeed, it influence their conduct and lead them to deny themselves the necessaries of life, as is not infrequently the case.

There is an automatic habit of adjustment to the routine ways of life, and also an automatic propriety of response to customary questions on the part of senile cases far advanced in dementia. This deception, as to the relative amount of intelligence retained, is readily detected by the introduction of some subject new to the patient requiring attention and judgment on his part, and his psychical defect will at once become evident.

A senile lawyer, for instance, may talk with considerable show of legal lore, and yet may not be able to tell the day of the week, the place where he is, or the names of his nearest relatives, or to name the street or the number of the house in which he lives.

The mental depression of the aged has not the same intensity of manifestation as in younger persons, and the physician has to be on his guard in these senile cases of melancholia, which may end in suicide while he is debating in his mind over the diagnosis, which is often not facilitated by the presence of any delusion, since melancholia *sine delirio* is one of the characteristic senile forms of Insanity.

Eccentricity.—The presence of decided eccentricity may create some difficulty in the diagnosis of mental disorder.

There are two kinds of eccentricity. Some eccentric persons are strong-minded, self-reliant, independent thinkers, taking original and often correct and advanced views of general affairs, and such persons are far removed from the danger of Insanity. They are more apt to control persons and events than to be influenced by them, and they rise superior to the untoward circumstances of life, and they are not easily cast down by misfortunes.

The other kind of eccentric persons are weak, vacillating, pecul-

iar, often with one-sided talent, and deficient mentally and physically in general development. They are often timorous, suspicious of others, and without confidence in themselves, strange in manner and dress, shy and reticent, sensitive and having a silly vanity in certain directions. They also have native mental deficiency in many instances, and they are prone to Insanity. These strange weaklings often become more and more eccentric with the advance of life, and there is often real difficulty in determining the point at which they are to be regarded as "non compos mentis." The diagnosis in these cases can only be made by a careful study of the life-history of the patients as compared with the actual mental status in which the medical examiner finds these eccentric persons.

Imbecility.—It is difficult to say, in cases of partial arrest of mental development, what is due to native defect and what may be due to subsequent mental disease. There is every grade of mental deficiency and of resulting absurdities of conduct in complex and difficult situations of life. Imbeciles also are easily disconcerted by emotional influences, and they may indulge in imbecile rage or destructive or violent actions, which may spring from Insanity in some cases, and from simple defect of self-control in the other. It is difficult to determine whether there is in a given case of imbecility capacity for control of property, as some imbeciles have special facility in figures, though they are generally defective in judgment.

Some imbeciles live on the border-line of mental disorder, and have frequent recurrences of mental aberration from slight exciting causes. There is often some difficulty in deciding what their normal mental status has been, as people have generally failed to distinguish their weak-minded vagaries from actual insane symptoms, and their repeated mild attacks of mania are occasionally not recognized as such, but are simply termed "bad spells" by the family. The melancholia to which they are so subject is also not of a very pronounced type, and readily escapes recognition, by the relatives, as an actual form of Insanity.

A complete personal history and a careful personal examination, with tests of the various mental faculties, are the only practical aids to the diagnosis in these cases of imbecility, and, as wide variations in the mental symptoms are liable to occur, a number of visits may be necessary, among the higher order of imbeciles especially.

Not a few imbeciles find some simple routine occupation and go through life unrecognized as belonging to the defective class. The

physician must be able to diagnosticate the grade of mental defect and the Insanity which may be superadded.

Deaf-mutism.—The number of insane deaf-mutes has increased of late years in hospitals for the insane, chiefly through the ability of physicians to detect Insanity when existing in this defective class. The difficulty of diagnosis varies in inverse proportion to the degree of education of the deaf-mute. Among the highly educated deaf-mutes the Insanity is revealed in a variety of ways, but chiefly in the form of insane delusions and of irresistible and dangerous impulses.

In the uneducated deaf-mute the difficulty lies in ascertaining the natural degree of intelligence, and the changes which have occurred in it from the effects of disease.

The actions of the patient alone furnish an index as to his mental condition, and it is seldom that the real motives of his conduct can be learned. If the mental excitement interferes with the meagre sign-language which he possesses, the task is almost hopeless, but even then a homicidal or suicidal attempt, or the discovery of epileptic symptoms, may throw light on the diagnosis. Maniacal states and acute melancholia are, of course, recognized.

Delusions of suspicion and suicidal tendencies have been the most constant symptoms in insane deaf-mutes who have come under the writer's care. The diagnosis of malingering in a deaf-mute would doubtless present unusual difficulties.

Voluntary Mutism.—Peculiar difficulty of diagnosis arises in case of absolute silence, and refusal of the person examined to communicate with anyone. Voluntary mutism is itself a symptom of Insanity in an occasional case, in which it may continue for years under the influence of insane delusion. Convicted criminals have been known to feign this type of Insanity, and this is in some respects the easiest form of simulation, though it eventually becomes very trying to the malingerer.

It sometimes happens that the nature of the physician's visit to the supposed insane person is understood by the latter, who, for the time being, maintains a silence which cannot be broken by any device. In such an instance the physician must obtain information through the medium of other persons with whom conversation will be carried on by the patient. If this be not practicable, and if a physical examination is refused, the physiognomy and the personal history of the case can alone be relied upon for the diagnosis. If the personal history be meagre, the elements essential to a diagnosis

are wanting and a conclusion cannot be reached. In the latter case it will be necessary to resort to continued personal observation of the supposed insane person until sufficient cumulative evidence of Insanity can be had.

It is not to be recommended that the physician resort to means to provoke, surprise, or intimidate the person who is obstinately silent under examination, unless it be in the case of a convict suspected of malingering.

Painful electric currents and similar means are seldom necessary or justified even in prisons. Scientific observation, and the determination of somatic signs and bodily functions, and of personal conduct during a certain period of time, are sufficient even in cases of prolonged voluntary mutism, and the physician who is not competent to make a diagnosis without crude or questionable measures should call the skill of a specialist to his assistance.

Aphasia.—The question of the mental status of an aphasic person often has important medico-legal bearings, as, for instance, in the case of the validity of wills executed during aphasic conditions. The cerebral lesions which cause aphasia often result in organic dementia. A close study of every individual case of aphasia is required to determine the mental functions affected and the general degree of impairment of mind.

Cases of motor aphasia, having lost the memory of movements, of speech (aphemia), or of writing (agraphia), or of gestures (amimia), are not from that fact alone to be regarded as insane, and if the will and understanding are otherwise sound, the testamentary capacity cannot be questioned on the ground of Insanity diagnosticated by these cerebral symptoms.

Cases of sensory aphasia, having lost the visual memories of words written or printed, or of gestures and manual signs executed, or the auditory memories of words spoken, are not to be considered insane from the mere fact of this word-blindness and word-deafness, for they may still have a clear understanding of themselves and of their surroundings, and they may judge correctly of events about them and may be free from actual disorder of mind.

If, in addition to symptoms of motor and sensory aphasia there be incoherence of ideas and of speech from lesions of the associative fibre-system (paraphasia), the intellect is evidently so far impaired that the diagnosis is extremely difficult, and the probability is that the sufferer is at least medically insane. If such a case be recent, only

a guarded and provisional opinion is to be given, and the element of time is to be claimed as essential to the diagnosis, as both the paraphasia and incoherence with excitement may shortly disappear, leaving the alexia or aphemia, which in turn may slowly diminish. On the other hand, the intellectual impairment may progress to fully developed organic dementia.

In these cases the somnolence, emotional weakness, and irritability of temper are not diagnostic of Insanity, as they are symptoms common to all coarse brain disease. The prevailing mood in cerebral focal lesions is that of irritable depression, even in the absence of symptoms of active Insanity, and a fundamental tone of exaltation in one of these aphasic cases, therefore, has considerable significance as to Insanity, as it is highly abnormal.

Alcoholic Intemperance.—Nothing is more difficult than to determine the real mental condition of an habitual drunkard, who has become a public nuisance and a menace to the personal safety of his own family. In the first place, it is not easy to obtain a personal examination at a time when the individual is free from the direct effects of alcohol, and then the personal history and alleged insane acts are known to be in part the result of alcoholic influence. The habitual drunkard assumes something in his manner and speech beyond that which springs directly from the alcohol; he usually exaggerates the effect of the stimulant, both as to its mental and bodily influence. In the early history of the drunkard this is a species of histrionic performance of a clownish nature, but eventually the drunken manner and speech become habitual, along with a sort of stupidity, which is sometimes more apparent than real.

If such a drunkard is put to the test of an examination as to his sanity, he will often inhibit even the above-mentioned habitual bearing, and he will talk "as sober as a judge," and no delusions will be discovered, and the lapses of memory will be surprisingly few. This effort of inhibition in those in whom serious cerebral lesions have taken place cannot be continued usually for an hour at a time without affording the medical examiner glimpses of the true state of mental impairment, especially if the intemperate person can be taken at a time when he is not sustained by his customary stimulus. If the person can be induced to abstain from drink even for one day the examination may then be renewed with success, and, by plying the person with questions upon subjects in which his feelings are known to be enlisted, delusions of conjugal infidelity, hallucinations,

and other characteristic symptoms of alcoholic Insanity may be discovered. In other instances, however, no positive symptoms of Insanity will be found even after repeated examinations, and the physician can only declare that the case is not yet ripe for a diagnosis, however sure he may be that cerebral lesions have so far advanced that it is only a question of time when the mental disorder will make its appearance.

Excessive Indulgence of Appetites.—The most abject addiction to sensual indulgence is not *per se* proof of Insanity. Men are found the world over making the gratification of their beastly appetites a chief source of pleasure. Some of these appetites are natural and others are artificial or acquired. Both savage and civilized peoples addicted to the use of animal, vegetable, or mineral poisons, of which the most widely used are arsenic, opium, and tobacco, are known to indulge to the extent of serious damage to their physical and mental state. When the mind is undergoing, with the rest of the organism, deterioration in this way, it becomes a difficult question often to fix the point at which Insanity may be said to exist as the result of the excess. Some opium-eaters live to advanced years and retain their mental faculties intact to the last, just as do some life-long alcoholic tipplers, but others, through idiosyncrasy or transmitted instability of nervous tissues, suffer serious lesions after comparatively slight indulgences.

As far as the Insanity is concerned, therefore, it is not a question of length or degree of indulgence, as the individual standards vary so widely in these particulars, but of the actual damage which the nervous system has sustained and of the resulting degree of mental impairment or disorder of the faculties of body and mind. The disorder of physical functions is here mentioned because the mental disease follows in a reflex way in some of these cases as a sequence of the physical disturbances.

The diagnosis of Insanity, therefore, in these cases of excessive indulgence of appetites, natural or artificial, cannot be based on the fact of gross sensualism, or on the individual's deliberate choice of continued indulgence to the extent of damage to health or fortune, and it cannot be made at all unless there be positive disorder of mental faculties or decided impairment of mind.

The ability to make a diagnosis in these cases implies a familiarity with the effects of all sorts of drugs and self-indulgent habits, in addition to a knowledge of the psychic and somatic symptoms of

Insanity. The difficulty of diagnosis will also be found to be increased often by the extreme reticence and cunning of the patients, who hide their true state of mind and body from the physician.

Supposed Recoveries from Psychoses.—Patients who have recovered from an attack of Insanity treated at home or in hospitals for the insane are subject to relapses, which it falls to the lot of the general practitioner to recognize. It is a trying thing for a general practitioner to oppose the expert opinion of hospital officers who may have discharged a patient from their care as recovered from Insanity, yet the family physician must be equal to this emergency.

The patient may, in the quietude and regularity of hospital life, have ceased to show any signs of Insanity for some weeks before his discharge, and yet the cares and responsibilities of active life may soon cause a return of symptoms, which it is the duty of the family physician to recognize.

There is usually pressure brought to bear for the release of patients from hospitals for the insane before their cure has had time to harden, and the officers of such institutions may yield to the persistent demands of the relatives when the symptoms of Insanity have disappeared completely for a certain period, and before the danger of relapse has ceased to exist.

The person supposed to have recovered has gained much experience as to Insanity and the views of physicians about it, and is able often to practise deception as to his real mental condition. The diagnosis of a return of symptoms in a supposed case of recovery is therefore very difficult in many instances. On the other hand, the physician has to guard against the tendency of expectant attention on the part of acquaintances or interested parties, who are apt to see strangeness in the conduct or speech of a patient when it does not exist. The change in the bearing of the patient toward those friends whom he knew before his first Insanity is often only a reflection of the altered mental attitude and feeling of the friends toward the patient, who, after an attack of mental disorder, is seldom restored to the complete confidence of any but his nearest relatives. The physician must possess much astuteness, therefore, to determine whether the changed conduct and feeling does not exist more largely in the patient's personal environment than in the patient himself; whether the patient is simply reacting normally to the changed bearing of others, or is showing altered and morbid conduct, irrespective of the changed conditions just mentioned.

In order to arrive at the truth it may be necessary for the physician to gain the confidence of both the relatives and of the patient. If there was in the first place a contest of opinion and feeling about the patient's mental condition, it will very likely be renewed among the relatives in the second instance, and the physician must be at great pains to act with judicial impartiality in the case, and he must be prepared, if need be, to incur the ill-will of the family in order to protect the best interests of his patient.

Feigned Insanity and the Detection of Various Forms of Malingering.—Accounts of feigned Insanity abound in history and literature, and the same motives exist to-day for the simulation of mental disease. In military and naval service, or to escape from the same; in prisons, or to avoid punishment for crime committed; and to evade the responsibility of contracts or of financial undertakings, and for various other motives, Insanity may be feigned.

Many attempts at the feigning are absurdly crude, but others are so premeditatedly perfect or accidentally successful as to deceive an expert, so far as a diagnosis from the personal examination alone is concerned.

The fact that the person to be examined has a motive for the feigning of Insanity is of no service in the formation of opinion in the case, but the fact of heredity and of previous attacks of Insanity is of importance. A complete personal history of the individual is of the utmost importance before an attempt is made to detect the supposed simulation. The fact that the insane feign symptoms of Insanity other than those which constitute their mental disease is not to be forgotten, otherwise the physician might be betrayed into the declaring of a lunatic a malingerer.

A difficult complication arises when the person feigning Insanity is in reality affected with some neurosis, such as hysteria, neurasthenia, or epilepsy, and the general ill-health of prisoners interferes in some degree with the value of somatic signs, since there may be constipation, coated tongue, indigestion, and other bodily symptoms as in Insanity. Another relevant fact is that prolonged simulation sometimes ends in actual Insanity, as already described in the chapter on Etiology.

The points to which special attention is to be given in the detection of cases of malingering are, in the main, as follows: First, does the history of the case accord with the ordinary course and mode of development of Insanity, and is there any prevailing tone of depression or exaltation, or is there any real continuous stupor?

Secondly, are there delusions, illusions, hallucinations, and real impairment of any of the mental faculties, and are the apparent symptoms of a kind found in ordinary cases of Insanity?

Are there any somatic symptoms such as are found in Insanity, and are they in accord with the mental symptoms displayed?

Is there a general likeness to any special type of Insanity in the manifestations, or is there an inconsistent mixture of symptoms of several forms?

The first question covers the point that there are almost always preliminary symptoms for weeks or months before an attack of Insanity, and that there is usually a certain order of appearance of both the bodily and mental signs of the coming mental disorder. There is also, in the vast majority of cases, preliminary mental depression and a permanent emotional tone of exaltation or depression, or the presence of stupor, after the Insanity has once declared itself. If all these signs fail and the preliminary features have none of them been present, there is a first ground for doubt.

The second question relates to the very essence of the mental disorder, and it will be found almost impossible for a malingerer to feign delusions, hallucinations, and illusions consistently with any form of Insanity with which he is not very familiar. He will either have too many delusions about many subjects, or a few gross delusions out of keeping with the general intelligence present; or he will change his delusions and forget about them and get them confused on different occasions in a way not found among the insane.

If loss of memory be feigned it will likely be for those things forgotten last in true amnesia. Even the names of the months of the year, the multiplication-table, the names of near relatives, and like automatic memories may appear to have been forgotten, which is only the case in almost total amnesia. The malingerer readily falls into such absurdities and greatly exaggerates his rôle in most cases.

The somatic symptoms of Insanity cannot be feigned successfully. Even the melancholy caste of countenance is not to be long retained, and the facial wrinkles of depression cannot be imitated at any time, nor the unhealthy hue of the skin, nor the slow or rapid pulse, nor the foul breath, coated tongue; nor, indeed, any of the decided bodily symptoms of Insanity.

It is still more difficult to imitate the rapid flight of ideas, the wild looks and the haggard mien of mania, with the constant activity

and, above all, the insomnia and the general bodily symptoms. The swift facial changes of an emotional nature, and the automatic grimaces in mania cannot be feigned even by the most skilled facial contortionist.

The third point, which is the choice of form of Insanity, or, rather, in many instances, the ignorance of the types of Insanity and the mingling of various forms in the simulation, is one of the most constant signs of malingering, and the simulator may reverse the natural order of the stadia of depression, excitement, and stupor. The stuporous physiognomy cannot be feigned, nor can the cutaneous anæsthesia, if the patient be pricked with a pin when unprepared for it, and the absence of certain reflexes cannot be imitated if tests are unexpectedly made.

The primary symptoms which are followed by stupor will also be wanting, unless melancholia attonita, or primary dementia, or some like impossible form of stuporous Insanity be simulated. The mental symptoms of general paresis may be imitated with some success by one very familiar with them, but this is not true of the physical symptoms of the disease, except as to the hesitancy and tremor of speech and the exaggerated knee-jerk. By long acquaintance and practice in imitation the speech of the paretic may be very perfectly simulated, and some of the one-sided seizures are far more readily feigned than epileptic seizures. The writer once had to pass an opinion on a person who feigned epileptic convulsions and subsequent maniacal excitement for a few hours on several occasions, but at the end of a few weeks gave up the rôle (which was remarkably well done) on being assured that the fraud was very evident. Another case feigned simple melancholia with hatred of relatives and suspicion of conspiracy against his life by poisoning, and the only failure was that the facial melancholy was a trifle overdone, and secret observation showed a completely different expression when the patient was alone in his room.

Primary monomania cannot be well simulated, and the systematized delusions and the whole ingenious system of reasoning about them can only be well feigned by those having very special knowledge.

The personal history of some criminals corresponds in the main with what is termed moral Insanity, but the latter is too technical a type of Insanity to come within the range of the simulator's attempts.

Insane mutism is almost too negative a form of Insanity for the simulator, though less difficult than some which are attempted. Abject dementia cannot be feigned, as the fraud is exposed by the physiognomy and the intelligent look of the eyes and the state of facial innervation and general attitude and bearing of the patient.

The easiest form for the simulator is simple melancholia, and, if he confine the manifestations to delusions of persecution, hatred of family, suspicion of poisoning, and wear a sad countenance, and is never betrayed out of his gloomy taciturnity, it will be very difficult for the medical examiner to form an opinion as to the simulation.

This form of simulation may also be reinforced by suicidal preparations or attempts made with sure chance of prompt interruption, or in the weak way common among many really insane, and in the latter instance it does not aid the simulator. Well-timed and well-executed attempts at self-destruction are very effective means of feigning, and they are always to be investigated in a most searching manner, since attempts may, if stupidly undertaken, furnish the most convincing proof of malingering.

The most effectual means for the detection of feigning is prolonged observation of the simulator. Practically there is no possibility of successful feigning under secret observation, and all the other tests which may be applied in a hospital for the insane, where the person is continuously under the espionage of skilled attendants.

It is fully possible for persons to feign Insanity so as to remain inmates of hospitals for the insane. The ordinary attention given to patients by medical officers is not sufficient to penetrate the mask of the simulator at all times, and especially where there is no cause to suspect the extraordinary conduct of one who feigns Insanity simply for the purpose of seeing the inside life of a hospital for the insane. This has been done repeatedly, however, and it is mentioned as of incidental interest in this connection, and as showing that feigning by inexperienced persons is by no means self-evident, even to the eye of experts, and that it requires special attention for its detection.

Feigning may be discovered by the administration of anæsthetics when more customary and less heroic measures have failed. By tempting the simulator to indulgence in alcoholic stimulants, or by the artificial feeding of the same by nasal tube in milk, the feigning may be exposed in some cases.

Ridicule, sudden surprise, intimidation by the announcement that a surgical operation to the patient's head may be necessary, and the exciting of the emotions in various ways may be justified and successful means of exposure of the fraud of feigning in criminals, but, as a rule, these measures are not to be employed, except as a *dernier ressort.*

Strong electric currents sometimes have a demoralizing effect on the simulator, and they are then a prompt means of detection, but, like the other questionable measures, they are seldom necessary or justifiable, and the same may be said of the surprise-douche and various means of inflicting physical shock. The quiet but decided assuring of the simulator that his fraud is very evident will sometimes lead to the abandonment of his rôle when other means have failed.

The gaining of the confidence of the simulator by persons about him or by former friends may be a successful way of arriving at the true mental condition of the person under observation, and the secret facial study of the simulator when he is alone with his most confidential friend may decide the question. All these detective means are rarely required, and the same scientific procedure as to personal history and personal examination described for the diagnosis of Insanity in general will be all that is essential for the vast majority of all cases of feigned Insanity.

The Differential Diagnosis of Mental Disorders.—In the making of a diagnosis of Insanity a variety of affections, which in some respects resemble it, have to be excluded. The differentiation between mental disorder and some of these affections is not always easy, from the fact that there is real disorder of the faculties of mind in both instances, but in the one it is arbitrarily called Insanity and in the other it has a different designation. The sufferer from acute brain diseases may have excitement, incoherence of ideas, and great motor activity, and, for the time being, is beside himself or delirious. If like symptoms follow epileptic attacks they are said to be symptoms of epileptic mania, and if they follow upon toxic conditions, they are recognized as toxic Insanity. If alcohol happens to be the toxic agent, the patient is said to have delirium tremens, or intoxication, or chronic drunkenness, which are not regarded as symptoms of Insanity unless certain psychical symptoms happen to appear in addition to those found in the above affections.

Now, as a matter of fact, there is mental disorder in all the above

instances, and it is a purely conventional distinction to apply the term Insanity to some and not to other conditions in which there is real disturbance in the action of the mental faculties. It would be a broader and more philosophical view to recognize every genuine disorder of the mental faculties as Insanity from whatever cause produced, and to admit the clinical fact that every possible degree and every conceivable duration of the Insanity may occur. If a patient is beside himself from drugs, alcohol, trauma capitis, diathetic poisons, infectious diseases, or any other causes, whether it be for hours or days or months, the Insanity should be recognized if it really exist. The only brief form of Insanity, of a few hours' full duration, admitted, is mania transitoria, which, as it is now understood, could not be applied to any of the conditions above mentioned.

The arbitrary usage of authors on Insanity, after the above qualification, must necessarily be followed here in speaking of the differential diagnosis of mental disorders.

In the first place, then, Insanity is to be differentiated from acute brain diseases.

If the patient be suffering from meningitis and be in a flighty condition, the mental disorder is not to be designated or treated as Insanity. The patient is to be guarded against accident and to be treated for meningitis. The physician would render himself liable to censure if he were to send such a patient to a hospital for the insane for treatment. If permanent symptoms of mental disorder were to attend chronic meningitic processes, the Insanity would be recognized as the chief affection, or, if melancholia followed or attended basilar meningitis in a tubercular patient and both affections were prolonged results of the tubercle, the patient might be diagnosed and treated as insane. Meningitic metastasis in acute rheumatism may cause active delirium for hours or days at a time, and the joint becomes less inflamed often and other symptoms may be less marked while the delirium lasts. This delirious state is not termed Insanity unless the hallucinations and disorder of mind continue after the acute inflammatory symptoms have disappeared and high temperature has subsided. A like conventional usage applies in all acute brain diseases attended with delirious conditions, or brief alterations of consciousness, perception, or intellection.

Insanity is to be differentiated from the delirium of fevers during either the stage of high temperature or of exhaustion. Some persons are always delirious when the bodily temperature rises more than

five degrees Fahrenheit from any cause. The delirious symptoms in the exhausted stage of fevers are sometimes prolonged. There may eventuate a mental disorder termed post-febrile Insanity. In typhoid fever delusions of suspicion and melancholia may arise at any stage of the disease, and forms of stuporous Insanity are common sequels of the fever. In acute infectious diseases of all kinds there is apt to be delirium from two causes: first, from the hyperpyrexia, and, second, from the specific virus in the blood. In all these acute infectious diseases impaired consciousness, sensorial disorder, incoherent ideation, muttering, and restless movements are not termed Insanity, even though they may be present for a week at a time.

If the patient has no active disturbance of consciousness and is fully aware of the nature of his surroundings, and is connected in his memory of events, persons, and places, and still has persistent delusions, it is conventional to recognize the Insanity, even during the course of the infectious disease.

It will be found useful, by graduated baths or the application of ice to the surface, to reduce the temperature in all diseases in which there are delirium, hallucinations, and excitement, and if the mental disorder subsides the conclusion is that it is due to the hyperpyrexia.

Insanity is to be differentiated from the delirious symptoms in inflammation of internal organs. Pneumonitis is very constantly attended with delirium, and it is sometimes followed by Insanity, especially in those of intemperate habits.

Cardiac inflammatory affections, peritonitis, and intestinal inflammations, nephritis, and hepatitis are sources of temporary mental disorder of a delirious nature not to be recognized as Insanity. At the same time, in one predisposed to a psychosis, any of the above affections may act as the exciting cause of permanent Insanity, which is to be recognized without hesitation, even though it develop in direct sequence of the delirium. The differential points in the conventional distinction between delirium and Insanity are as follows: In delirium consciousness is much impaired; there is confusion of time, places, persons, and past events, which are not recognized in their relation to immediate surroundings, of which the patient has no clear conception, and the muttering is an incoherent jumble of past memories and hallucinatory images, with picking at illusory objects, and the muscular movements are purposeless, and the excitement is usually motiveless, and manifestations are very

largely of a reflex and automatic nature. In Insanity the supposition is that the patient is conscious of his relation to his environment, he knows what he is doing, and acts from some motive, even though it be insane, and his restless activity in excitement is to some purpose, and his delusions bear some relation to actual events, as a rule, and there is some effort to reason and explain them, and his hallucinations are not such incoherent sensorial mixtures of real and imaginary things, and, in a word, the general reduction of consciousness and of the mental faculties is not as general as in delirium. These differential points, arbitrary though they be, usually suffice for practical purposes of diagnosis in cases in which the physician has to act.

Insanity must also be differentiated from the flightiness of inanition from whatever source it may proceed. There are many diseases, both acute and chronic, in which the patient falls into a state of extreme inanition, which may be attended by disorder of sensorial perception and wandering speech and actions. Forced alimentation, with a generous amount of predigested foods, if need be, may relieve the mental disorder and assist in the diagnosis. Extensive losses of blood following accidents, childbirth, or operations may be followed by temporary delirium not to be mistaken for Insanity. The same may be said of the delirium following physical injuries, and surgical and all other kinds of traumatism.

Commotio cerebri and spinal concussion may give rise to confusion of ideas, loss of memory, inability to fix the attention, and to other symptoms of mental impairment, which, as it is often of a temporary nature, is not ordinarily recognized as Insanity. It is a fact, however, that these symptoms sometimes remain and gradually assume a more serious nature, and end in permanent Insanity.

Insanity is to be differentiated from acute alcoholic intoxication and from the immediate effects of drugs. If the odor of the breath reveals nothing, the general appearance and actions of a drunken person are so well known as hardly to require description here. Delirium tremens, it is well known, arises when drink has not been taken, and it is often provoked by physical shock or some acute disease, especially pneumonitis in the chronic inebriate. The mental disturbance caused by drugs varies considerably, and the chief difficulty lies not in the distinction between their immediate effects and Insanity, but in the determination of the point at which the habitual addiction to some drug has developed sufficiently general or perma-

nent mental disorder to justify the diagnosis of Insanity. When the abuse of a drug has led to permanent perversion of the affective faculties, to impairment of memory and reason, and has resulted in positive delusions, the diagnosis of Insanity must be made. The direct tendency of many drugs is to develop the above symptoms, and alcohol acts in the same way, and yet, when a tippler is perverted in affection for his family, whom he abuses, is forgetful and stupid, and gets suspicious, false ideas about things and people in general, he is often not recognized as insane. Both the popular and professional standard of sanity in this instance favors a very large class of the community, coming by force of bad habit more or less distinctly in the above category. The physician, therefore, is compelled, against his scientific opinion, to diagnosticate Insanity in alcoholic patients with unusual circumspection if he wishes to escape legal actions and personal trouble.

All toxic states are to be judged by the rule above given for drugs as to the presence of Insanity. Malarial intoxication has a delirium, usually in the pyrexial stage, not to be confused with the actual Insanity which sometimes results from the malarial cachexia.

Insanity is to be differentiated from the effects of violent emotions. It is well known that there is a great individual difference as to the effects of emotions, and that some persons are completely prostrated for the time being by anger, fright, or injured pride, and that even sudden death may result from severe emotions in those affected with cardiac disease. Reaction to real emotional causes may therefore be extreme, but it does not indicate Insanity unless it be greatly prolonged.

Finally, Insanity must be differentiated from great functional exhaustion of mental powers. Some persons are capable of such severe mental exertions as to completely exhaust their powers of mind for the time being. They may not be able to remember, or to exert their reasoning faculties, or to do customary work, or to solve simple problems, or to concentrate their attention. This temporary state of brain-exhaustion is not Insanity. There may even be associated with this functional exhaustion defects of speech and incoordination of highly adaptive movements from deficient innervation, which might favor a mistake in diagnosis. The writer has known such cases to be mistaken for general paresis. In all cases of severe strain and over-work a chance for rest should be had, if practicable, before the final diagnosis in doubtful instances.

The interdifferential diagnosis of the various types of Insanity will be discussed in the clinical part of the work under the special forms of mental disorder.

Main Points to be Determined by the Diagnosis.—The main points to be settled by the diagnosis are the existence of mental disease, the special type of the Insanity, the question of institutional or home treatment, the degree of responsibility of the patient in medico-legal cases, and the ætio-pathology and general indications for the treatment of the case.

To determine the fact of the existence of Insanity is to make the minor diagnosis in the case. The medical examiner may reach the conclusion that the patient is insane long before he is able to determine the other points in the case, but it is just as well to reserve his opinion until he has made up his mind about the full nature of the disease, for, as soon as he announces the prime fact of mental disorder, he will have many other questions to answer. A second visit, therefore, may be wise before the minor diagnosis is made.

The major diagnosis determines not only that the patient is insane, but decides the special type of Insanity from which he is suffering. As certain types of Insanity are practically incurable, the major diagnosis in some cases also includes an opinion that the disease is without hope for the future. The physician must use his discretion in the announcement of this fact, which had better be communicated only to those having a natural right to know, as it may prejudice the best interest of the patient, and, if there should be subsequent lengthy remissions of symptoms, as in some cases of general paresis, it may throw doubt on the original diagnosis.

The diagnosis of the special types of Insanity will be discussed under the separate forms in the clinical chapters, but the general principle involved is to be here mentioned.

The first thing is to determine whether there be a prevailing tone of depression or of exaltation, and, in their absence, whether mental weakness or stupor be present. The question whether the depression, exaltation, mental weakness, or stupor be primary or secondary is next in order, and whether one of these conditions has alternated with the other, and, if so, what the sequence has been.

These are the broadest grounds upon which a diagnosis by exclusion can be approximated, for, if mental depression has constantly prevailed, and the examination shows no marked impairment of

faculties, all forms of mania, dementia, and stupor are excluded. In the same way, if stupor has prevailed and was primary, all forms of mania are excluded, and all forms of melancholia, unless it be melancholia attonita, and all forms of dementia except primary dementia. Likewise, if mental exaltation has been continuously present, all forms of melancholia, stupor, and dementia are excluded, and it becomes a question between general paresis and some form of mania. The personal history and the actual psychic and somatic symptoms present will then be sufficient additional evidence to settle the question of the form of the Insanity.

If the prevailing emotional tone has varied, and the sequence has been depression and exaltation, and then a repetition of the same, the form is probably circular Insanity. If there has been depression, then exaltation and then mental weakness, there is in all probability a simple psychosis pursuing the course of the customary stadia.

The elements of diagnosis of the special form of Insanity, therefore, are the presence of depression, exaltation, mental weakness, or stupor, and the sequence or alternation of these conditions, the personal history, the actual psychic and somatic symptoms present, and in some cases the cause, when well known, and the general order in which all the manifestations have progressed. The full application of these principles in special forms will be made in the second part of the work, in which differential diagnosis of forms will also be treated.

The question of institutional or of home treatment is of great importance, and it is to be embraced in the diagnosis, as it is dependent largely on the form of Insanity recognized to be present.

The popular stigma of Insanity, and the loss of standing of those who have been inmates of hospitals for the insane, has already been mentioned. It is better in general to avoid institutional treatment if the patient can be cured equally well in his own home. The simple fact that the person did not have to go to an asylum favors the idea that his mental trouble was not serious, and it often largely avoids the popular prejudice as to one upon whom the official seal of Insanity has been stamped by commitment to an institution for the insane. While protecting the interest of his patient against this popular feeling of mistrust, the physician has other considerations to guide him in his decision. The effect of the home treatment upon the members of the patient's family is one consideration. It is the duty of relatives to suffer inconvenience and some hardship even

to nurse sick members of the family. Insanity presents no new features which change the moral obligation of relatives, though the physician must not in this, any more than in other sickness, allow the health of the family to be seriously jeopardized.

The financial consideration often settles the question. The expense of home treatment is greater, unless there be members of the family suitable for nurses, one for the day and the other for the night, and, except in mild cases, specially experienced attendants are required, and a certain part of the house must be properly prepared for the accommodation of the patient.

The main consideration is the best chance of cure for the patient, whether at home or in a hospital. If the patient be suicidal, homicidal, destructive, or very noisy, institutional treatment is strongly indicated. It is the safest resort in the vast majority of cases of Insanity, unless the physician can conform to all the directions for home treatment mentioned in the chapter on Treatment, to which reference is made to avoid repetition.

One thing must be avoided, and that is the temporizing policy, which sacrifices the chances of cure of the patient, who is not actively treated, either at home or in a hospital, until he is finally relegated to an institution as incurable.

The diagnosis often has to be made with reference to the degree of responsibility of the patient in medico-legal cases.

The degree of responsibility in mental disease is the most difficult of all the questions which the expert physician has to decide. Medically speaking, personal responsibility ceases right at the point of the recognition of Insanity in the patient. This would be a simple, just, and satisfactory solution of the medico-legal difficulties, but neither the legal practice nor the popular view will allow this medical standard of responsibility to serve as a defense in court for overt acts committed or financial liabilities incurred.

The individual, though insane, may contract reasonable debts, for which his estate will be held; he may make a will, which, if not the direct outcome of his Insanity, will be valid, and he may exercise his civil rights and incur responsibilities in various directions; and, when it comes to the commission of illegal acts, the courts will hold him responsible according to the degree of his knowledge of the nature of the deed committed and of his supposed power of self-control to do or to refrain from doing the act in question. The physician will be called upon to decide the knowledge of right and

wrong, and the degree of self-control possessed by the patient, and the modified responsibility which existed at some particular time in the patient's history. If the physician simply replies in court that Insanity, to his mind, excludes all responsibility on the part of the patient, he will be supplanted by other experts, who will discriminate and define the relative responsibility, under hypothetical considerations, of the state of the mental faculties of the patient and the nature of the offence which he committed.

The diagnosis of the special form and of the particular phase of the Insanity at the time of the act in question will be important in these medico-legal cases. Irresponsibility would be more readily admitted in epileptic automatism, in maniacal and melancholiac furor, in advanced general paresis and terminal dementia, than in paranoia, subacute mania or melancholia, hypochondriacal or neurasthenic Insanity.

The diagnosis, finally, has to extend to the ætio-pathology and the general indications for treatment of the Insanity.

If the patient be suffering from syphilitic Insanity it is a part of the medical examiner's task to discover the fact of the true nature of the mental disorder.

If the patient has been secretly addicted to a drug, and has undermined his physical and mental health, the pathology of the mental disorder should come within the scope of the diagnosis, as well as the effectual means of preventive treatment of the Insanity in the future. The physician must extend his diagnostic research from the fact to the cause of the mental disease, and he will be surprised often that the ætio-pathology is simply the abuse of drugs or alcohol unknown to relatives in many cases. If Insanity be the result of nocturnal epilepsy, not known to the patient or family, the medical examiner must, if possible, arrive at the true nature of the case and of the indications for its treatment. The case may be one of phthisical Insanity, and the lesions may be found far advanced without cough or expectoration, greatly to the astonishment of the family.

The lines of the diagnosis and of the pathology of Insanity often run parallel and close together, and the diagnostician must extend his research the full length of pathological knowledge, if need be, to discover the real source of the disease and the corresponding course of treatment indicated.

Complete Formula for the Mental and Physical Examination with Reference to Diagnosis.—No effort has been made to present a technical or exhaustive formula for the personal examination of patients supposed to be insane, but a condensed and practical array of points to be canvassed by the medical examiner in attempts at diagnosis, are here brought together in systematic order, and it is thought that they may prove highly suggestive and useful to the general practitioner.

Formula for Diagnostic Examination of Patients.

A. Psychical Examination.

I. Perception.

1. Test all the senses.
   - **Touch** — Anæsthesia, ana'gesia, thermo-anæsthesia. Test the sense of pressure, contact, locality, temperature, pain, and the time rate of the reactions of the skin in these directions.
   - **Taste** — Test for sweet, sour, salt and bitter solutions. Ageusia, hyperageusia, parageusia.
   - **Smell** — Various tests best made before testing taste. Anosmia, hyperosmia, parosmia.
   - **Sight** — Anomalies of vision, color-blindness. Ophthalmoscopic examination. Pupillary reflexes. Action of ocular muscles.
   - **Hearing** — Distance, cranial conduction, electrical tests, otoscopic examination.
   - **Muscular sense** — Sense of weight. Position of limbs.
2. Hallucinations and illusions of all the senses.

II. Consciousness. — Degree of impairment. Changes in identity. Realization of present surroundings. Consciousness of mental disease.

III. Memory.

1. Test of memory. — Amnesia. Special loss in aphasic conditions.
2. Disorders of memory.

IV. Intellection. — Tests for thought-rate, power of attention, association of ideas, incoherence of speech, reasoning, delusions.

V. The Emotions.

1. The fundamental emotional tone, depression, exaltation, apathy, mental weakness, stupor.
2. Egoistic feelings, animosities. Dominant emotions of fear, hatred, anger, suspicion, pride.
3. Altruistic feelings. Affection for parents or relatives. Social tendencies, religious and erotic sentiments.

VI. Volition.

1. Loss of control of ideas and of actions, as shown in general bearing and conduct.
2. Irresistible impulses and impellent ideas. The tendency to destroy or burn property.
3. Suicidal and homicidal impulses and sexual perversions, and morbid instincts or appetites.

B. Physical Examination.

I. Osseous Structures.

1. Cranial conformation, measurements, asymmetries, size relative to stature, injuries, cranial thermometry.
2. Stature—excess or defect of growth, spinal curvature, abnormal joints or long bones, exostoses, mollities ossium.
3. Stigmata degenerationis.

II. The Muscles and their Disorders.

1. General muscular development.
2. Tests of muscular functions. Strength, co-ordination, dynamometer and electric tests.
3. Paralysis, atrophy, contractures, tremors, ataxia, cataleptoid and tetanoid states.
4. Tests of muscular reflexes: Knee-jerk, ankle clonus, etc.
5. Special movements: Gait, speech, and handwriting.
6. Characteristic attitudes and gestures. Automatic actions.
7. Physiognomy: Innervation of facial muscles, paradoxical expressions, laughing, crying. Dominant expression.
8. Lingual movements: Palatal muscles and innervation.

III. The Heart and Vessels.

1. Cardiac dilatation or hypertrophy. Valvular lesions.
2. The large vessels, degenerations, aneurisms.
3. The pulse: Sphygmographic tracings.

IV. Epithelial Structures...

1. The skin: Eruptions, pigmentations, cyanosis, state of the cutaneous excretion.
2. The hair: Baldness, grayness, alopecia.
3. The nails: Bitten nails, trophic changes.

V. Internal Organs .....

1. Lungs: Phthisis, asthma, modifications of respiration.
2. The stomach: Digestive disorders, gastralgia.
3. The spleen: Malarial enlargement.
4. The intestines: Parasites, catarrh, obstipation, hemorrhoids.
5. The liver: Abscess, cirrhosis, icterus, gall-stones.
6. The kidneys: Chronic degeneration. Examination of urine.
7. Supra-renal capsules: Addison's disease.

VI. Nutrition, Secretions, and Excretions, and Vasomotor Functions.

1. Total bodily weight: Subcutaneous fat, emaciation.
2. Disorders of nutrition: Anorexia.
3. The blood: Toxic conditions, hæmoglobin, corpuscles.
4. The saliva: Quantity, quality.
5. The urine: Chemical and microscopic examination.
6. Temperature: Changes morning and evening. Difference between head and armpits.
7. Trophic changes..... Epithelial, muscular, osseous structures.
8. Vasomotor functions. Hæmatoma auris. Local hyperæmias, œdema of skin, cyanotic extremities.

VII. Nervous System ... ...

1. Diseases of the brain.. Anæmia, hyperæmia, focal lesions.
2. Spinal affections: Alcoholic, and syphilitic lesions.
3. Diseases of the peripheral nerves: Electric reactions.
4. The major neuroses.
5. The acquired neuroses.
6. Congenital defects.

In the above formula for the examination of patients with reference to a diagnosis it has not been thought worth while to mention many modern contrivances for testing the special sensorial functions, registering thought-rate and voluntary reaction time.

Even in testing the tactile sense, if an æsthesiometer is not at hand, a pair of sharp-pointed scissors or a hair-pin may be used, or a knitting needle may be employed to trace letters or figures on the skin. Contact may be tested by drawing a feather over the skin, and sense of locality by requiring the patient to point to the places touched, and the direction of lines drawn on the skin is to be told. Temperature-sense is easily tested with test-tubes, or with coins in the absence of a thermo-æsthesiometer.

In testing the muscular sense it is to be borne in mind that an-

æsthesia of joints and tendons causes loss of the sense of position of the limbs and static ataxia.

All the usual tests are practicable in many cases of Insanity, though the physician must resort to ingenious expedients, and be prepared to vary the routine-tests to suit the particular case under examination.

CHAPTER X.

THE PROGNOSIS OF INSANITY.

The Substance of the Prognostic Inquiry.—There are a number of substantial points to be embraced in the prognosis. In the first place, there is the question of life or death. Are the chances, all things considered, that the patient will survive or perish during the attack of Insanity?

If the patient live, will he recover from the mental disorder? and about how long will it be before the cure will be complete? and if he recover will he be liable to have another attack? The family physician will be called upon to answer these questions, and he will require great skill, if he have many cases of Insanity, to uniformly acquit himself successfully on these categorical occasions. There are still other questions which he will have to answer, but the above is the chief substance of the inquiry upon which he must form an opinion. The whole subject of prognosis, being very complex in its bearings, is best discussed seriatim as to its substantial points, and first in order of magnitude is the matter of life or death.

The Possibility of Death.—It was estimated in the chapter on Statistics that out of every one hundred persons attacked for the first time by Insanity seventy eventually die insane, either during the first or subsequent attacks. Another broad statistical statement is that the average mortality-rate among the insane is from four to five times greater than among the sane. In European, British, and American hospitals for the insane the mean annual death-rate varies from eight to twelve per cent. on the average numbers resident.

The expectation of life of an insane person, therefore, at any given age is very much less than that of a sane person of the same age.

The mortality-rate is, in general, somewhat less among women than among men.

The danger of death is greatest during the first month of the

attack, and it decreases each month during the first year of the Insanity.

Among the insane in general the seasonal influence on mortality is that more die in winter than in summer, and more in the spring than in the autumn or at any other time of the year.

Other things being equal, the chances of the survival of an attack of Insanity are much greater among the young than among those advanced in life. The immediate causes, which lead to a fatal issue in the acute stage of the mental disorder, are impaired nutrition, insomnia, and cardiac failure. The general vitality of the patient becomes reduced and he dies of exhaustion from acute mental disease, often without visible organic lesions of any kind. In other cases the patient succeeds in taking his own life, or he meets with injuries or surgical accidents which are treated with great difficulty and may eventuate fatally.

In melancholic and emaciated cases phthisis pulmonalis not infrequently results, and pneumonia or œdema of the lungs sometimes leads to the fatal result.

All cases complicated with chronic organic diseases of the heart, kidneys, and lungs have an unfavorable prognosis as to life, which seldom extends beyond the duration of the Insanity.

There are certain forms of Insanity which uniformly have a bad prognosis as to life. General paresis ends fatally so constantly that some authors question the genuineness of any case said to have recovered. The average duration of life in general paresis is three years from the first appearance of symptoms.

Delirium acutum is another fatal type in which the death-rate is variously estimated by writers at from fifty to seventy-five per cent. of all cases attacked, and the average duration of life in the fatal cases is from one to three weeks.

Syphilitic and alcoholic dementia usually terminate fatally within a few years from the date of their full development.

The expectation of life is greatly reduced in cancerous, tubercular, pellagrous, and myxœdematous cases of Insanity, and also in other severe cachexia.

Mental disorder from focal brain diseases is unfavorable as to the chances of life, and in the majority of cases it terminates fatally in from two to five years. In hemiplegic dementia from intracerebral hemorrhage there may be a considerable prolongation of life in occasional cases. On the other hand, Insanity from brain tumors

usually terminates fatally within less than two years, and has a more prompt average mortality even than general paresis.

The prognosis as to life and death, therefore, in any particular case, must be judged by the above principles, and also by the careful estimate of the individual strength of constitution and general vitality and powers of recuperation, and also by considerations of the age, sex, stage of the mental disorder, and by the more or less complete facilities for the good nursing and thorough medical treatment of the case. If the patient be too poor to afford good nursing and abundant supplies of nourishment, and the family have an unreasonable prejudice against the removal of the patient to a hospital for the insane, the chances of life are greatly diminished, and such cases are constantly sent to hospitals in a final stage of reduction, in which no amount of forced alimentation or medical skill can avert the fatal termination.

The Hope of Recovery.—The recovery-rate, calculated on the total number of admissions in European and American hospitals for the insane, varies from thirty to fifty per cent. This is rather more favorable than the real facts of recovery would warrant, as relapses and second recoveries of the same patients are not eliminated from this estimate. On the other hand, it is to be considered that the more unfavorable cases usually find their way to hospitals, so that the general chance of recovery above stated is not far from correct. The writer's opinion, based on experience in both hospital and private practice, is, as already stated under Statistics, that out of every hundred patients attacked for the first time by Insanity, thirty recover and remain well the rest of their lives, and twenty recover, but relapse and die insane, and fifty do not recover at all. The chances of recovery among women are, on the average, greater than among men, as shown by statistics on a large scale.

The percental chances of recovery from first attacks of Insanity, therefore, are not very different from those found in severe organic diseases of internal organs, and the individual prognosis in both instances is specially modified by the age, constitution, and direct hereditary tendency to the disease.

The patient who has had pneumonia, pleurisy, or pericarditis is liable to have subsequent attacks, and the insane patient once recovered is still more apt to have a recurrence of mental disorder.

The hope of recovery diminishes rapidly with each successive attack, and, although a dozen recoveries have been recorded excep-

tionally in cases, it may be practically assumed that not more than three recoveries are to be admitted as complete in any case. In strict accordance with scientific truth the majority of first recoveries even leave the keen edge of the intellect somewhat dulled, and a slight impairment of the higher intellectual and moral qualities. These sequels in recoveries from first attacks are imperceptible, however, except to experts, and, for all the intents and purposes of life, the patient is as well as he ever was.

The prognosis as to recovery, as greatly modified by the form of the Insanity and other factors in individual cases, will be found discussed under a later heading.

The Probable Duration and Mode of Termination.—It is important for the family to know how long the large expense of the care and treatment of an insane relative will probably have to be borne. Insanity pursues a longer course than most diseases, and it presents greater extremes in time-limits than other maladies, as it may last from an hour to a life-time. It has been estimated that the average life of the insane is about twelve years.

Fortunately the immediate danger of death, as well as the hope of recovery, is decided during the first year. If actively and skilfully treated within the first month, seventy per cent. of those attacked may be cured, but if not treated until the sixth month of the disease only fifty per cent. can be cured, and for each subsequent month the hope of cure diminishes, and after the first year not more than ten per cent. recover, and after the second year and until the twentieth year of the Insanity an exceptional recovery may occur. Practically, however, Insanity may be regarded as having little hope of recovery after the first year, and the family should not be expected to suffer financial distress to support an insane relative, who at the end of a year's treatment shows no signs of improvement.

Seventy-five per cent. of cures in hospitals for the insane occur within eight months from the date of admission of the patients. The above statements will enable the physician to form a correct general opinion of the curable prospects of the case, judged by the actual and by the prospective duration of the attack.

The form of the Insanity will also influence the opinion given as regards duration. Insanity of the menopause is often prolonged for several years before recovery, while typhomania runs its course within a few weeks, and many of the acute psychoses terminate within a few months.

The expansive forms of mental disorder are more apt to run a prompt course than the depressive forms. Thus, in adolescent Insanity the melancholy type rather than the maniacal runs into chronic mental disease. The maximum recovery-rate in this form is from the fourth to the eighth month, and fully three-quarters of the cases recover before the latter date, the most recoverable period being earlier in males than in females in this instance, being prior to six months in the former and subsequent to that time in the latter.

In all the incurable forms of Insanity the question of duration, of course, is equivalent to the determination of the expectation of life in each case, and this is often in turn dependent upon some organic disease of internal organs, or upon some diathetic state.

The Mode of Termination of an attack of Insanity is a question about which the physician will surely have to give an opinion. The demand will be not alone as to the possibility of death or the hope of recovery, but also, in case of neither of those events, just what the state of the patient will be. Will the patient be able to attend to any business or to have any voice in the management of his affairs? will he be well enough to live at home, or must he remain an inmate of a hospital for the insane?

The prognosis as to the mode of termination requires a more extensive experience in mental disorders than is required to give an opinion as to the chances of recovery.

In hereditary cases there is a tendency to make repeated sudden and partial recoveries, which are less and less perfect after each successive attack. Outside of this general rule the physician will do well to bear in mind in these cases that the unexpected always happens, and he will often be astounded to see a patient in abject craziness one month and to find him clothed and in his right mind and successfully at his business the following month. Such a patient has entered upon a degenerative line of life graphically represented by abrupt descents into the depths of Insanity and sudden ascents to planes of mental health, sinking successively lower after each recurrence.

There is another hereditary tendency to a special mode of termination in certain families at certain ages. Thus, active suicidal Insanity appears about the age of forty-five in certain families, and then subsides into a mild form of mental impairment for the rest of life, while in other cases it takes the form of premature senile decline of mental faculties from the very first and is absolutely hope-

less and progressive in nature. It is well, therefore, to carefully study the family tendencies, which so often repeat themselves in mental disorders.

A common mode of termination is partial recovery, with no remaining disorder but general weakness of mental faculties. There is about one chance in four that an ordinary acute psychosis will terminate in this way. Such partially recovered patients may often live at home, and be engaged in some light business, and manage their own affairs, if they demand only a modicum of business capacity.

In other cases of alcoholic, syphilitic, paretic, and toxic nature, in which hopeless lesions have evidently resulted, the physician will be able to prognosticate permanent dementia, even if life be spared for years. The physician must recognize these cases, which bear the stamp of incurability from the beginning, in order that the family may not be impoverished by expenses of cure undertaken in the false hope of a favorable termination of the mental disease. To this incurable category belong general paresis, senile dementia, mental disorder as a sequel of tuberculosis or cancer, the periodical and circular Insanities, mental alienation resulting from chronic epilepsy, primary monomania, hereditary alcoholic Insanity, terminal dementia, and organic dementia.

The Chances of Recurrence.—There is a certain tendency to recur in all forms of Insanity, and one attack always increases the probability of a subsequent one. There is not only a special form, known as recurrent Insanity, which is almost hopeless in prognosis as to the prevention of the return, but there is also direct heredity to this particular form, and this is still more unfavorable. This recurrent form is especially common during middle age, and at a somewhat later period still in women.

The general average chance of relapses has already been stated in the estimate that, out of one hundred attacked by Insanity for the first time, thirty recover and remain well, while twenty others who recover relapse and finally die insane.

If the patient be without special heredity and become insane from great exposure, hardships, fevers, or other active cause, and make a good recovery of his original strong physical condition, the chances are that he will not have a relapse.

The danger of a relapse is avoided sometimes by prophylaxis as regards the original cause of the Insanity. Thus, if childbearing

be the cause of the mental disorder in a woman free from heredity, the probability is that there will be no relapse if a second puerperium is avoided.

The same would be true of Insanity from alcoholic excess and drug habits if prophylaxis were less difficult, but the physician may safely prognose a relapse in seventy-five per cent. of this intemperate class of patients, simply because there will be re-exposure to the original cause.

In estimating the chance of recurrence the total environment of the patient is of the utmost importance.

If the recovered woman is again to be exposed to hardships, the care of children, the loss of sleep, unhygienic surroundings, and perchance the abuse of a drunken husband, there is almost a certainty of a relapse. In the same way a recovered business man, returning to the fight of life, working against fate, and hoping against desperate chances to better his financial condition, and living again on the keen edge of anxiety, will almost inevitably have a recurrence of mental aberration. For the statistical chances of relapse, this heading in the chapter on Statistics may be consulted.

The Essential Elements of Prognosis in Individual Cases.—The individual elements of prognosis are age, sex, constitution, and heredity of the patient, and the form, duration, course, and cause of the attack.

Age.—Youth is favorable to survival and recovery from attacks of acute Insanity, and old age diminishes the hope of life and of cure. The greatest number of recoveries takes place between twenty-five and thirty-five years of age. The individual exceptions to this rule are found chiefly in particular transmitted neuropathic tendencies to epochal Insanity followed by recoveries. For instance, in certain families such a tendency exists to climacteric or senile mental disorder followed by recovery, and even a tendency to relapse and final recovery may exist.

The damage done to cerebral tissues and vessels during the acute stages of the psychoses are not readily repaired, and the recuperative powers are much greater in early life than in advanced years. The more perfect nature of the cures, as well as their greater proportion, is to be noted during the earlier part of life. The fact of recovery in a patient between fifty and sixty is by no means the equivalent of a recovery between twenty and thirty. The clinical proof of this is the constant relative numerical increase of relapses as age advances from the period of maximum recoverability named.

It is to be borne in mind that age is relative, and not absolutely measured by lapse of years, and the fact of involutional changes in the vascular system, and in the tissues generally, is the true gauge of senile decline, which is present in some families at forty and in others not before sixty years, just as adolescence is complete in some before twenty, and in others not until after twenty-five years. The period of greatest recoverability falls at a later period in long-lived families in which maturity is slowly reached, and at an earlier date in those exhibiting precocity at one end of life and at the other senium precox. The general hope of recovery is greater in the former families than in the latter. All forms of juvenile Insanity in which there is a basis of congenital defect are unfavorable, and this is true of Insanity at any age in those having inherited mental deficiency.

The bearing of age on the chances of life in mental disorder is sufficiently expressed by the fact that the expectation of life diminishes with advancing years much more rapidly in the insane than in the general population.

Sex.—The relation of sex to prognosis may be summed up in the statement that there is, as shown by statistics, a slight advantage on the side of women, both as to recoverability and mortality.

The fact of a larger proportion of recoveries among women is offset, however, by the secondary fact that there are among them more relapses than among men.

As to the sexual difference in the mortality-rate, it only tallies with that which exists in the general population, for in the long run the death-rate is smaller among females than males, according to both British and American statistics. The truth probably is that men have greater strength of resistance to the shocks of life which cause Insanity, and that, were women equally exposed to alcoholic excess and all the hardships of the battle of life, the statistical relation now in their favor would be reversed. The greater mortality in males is largely accounted for by the syphilitic, alcoholic, and paretic cases. The greater frequency of relapses among women is probably to be attributed to a greater preponderance of hereditary influences among them.

Constitution.—It is intended to express by the word constitution both the physical and mental organization, and the general distinctions implied in the word temperament. The skilful physician learns to judge with considerable accuracy of the general strength or weakness of the constitution of his patients, and to recognize certain traits

implied in common parlance by the terms nervous, sanguine, bilious, and lymphatic temperaments. The differences in individuals above mentioned certainly have importance, and are to be given due weight in prognosis. There are individuals so constituted that expansive forms of mental disorder prevail with them, while in others depressive types result, and with the lymphatic temperament stupor is more often associated.

The strength of constitution required to recover well from acute maniacal Insanity is very considerable, and this favorable issue is certainly not to be anticipated in those of distinctly feeble constitution. The latter are much more apt to succumb to maniacal exhaustion or to pass into secondary dementia. The family physician who has had an opportunity to watch the individual through the infectious diseases of childhood and the disorders of later life, often has valuable knowledge as to the inherent strength or weakness of the constitution, which is to be subjected to the severe strain of an attack of acute Insanity. The stress during an acute psychosis is greater and more prolonged than that of an acute infectious disease, and the direct sequela of the mental disorder is often the development of any latent tubercular or other constitutional tendency to disease. The individual constitution, therefore, becomes one of the elements of prognosis.

Heredity.—The hereditary element in a case of Insanity modifies the prognosis, more especially as to the ultimate result. The chances of a first recovery are not greatly impaired by heredity, but the rule is that relapses follow until the mental deterioration is complete.

The different degrees of heredity are to be skilfully weighed in giving an opinion as to the prospect in a case of mental disorder. The derivation of a neuropathic constitution in direct line, both from the paternal and maternal sides, reduces the ultimate chances of cure to a minimum. Chronic alcoholism on the paternal side is very frequent, and in the light of heredity it is equivalent to open mental disorder. Alcoholism of the father and active mental disease of the mother during the full gestation of the child is a hopeless form of heritage. Confirmed epilepsy in one parent and chronic intemperance in the other is as unfavorable as direct linear heredity to Insanity.

Fully developed mental disorder in both parents prior to the birth of the patient precludes all favorable views for the future of the sufferer. Advanced phthisis pulmonalis in the father or in the

mother before the birth of the patient is tantamount to mental disease, when combined with direct heredity to Insanity in the other parent.

General paresis is held by some French authorities as simply a brain disease, which directly constitutes no heredity to Insanity in the children of the paretic. The writer cannot indorse this view, and holds that all forms of the neuroses, as well as Insanity, are found among the children of paretics. Direct heredity to Insanity derived from grandparents on both the father's and mother's side of the house is just as unfavorable as if it existed in the immediate parents, and the fact of atavistic transmission shows the strength of the latent tendency. Idiocy or imbecility, when congenital, shows a stronger degenerative tendency than Insanity itself. The type of the mental disorder among ancestors is also to be considered.

Primary monomania would signify a much stronger neuropathic tendency than puerperal or senile Insanity. The degree of degenerative taint is to be judged, also, not alone by the cases of Insanity in the family, but by the total of all neurotic affections in the direct and collateral branches of the family. If the history of the family for several generations had shown cases of epilepsy, chorea, migraine, asthma, spinal degenerations, myopathies, and feeble-mindedness, the heredity would be stronger than if actual cases of Insanity alone had appeared in the ancestry.

Above all, the physician must not fail to discover specific forms of heredity to definite types of mental disorder at certain ages to which allusion has already been made. The course and mode of termination of Insanity in ancestors of the patient will also afford often valuable aids in prognosis. There are instances of desperate and fatal suicidal mental disorder in successive generations of the same family at about the age of middle life. In some families hypochondriacal melancholia begins about fifty years of age and terminates only with life. In other families phthisis pulmonalis appears about a certain age, with mental disease as a sequel. Every tendency to a special heritage of this kind is of the utmost value in prognosis.

Direct heredity to Insanity is somewhat more constant through the maternal than through the paternal line, and the daughter who nearly resembles an insane mother will likely become insane in a similar manner.

Other principles of heredity in relation to Insanity are discussed

under this head in the chapter on Etiology. The principle of reversion to a healthy type is not to be forgotten. The history of one family shows that it is constantly and surely degenerating. In another family there is a steady process of regeneration and of return to a healthy type. In the former instance heredity, as indicated by the presence of actual cases of Insanity, justifies a much more unfavorable prognosis than in the latter case.

Hereditary syphilitic taint is to be looked out for as an unfavorable prognostic element, and in Europe goitrous and pellagrous parentage is almost as bad as transmitted specific taint. In France alone it is estimated that there are 420,000 goitrous persons.

In cases in which no heredity can be ascertained by inquiry the existence of the same may still be revealed by the well marked periodicity of the attacks, or by both psychic and somatic stigmata.

Form of the Attack.—The form in which the mental disease presents itself is a valuable element in prognosis. There are certain forms which imply incurability from the very beginning.

When the diagnosis of general paresis has once been made beyond doubt, there need be no hesitancy in declaring the prognosis hopeless. Doubtful cases of alcoholic origin chiefly are to be given the benefit of the doubt in prognosis.

Cures have been reported in cases of general paresis, but the diagnosis is questionable in such cases, and there is also the possibility of mistake through the extraordinarily prolonged remissions which exceptionally characterize general paresis. Primary monomania, the gradual outgrowth of neurotic taint, with fixed and systematized delusions, is absolutely without hope, and yet, on account of the amount of reasoning ability retained by the patient, it is difficult to impress the relatives of the patient with the truth of the bad prognosis, which may even cost the medical adviser the loss of his patient and of the good-will of the family. Moral Insanity, appearing in very youthful subjects with decided depravity, criminal propensities, sexual perversions, and other signs of neurotic degeneration, is almost as hopeless as the form of original monomania just mentioned, and, in fact, they belong to the same degenerative group of Insanities. The early appearance of the mental obliquity shows the high degree of the transmitted taint.

Congenital mental deficiency is, of course, irremediable, except in so far as some amelioration is practicable through minor degrees of education.

Goitrous inheritance is fatal to hopes of complete mental development, except when the patient is removed at a very early age from the endemic region and submitted to the most systematic means of physical and mental training. The prognosis is more favorable in children born of goitrous parents, who have emigrated to parts of the world where goitre is unknown, before the birth of the child.

The prognosis in Insanity emerging from confirmed neuroses, epilepsy, hysteria, and hypochondria is uniformly bad.

Mental disorder from coarse brain disease and focal lesions, taking the form of dementia, is to be counted among the incurable forms. In embolic processes giving rise to amnesic disorder a guarded opinion is to be given, and time becomes a necessary element in the prognosis. The prospect is always bad in periodical and circular Insanity, though long lucid intervals may be enjoyed.

Delirium acutum, if the patient survive, admits of an occasional recovery.

Senile dementia from involutional brain-atrophy is incurable, though there are senile forms of mania and melancholia which recover.

Terminal dementia is without hope of cure, and epileptic, alcoholic, and syphilitic dementia have an equally bad prognosis.

Melancholia is, according to statistics of many hospitals for the insane, the most curable of the forms of Insanity. This statement holds not only for the acute forms, but for all types of melancholia entered in tabular reports as acute, subacute, and including also chronic forms of melancholia, as compared in the aggregate with corresponding forms of mania received in the same hospitals.

This is statistically confirmatory of the fact that mania is a more profound disorder of mind than melancholia. Out of a total of 2,165 cases of melancholia treated in three of the largest New York State hospitals 639 recovered, while out of 2,259 cases of mania treated in the same hospitals during the same period 635 recovered. In European hospitals for the insane some statistics show mania to be the more curable form.

There can be no doubt, however, if the large number of mild cases of melancholia cured outside of institutions be taken into account, that melancholia is the more curable form of Insanity. It is probable that the greater urgency for the admission of maniacal cases to institutions, and the advantage of early hospital treatment thus obtained, favors recovery in the maniacal forms.

In the United States acute mania is seven times more frequent than acute melancholia, and chronic mania nearly twice as frequent as chronic melancholia, according to total figures given by institutions for the insane. The total number of cures from mania, therefore, vastly outnumber those from melancholia, and the general impression as to the more curable nature of mania may be based on the greater frequency with which the physician meets the recovered maniacal cases after their discharge from institutions.

There is a slight numerical preponderance of females over males in both the maniacal and melancholic types of simple psychoses, which is offset in the total enumeration by an excess of males in the paretic and alcoholic types of Insanity. In terminal dementia, on the other hand, males slightly preponderate in about the percental proportion of the greater recoverability of females over males in general.

These general facts as to mania and melancholia are given, since nearly all favorable prognostication has to do with one of these two recoverable forms of Insanity, in which the rate of cures ranges from fifty to sixty per cent. in hospitals, according to the duration of the mental trouble at the time of admission, which is usually much deferred.

Duration of Attack.—The duration of the mental disorder is an indispensable element in the prognosis. Insanity is curable in inverse ratio to its duration. From seventy to eighty per cent. of cases of the acute psychoses may be cured if treated within one month of the inception of the disease, fifty per cent. are curable at the end of six months, and during every subsequent month there is a rapid decline in the recovery-rate to the end of the first year, after which not more than ten per cent. of cures are to be made, and after two years' duration only five per cent. of recoveries occur, and still later there may be a very exceptional recovery, but, practically, the prognosis is then absolutely unfavorable.

The duration is to be calculated from the very first manifestation of mental disorder.

The lapse of time in the incubatory stage is usually not taken into consideration, though it has an important bearing on the prognosis, for long-continued action of the determining causes and a prolonged initial stadium of the Insanity are highly unfavorable for recovery. The man who breaks down under the stress of business anxiety after long years of worry has fewer chances of recovery than if he had sud-

denly suffered a great loss of fortune causing acute disorder of mind. The woman who has a bad husband and a number of sickly children, and has her maternal and conjugal feelings harrowed up every day of her life, until, worn out by years of misery, she sinks into despondent melancholia, is less apt to recover than if she had developed puerperal mania or some other acute type.

The critical point in duration of the attack is the question of the period of maximum recovery-rate, which is limited to certain months, which are not the same for every form of Insanity, and even vary somewhat in the two sexes. Comparatively few recoveries from acute Insanity fully developed are made during the first or second month of the attack, or, as before said, after the first twelve months. The period of the maximum recovery-rate for the average of acute and curable forms of Insanity is from the fourth to the eighth month.

The question of duration of attack in prognosis must have reference to this period. If the mental disorder has been treated from the onset for eight months, without decided change for the better, the most curable period has elapsed, though considerable percental chances of cure still remain. In the acute psychoses, in those aged fifteen to twenty-five, the maximum recovery-rate in maniacal types generally seems to be attained at an earlier period than in the melancholic forms, and also somewhat earlier in men than in women. In puerperal Insanity the highest recovery-rate is reached before the sixth month.

Climacteric Insanity has an exceptionally long duration, and the average period of curability is greatly deferred, and the same may be said of certain toxic forms of mental disease.

Neglect of treatment not only postpones the recovery, but renders it less complete. The prognosis in a case neglected for eight months must reflect not only the fact that the main chance of cure has passed, but also the probability that the recovery will be very imperfect, if, fortunately, it be brought about finally.

The recovery is later in recurrent attacks, on the average, than in the first Insanity, and this delay is at the expense of the lucid intervals, which become shorter. The temporal limits are often defined by inherited tendency to run a certain course, which the physician will do well to ascertain by close inquiry. In certain families pubescent and climacteric Insanity makes a comparatively good recovery after a very long duration. If no special tendency can be ascertained, the physician must prognosticate according to the gen-

eral law of average duration of attack and chances of recovery as above given.

Course of the Attack.—The prognosis is more favorable in a regular attack than in one which pursues an exceptional course. If incubatory depression is followed by prompt and acute mania and then a natural stage of exhaustion and a convalescent stage, the recovery will probably be good. If there is not a frank maniacal stage, but an irregular mixture of excitement, depression, and stupor by turns, and no distinct stages of the mental disease at any time, the prognosis is not good. Even if the physician fail to learn of any heredity in the family, he can set these nondescript cases of irregular course down as belonging to the degenerative types nine times out of ten. A prolonged incubatory stage is of bad omen for a prompt recovery, and the patient who has been becoming insane for a year or more will probably take the same length of time to recover, if, indeed, restoration ever occurs.

A very brief convalescent stage is likewise unfavorable, and the transition within a fortnight from acute Insanity to recovery is to be regarded with suspicion. The current of recovery sets in like the tidal advance, with gentle recessions, but a steady onward movement to the full height of reason, and the convalescent process takes, on an average, two and one-half months, varying more especially in length with the severity and duration of the acute stage. A good prognosis, then, demands regularity in the course of the attack, even in the convalescent stage. There is one exception, which will probably come within the physician's observation in this convalescent period, which still admits of a good prognosis, and that is found in cases of violent mania, in which the advances toward recovery and the recessions partake of the same turbulent nature, amounting to successions of lucidity and maniacal relapse of brief duration. A subacute course of the attack is unfavorable, and a circular course of the Insanity justifies a bad prognosis. The physician must make careful research for any signs of periodicity of symptoms, and even though the intensified return be at the menstrual molimen, it renders the prognosis bad if a periodic tendency is once established.

The regular course of the attack may be interrupted by an acute infectious disease, or by a traumatic accident, and recovery may then follow in a sudden and exceptional manner. The writer has thus seen some unexpected recoveries following inflammatory intercurrent diseases and bodily injuries, self-inflicted or accidental.

When called upon for a prognosis in the instance of the interruption of the regular course of the Insanity by a complicating disease, the physician can only state the favorable possibility of a hastened cure, but it is well to know the rule that severe intercurrent affections only postpone the recovery. Among the writer's patients in the New York City Lunatic Asylum, during the epidemic of Asiatic cholera, out of more than a hundred cases attacked, only one survived in whom it could be said that a favorable mental crisis seemed to have been established by the bacillary scourge; but several appeared to undergo a critical mental change for the better after the typhoid fever epidemic in the same institution, and, in suffering from the disease, they seemed to have undergone a constitutional alteration, especially of trophic functions favorable to mental recovery.

The interruption of the course of acute melancholia by an infiltration of miliary tubercle robs the prognosis completely of all favorable chances.

Whenever the regular course of the attack is unaccountably arrested or changed, the physician must suspect some insidious disease for which he must institute a careful physical search, as the usual physical signs are often absent, and walking cases of pneumonia are common, and phthisis pulmonalis may run its full course without cough or expectoration.

In malarial Insanity the intermittent course of the mental trouble being due to the nature of the intoxication is not necessarily of bad prognosis if the cachexia be not too far advanced. An alternating course of the Insanity with one of the major neuroses always justifies a bad prognosis.

In the course of a regular psychosis there may appear a distinct transformation of type of the mental disorder, and in all transformations of this kind the prognosis is unqualifiedly bad. The regular stadia of the attack must, of course, not be mistaken for such transformations, and there can be no danger of this after a careful perusal of the chapter on the evolution, stadia, and clinical progression of Insanity.

Cause of the Attack.—There is no more important element in prognosis than the cause of the attack, and in not a few cases it is at once decisive of the question of curability or incurability.

The most irremediable cause is congenital deficiency, and by this is not here implied general arrest of mental development, but more

especially those hopeless defects of character and of balance of mind which doom the unfortunate one to failure in life, and to a succession of trials which end in mental disorder. These ill-balanced cases of moral obliquity and mental weakness may undergo a first recovery and a species of restoration to their original state of weak eccentricity, but relapse is absolutely certain, and terminal dementia follows in ninety-nine cases out of a hundred.

The cause of Insanity among juvenile delinquents is usually this inherited deficiency of mind, which may escape recognition by the neighbors of the patient, who is simply regarded as odd or perverse in youth, but as soon as he undertakes the complicated relations of life as a man, his hopeless defects are at once evident. An attack of Insanity in these originally deficient cases signifies "the beginning of the end," and the prognosis must be made accordingly. In this category belong cases of moral Insanity, which is unquestionably associated with inherited deficiency, and cases of original monomania, as the outgrowth of native defects of mental organization.

A lesser degree of degenerative taint is shown as a neurosis, which becomes permanently established as a constitutional habit, like hysteria, hypochondria, or epilepsy, and, when Insanity is developed out of these neurotic conditions, the prognosis is decidedly unfavorable.

Involutional changes at the climacteric give rise to a doubtful prognosis because the Insanity is frequently protracted, and in most cases which end in recovery the treatment is instituted at an early period.

Fifty per cent. of climacteric cases admit of cure if taken under skilful treatment from the beginning of the attack, but, as this is seldom done, there is, on the average, scarcely an even chance between recovery and chronicity of the attack, which, in about ten per cent. of the cases, has a fatal termination sooner or later. The mortality of climacteric cases is considerably greater than the average death-rate among the insane.

The prognosis of Insanity from senile involution is to be based on the degree of degenerative tissue changes in the brain and arteries, and on the presence or absence of organic affections of thoracic or abdominal organs. Without regard to the cerebral atrophic lesions, if there be found atheromatous radial and tortuous temporal arteries, arcus senilis, and fatty heart, the prognosis must be unfavorable. Or, if there be renal disease, cardiac hypertrophy, or dila-

tation, and chronic asthmatic or bronchitic trouble, the hope of recovery is almost nil. In the absence of all physical complications of this kind the mere fact of advanced years does not prevent a favorable prognosis as to a first attack.

The prognosis in toxic Insanity varies considerably with the toxic agent, and the question of a brief accidental exposure or of a prolonged voluntary addiction to the poison. Insanity from morphinism, as a confirmed habit, has a bad prognosis, not on account of the physical damage sustained, but because experience has shown that four out of five cases cured relapse through subsequent return to the habit.

Mental aberration from alcoholic tippling is likewise unfavorable for the same reason.

In chronic alcoholism the prognosis is bad on account of actual lesions in cerebral tissues and vessels. It is of importance to know that spinal lesions in female alcoholics are the equivalent often of cerebral changes in men, so far as their prognostic significance in Insanity is concerned. A woman insane from alcoholic excess, with symptoms of spinal sclerosis, is as hopeless a case as a man with cerebral sclerotic lesions from the same cause.

Recovery from some metallic poisons causing Insanity is tedious and doubtful, especially in long and gradual intoxication from lead and arsenic. Mental disorder from certain vegetable toxic agents is equally unfavorable in prognosis, as found in cases of pellagra and chronic lathyrism. Nicotinism is capable, in the aged, especially, of establishing permanent organic lesions, and it is more unfavorable in prognosis than is generally admitted to be the case.

Youthful cases of Insanity from excessive cigarette smoking usually make a good recovery, but readily relapse on exposure to the toxic agent. Carbon monoxide and common illuminating gas may permanently damage the organ of the mind and the general health.

In Eastern countries a large percentage of Insanity of bad prognosis arises from the abuse of hashish.

In toxic Insanity, if anatomical lesions have not resulted, and if no deep-seated habit has been formed, the prognosis is not bad. Recoveries from minor degrees of poisoning and from auto-intoxication are very common.

Prolonged moral causes, such as worry or sorrow, in combination with toxic influences, give a bad outlook, and the man who suffers distress of mind and drowns sorrow in drink, and finally becomes insane, does not often make a good recovery.

A favorable opinion cannot be given in severe trauma capitis, or in decided cases of insolation followed by Insanity, which is often insidiously progressive, and not infrequently attended by epileptiform seizures in the more advanced stages, as meningeal and cortical lesions extend.

Prognosis is favorable in mental disorder immediately following commotio cerebri in a large percentage of cases, but the resulting slow and gradual development of Insanity after this sort of traumatism is unfavorable, and the same rule is applicable to mental alienation following spinal concussion.

Insanity from sexual excess is favorable in the young, less curable in the middle-aged, and of bad prognosis in senile cases. Sexual excess of men with women causes cerebral lesions and general paresis in some instances, which is not the case with masturbatic indulgence, which gives rise in extreme cases to spinal lesions and paraplegic symptoms, but never to general paresis.

The prognosis is only good on the supposition that the cause is to be removed, but in neurotic and degenerative cases, often, self-control cannot be restored, and the cure cannot be effected. In very many neuropathic patients the masturbation is symptomatic rather than causative of the Insanity.

The physician must guard against the vulgar error of mistaking the masturbatic manifestation for the cause of the mental disease, for not one insane case in a hundred is to be attributed solely to self-abuse, and one-half of the insane at some time during their Insanity masturbate. Among the insane, women are more secretive than men in the practice of self-abuse, but the evil habit is equally prevalent in both sexes. Indulgence of a sexually perverted instinct points to a degenerative taint, and the resulting Insanity is without hope of cure.

Mental disorder from inanition during forced and temporary deprivation of food may be cured, but years of semi-starvation, such as fall to the lot of the impoverished masses in large cities, result in permanent cortical changes of an atrophic nature, and this type of inanition is one of the most universal causes of incurable Insanity.

The prognosis in general paresis, as already stated, is always bad.

Cases of pseudo-paresis, especially those of alcoholic origin, recover with permanent partial and minor defects not perceptible except to experts.

There is a tendency to extend the limits of general paresis, and

to embrace cases which do recover, after syphilitic and alcoholic attacks of a pseudo-paretic nature, but it is not very difficult to differentiate these cases from genuine instances of general paresis, which, in the writer's experience out of several hundred cases, have never permanently recovered.

Lucid intervals of months or more than a year may throw doubt on the prognosis, but they finally yield to the typical and fatal symptoms of general paresis.

A chance of recovery in puerperal Insanity exists in the exceptionally favorable ratio of three out of four cases attacked, and the more promptly the mental disorder declares itself after parturition, the better is the prospect of a quick return to reason.

The prognosis in lactational cases is considerably less favorable, and the duration is greater. The Insanity of gestation treated in private practice is fully as favorable as the other forms, but in hospitals for the insane only the most unfavorable cases ordinarily are received, with suicidal or troublesome symptoms, which prevent their treatment at home, and a ratio of recoveries based on such cases does not furnish a fair standard of comparison. Not a few of these gestational cases are very mild and occur during the first three or four months of pregnancy and terminate probably in some instances without being formally recognized as insane.

Mental disorder caused by acute infectious diseases is favorable in the young and less so in those of advanced years. Epidemic influenza (grippe) gives rise to some very serious forms of Insanity, lingering and uncertain as to recovery, and this is particularly the case in elderly persons.

Among so-called moral causes of Insanity some justify a more unfavorable prognosis than others.

Loss of property and business failure may be considered one of the most common moral causes of mental alienation among men. The prognosis is not favorable because the cause is a constant one, hanging like a dark cloud over the patient, acting as an obstacle to convalescence, and favoring a relapse. This cause is especially unfavorable in those too far advanced in years to hope to re-enter business or to recover their financial losses.

Among women, grief at the death of a child or other dear relative is a cause of Insanity, from which recovery usually takes place, but it not infrequently happens that during long nursing of the departed one the patient suffered loss of sleep for months, as well

as sympathetic distress of mind, and that the general health was seriously impaired, so that sufficient powers of recuperation are not left for recovery from the psychosis.

Young persons, more particularly, may be rendered suddenly insane by severe emotional shock, usually from fright. The type is primary dementia in most cases, and the final result is recovery in the majority of the instances, unless there be native weakness of mind, and then reason is apt to remain shattered for all time.

Disappointment in love is a real cause of Insanity, which is more enduring in women than in men. The latter are more apt to commit suicide and to have active symptoms and a prompt recovery, while the former are more wont to sink into chronic melancholy of a religious or erotic nature. This form of mental aberration pertains more naturally to youth, and has, in general, a good prognosis.

As a rare exception, some retired elderly person, never having had an object upon which to expend the full force of a naturally loving disposition, becomes desperately enamoured and disappointed, and sinks into hopeless melancholy for the rest of life.

Finally, it may be said that a combination of both physical and moral causes gives a bad prognosis, whereas a single removable cause always admits of a favorable opinion in the absence of organic lesions as the basis of the mental disorder.

Special Symptoms of Bad Prognostic Import.—Among the host of symptoms which may appear in cases of mental disorder there are some which are uniformly very grave in prognostic bearing. If, upon the examination of an insane patient, the physician should find loss of the patella-reflex, persistent myosis with loss of response to light and accommodation, the prognosis would at once assume a very grave aspect, even in the absence of any characteristic mental symptoms of general paresis. If, in addition, there were present tremulous and drawling speech, the elements of a bad prognosis would be sufficiently complete to justify the expression of an opinion in the case. Epileptiform and apoplectiform seizures are of evil omen, pointing, in toxic Insanity, to the depth of the pathological processes, and foreshadowing, in organic dementia, a rapid decay of intelligence.

The congestive and convulsive seizures in malarial Insanity must not be mistaken for apoplectiform attacks, as they have not the same evil significance. Muscular inco-ordination is a bad symptom, whether it appear as static or locomotor ataxia, or as disorder of the

special mechanism of speech, gait, handwriting, or affect any other highly specialized muscular performance.

The patient who cannot stand erect, with eyes closed and feet together, without loss of balance, who cannot with closed eyes touch with the forefinger the tip of his nose, or any other indicated part of himself, who cannot walk without looking at the floor, or cannot walk a straight line, has a degree of anæsthesia of muscles and joints arising generally from serious lesions of the central nervous system.

Paralysis of limbs, persistent tremors other than those of debility, senility, and emotion, permanent muscular contractures, masticatory spasm and wasting of the muscular structures, are all unfavorable symptoms.

Continuous vasomotor disturbances, such as cyanosis, cutaneous œdema, hæmatoma auris, and monocrotic or very infrequent pulse, forbid a favorable prognosis.

Loss of facial innervation and the dropping of the lower jaw are often precursors of terminal dementia, and the disappearance of all intelligent expression from the face and eyes accompanies profound cerebral alterations.

Large gain in bodily weight after the acute stage of the mental disorder, if not accompanied by any corresponding improvement in mental condition, is a bad sign, as it often presages terminal dementia.

Prolonged trophic disorders after the acute stage of the psychosis, such as cutaneous pigmentations, disappearance of subcutaneous fat in women, muscular atrophy, progressive emaciation, and trophic changes in joints or long bones are very unfavorable.

The psychic symptoms which are of bad prognostic import are systematized delusions, which do not change in character, the persistence of hallucinations after the acute stage of the disorder, long-continued verbal incoherence, confusion of places, persons, and things, changes in personality, fantastic attire and self-decoration, the filling of the pockets with rubbish and the accumulation of worthless things, inability to fix attention and self-muttering, automatic laughing or crying, the picking of the flesh in sore spots and the plucking out of the hair, automatic swaying of the body and movements of friction of clothing, walking in circle and automatic angular progression, and grimacing and inarticulate vocalization.

Loss of the sense of modesty in women, when not resulting from active erotic impulses, shows a high degree of mental impairment,

and it is only in the most profound mental reductions that they cease to be conscious of indecent exposure of themselves.

The coinage and constant usage of new words, the claiming of titles, the attempt to impersonate in manner, dress, or speech, some great person, or the habitual acting of any part absolutely foreign to the nature of the person, are all equally bad as to prognosis.

The failure to recognize relatives, and the absence of natural affection, as of a mother who remains indifferent to the visits of her young children, are likewise bad signs, if present after the acute stadium of the mental disease has passed.

Symptoms of Favorable Prognostic Nature.—The return to normal weight after the acute stage of the Insanity is a constant and reliable symptom in perfect recoveries. The weight-curve at this period often rises a little above the normal, only to return, as the cure hardens, to the usual stationary point as influenced by season in the special Individual.

It has already been indicated that a parallel improvement in mind must attend this bettered condition of general nutrition. Superactivity of vegetative and torpor of mental functions, as already pointed out, are highly unfavorable.

A restitution of normal facial innervation is one of the most positive objective signs of recovery. Relatives familiar with the customary looks of the patient in health may even anticipate the prognosis of the physician in announcing the coming cure from the return of natural expression of face.

With the advent of good looks in women there goes a renewed interest in their personal appearance and in their toilet. The physician will often be astonished at the great change for the better in physiognomy, and, as his experience with these cases multiplies, he will tend to regard this beautifying of countenance as the surest harbinger of the coming recovery. The delicate lines of symmetry which constitute the handsome traits of a countenance are invariably obliterated by mental disease.

Another favorable symptom is the renewal of natural intonation of voice, and of the mode of speech habitual in health, even though stuttering or some other defect reappear. In recovery from shouting mania huskiness of the voice often persists for many months, and in the worst cases of this laryngeal over-strain the prime quality of the voice is never regained.

Normal gait, gestures, and general bearing of the patient are

among the essential preliminary symptoms of recovery, and even manifestations of former peculiarities of manner are to be hailed as favorable signs.

Among the somatic signs of approaching recovery the most important are good, sound sleep, normal appetite, and a general sense of well-being. In convalescence from melancholia, especially, the return of an agreeable cœnæsthetic consciousness is the surest subjective symptom of recovery. In this connection the physician is reminded that not only the cœnæsthesis, but the entire frame of mind, may be modified by the continuous influence of drugs, and that it is always well to suspend medication long enough to see the true condition due solely to the disease before a final prognosis is made. From the neglect of this precaution the writer has known some serious errors in prognosis to be made.

A hopeful sign of some prognostic value is the revival of natural affection for family and friends, and so long as this is absent, especially in women, whose rôle in life is so largely dependent on a healthful action of the affective faculties, there is no certainty of recovery. There are personal dislikes formed toward nurses and others, by the insane, which need not be abandoned, but antipathies to wife, children, or husband are to be given up, and such relinquishment of morbid animosities is among the early signs of returning reason.

Self-consciousness of past mental disease, and an insight into the nature of the delusions entertained, is surely prognostic of approaching recovery.

Some authors have gone so far as to establish this conscious insight on the part of the patient into his own mental malady as a necessary criterion of recovery. This is a mistake, for some patients have only a confused realization of their attack, and they have a clear consciousness only of those things of which they are assured by the physician. On the other hand, the capacity to view the events of the past disease in their true light implies a normal readjustment of the patient's mental mechanism.

This subject of prognosis has been thus fully studied from various points of view on account of the great responsibility often involved in the giving of an opinion. There is to be decided a question of great financial expense on the part of the family of the patient, as well as the entire disposition of the case, and the physician can ill afford to make a mistake in the prognosis.

It is hoped that the analysis of the essential elements of prognosis, under the head of age, sex, constitution, and heredity of the patient, and the duration, course, and cause of the attack, will stand the physician in good stead when called upon to decide the all-important question of the future results to be expected in a case of Insanity. The physician is advised to take time for a decision, to ponder well all the points of the case, and, in event of doubt, to call upon some expert in mental diseases for assistance before rendering a final decision, for a greater need of a gift of prophecy never exists than in the prognosis of intricate cases of mental disorder.

CHAPTER XI.

THE TREATMENT OF INSANITY.

Section I.—The Prophylaxis of Insanity.

The highest function of medical science is the prevention of disease. There is not one of all the known diseases in which there is a greater need of prophylaxis than in Insanity, which completely incapacitates a citizen for all the duties of life, and often makes him for a long series of years an expensive burden to his family or to the State. There is also no widespread disease which permits of more effectual limitation by wise preventive measures than certain impending forms of mental disorder taken in the early formative stage. The most radical and far-reaching prophylaxis is that which nips the evil in the bud, and fortification in the earliest periods of life against the approach of the dreaded disease is doubly preventive, and the prophylaxis of Insanity in childhood will, therefore, first be noticed.

The Early Life and Education of Children.—In neurotic children springing from parents having strong psychopathic tendencies, the whole of childhood should be a continuous period of fortification against the mental disease liable to first declare itself at puberty. Such children early present signs of instability of nervous centres by irritability and restlessness, extreme sensitiveness of the gastro-intestinal tract, convulsibility on slight rise of temperature, inability to bear the pain of ordinary dentition, and a tendency to night terrors and hallucinations. When a few years of age, such children are often precocious, wilful, mischievous, and morally deficient in understanding, while displaying wonderful cunning in selfish and perverse conduct. Other children of this class will be found weak in mind and body, averse to play or companionship, moping stupidly by themselves, slow to learn and disobedient continuously through seeming stupidity, or forgetfulness of that which is told them. Now, these and other types of neurotic children, too numer-

ous to admit of description here, are the very material out of which insane persons are formed, unless wise and systematic preventive measures are adopted and carried out from the earliest period of life.

The earliest prophylaxis, in fact, in these neurotic families is the hygiene of the mother during the gestation of the child. These neurotic mothers are wont to resort to drugs and stimulants during the cravings of pregnancy, to the detriment of the embryo.

Unquestionably, the earliest damage of a toxic nature may be sustained by the child in utero through the alcoholic indulgence of the mother, who daily takes free potations of wine or beer, in hopes of sustaining her strength; or of necessity, if in poverty, she lack a wholesome supply of food. If the family can afford a strong and healthful nurse, the child should not be nursed by a neurotic mother. And here, too, the prophylactic regulation of the diet and habits of the nurse are by no means to be neglected.

In well-to-do families nurses are sometimes allowed wine, and this simple and thoughtless indulgence may convey to the susceptible nervous centres of the nursing infant a daily deleterious alcoholic influence.

Other infants suffer from the pernicious habit of drugs given to procure sleep. These neurotic children should be reared, if possible, in the country and in the open air, on a generous but simple diet of fresh milk and eggs, with good bread and butter, and roast beef once a day and ripe fruits in season. They should play out-of-doors and have very long hours of sleep, taken in part, in certain cases, in the form of a daily siesta. If the best thing can be afforded in the way of education, these children may learn languages from native nurses, or music to some degree, but all regular studies should be deferred until the eighth or ninth year, and should then be taken up very gradually. The forcing of school children in routine classes, without regard to their natural degree of development of mind, is often very harmful, and the severe taxing of the brain with over-study is a sure preparation for future mental trouble.

There are extreme cases in which only a common school education should ever be allowed in order to fit the person for some active occupation. The emulation of neurotic and often precocious children in competition for school prizes is especially dangerous from overstrain, excitement, and disappointment.

As these children grow older they must be judiciously trained

to the most systematic and orderly habits of eating, sleeping, and working. Continuous long hours of occupation must be avoided, and work must be interspersed with frequent respite. Manual training to the use of tools, moulding, modelling, turning, gardening, and many like useful occupations, should interrupt brain work, which should never be carried on for more than one hour at a time. Special schools for neurotic boys are needed, and in their absence such boys should be taken from their parents, who cannot enforce the necessary discipline and retain the affection of the child or their own peace of mind, and placed under the direct control of some judicious person, who will devote himself to their education and continued training. This course, if faithfully pursued, will often prevent failure in life and final Insanity.

Girls may be managed better at home, but there are often those who must also be sent to special schools, or be placed under special tutelage, from the fact that their mothers have not the time or the force of character to work out their salvation. The methodical habits and the force of good example and orderly life in schools is often the only available influence to save certain girls from developing into cases of moral Insanity. These cases, deficient in moral understanding, require a very special system of training for a series of years, and, in fact, until the crisis of puberty has been passed with the immediate danger of an open outbreak of mental disorder. Training, in the direction of music or of some one-sided talent, to the neglect of general education, is especially to be shunned. The effort must be to equally develop the physical and mental powers, and to round out the character evenly in all useful directions. In these psychopathic young women attempts to widely expand the intellect will defeat their own purpose and lead to mental breakdown, but the aim must be to establish automatic habits of industry and usefulness in all-round womanly occupations, while laying firm foundations of physical health.

Advice About Marriage and the Adult Relations of Life.—All of the learned professions are attended with too severe brain work and too much responsibility for neurotic persons, who should choose less difficult and more automatic callings, and such by preference as lead to out-of-door life. Psychopathic young women are not fitted to become teachers or governesses, and many become insane as the result of this mistake in the choice of an occupation, which drains their sympathy and their nervous forces. These neurotic young

women often have abnormally quick memories, gain some prize in school, and are fired with the false idea that they can distinguish themselves in intellectual pursuits. Male adolescents become possessed of a like false ambition and vain pride of intellect, which they are allowed to pursue like an "ignis fatuus," overtaxing their brains with study until they break out into adolescent Insanity.

It should be the duty of the family physician, with the aid of an expert in mental diseases, to make a special study of the members of neurotic families, and to decide in each individual instance the character of the occupation which it might be safe for the person to adopt.

One of the surest means of the prophylaxis of Insanity is the prevention of the marriage of those constitutionally unfitted for the reproduction of their kind. The question of marriage in hereditarily tainted families is one about which the physician will often be consulted, and upon which he must be prepared to give an opinion.

Neurasthenic young women, who have been more or less under the physician's care, who have perhaps had attacks of hysteria and other nervous symptoms, sometimes form an attachment and wish to marry. The parents may be glad to be released from the burden of such a daughter, and they may have planned the match, believing that it would benefit their daughter's health. The latter result sometimes follows such a marriage, but the physician should discourage the marriage, as such young women do not make good wives or good mothers, and it is from the offspring of such marriages that the contingent of the insane is largely recruited.

Marriage, for the same reason, should be forbidden instead of advised remedially in the case of weak young men, partially unmanned by the habit of masturbation. The physician cannot trifle with the interests of the coming generation, the serious responsibilities of the married state, or the honor of his calling by adding matrimony to the list of his remedies.

How far marriage in families tainted with heredity is to be allowed must be decided separately in each individual case. A man born of such a family may marry a strong and healthy woman, devoid of any hereditary tendency to mental disease. A woman born of such a family had better not marry under any circumstances.

Those who have hereditary taint and have already developed symptoms of Insanity should not enter the married relation.

Those who have recovered from a brief simple psychosis resulting not from degenerate inheritance, but from some single powerful cause, which has been removed, may marry into some family known to be soundly constituted. Such a marriage should not take place for at least two years after the recovery from the mental alienation. If the cause of the mental disorder was epidemic influenza, a still longer period should elapse, as there is a lurking tendency to relapse in these cases.

Consanguineous marriages, with taint on both sides, should never take place, as the diseased tendency is sure to be greatly heightened in the offspring when it exists alike in both parents.

Consanguinity alone in parties both of sound stock is no contra-indication to marriage, though there is still an increased probability that in subsequent years such parties will suffer from similar diseases, which they may eventually transmit to their children. This contingency is so remote as to practically form no valid objection to the union, though it cannot be denied that an unusually large percentage of sensorial defects appear among the offspring of consanguineous marriages.

A person whose parents were both insane before his birth should not marry, nor should one wed whose mother was insane during the time she bore him "in utero."

Cumulative tendency to nervous diseases appearing in the families of both the intended parties to the marriage is a strong objection of the same weight as direct tendency to Insanity in one of the parties. A double tendency to epilepsy on the part of the would-be contractors of marriage is a serious objection, as the majority of epileptic children undergo mental deterioration.

Those who have suffered from prolonged Insanity of more than one year's duration, or who have had relapses of the disease, should not marry under any conditions.

A woman who remains well until the menopause, and then succumbs and makes a good recovery from climacteric Insanity, may wed and have the comforts of her own home; but a man who develops mental disorder during the involution of the sixth decennium had better shun wedlock if he does not wish to sap the foundation of his mental integrity, which he may have apparently regained fully, but which, once unsettled by senile retrograde changes, always rests on a precarious basis.

Persons without known hereditary tendency to mental disease,

who have still acquired instability of cerebral centres, and who for years have been recognized as living on the border-line of Insanity, should be strongly advised against marriage.

So far as the happiness of an intended wife or the degenerate heritage of prospective children might be involved, all forms of chronic alcoholism in men should, as decidedly as Insanity itself, debar all idea of marriage.

The physician must give prophylactic advice as to the conjugal relations of married persons who may be insane, or who may have recently recovered from an attack of mental disease.

A person, while insane, should never be allowed to propagate, and the risk of reproduction should not be incurred for at least one year after complete recovery, and not at all if one of the parents be not of sound mental constitution. Even long lucid intervals furnish no exception to this rule. The physician cannot interfere with the conjugal rights of a husband restored to reason, but he must still give sound medical advice, even though he know that it will not be heeded.

So long as the physician can in any way prevent Insanity, it is his duty to give the most uncompromising advice, and to adhere to the strictest interpretation of hereditary laws, but there may be occasions for an opposite tone of opinion when consulted by certain parties.

Some persons, who have inherited directly a tendency to Insanity, live in ever-increasing dread of the disease, and it would be worse than cruelty to fail to speak with hopeful reserve when consulted by such a person. The advice given on such an occasion might become the exciting factor of mental disorder, or a psycho-therapeutic preventive of the impending attack. The most hopeful view consistent with truth must be expressed to weak wives nursing husbands on the verge of mental disorder, and to neurotic young women affianced to lovers in precarious mental condition, and occasionally the physician, when consulted by such parties, will do wisely to withhold his opinion.

A physician, knowing the degenerative taint in a family, may believe that a certain man is liable to become insane any day, but, if consulted on this point by someone having a natural interest in the man, as a business partner, the physician would not be free to openly express his opinion, which might seriously damage the prospects of the man with hereditary taint. In this and many similar

situations which may arise the physician should avoid personalities, and express his opinion on a hypothetical case embodying the facts furnished him by others, and not on those supplied from his own professional knowledge of persons.

State Medicine and the Prevention of Insanity.—The state would be less burdened with the support of a rapidly increasing number of insane if wise public measures were instituted for the prevention of Insanity. The following are some of the means which might be taken by the state for the prophylaxis of mental disorders.

1. The state should disseminate sound medical knowledge among all classes as to the common causes of Insanity and the modes of its avoidance, and this should be accomplished by free lectures and the distribution of reliable medical literature on this subject.

2. The state should make it compulsory on all medical schools to establish a professorship of mental disorders, and to hold not a nominal, but a full course of lectures on this subject, demonstrated fully by clinical material. The state examination for the degree of Doctor of Medicine should always embrace the subject of mental diseases, with clinical and practical, as well as theoretical, tests.

3. The state should establish voluntary reception hospitals in which sufferers from incipient symptoms of mental disease could receive prompt, skilful advice and relief, which would prevent attacks of Insanity.

4. The state should establish a Bureau of Protective Aid for those discharged recovered from hospitals for the insane, as well as for those under some great temporary stress of mind or body liable to end in Insanity. Recovered patients often fail to find employment and suffer hardships which cause relapse. There are critical periods in the life of the poorer classes which develop Insanity, which a little timely aid would often prevent. It would be wise economy on the part of the state to forestall such attacks of mental disorder. On an average, every case of confirmed Insanity implies an expense to the state of thousands of dollars, and a fraction of this amount judiciously expended would prevent many cases of Insanity.

Section II.—General Mode of Treatment.

The physician, after he has made the diagnosis of Insanity, must decide on some general mode of treatment, and, in order to choose

some general plan best suited to the case, he should be familiar with the systems of treatment most in vogue at the present day.

The Colony System.—This system is chiefly adapted to the more confirmed cases of Insanity, or to those convalescing from prolonged attacks. The most celebrated colony is at Gheel, in Belgium, where, since the seventeenth century, the insane have been cared for in private families. There are now about two thousand insane provided for in this way among the six thousand residents of Gheel, and new cases are under observation in a central infirmary for a few days before they are assigned to family care. At Alt-Scherbitz, in Saxony, is another noted colony furnishing provision for about six hundred insane in cottages, with a central hospital for the special treatment of emergencies.

At Clermont-sur-Oise, in France, has long existed a thriving agricultural colony of the insane. The colony plan is also carried out at Ellen, near Bremen, and Slup, near Prague, and at Ilten, near Hanover, where the patients are cared for in private families. This family system has long been in vogue in Scotland, where yearly several thousand cases of Insanity have been boarded out in private families, in which not more than one patient can be received at a time without a special license. This system of boarding-out has also been tried in several hundred cases annually in Massachusetts for ten years past, and for a shorter period of time in Wisconsin.

Institutions for the Insane.—These institutions are distributed all over the United States, somewhat in accordance with the numbers of the insane and the actual need for them, though the supply is never fully equal to the demand in the public institutions, which almost uniformly labor under the disadvantage of overcrowding.

The best of these institutions are under state control and are thoroughly equipped as hospitals for the care and treatment of the insane. Others are more custodial than curative, and are known as county asylums, or as departments of poorhouses. There are also large numbers of private asylums, bearing the names of homes, retreats, or lodges, and these are sometimes well appointed and sometimes less commendably organized for the treatment of the insane.

Furthermore, there are numerous places designated as "sanitariums," in which cases of mental disorder are received, and still others, of a more nondescript variety, in the nature of hotels, with arrangements for the medical treatment of guests.

Then, again, there are water-cure and bathing establishments, with Turkish or Russian baths, in which incipient mental trouble and neurasthenic cases are sometimes treated.

Out of the one hundred and six thousand of insane in the United States, at the time of the last census, seventy-four thousand were in some kind of institution for the insane.

Relative Advantages of Public and Private Hospitals.—The physician, four times out of five, will have to choose between a public and a private asylum for the case to be treated, and hence something is here said about their relative advantages.

The best public hospitals for the insane have experienced medical officers and attendants, wholesome food, and fair hygienic conditions. In them the patient enjoys the benefit of a systematic and orderly life, of perfect regularity of hours for eating, sleeping, exercise, and reasonable diversion and occupation. The force of the example of large numbers living in strict conformity to rules is a salutary and unobtrusive form of discipline. The medical officers in such hospitals are without pecuniary bias or any other consideration except the best interest of the patient, and they are more free to disregard the ill-advised interference of relatives and to act in accordance with scientific judgment in behalf of the patient.

Even the sceptical public must understand that it is for the best reputation of the physicians in charge of these hospitals to get as many and as prompt cures as possible, and that there can be no conceivable motive for the retention of a patient after recovery, especially as the discharge of a patient tends to diminish the inconveniences of overcrowding, which is found in nearly all these public hospitals for the insane, and which, in fact, is one of their chief disadvantages.

Finally, there is the great pecuniary advantage in the public hospital, that the actual expense to the patient is, on an average, only about one-eighth that of a private institution having a relatively good organization.

The well-appointed private hospital, on the other hand, offers all the comforts of a home, and there is avoided, in elderly patients especially, that wide departure from customary surroundings on which they are so dependent for their happiness. The individualized treatment is more fully carried out, and the patient receives more constant attention from the physician and from attendants. The patient thus derives the great benefit of the direct influence of the sane upon the insane mind.

The diet is presumably of a superior quality, and the patient enjoys many of the luxuries of life, including the use of carriages and a variety of diversions. The patient has greater liberty of action and retains more fully his sense of freedom and his self-esteem, and isolation or companionship are at once more optional and more practicable.

In some of these private hospitals voluntary patients are received without legal form of commitment, and this saves the feelings of the patient and of the relatives in some instances, and may even make a difference in the public sentiment toward the patient after his return to society again.

There is also an escape from occasional sights and sounds of a disagreeable nature, inevitable in the wards of a large hospital, and to a refined and sensitive patient this is a desirable point.

The greatest of all advantages presented by private hospitals is the daily personal influence of a skilful physician ever at hand to advise, comfort, and sustain the patient through all the changing phases of the mental disease, requiring constant new adaptation of remedies to the symptoms as they arise.

Directions for the Treatment of Cases in Private Practice.—It has already been said that in the vast majority of cases institutional treatment is the best for all parties concerned.

It will sometimes happen that the patient or the relatives, or both of them, have an insurmountable dread of all institutions for the insane, and they will not consent to this mode of treatment. It will then devolve upon the physician to devise some plan of private treatment, which, though apparently simple, is extremely difficult to manage with safety and success.

If the case be one of acute mania, which will run a course of several months, it will not do to keep the patient confined in a house in a town or city, since walking in the open air is essential. A house in the country should be rented and especially arranged for the treatment of the case. It should have at least one spacious sleeping apartment on the ground floor, large enough to accommodate the patient and one attendant, and a water-closet and bath-room in the immediate vicinity.

It is taken for granted that the patient will present the usual symptoms of acute mania, and that he will by turns be noisy, violent, destructive, and filthy in his habits. Two attendants at least will be required, one for the day and one for the night. One of

these nurses must be in constant attendance upon the patient, who is never to be left alone to himself, not for even a few moments, if he have violent, destructive, or suicidal tendencies, as is usually the case.

Everything is to be removed from the large room, including carpet, curtains, and tapestry. Strong outside folding blinds are to be left open or closed at the windows, as occasion may require. The windows are to be screened inside if the patient develops a constant tendency to break the window-panes. If the room be heated by an open fireplace, a strong locked wire screen must guard the fire. The floor, after the cracks have been calked, should have a coat of water-proof filling, so that it can be washed and kept absolutely clean and free from absorption of saliva or excrementitious material. Carpets are totally impractical for this class of cases, but mats may be used and be daily shaken, aired, and replaced or not, as the changing emergency of the case may indicate. If the floor is very poor, it is best to have a smooth, hard-wood, dovetailed, and blind-nailed floor laid right over the old one. This is not very expensive, and a proper floor is of hygienic importance. To have a maniacal patient constantly stirring about on a carpet and inhaling the dust which arises is very bad.

The room should contain nothing but an iron bedstead with a comfortable spring bottom, and a first-class heavy hair-mattress, a settee long enough for the patient to recline at full length, and one large easy-chair, so heavy that the patient cannot use it suddenly as a weapon of offence or destruction.

A commode, with night-vessel and wash-basin, towels, and like things should be in an adjoining room, or in the bath-room. All clothing should be kept in a separate room.

Most maniacal patients are indifferent to æsthetic things, but if the patient can appreciate it, pictures without glass coverings may be hung in the main room, which, with a hard polished floor, a few Turkish rugs, and a bright open fire may be cheerful in its hygienic simplicity.

It must be so arranged that the nurse who is resting will be removed from disturbance by the noise of the patient, and still there must be some signal by which he can be readily summoned in emergency by the nurse on duty with the patient. In maniacal cases relatives do not often do well as nurses, for there is too great a revulsion of feeling on their part, and the patient is often more excited by their presence, and it becomes very trying for both parties.

The nurses must keep a written account of the pulse, temperature, excretions, food consumed, medicines taken, and of the hours of sleep and exercise out-of-doors and of all new symptoms. If the patient be active or tend to escape, two attendants must always go with him in his walks, and one of them at least must be more active and fleet of foot than the patient. It is seldom safe in any case of mania to allow a single attendant to take the patient out to walk unless there be great physical superiority on the part of the attendant. The patient should not be at such a distance from medical aid, that it could not be promptly procured in case of need.

The case may be one of acute melancholia, and the friends may insist upon home-treatment in town.

It may be that only a second-story room is available for the case. The windows of the room must then be secured, so that they will not open more than six inches at the top or bottom, and if the panes are very large they must be of such heavy glass that they cannot be broken, or smaller ones must be used. The only safe theory to act upon in all cases of melancholia is, that the patient is suicidal or may at any hour be seized with an impulse to self-destruction.

All glass and china-ware, and every conceivable article which could be suddenly used for self-injury, should be removed from the room. Two attendants, one for the day and one for the night, will be indispensable. The objection to relatives as nurses does not exist to the same degree as in mania, but trained nurses and entire strangers are always preferable. The outings of the patient in crowded streets would have too many elements of danger, if the patient were suicidal, but carriage drives could be taken with the nurse sitting in control next to the single exit from the vehicle, and a second person should be in attendance. The patient, under some delusion or impluse, may attempt to plunge head first out of the carriage window. This has happened not only in a carriage, but in a railway car, in the twinkling of an eye, with two attendants beside the patient.

With the patient on the second story of a private house the stairways or balusters are always dangerous points. The patient is never to be lost to view while in a bath-tub, and must be attended at the water-closet, and indeed, is never to be left alone, night or day, during the acute stage of melancholia. Matches and coal-oil lamps, which can be suddenly overturned, are to be kept at a safe distance from the patient.

With these precautions, and minor ones too numerous to mention, and with two reliable trained nurses the physician may undertake to treat a case of melancholia at home, but if the expense of these arrangements cannot be met he would do well to refuse the responsibility of the case.

The brief maniacal attacks following within a few days of parturition may be, for special reasons, undertaken at home, in accordance with general directions above given. The woman in this instance should be treated in bed, and excited attempts to leave the bed and to interfere with local antiseptic treatment will demand restraint, which, on acount of abdominal pressure and liability to other inconvenience in these cases, can seldom be carried out well by the force of attendants, and the restraining sheet will be found a much more comfortable means, with occasional full doses of sedatives in great excitement.

General paresis, when the diagnosis is once established beyond all doubt, is better treated in hospitals. There is no longer any question of damage to business reputation or professional standing by the residence in a hospital for the insane, as it is only to be considered how long the patient will live; and he can be cared for at home in the demented stage if the relatives do not wish him to die in an institution.

In the early stages of the disease paretics are often difficult of control and not suited for home-treatment.

Brief attacks of alcoholic mania may be treated in private or in a general hospital if the authorities will receive the patient.

Temporary Insanity, in connection with fevers and other infections, may sometimes be treated outside of hospitals for the insane.

Stuporous forms of mental disorder, resulting from sudden emotional shock in young people, are often appropriate cases for treatment in their own homes, as all element of danger to themselves or others is eliminated by the nature of the malady, which only calls for attentive nursing and appropriate medication.

There are acute delirious cases of Insanity, with extreme exhaustion of vital powers from the very onset, which should as a matter of humanity be treated at home, and should never be transferred any great distance to a hospital, as the question of life or death is often settled within a few days in these cases, which require immediate and active sustaining treatment and absolute repose, and even the loss of a few hours may be fatal.

Finally there are cases known as mania transitoria, which necessarily are treated out of hospitals for the insane, as the duration of the mental troubles is too brief to admit of the slow formalities of legal commitment.

Section III.—First Attentions to Urgent Symptoms.

In both hospital and private practice the first approach to a case of Insanity often reveals the necessity for immediate attention to urgent symptoms. The emergency may be all the greater because the patient may suffer extremely without calling attention to it. It depends upon the physician to discover the latent urgencies of the case.

Attention is, therefore, directed in this section to the chief urgent symptoms with which the physician will have to deal preliminarily to the regular treatment of the case.

Traumatic Accidents.—It is a very common thing for patients to arrive at hospitals for the insane with injuries undiscovered by friends or by the physician, who has been in attendance upon the case, especially if the patient be acutely maniacal. These injuries are sometimes extensive bruises, fractures of ribs, genital self-mutilations, foreign bodies forced into the vagina, threatened sloughing of penis or scrotum from ligatures tied by the patient, loosened teeth, fractured jaw, contusions of the scalp, dislocation of the sterno-clavicular articulation, broken nasal bones, rupture of muscular fibres and of tendons and sub-luxations.

In assuming charge of a case the physician should make a complete physical examination, and it may be necessary to trust a part of the personal inspection to a skilful nurse or to a woman physician. The administration of a warm bath affords a good opportunity for the inspection. The possibility of internal injuries is not to be forgotten.

Inanition.—The enormous waste of tissues in acute mental disorders is rarely understood and the large supply of nutriment required is not taken, and the result is more or less extreme inanition often betrayed first by a "sudden sinking," which leads to a hasty summons of the physician. If the patient be of strong muscular development, as a man, or have natural rotundity, as a woman, the point of dangerous inanition may have been reached before sufficient time has elapsed for emaciation. There is in these cases a pathognomonic starvation-odor as unmistakable as it is indescribable. The urgency for forced alimentation in these cases is extreme, and not

one hour is to be lost, for when a certain point is passed the function of digestion and assimilation is reduced to a minimum. Concentrated beef-essence, fresh eggs, and milk should be freely administered. If the patient will not take nourishment voluntarily it should be at once given by the soft nasal tube, or by the æsophageal feeding tube, as later described in this chapter, under the head of "Dietetics of Insanity." If the stomach is found already too weak to perform its function, and too irritable to retain the nutriment, small and oft-repeated quantities of predigested foods must be given, and in extreme cases rectal alimentation is an auxiliary means of sustenance.

For food-formularies and full directions as to artificial feeding reference is made to the heading just mentioned.

Insomnia.—The most universally urgent symptom in acute mental disease is insomnia, but occasionally it attains such an extreme that the patient may literally be said to be dying for want of sleep. The peculiar haggard look of insomnia, and the length of time passed without sleep, and the general state of the vascular system, will decide the degree of urgency and the hypnotic to be employed. A full dose of chloral hydrate (20 grains) is as prompt and reliable as any remedy of the kind, when cardiac disease does not contra-indicate. Trional, though quicker than sulphonal, is too slow for this special emergency.

If the patient is very feeble, whiskey in hot milk, with a dry and warm blanket-pack, and a warm water-bag to the feet, and a cool room may procure sleep and obviate the use of a drug.

For the list of hypnotics and their uses, reference is made to the section on "Pharmaceutical Remedies," in this chapter.

It will not infrequently be found that the insomnia is an attendant symptom of inanition, and when the latter is relieved, sleep returns more effectually than by any other means. In all acute Insanity sleep and food are the two most urgent needs.

Obstipation.—Obstinate constipation is common in mental disease, and more especially in melancholia, from diminished peristalsis and intestinal secretions. Not infrequently there are dangerous excremental accumulations of some weeks' standing, during which time there may have been repeated partial evacuations. The urgency will be found still greater in certain cases with fecal impactions in the large intestines. The relief of these conditions will often modify at once the distressing excitement of the patient. The only prompt

remedy is mechanical delivery of the impacted rectum. Ordinary syringes and enemas are of no avail. In the absence of a gynæcological chair or table the patient may be treated on a bed, spread with a rubber sheet drawn on one side of the bed into a vessel. The patient is drawn crosswise of the bed, in the dorsal recumbent position, with the knees held bent apart by assistants, the heels and buttocks together at the edge of the bed and the operator seated directly facing the patient at the edge of the bed. The effect of glycerine and warm water, or of soap and warm water may be tried, but they are seldom of any avail. Warm olive-oil or cotton-seed-oil injected through a soft Irish linen catheter, passed gently by obstructions, may facilitate the operation. Rectal speculum and other appropriate instruments may be used with great care not to injure the parts, but fingers are often more effectual and less dangerous than other instruments. In the worst cases anæsthesia may be advisable, or necessary, on account of the resistance of the patient.

If the accumulations are in the large intestine it becomes necessary to use a long flexible tube and to practise intestinal lavage.

The physician will often be surprised at the relief of the general condition of the patient afforded by prompt attention to this urgent symptom of obstipation, after purgatives have been used to no purpose.

Retention of Urine.—The bladder will often be found immensely distended, and reaching almost as high as the gravid uterus at full term, and this is especially apt to be the case in general paresis and organic dementia. Vesical rupture may occur from over-distention.

Catheterization should be practised at once if the patient will not or cannot make a successful effort to empty the bladder.

In males old strictures may offer obstruction, and a warm bath, and filiform bougies may become necessary.

Obstinate resistance on the part of the patient, and urgency of the vesical symptoms, is a sufficient indication for anæsthesia, provided no thoracic contra-indication is found on auscultation, and that the feebleness of the patient is not too great. Vesical puncture may become a final necessity.

Attempts at urination while in the prolonged warm bath are often successful, and this simple measure should always be tried before any operative procedure is undertaken.

Gastro-intestinal Disorder.—Aggravated forms of gastro-intestinal catarrh will demand early attention. A very distressing condi-

tion is often due to dilatation of the stomach and long retention of food due to defective innervation of the gastric musculature, as well as to altered secretions. Even in the absence of these conditions, sarcinic and acid fermentations, with pyrosis and gastralgia, will occasionally call for immediate attention. The gastralgia may be intense, in neurasthenic cases particularly, and accompanied by severe tonic spasms of gastric muscles. A full dose of sulphate of morphia by hypodermatic administration is the best remedy.

The most ready means of relief of the other gastric troubles above mentioned is the thorough washing out of the stomach. A long flexible soft rubber æsophageal tube with a funnel attached at one end is to be employed. When it has been oiled and passed into the stomach the fluid is poured into the funnel, which may be slightly elevated, and then, when sufficient liquid has passed and while the tube is still full, by lowering the funnel end, the tube, acting as a syphon, will empty the stomach. This procedure may be repeated without removing the tube until the stomach is completely cleansed. It is best to use boric acid, or salicylic acid in a $\frac{1}{2}$ per cent. solution for the cleansing, and if the stomach is acid vichy water or bicarbonate of sodium in a 2 per cent. solution may follow for the final washing out of the stomach. This antiseptic lavage will sometimes give prompt good results. The tongue in these cases is heavily coated, and the buccal and pharyngeal cavities have an offensive odor, and a mouth wash of glycerine and biborate of sodium in solution may be used.

Exhaustion and Heart-failure.—A considerable percentage of all cases of acute mental disorder die from exhaustion and heart-failure. The heart-failure may arise from general arterio-sclerosis and cardiac degenerations or valvular lesions, or from focal brain disease and organic lesions involving the origin of the pneumogastric nerve, or it may only be a symptom of the general exhaustion of nervous centres, or it may result from a toxic diathesis or auto-intoxication.

The general exhaustion springs from a vast expenditure of nervous and muscular force, which is not restored by adequate sleep and nutrition. The actual danger in these exhausted cases is often masked by an appearance of strength which is not real, and may lead to neglect of active treatment until the approaching fatal issue demonstrates the hopeless degree of general exhaustion. There is in these cases an ominous fall of temperature and feebleness of the pulse which announces the approaching danger. When the physician is

called to a case of acute Insanity and finds the restless patient with a subnormal temperature and a feeble and irregular or intermittent pulse he may know that there is no time to be lost. The patient is at once to be put to bed, and is not to be allowed to leave the recumbent posture, and is to be kept warmly covered, and if the extremities are cool artificial heat is to be applied. The administration hourly, during waking hours, of small doses of whiskey in concentrated beef-tea and in milk is to be continued, and the tincture of digitalis in certain cases is useful in small and repeated doses. Sleep is to be encouraged in every way, and is not to be interrupted for the purpose of nourishment or stimulation, for as the pat French proverb well says, "Qui dort, dine." This treatment is to be supplemented by small doses of quinine, and of dilute phosphoric acid.

It is best to carry out a systematic rest cure for some weeks in these cases, in which passive movements and massage are to be substituted for exercise.

When the first urgency of the symptoms has passed it is better to keep the room cool at a temperature not exceeding 65° F. The special pathology of the heart-failure as above noted may give varying indications of treatment.

Psycho-motor Excitement.—All forms of intense excitement, whether continuous or paroxysmal, are urgent symptoms, as they lead often to exhaustion of vital powers. The patient will be found shouting, grimacing, spitting, gesticulating, beating the air, and sometimes jumping continuously or running about in a circle. The effect of a graduated bath with cold to the head may first be tried. If this does not answer the purpose, and the patient be a strong person, the subcutaneous injection of hyoscine (gr. $\frac{1}{100}$, Merck's) is as efficient as any remedy known for allaying the excitement. This remedy is powerful and not without danger of cumulative effect. Conium is efficient, but as ordinarily dispensed is of uncertain strength, which may give rise to disagreeable symptoms. In muscular men free from cardiac trouble tartar emetic, gr. $\frac{1}{8}$, often acts as effectively as hyoscine, and tends to relieve the hoarseness and congestion of laryngeal, tracheal, and bronchial membranes, which results often from constant shouting and mouth-breathing. If the patient has been isolated in a closed room and only partially clad for some time, the expedient of dressing him completely and taking him out into the open air for a walk in comparative freedom will sometimes surprise him into temporary quietude. Ordinarily, though, all

element of self-control is lost and the excitement is the direct result of cortical irritation. If the excitement become continuous, and tend to a chronic nature, the electric cautery or blisters ad nucham may prove advantageous.

Acute Organic Affections.—Inflammatory affections of thoracic and abdominal organs run an obscure course often among the acute insane, and they will not be discovered except by the closest observation, and the physician will often have to treat symptoms of this kind more urgent than those of the mental disease. Auscultation and percussion should be performed at the earliest practicable moment, and the urine should be examined. All acute organic diseases in the insane are best treated in bed. In these cases the effort of attendants to retain the patient in the recumbent posture is often more exhausting than chemical restraint. The choice of evils, therefore, is between the latter and the restraining sheet, for it will not do to have a patient running about with pneumonitis, pleuritis, pericarditis, acute nephritis, or any of the acute organic affections common among the insane.

The physician at his first visit to a case of Insanity, therefore, is to settle the treatment of urgent symptoms of this nature.

Infectious Diseases.—Zymotic fevers in the primary stage may be ushered in by Insanity, and delirious mania of toxic origin sometimes presents eruptions, and a differential diagnosis, owing to a rash and a rise of temperature in both cases, may require a little time. All doubtful cases should be treated as if of infectious nature until the diagnosis is settled beyond a doubt. All hospitals for the insane should have an isolation hospital, built in pavilion form, at a distance from other buildings, for the treatment of cases of Insanity with contagious diseases. The family physician is to isolate these cases completely, and to treat the infectious disease as if the Insanity did not exist, though the restraining sheet may become a necessity. The intercurrence of Insanity in infectious diseases after their full development is seldom a justification of the commitment of the patient to a hospital for the insane during the course of the infectious malady.

Section IV.—Certain Specially Troublesome and Responsible Cases.

There are certain cases which tax the resources of a well-equipped hospital for the insane, and are still more difficult of treatment in private houses.

The endeavor here is to point out the modes of dealing with the most troublesome cases which occur either in hospital or private practice.

Destructive Patients.—Destructiveness, as a part of the aimless and general incoherent violence of acute delirious mania, is best controlled by prolonged warm baths and cold affusions to the head, and if the patient be strong by the subcutaneous use of hydrobromate of hyoscine, gr. $\frac{1}{100}$. The general automatic destructiveness of epileptics, following or preceding the seizures, is sometimes avoided by large and repeated doses of bromide of potassium, conjoined in extreme cases with chloral.

Ordinarily, medication for the control of destructive tendencies alone is not to be recommended.

The simplest expedient in maniacal destructive patients is the complete removal from their reach of everything which they can destroy. This implies isolation of the patient in an empty room with guarded windows.

The next most effectual means is the incessant watching of the patient by attendants, who must exert sufficient manual restraint to prevent any destructive acts of the patient. This amounts to constant holding of some patients who are quick and bent on mischief. Patients who kick holes in the plaster of the walls may be given slippers or felt shoes. Many of the most destructive patients are cases of chronic mania, who have fixed habits and studied ways of destroying property. They use pins, buttons, hairpins, splinters of wood from the floor and sharp bits of stone to do an incredible amount of damage to walls, doors, windows, and furniture in a brief space of time. The only way to deal with these cases is to keep them under constant supervision, to search them and their clothing night and morning, to teach them some manual occupation if possible, and to get them tired with out-of-door labor, so that they will rest at night, and to have them sleep in an associated dormitory under the eye of the night-attendant, if in hospital. Restraint, as a remedy for destructiveness, is not to be practised by mechanical appliances.

Another class of destructive patients is of the impulsive variety. They know the nature of their act perfectly well, but they have an irresistible tendency to perform it. Fortunately the tendency usually takes some definite form, such as breaking glass, setting fire to things, turning the table over, or throwing things out of the window. The apartment must be arranged with special reference to the avoid-

ance of the particular impulse, and of those things which suggest it, and the nurse knowing the constant direction of the patient's weakness can foresee and prevent it.

Chronic cases of insanity, which more or less automatically pick, bite, and rub their clothes to pieces, and are past all hope of teaching any manual employment, are provided with strong quilted, or canvas, suits, which can be washed. An expedient occasionally successful in these cases is to give them something to tear or pick to pieces, and thus to direct their activity in a harmless direction. The task of breaking the automatic habit in these cases by constant prevention by the hands of nurses is wellnigh hopeless. Patients thus prevented for weeks together will at once return to their old destructive ways. In the formative stage the habit may be broken. Among comparatively intelligent patients with impulsive tendencies to destroy, mental therapy and counter-suggestion are of some avail, and possibly hypnotic influence might have some application in these cases, which are ordinarily of an impressionable nature. In some of these cases the type is degenerate and beyond hope of cure.

Violent and Homicidal Cases.—During the play of emotions in acute mania anger may prompt to violence, which is occasional and of brief duration, and not usually very dangerous.

Such maniacal patients may be violent one moment and laughing the next, and the skilful nurse can always manage with these cases with tact and kindness.

Certain cases of mania assume a chronic irascible and violent form, and if there be a certain degree of physical strength, and at the same time combined with it in men a certain knowledge of the pugilistic art, the patient becomes very dangerous. It is fully possible for a person to be killed by a single blow with the fist. Patients of this class who are habitually violent should be kept isolated, or duly guarded by a sufficient number of nurses.

A single attendant should not be left alone with such a patient against whom he may be thus compelled to use great force in self-defence. If there be a temporary insufficiency of nurses it is better that the patient should have one hand restrained than to incur the risk just mentioned. It is in this way that nearly all injuries to patients or nurses occur through inadequate assistance in the control of violent patients.

There are some patients who are persistently homicidal, either from delusions of persecution, or from irresistible homicidal im-

pulses. Some of them are fully aware of their condition, and may even beg to be restrained, that they may injure no one. The physician must decide in each case according to all the circumstances how long restraint is justifiable in these cases, in which bodily signs, not unlike epileptic auræ, may give forewarning of the culminating impulse.

In attempts to carry out non-restraint in dealing with these cases the writer has known nurses and medical officers to be badly hurt, and has himself sustained injuries from attacks which might have proved fatal to a person less able to sustain them. The first onslaught of such a patient upon the physician may be so rapid that the attendants cannot prevent it.

The treatment of homicidal patients should never be undertaken in private, and isolation is the proper measure until the removal to a hospital for the insane is effected.

In the chronic irascible violent cases mentioned the writer has seen good results from the insertion in the back of the neck of a seton, which seemed to relieve the cortical irritation and the explosive nature of the anger.

Epileptic violence, which is blind and furious, occurs chiefly in certain definite relations to the seizure, and with prodromes which come to be recognized and guarded against by the habitual attendant of the patient.

These violent outbreaks in epileptics are sometimes vicarious of the seizures, and they may be in certain instances prevented by the use of nitrite of amyl or by anæsthetics.

Passively and Actively Filthy Cases.—Maniacal, demented, and stuporous cases soil themselves frequently both during the daytime and at night.

The cases of terminal dementia, so long as there is a minimum of intelligence left, can be trained to go to the water-closet. They should be taken there every hour during the day, for weeks together, to establish the habit of attention to nature's wants, which they finally come to heed.

A night-habit of cleanliness may be taught by the same means in the same class of patients. The beginnings of this method are discouraging, but the result repays the trouble taken.

Paralytic dements cannot be taught, but by regulating the amount of the fluid taken, and by the use of the catheter and enemas and bed-pan, they are readily managed. The latter are the only

means also to be employed in profoundly stuporous cases, which cannot be led to make any effort when taken to the closet.

Maniacal patients are often actively filthy, daubing themselves and the walls with excrement, and they are sometimes coprophagists as well as daubers. Such patients should be given concentrated meat diet and little liquid, should be taken to the closet the last thing at night, and if the visit is without result, the lower bowel should be emptied completely by enemas. Some chronic maniacs are extremely troublesome, and have an insane cunning in reserving themselves for the smearing nightly performance. These may be given the restricted diet, a full dose of opium one night, and a complete rectal clearance by enemas the next night on retiring to their room, as they are usually too noisy to sleep under surveillance in an associated dormitory. In general paretics in the final stage the rectal and vesical incontinence from paresis of sphincter-muscles is best met by constant changes of the under sheet drawn over a rubber sheet to protect the bed. Some use a diaper in these cases, and others attach a funnel to the centre of the rubber sheet to deliver the urine through a tube extending directly through the centre of the bed into a vessel, and others use rubber apparatus such as is worn in chronic incontinence of urine, and if the patient is quiescent some form of urinal can be adjusted in these cases.

In both actively and passively filthy cases the education of the patient, and the tact and perseverance of the nurse, are the main reliance, and the prevention of the formation of uncleanly habits in the first place is of great importance, and calls for constant watchfulness on the part of the nurse.

Feeble, Helpless, and Bedridden Patients.—Some of the most responsible and troublesome cases with which the physician has to deal are very feeble insane patients, and especially senile dements. Such patients are often restless and constantly tottering about at the risk of falling and striking against things. They often sustain bruises and rents of the skin, which is so atrophied in some instances, that it tears like wetted paper. The slightest firmness of grasp of the nurse in efforts to restrain them causes capillary rupture and discolorations showing the imprint of the fingers, and giving rise to the suspicion of unnecessary violence. Very often they fall and sustain intra-capsular fracture of the neck of the femur or Colles's fracture of the radius.

In all hospitals for the insane there should be special quarters pro-

vided for the treatment of these cases on the ground floor to avoid going up and down stairs. The floors should not be smooth polished, the bedsteads should be lower than usual, and provided with an adjustable side-board in cases tending to fall out of bed. An active night service is required.

In private practice the physician cannot do better than to treat these cases in bed, having them warmly clad and taken into the open air daily.

The helpless insane, who are hemiplegic or paraplegic, from focal brain disease or spinal degenerations, usually do better dressed and out of bed in the daytime, seated in easy-chairs. The best appliance for these cases is a comfortable arm-chair mounted on noiseless wheels with rubber tires, so that they can be quietly conveyed back and forth on the long wards of hospitals, or wheeled into the open air daily. In certain cases in private practice a tricycle adjusted for propulsion by the arms of the patient is a desirable arrangement, furnishing exercise and diversion in paraplegic cases. Hygienic measures, and, instead of sedatives, open-air exposure for some hours daily to procure sleep is in the long run the best treatment in these helpless cases.

The bedridden cases are made up largely of general paretics in the final stage, of tabetics, or of cases of organic dementia, or of alcoholic or syphilitic dements with sclerotic spinal lesions. From lesions of the lumbar cord arise troublesome symptoms in the bladder and rectum. Irritative lesions here give rise to spasm of the urethral sphincter and retention of urine and overdistention of the bladder, which may rupture in paretics, especially from atrophic disease of the muscular coat of the bladder. The catheter should be passed every few hours in these cases. Destructive lesions of the lumbar cord cause paralysis of the bladder and overflow of urine often highly alkaline if not frequently drawn. Exposure of the skin to urine is promptly followed by eruptions and bed-sores. Benzoated lard with a little admixture of white wax freely applied in anticipation of exposure is an effective preventive, and much better than attempts to harden the skin with applications of alcohol, tannin, and like things. The real preventive should be constant changes of linen, as often as required, and the use of the catheter. In many of these bedridden cases there is paralysis of the sphincter ani and escape of the rectal contents. Astringent suppositories at first may be of some use, but a retention pad of patent lint, retained by a perineal elastic attached to a waistband, does still better, but nothing finally suffices but frequent

changes of cloths evenly folded and smoothly drawn beneath the patient to save the sheet. The secret of this part of the treatment has to be taught to the nurse, who nine times out of ten will *wipe* the patient clean a dozen times a day, and will within a week have abrasions, small furuncles, cellulitis or bed-sores as the result of mechanical irritation. No friction is to be allowed, and the whole knack lies in the use of a bed-pan, of a syringe with warm water to effect the cleansing, which must be complete, and then simply *pressure* with absorbent lint to dry the parts, and finally the application of an unguent of refined lard, spermaceti, and white wax over all the parts liable to subsequent exposure to the discharges.

Suicidal and Masturbatic Cases.—The danger of suicide increases greatly the responsibility of the physician in the treatment of mental disorders. The means of self-destruction are almost incredibly easy and near at hand. A small piece of glass, tin, or china-ware, or a strong pin may be used to open the vessels of the arm. A patient can fill a wash-basin with water, place it on a chair at the side of the bed, and lying across the bed with his face in the basin drown himself.

A patient sitting at table, in the presence of attendants, eating without knife or fork on account of known suicidal intentions, may take his life with no other weapon than a piece of bread. This occurred in the writer's hospital practice. A patient who had been under the closest surveillance sat eating with the nurse standing behind him. The patient fed himself with the right hand and with his left hand in his lap kneaded slyly the moistened soft part of bread into a doughy mass nearly the size of his fist, and in an instant he carried it to his mouth and jammed it forcibly down his throat with his fingers. The nurse at once noticed the unusual action of the patient placing his fingers in his mouth, and springing forward seized his hands, and then seeing signs of suffocation, properly used his finger to free the pharynx from the mass. In five minutes' time the physician with instruments was at the patient's side, but the patient was dead, and resuscitation could not be brought about by artificial respiration or any other means. The autopsy revealed that part of the doughy mass had passed not only into the larynx, but also into the trachea.

The failures and accidents of medical and surgical practice are often more instructive than the successes, but they are unfortunately seldom published, and one more is, therefore, here made known to

illustrate the facility and danger of suicide, and this was also a hospital case. A woman with a suicidal tendency made known in the history was placed the night of her arrival in a dimly lighted room with the door ajar and with a nurse seated so that she could see if the patient attempted to rise from the bed at any moment during the night. By special order the nurse searched and removed the patient's clothes from the sleeping-room, and stripped and searched the patient just before putting her to bed. The patient managed with insane cunning to secrete about her person, in spite of this search, either in perineal regions or more likely in the vagina itself, a cord the size of a goose-quill and more than long enough to go around her neck. She lay quietly in bed on her back, drew the bed-clothes well up around her neck, adjusted the cord about her neck with an ingenious slip-knot, which would stay at the point to which it was pulled, and evidently with one supreme effort drew it so taut that it stopped respiration, and she died without the slightest noise or struggle, or without even a change of position in bed.

The nurse on guard in the hall-way, only the distance of the length of the room from the patient, was astounded when after some hours she discovered how the fatal deed had been done.

Patients may commit suicide by suddenly plunging head first against the wall causing vertical or basal fracture of the skull, or they may seize and swallow things dangerous to life, and any opportunity for precipitation or drowning is almost sure to provoke an attempt.

Ocular enucleation with the forefinger and sexual mutilation by male and female patients are performed at times with suicidal intent.

The only safe treatment of suicidal patients is to be conducted on the supposition that they are bent upon "felo de se" at every moment of their lives. Such patients are never to be left alone for one minute day or night, and eternal vigilance on the part of the nurses is the only condition of safety of the patient.

Opiates may alleviate mental depression, but no drugs will remove suicidal impulses except as they produce delirious excitement or stupefaction. A combination of opium and bromide of sodium may be used to blunt the keenness of precordial anxiety, which sometimes leads to suicide. Frightful hallucinations of sight prompting to suicide are sometimes relieved by isolation in a darkened room. Special effort is to be made to ascertain and remove any delusion

which may be driving the patient to self-destruction. If a man wishes to die because his wife has been murdered, as he supposes, by his enemies, it is well to have the wife visit the patient.

The impulse to suicide may disappear temporarily with the delusion, but the lurking tendency is apt to reappear with a new delusion to justify its execution.

Some suicidal patients have a sense of relief when wearing some form of restraint which precludes the possibility of injury inflicted by their own hands, but except in the most desperate cases, with impulses to self-mutilation, mechanical restraint is not to be recommended. The writer has had days together to bit and bridle certain patients determined and partially successful in attempts to destroy both lips and tongue by biting them.

The modes of dealing with masturbatic patients are numerous, and the practice can usually be prevented, but the tendency cannot often be eradicated. In women it is sometimes the result of pruritus vulvæ or of other local disease, which should be treated for the relief of this symptom. In acute Insanity it is often a manifestation of hyperæsthesia sexualis, which subsides with the acute stage of the malady. In confirmed cases the habit has become an organized part of cortical associative relations, and even castration will not remove the deep-seated tendency to the habit, and clitoridectomy is likewise without curative result, and oöphorectomy itself does not eliminate the psychical sexual erethism, which has become an organized habit of mind. Hereditary masturbatic tendency is likewise incurable.

The prevention of masturbation as an inter-current symptom of acute Insanity is accomplished in men by blistering with cantharidal collodion. Pain then prevents erethism and erection. A stitch with silver wire may pass from the base of the gland through the skin enclosing the prepuce, or the latter may be drawn forward and stitched through from side to side. These methods prevent turgenscence by the pain they cause, and are only to be used in extreme cases. In women it is more difficult to limit the effects of blisters, and improvised dressings with bandages to prevent friction of the thighs are required. Temporary resort to mechanical restraint may be justifiable in these cases, and various forms of local preventive apparatus are used but with indifferent success. The most effectual prevention is a day and night surveillance by nurses accustomed to this class of patients, and having experience of their

cunning ways of indulgence in their habit. Sitz baths and forms of hydrotherapy, including the shower bath, are useful adjuvants. Anaphrodisiacs, especially the bromides, are of some service. A trial may be made of Gokhru, the East Indian remedy, which is the fruit of Pedalium Murex. Lupulin, salix nigra, and camphor are sometimes of benefit. Urethral hyperæsthesia, which favors erethism, may be relieved by application, cautiously made, of nitrate of silver. Strychnia, phosphorus, and quinia are the best tonics in these cases, and general hygiene, physical fatigue, and mental occupation are indicated. Spinal galvanization is sometimes useful. On recovery of the patient from the mental disorder, if sexual hyperæsthesia be a sequel, marriage is not a preventive of the possible return of self-abuse, which is also common among the married, to whom the constant presence of the opposite sex may only prove a provocative to artificial indulgence.

Masturbation in climacteric Insanity is due to paræsthetic local conditions, and it usually recovers by self-limitation of the menopause.

Section V.—Treatment Based on Diagnostic Conclusions, and Etiological and Pathological Indications.

The complete survey of the history and of all the symptoms of a case of Insanity often leads to diagnostic conclusions, which constitute the broadest grounds of treatment.

If the case be that of a child, and the diagnostic conclusion be mental arrest, the whole treatment must be based on the central idea of educational training, continued for years by those specially skilled in these cases. If the mental weakness be the sequel of acute infectious disease in the child, who has failed to recover its former natural mental status, the same educational treatment is to be pursued as in the first case mentioned. If the developmental arrest is congenital, and the child has reached the age of ten or twelve years without treatment, the physician must inform the parents that the hope of benefit to be derived from any curative attempts is almost *nil.*

If the child before the age of ten has shown monstrous depravity and uncontrollable wickedness, the treatment must also be of a corrective educational nature, carried out for years under some judicious person, not a parent of the patient, who in this way some-

times may be rescued from life-long Insanity. Certain forms of imbecility, not moral but intellectual, are to be treated in accordance with the degree of mental deficiency diagnosed. Such patients in early life are misunderstood, and they are punished by parents for supposed neglect of duties. and disciplined by teachers, until they are driven out of their minds finally by continuous little hardships of life, which would not thus affect a person of stronger mind. The treatment must depend completely on the degree of native enfeeblement established by the diagnostic conclusion founded on a review of all the anamnestic data. If it be concluded that there is decided mental deficiency, the young person, temporarily unbalanced by the petty trials and severities of life, should be placed in the care of one known to be kind and gentle, and should never be again sent to a common school, and should be taught some simple manual or out-of-door occupation to be followed for the remainder of life.

If the patient in this degenerate group is adolescent, and has developed the symptoms of original monomania by a gradual outgrowth of perverted traits, the treatment can only consist in surveillant and expectant methods, without hope of cure. The patient is best removed from large cities to agricultural pursuits, and a life in the open air under good regimenal conditions will in the course of years effect such amelioration of the general constitution as is possible in inherited psychopathies.

If the psychopathic tendency manifests itself in a periodical way, or a definite cyclic character has already been established, the treatment in the lucid interval is to be confined to hygienic means of reinforcing the whole physical constitution, and then the most vigorous therapeutical measures are to be employed to ward off the attack. The recurrence in women often coincides with the catamenial period, and in such instances as the molimen approaches absolute rest in the recumbent posture is to be enforced. Prolonged sleep, light but nourishing diet, warm baths, gentle massage, intestinal lavage in obstipation, and galvanism through sacro-pubic regions in delayed menstrual flow are the indications. If this course is not successful at the next coincidence of mental and menstrual trouble, the patient is to be quickly brought under the full physiological effects of bromide of potassium and to be kept in this artificial state of sedation for five days previous and five days subsequent to the menstrual flux.

In men the cyclic approach of mental trouble, according as exaltation or depression is in order, is to be treated actively with sedatives or with tonics, stimulants, and general faradization.

If the diagnosis establish the sequential relation between the mental disorder and an established neurosis the latter is to be treated. Thus choreic Insanity is best dealt with by remedies to control the convulsive affection, which once relieved in children is followed by a return to sanity of mind. Epileptic mental disorder is likewise dealt with by active therapeusis directed against the neurosis. The treatment in the latter instance is only effective before mental deterioration has actually occurred.

If the diagnostic conclusion is that the Insanity is the direct result of the crisis of puberty, the menopause or senility, the chief idea must be to conduct the case expectantly and safely through the natural evolutional or involutional changes, and to meet intercurrent symptoms with special remedies as the occasion requires. There is undoubtedly a good application of the bromides in climacteric cases to allay nervous irritability, and of opiates in senile cases for a relief of the persistent agrypnia. The treatment of the pubescent cases naturally calls for such drugs, nervines, and tonics as best combat sexual neurasthenia in men, and amenorrhœal troubles in women, and such other symptoms as hysteria, tetanoid, and cataleptoid states, hysteroid seizures, stuporous and fasting conditions, and temporary maniacal outbreaks. In some cases the rest cure, with massage and hydrotherapy, bromides for insomnia, nux vomica and iron as tonics, and complete isolation are very effective. In hysterical patients valerianate of zinc, asafœtida, and turpentine are of some service, and bromides in large doses control the crises in some instances, and an emetic may cut short the seizures, and for prompt action apomorphine (grain $\frac{1}{10}$) injected under the skin is used. In the second part of the work, under the special types, the details of treatment in these cases will be given.

The etiological conditions shape the course of treatment very largely in mental disorders. The general systemic morbid states, out of which spring the various toxic and diathetic insanities, usually afford the most direct indications for treatment.

The prime object is the elimination of the poison from the system through the bowels, kidneys, and skin, and hence cathartics, diuretics, and sudorifics come into use in recent cases. Acute alcoholic mania, breaking out during a drinking bout, the writer has found, benefited by the Turkish bath, with copious draughts of water, acidulated with dilute phosphoric acid, and followed by the use of strychnia, and a combination of bromides and chloral as a hypnotic.

There are certain remedies, as in saturnism, which also assist in the elimination of the toxic agent, and still another class of direct antidotal nature which should be promptly administered. Unfortunately the toxic insanities are often not early symptoms of the action of the poison, and organic lesions may result in muscular and nervous tissues before the case comes under treatment. In the latter instance time is essential to a cure, which is to be perseveringly sought with electricity systematically used for the atrophied muscles, and mild tonics, a generous regimen, and the avoidance of powerful drugs, which the damaged nervous centres ill support.

Arsenicism, with resulting multiple neuritis, will be found tedious of treatment, and mental disorder from plumbism has a chronic course in many cases, but treatment is to be pursued even after dementia is fully developed, as partial recovery is still possible.

The diathetic etiology of Insanity also furnishes indications of treatment which call into use the whole armamentarium of drugs. Here again the diathesis, rather than the resulting symptom of mental disorder, is to be treated, and if the former is relieved the latter usually disappears; except in those instances in which one is the vicarious or larval representative of the other. Thus, in malarious Insanity, the usual remedies are directed against the paludal diathesis, but if the mental disorder appears without the intermittent fever, in one known to have suffered much from the malaria, the conclusion is that the mental disorder is vicarious of the fever, and the correctness of the theory is proved by the readiness with which the Insanity yields to the use of quinine. Likewise gouty and rheumatic Insanity suggest appropriate remedies for the systemic rather than the mental trouble, and myxœdematous Insanity is met with the modern specific in form of thyroid extracts.

In the tubercular diathesis the contagionist theory has not yet impressed medical officers of hospitals so far as to lead to isolation in treatment of the insane. The customary drugs are not well borne by the tuberculous insane, and apart from stimulants, cod-liver oil and quinine, the treatment best adapted is the open-air cure, with gentle exercise and prolonged hours of sleep. Vicarious phases of the pulmonary and mental symptoms are often very marked, and almost discourage treatment. Thus in some cases successful attempts to limit the pulmonary disease are followed by aggravation of the mental symptoms, and upon a new invasion of pulmonary tissue the mental disorder temporarily ceases.

There is a distinct anæmic diathesis giving rise to Insanity, and calling for not only ferruginous remedies, but also arsenic, cod-liver oil, the most concentrated nourishment and peptonized foods, as both primary digestion and secondary assimilation are impaired.

Alienation of mind arising in the post-febrile diathesis usually presents a variety of sequels for treatment, such as renal and cardiac disorder, muscular atrophy, and diseases of the organs of special sense. The visual and aural disorders require active attention as a source of hallucinations and delusions, to be removed if possible by local treatment. The sequel of deafness in scarlet fever may cause permanent arrest of mental development if special educational methods are not employed.

But there are pathological as well as etiological conditions on which is to be based the treatment of mental disorders.

The insanities with organic lesions of cerebral centres have special indications for treatment. Traumatic affections of the head often demand direct surgical interference for the ablation of depressed bone. Foreign bodies or growths in other parts of the nervous system, acting as centres of peripheral irritation, may demand removal.

Syphilitic gummata and other cerebral lesions of luetic origin call for active specific treatment.

The various forms of coarse brain disease, which give rise to organic dementia, are not without indications for treatment. The paralyzed limbs and secondary degeneration of muscles are best treated by massage and electricity.

The diffused cerebral lesions of delirium acutum prove fatal in a few days if active treatment is not forthcoming. Isolation in a darkened room, forced alimentation, and sustaining measures, the reduction of temperature by tepid baths, the procuring of sleep, and the control of motor excitement by hyoscin, stimulants, especially in those cases of alcoholic origin, judiciously employed, are in the main the remedial measures.

The above are the chief general indications for treatment of Insanity as based on diagnostic conclusions and etiological and pathological conditions, and attention will next be directed to the special uses of drugs in mental disorders.

Section VI.—Pharmaceutic Remedies.

It is thought best to consider the uses of pharmaceutic remedies in their application to the symptomatic treatment of Insanity under

one heading. The classification of remedies here adopted is not exhaustive, but it embraces all the chief drugs employed in psychiatry. The therapy of the separate types of Insanity will be described in the second part of the work, but it is the intention in this section to display the entire therapeutic armamentarium which the physician has at his command to combat the symptoms of mental disorders.

The same drug, like opium for instance, may be stimulant or sedative, according to the dose in which it is given, and hence it may appear under more than one heading, according to the purpose for which it is administered.

HYPNOTICS.—First on the list of pharmaceutic remedies are those which relieve insomnia, known to be the most constant and one of the most urgent symptoms of mental disorder.

Chloral.—This is as sure in its hypnotic effects as any drug used in the treatment of mental diseases. It is not an anodyne, and if pain be the cause of the insomnia it must be combined with opium in some of its forms.

Chloral hydrate is given in doses of from ten to twenty grains, largely diluted for internal use, or it may be used in an injection, which will be expelled from the rectum if not retained by compress.

On account of its disagreeable taste some patients will not swallow a second dose of it, and it may be necessary to give it in milk by the feeding-tube or in an enema as mentioned. Acacia and high-flavored syrups help to mask the taste.

A full dose of chloral in maniacal insomnia is usually followed by four or five hours of refreshing sleep.

The drug loses its efficacy by repetition, and larger doses become necessary.

The long-continued use of the drug causes an eruption, vascular paresis, and heart-failure, digestive disturbances, and vasomotor disorders.

Chloral is not to be given in cases with atheromatous disease of the aorta, fatty heart, or cardiac valvular lesions.

Chloral is especially effective in acute hallucinatory excitement, and when combined with morphia (chloral, grain 10; morphine, grain $\frac{1}{8}$), its effect is much heightened.

Bromides.—The bromides of potassium, sodium, and ammonium are chiefly used, and they tend to produce sleep by lowering reflex excitability and diminishing cortical activity in mental disorders.

Bromide of sodium is better tolerated by the stomach, and is to

be preferably employed as a soporific, though in an occasional case bromide of potassium seems to act more effectually. Either of them may be given in doses from one-half drachm to a drachm, though twenty grains at first may cause sleep.

The bromides in general are more adapted as hypnotics in states of excitement than in states of depression, and they are especially useful in insomnia from paræsthetic states and tactile illusions, and hypnotic hallucinations, and in the wakeful conditions in alcoholic and neurasthenic cases with subsultus tendinum and frightful dreams, out of which the patient awakens suddenly every few moments. In patients with evident cerebral congestion ergot may be combined with the bromides, and in acute melancholia cannabis indica is sometimes given with the bromides to good advantage.

Amnesia, stupor, emaciation, fetid breath, and other symptoms follow the excessive use of the bromides. On the other hand, the patient does not form a habit, as in the use of other hypnotics.

The anæmic diathesis is a contra-indication for the bromides.

Hydrobromic acid is too irritant to the stomach to take the place of the bromides of potassium and sodium. It has been used largely diluted in half-drachm to one drachm doses to procure sleep.

Opium.—Insomnia due to psychical or physical pain is relieved most completely by opium. In phthisical Insanity, with cough and pain, it is effectual as a soporific. In states of acute mental depression it relieves agrypnia and soothes the emotional irritability. It may be given in mental disorders associated with cardiac disease in which other hypnotics are contra-indicated.

The objections to its use are the readiness with which the opium-habit is contracted, the constipation and impairment of digestion which it causes, and the rapid tolerance of the drug, which requires to be given in constantly increasing doses.

Opium deodoratum may be given in doses of one-half to one grain.

Tinctura opii deodorata the writer has for many years found to be one of the most eligible preparations in hypnotic doses from twenty to forty minims.

Morphine has largely supplanted other preparations of opium in the treatment of mental disease, as it has a uniform strength and readiness of administration by the hypodermic syringe.

Sulphate of morphine, by the mouth, may be given in one-eighth or one-quarter grain doses in women, and in still larger doses in

men. It is less apt to cause gastric disorder when used subcutaneously, but even then nausea is an occasional result and it may be in part prevented by the use of bromide of potassium, and strong coffee relieves the depression. The hypodermic use of morphine is not without decided danger, and a first dose given subcutaneously should not exceed grain $\frac{1}{8}$, on account of idiosyncrasy, which may exist.

The indications and contra-indications for morphine are, in the main, the same as for opium, but the morphine-habit is more readily contracted.

Paraldehyde.—This is a prompt and valuable hypnotic in doses of one-half drachm to two drachms. It is best given in high-flavored syrup, or in wine, or in powdered sugar, just after a teaspoonful of clear whiskey has been swallowed, or in salad-oil flavored with volatile oil.

Nothing fully masks the disagreeable taste, and the odor of the breath and of the stools is the greatest objection to the continuous use of the drug, which becomes a positive affliction to some sensitive patients.

It procures sleep in from five to ten minutes ordinarily. It is to be avoided in phthsical cases. It may be given in enema, but when administered per rectum the dose must be nearly doubled. It has few dangerous effects, but in large and prolonged doses it may become toxic and give rise to tremor and stupor.

Sulphonal.—The dose of this hypnotic is from twenty to forty grains. It is practically insoluble in cold water and is without odor. It is dissolved in twenty parts of hot water, and it may be given in hot tea, soup, or milk. The drug may be shaken up in a little syrup and water and swallowed and the warm soup then taken to effect solution in the stomach, or a dose may be dissolved in eight ounces of hot water, which is to be taken before it cools. Sulphonal in solution acts in about twenty minutes, but sleep is sometimes delayed for hours, and this is one of the uncertainties of the drug, which, given in repeated doses, has a cumulative effect which may be dangerous. The writer has used it in many forms of Insanity, but can only commend it in strong maniacal patients. In large and prolonged doses it produces diarrhœa, vertigo, ataxic symptoms, and hæmatoporphyrinuria.

Sulphonal has the advantage that tolerance is seldom created by continued use, and that a sulphonal-habit is extremely rare.

Amylene Hydrate.—This hypnotic may be given in beer, or in

mucilaginous solution diluted very greatly, in doses from ten to thirty minims. It may also be used per rectum in a mucilaginous enema diluted twenty times.

It sometimes disturbs digestion, and it is not as reliable as soporifics already named, though less disagreeable than some of them in its effects.

Urethane.—This is said to be a safe hypnotic in doses of thirty grains, to be repeated if need be, and administered in aromatic syrup to cover the saline taste. It is represented as free from disagreeable after effects. The writer has had no experience in the use of the drug, which is recommended as being free from depressant results and adapted for use among children in ten-grain doses.

Trional and Tetronal.—These drugs are closely allied to sulphonal and have a similar physiological effect, and about the same soporific value. They are not free from toxic tendencies and are to be employed with caution.

Trional or tetronal may be given in doses of from ten to thirty grains in hot soup, tea, or whiskey.

Somnal.—In doses of from twenty to thirty minims, given in flavored syrups, the drug produces several hours' deep sleep, followed by lassitude in some cases. It is still on trial as a new drug.

Methylal.—This drug has been experimented with by various observers, and is said to be a decided hypnotic in doses from one to three drachms. It has also been given hypodermically, but it does not seem to have come into use, and it is expensive and probably less reliable than many other remedies already known.

Hypnone, chloralimide, piscidia erythrina, chloralose, duboisine, hypnal, ural, and other modern hypnotics do well in an occasional case, but they are not to be compared in reliability to those established drugs already mentioned.

Sulphate of duboisine is nearly the same thing as hyoscine, but there is no reason in its substitution for the latter drug. It is given hypodermically in grain $\frac{1}{50}$, as a hypnotic, and it is safe to begin with grain $\frac{1}{100}$.

Hyoscine.—This powerful alkaloid of hyoscyamus must be used with great caution. It is a sure hypnotic in the great majority of violent maniacal cases in doses of from grain $\frac{1}{100}$ to grain $\frac{1}{50}$, hypodermically administered, and it produces sleep usually within one-quarter of an hour when thus given. By the mouth it may be given in one-third larger dose, but it has a dangerous cumulative tendency

in some instances. It is very widely used in psychiatry, and, being without taste and very effective in minute doses, it is more convenient in administration than any other drug of like power. There is something more than an idiosyncrasy as regards its use in mental disorders, for there are numerous patients who suffer from its effects even in small repeated doses.

In strong and muscular maniacs there is no other remedy which so effectually subdues motor excitement and produces quiet slumber in the brief space of a few minutes. In a word, it is a sure hypnotic, powerful for good or evil, and never to be used in feebly constituted patients, and not to be administered hypodermatically except by the physician himself. Merck's preparation of hyoscine is considered reliable, and no uncertain article should be used.

The officinal drug is Hyoscinæ Hydrobromas (U. S.).

Hyoscyamine.—This drug is like the foregoing in most of its effects, but it is less decidedly soporific, and it may be given in larger doses.

Subcutaneously, it is well to begin with grain $\frac{1}{60}$ as a hypnotic. Its effect is heightened greatly when combined with small doses of morphine.

Cannabis Indica.—This drug was formerly used much more than at the present day as a soporific.

Extractum Cannabis Indicæ is given in doses of grain $\frac{1}{4}$ to $\frac{1}{2}$, the fluid extract from ten to twenty minims, and the tincture in one-half drachm to one drachm doses.

It is very important to procure a reliable preparation, otherwise constant disappointment will result.

Cannabinon, a resinoid from Indian hemp, has also been employed in doses of one grain as a hypnotic. It is best to begin with small doses in all instances.

In senile and alcoholic cases and in certain cases of melancholia cannabis indica acts favorably.

The chief objection is that it is impossible to predicate the action of the drug in any given case, and the first use of the remedy must therefore be experimental.

When combined with bromides, cannabis indica becomes a much more uniformly reliable hypnotic.

ANODYNES.—In psychiatric practice there is constant need of remedies which relieve physical pain and distressing sensations due to anomalies of the sensory nervous system.

Psychical pain also is a prominent symptom, and there are certain drugs which dull the keen edge of suffering and distinctly modify the prevailing emotional tone.

Under this head of anodynes, therefore, is described the application of pharmaceutic remedies used in mental disease to relieve physical or psychical pain.

Antipyrine.—This drug, in doses of from five to twenty grains, has a wide application in the treatment of the neuralgic symptoms which are so prominent in many forms of Insanity.

The lancinating pains in paretic, tabetic, and certain alcoholic cases are well controlled by antipyrine, which is also useful in the neuralgic pains of the joints and muscles in rheumatic and podagrous Insanity.

Many melancholiacs, tormented with neuralgic pains about the head, face, and neck, and which often furnish the material for delusions of persecution, are relieved by the judicious use of antipyrine as an analgesic.

Peripheral paræsthesiæ, which are the persistent source of hallucinations and delusions, are in some cases temporarily abolished by the remedy.

The constant peripheral neuralgias of neurasthenic Insanity occasionally yield to small and repeated doses of antipyrine.

The severe migraine of the generative types of mental disorder is sometimes checked by the drug.

Antipyrine is best given in the smallest dose which will prove effective, and it has frequent disagreeable results.

Bromides.—The painful paræsthetic states in climacteric Insanity are best controlled by the bromides. The occipital boring pain, which is a reflex of uterine origin, so common in these cases, yields to this drug.

The distressing pharyngeal and laryngeal paræsthesia, which is the source in hypochondriacal melancholia of the delusion of foreign bodies lodged in the throat, may be relieved by the bromides in some instances. Distressing paroxysmal cough in hysterical Insanity from laryngeal hyperæsthesia is also checked by the bromides.

In depressed cases at the menopause, when bromides are given to relieve cutaneous paræsthesiæ, they should be combined with citrate of caffeine. In tabetic and paretic cases the distress of laryngeal crises may be mitigated by the bromides.

Climacteric melancholia agitata presents a restless variety, which,

like some other states of psychical pain, is favorably modified by the bromides.

Even in states of depression the bromides may occasionally be employed with stimulants to correct their depressant action.

Opium.—The anodyne action of opium, as a modifier of psychalgia, has led to the opium treatment of melancholia.

Small and continued doses of the drug are given for weeks together to modify the emotional tone. The mental distress is greatly mitigated and the attack apparently abridged in some cases, which go on to complete convalescence under the influence of the remedy.

The chief objection to this procedure is the risk of the formation of an opium-habit.

Morphine is not employed for the purpose just mentioned, but it is given hypodermically to control the precordial panic of melancholic cases manifesting this culmination of mental and physical suffering.

Painful hallucinations in exhausted states of mental disorders are in some cases checked by opium.

Painful sensory disturbances of pneumogastric origin, to which the writer has called special attention, are often relieved by opium.

The cardiac crises, in ataxic cases, which take a dyspnœal form, are alleviated by morphine subcutaneously given. The deodorized preparations of opium disturb the stomach less and should be preferred.

Cannabis Indica.—This drug has several anodyne applications in the treatment of mental disorders.

In exceptional instances psychical pain in melancholia is remarkably alleviated by cannabis indica in small and repeated doses, but it is also to be stated that nothing but a trial will decide in what cases it will act thus favorably.

In painful forms of hemicrania cannabis indica is of value, and in headaches arising from uterine reflex channels in climacteric cases it is often an efficient remedy.

There is no danger, among Anglo-Saxons, at least, of a drug-habit from the continued use of cannabis, though in oriental countries cannabism is the cause of a considerable percentage of all cases of Insanity.

Spiritus Ætheris Compositus.—In the precordial anxiety of senile and feeble cases one drachm of this anodyne mixture repeated as occasion may require gives marked relief.

In the painful pseudo-angina pectoris, which, as a symptom of pneumogastric disorder, is very common in melancholic conditions and is mistaken for precordial panic, this remedy is specially efficient and does equally well to relieve cardiac distress in Insanity from nicotinism.

DEPRESSO-MOTORS.—Incessant motor excitement in mental disease is a common symptom, which calls for a remedy, for in maniacal states, especially, the patient becomes exhausted by constant violent action.

In patients who are wearing themselves out by uncontrollable exertions, depresso-motors are occasionally of great service. When restrained by the hands of attendants, such patients may exhaust both themselves and the nurses, and resist so desperately as to become covered with bruises and finally sink into a dangerous state of collapse. Chemical restraint in certain cases is a less evil than restraint by the hands of nurses.

Conium.—This is a powerful drug, and in controlling motor excitement it is best to begin its use by small doses, on account of the uncertain strength of many of the preparations in the market.

Extractum conii may be given in one-half grain doses, and the fluid extract in four-minim doses, increased until the physiological effect is obtained, or until the motor excitement partially subsides. The physician must watch the effect of the drug and promptly suspend its use at the right point, and if the effects are excessive, recourse must be had to cardiac stimulants or to strychnine subcutaneously employed.

Gelsemium.—In powerful and persistently violent and destructive men, who brook no control by the hands of nurses, this drug may be employed to prevent the muscular expenditure of energy, and to control the dangerous actions of the patient.

Extractum Gelsemii Fld. (U. S.) may be given in five-minim doses, or the tincture in ten-minim doses. It is best to begin with small doses, and to carefully observe the action of the drug, which is too powerful to use in any but very strong patients.

Veratrum Viride.—In maniacal men, whose muscular strength renders manual control impossible without a dangerous amount of force brought to bear upon the patient, this drug exerts a less harmful control of motor waste of nervous energies than the prolonged and desperate struggle between patient and nurses. It is so powerful that it must be closely observed and the dose gradually in-

creased during its employment on different occasions in the same patient.

Tinctura Veratri Viridis (U. S.) may be used in doses of two minims, to be increased as the occasion demands.

In puerperal mania it may be indicated as a remedy for the eclamptic seizures.

The Bromides.—In the blind motor violence of epileptics large doses of the bromides are indicated.

The motor explosions often occur in a definite relation to the seizure, and they are to be anticipated by full doses of the bromides, which thus obviate much dangerous activity and conserve the strength of the patient and avoid serious accidents.

The "anxietas tibiarum" and aimless rushing about in climacteric melancholia is well controlled by the bromides.

Vascular Sedatives.—There are occasional indications in mental disorder for remedies which control cardiac and vasomotor activity, and lower the intra-arterial blood-pressure.

Aconitum.—In sthenic maniacal cases, with bounding pulse, strongly pulsating carotids and evident signs of cerebral hyperæmia, the judicious employment of aconite may be of great benefit.

Tincture of Aconite (U. S.) should be given, one drop hourly, until some vascular sedative effect has been produced.

In the maniacal outbreaks during acute infectious diseases it also has some useful applications.

In chronic maniacal states with cardiac hypertrophy and continued violent cardiac action the drug may be used advantageously, unless the cardiac enlargement be compensatory of renal disease or other organic obstruction.

Aconite should never be employed in asthenic cases, and always demands watchfulness in its administration.

Antimony.—Tartar emetic was formerly in general use in psychiatric practice, but other remedies, of which some are less effectual, have supplanted it.

It is a valuable vascular sedative in maniacal excitement immediately associated with intercurrent inflammatory affections.

In prolonged states of vascular and cerebral excitement it modifies most favorably the general condition of perturbation, restoring quietude in a brief state of time, and, if then followed immediately by a hypodermic injection of morphine, the patient may remain composed for a day or two.

Pilocarpus.—Insanity with Bright's disease of the kidneys affords an opportunity for pilocarpine, which lowers the blood-pressure, and relieves the renal troubles and assists in the elimination of urea.

In phthisical Insanity it may be used instead of atropine for the relief of night-sweats. It has been recommended in cretenoid Insanity on account of its action on the skin. It is apt to have depressant effects and it is best employed hypodermatically in the form of the alkaloid pilocarpine from grain $\frac{1}{30}$ to grain $\frac{1}{20}$.

Vascular Stimulants.—As all acute forms of mental disease tend to exhaustion and to failure of cardiac action, there is a positive necessity in psychiatry for vascular stimulants.

Digitalis.—In ordinary medicinal doses digitalis is a cardiac stimulant, but in larger and toxic doses it is productive of cardiac stasis in diastole. The customary use of the drug increases both the volume and the force of the pulse-wave.

In asthenic cases of mania, tending to dangerous exhaustion, digitalis as a cardiac stimulant is a valuable remedy, which always, in conjunction with generous and, if need be, forced alimentation, hastens a return of strength and of equalized circulation.

The asthenic maniacs here mentioned have pallid faces, dilated pupils, and evidently cerebral anæmia, and, after they have been fed with milk, eggs, and one ounce of whiskey, they should be given ten drops of the tincture of digitalis every hour until there is some increase in the force of the heart's action. After the third dose, or sooner, if a favorable reaction in the circulation occurs, it is well to suspend the medication for the day and continue artificial nourishment if the patient does not take food freely. Under this treatment, as a larger supply of blood is sent through the brain, the change for the better is sometimes very rapid.

In many forms of mental disorder associated with cardiac disease, as a cause or concomitant, digitalis is a palliative, and it has its special application also in Insanity with renal disease. In exhaustion from acute mental disease it can be combined with alcoholic stimulants to good advantage in all cases where there is not aortic aneurism, focal brain disease, or like contra-indication in vascular degenerations.

Alcohol.—By the term alcoholic stimulants whiskey or brandy is designated, unless some other specification is made. A good old whiskey is the best form of alcohol for medicinal use in mental dis-

orders. Sufficient care is not taken to employ a standard brand of whiskey of definite strength. It is as important to know the percentage of alcohol in the whiskey used as to know the strength of any other drug. The tendency is to give too large doses of whiskey used as a vascular stimulant in mental disorders. No alcoholic stimulant should ever be given in Insanity on the vague general idea that it is strengthening and nourishing, and not one drop of alcohol in any form should be administered in mental disorders except to fulfil definite therapeutic indications. The best stimulant in maniacal exhaustion is concentrated nourishment. Alcohol is apt to interfere with digestion, which is already impaired in acute cases of Insanity, and it is best given in milk, and only at times when the stomach is not digesting solid food.

In acute exhaustion from mental disease alcohol may be employed to stimulate cardiac action when there are signs of impaired circulation. It causes the heart to act with greater force and frequency, and by stimulation of the vasomotor system it brings about increased arterial tension, which is readily demonstrated by the character of the sphygmographic tracings. To procure any prolonged benefit from the agent as a vascular stimulant it should be given in small and repeated doses once in two hours, or more frequently if the emergency demands it. Some patients convert and eliminate the ingested alcohol much more rapidly than others. In melancholic exhaustion, when taken in amounts larger than are converted in the system by oxidation, it is eliminated chiefly by the lungs and kidneys, but in maniacal cases it is also partly excreted by the skin and intestines, and the latter ordinarily bear larger doses than the former without digestive disturbance. It is a mistake to mix alcoholic stimulants with predigested foods.

If an emergency demands immediate vascular stimulation, brandy or whiskey must be given hypodermatically, and in hot drinks they act more promptly than in cold. It is not well to mix the forms of alcoholic stimulants in the same case in close succession. The insane very readily contract an alcohol-habit.

The cases of Insanity in which more than four ounces a day of whiskey are to be given are very rare, and in very large doses alcohol becomes a vascular depressant rather than a stimulant. Alcohol is contra-indicated in most inflammatory affections.

Caffeine.—This is a very convenient vascular stimulant in asthenic and depressed forms of mental disease. It not only stimulates

the heart's action, but it relieves the "sinking feeling" common in melancholia and referable to epigastric regions, and which is, in fact due to defect of pneumogastric innervation.

Caffeine is also valuable in mental disorder associated with cardiac disease, and it is borne in some cases better than digitalis, though it has not the permanent effects of the latter drug. In the neuralgias which prevail in so many forms of mental depression it is effective combined with antipyrine.

It is through its vascular stimulant effect, probably, that it relieves the giddiness, which is a troublesome symptom in many forms of mental depression. An average dose of caffeine (U. S.) or of caffeine citrate is three grains. The popular preparation of effervescent citrate of caffeine may be given in three-drachm doses.

Caffeine should not be given in the evening, as it produces wakefulness.

Ergota (U. S.).—Ergot is classed among the vascular stimulants, not so much on account of its influence on the heart as upon the vasomotor centres, which, stimulated by the drug, cause contraction of the arterioles.

In maniacal conditions of cerebral congestion the vasomotor stimulation by ergot effects vascular contraction and relief of cerebral hyperæmia, and for this purpose it may be combined to advantage with the bromides as hypnotics at night, and the ergot is to be given in divided doses every two hours during the day-time.

In climacteric Insanity, with troublesome menorrhagia, and in the night-sweats of phthisical Insanity, it fulfils certain indications.

In cephalalgia of the congestive type, so common in general paresis, and in some other forms, ergot gives relief, and it is also useful in the congestive vertigo often encountered in psychiatric practice.

The fluid extract is an eligible form of the drug, but ergotin had better be given subcutaneously where a prompt action of the drug is indicated.

Belladonna.—In toxic Insanity, especially following the abuse of opium, belladonna is a useful vascular stimulant in the exhausted states often bordering on collapse.

It is both a cardiac and vasomotor stimulant. It is a useful substitute for morphia in many of the neuralgic affections in neurasthenic cases, and it also has its uses in epileptic cases combined with the bromides. As a vascular stimulant in primary dementia from

emotional shock and in melancholia attonita it relieves the capillary stasis by vasomotor stimulation.

The tendency to syncopal attacks in post-febrile Insanity is best met by prompt stimulant doses of atropine.

NERVOUS SEDATIVES.—There is a frequent need of nervous sedatives which stop short of actual hypnotic effect in mental disorders. The hypnotic use of certain drugs here mentioned has already been considered under another heading.

Opium.—As a nervous sedative opium is the most useful drug to combat the distressing anxiety, which is such a prominent symptom in most acute forms of mental depression. It is to be given in small and repeated doses to relieve acute mental suffering, and in large doses to meet the emergency of precordial panic and of frightful states of hallucinatory aberration.

The restless perturbation of senile cases is relieved by it, and the exacerbations in the depressed type of general paresis are best treated by it.

In maniacal excitement it has a less general application, but there are cases free from cerebral hyperæmia in which it is a most effective nervous sedative, and it may be used with special success in exhausted patients in whom the psychomotor activity is extreme.

Opium may also be effectually employed to abridge one of the cycles in periodical Insanity, by full doses on the first appearance of the acute symptoms of mental depression, and in the same way the melancholic exacerbations of climacteric melancholia of a periodical nature may be anticipated, as they usually correspond to the dates of the menstrual molimen.

In the painful state of mind of subacute melancholia, opium, more favorably than any other drug, modifies the cœnæsthesis, which is the organic basis of the depression.

In alcoholic mania with active hallucinations, and in delirium tremens, opium is a valuable nervous sedative.

Calabar Bean.—Some observers have claimed good results derived from the use of this drug in the treatment of general paresis. Small doses, continued daily for several months, is the mode of its use in these cases.

Valerian.—The senile insane, who are restless and fidgeting at all hours, may be benefited by this drug, which also relieves the nervous agitation of neurasthenic cases.

Valerian is also of occasional value in hysterical Insanity, and

if used as a sedative during the seizures it must be given in large doses.

Camphor Monobromate.—This drug may be given in emulsion in doses of five grains in nervous and spasmodic conditions in choreic or hysterical patients. One objection to it is that it is a gastric irritant.

Lupulin.—This is a mild nervous sedative and antispasmodic, which is sometimes of service in mental disease, especially in neurasthenic and hysterical cases.

Chloral.—Chloral as a nervous sedative is confined chiefly to doses less than hypnotic given to control maniacal excitement. Chloral is one of the best remedies to limit spasmodic seizures in the "status epilepticus." When used for this purpose it is given in form of suppository.

Strontium.—The bromide of strontium has some advantages over the bromide of potassium, and may be used in from twenty- to sixty-grain doses in the irritable epileptic cases, in nervous instability of climacteric cases, in the aimless activity of senile dements, and in the excitement of all forms of mental exaltation.

Nervous Stimulants.—There are in mental disorders lethargic states of the nervous centres, and also certain conditions of exhaustion in which there is need of nervous stimulants. The use of this class of drugs calls for skill in diagnosis and judgment in the graduation of the doses given.

Nux Vomica.—The complete anergia, which follows the acute stage of mental disorders, is best treated by tincture of nux vomica used as a nervous stimulant in doses of five drops, given after meals, and increased in some cases to treble the amount named. Certain conditions of primary stupor are benefited by a like treatment.

There is a critical period at the beginning of the convalescent stage, a turning point at which there is a tendency to sink into dementia, when strychnine as a nervous stimulant is most advantageous.

Insanity from nicotinism presents indications for relief of depressed respiratory and circulatory nervous centres, best fulfilled by strychnine used as a nervous stimulant in small and continuous doses, which, in some cases, are by preference administered hypodermatically, beginning with grain $\frac{1}{30}$ of strychniæ sulphatis.

In toxic Insanity from lead-poisoning strychnine is most beneficial in addition to the appropriate eliminatives.

In mental disorder resulting either from psychical or surgical traumatism the stimulant effects of strychnine are, if judiciously procured, of great value.

There is much tact and close watchfulness required in administration of nux vomica as a nervous stimulant, to stop the remedy at the right point, and to graduate the dose to the case in continued use of the drug.

Erythroxylon Coca.—In states of mental torpor and of mental depression, as a temporary nervous stimulant, this drug is of some service. It stimulates the cortical functions remarkably, and it may be employed to break the beginning of a habit of lethargy to which the patient is inclined to yield in the debility of mind following all severe attacks of mental disorder. The drug should never be continuously given for long periods on account of the danger of the drug-habit. This same danger exists in the treatment by this drug of morphinism, which is thus converted into cocainism, if the use of the remedy is prolonged.

As a nervous stimulant in the general depression of post-febrile Insanity, coca is a good means of temporary relief.

Anæsthetics.—There are occasions for the employment of anæsthetics in Insanity, though in general they have a very limited rôle in psychiatry.

In extreme instances chloroform has been employed to control the spasmodic movements in choreic Insanity, and also the seizures of the status epilepticus and the serial convulsions of general paresis.

During the Insanity of child-bed the puerperal convulsions have also been controlled by this anæsthetic.

It is possible to check hysterical convulsions in like manner, and, by previous subcutaneous injection of morphine, to get a continued sedation.

Ether.—It becomes necessary to anæsthetize the insane for a great variety of surgical procedures, on account of obstinate resistance, and as a subsequent period of quietude is advantageous, it is sometimes advisable to precede the anæsthetic by the hypodermatic use of morphine that sleep may succeed the narcosis. In strongly resistant patients catheterization or a necessary gynecological examination may require anæsthesia, and this is also the case often in examination for suspected fractures, and in the differential diagnosis of scrotal tumors, and for many surgical reasons.

Ether is also a valuable final resort in criminals who feign symptoms of mental disorder.

Anæsthetization may also be justified in hysterical Insanity to determine the real condition of tendinous and articular parts.

Ethyl Bromide.—If a pure article of this anæsthetic can certainly be had, it is recommended for purposes of brief anæsthesia on account of the great rapidity with which it acts, thus obviating a struggle with the patient.

It has been used to overcome the violent excitement of maniacal patients. The chief objection to this anæsthetic is the disagreeable odor of the breath and the bad taste which it leaves in the patient's mouth.

Cocaine.—The employment of cocaine as a local anæsthetic has too wide a range to admit of description in these pages, but a word of warning is here spoken against the danger of systemic poisoning from its local use in minor surgical operations.

Laxatives.—In all states of mental depression there is a diminution of peristalsis and a resulting constipation, for which the therapeutic remedies alone are to be here mentioned.

Rhamnus Pershiana.—This remedy, known as cascara sagrada, is the most reliable laxative which can be employed in the intestinal atony of melancholic patients. In laxative doses of from twenty to thirty drops of the fluid extract, in aromatic syrup, it relieves the bowel of its contents without any disagreeable effects. Preparations agreeable relatively, and known as cordials, are now in the market, but not of uniform strength.

Phosphate of Sodium.—The Sodii Phosphas (U. S.) is given in drachm doses as a laxative. This dose is to be repeated until the desired effect is obtained. The remedy is of value in liver complaints, apart from its laxative quality.

Aloe Socotrina.—As a laxative this drug is best given in pill-form, combined with extract of belladonna and nux vomica.

Podophyllum.—This laxative should be given with reference to its special action upon the liver in melancholia, and it is also well to combine it with belladonna to prevent griping. The dose of the Resinæ Podophylli (U. S.) is grain $\frac{1}{10}$. It is well to use small doses in women, and also in men, on first trial, as some are much more readily affected by it than others.

Mineral Waters.—Sometimes cases derive benefit from laxative mineral waters, which are never to be given continuously as laxatives. Appropriate waters for this purpose are Hathorn (Saratoga), Hunyadi Janos, Carlsbad, Friedrichshall, and some other waters

bottled in this country, which, taken in the morning before breakfast, usually have a laxative effect within a few hours without disturbing the stomach or appetite.

PURGATIVES.—The day of continuous purgation as a derivative remedy in Insanity has gone by. Nevertheless an active purge in a strong and constipated maniac of plethoric habit is a most appropriate therapeutic measure, often followed by notable amelioration.

Oleum Tiglii.—This is one of the most prompt and reliable purgatives known. It has the advantage that one drop placed on the back of the tongue, with a few drops of olive-oil as a medium, will cause a full watery passage from the bowel. In unconscious patients, in apoplectiform conditions, in the status epilepticus, in stuporous patients, and in cataleptoid states, it can be thus employed; and it usually acts when large doses of other purgatives have failed to produce their customary effect, owing to intestinal atony.

Hydrargyrum.—Out of respect to the traditional use of calomel as a cholagogue, and because, as a matter of clinical experience, it seems to clear up a foul tongue and stomach, so common in acute mental disorders, it is often given with good results as a purge, combined with bicarbonate of sodium.

Blue mass, acting more mechanically, will also, when given in full doses, produce watery evacuations.

In default of due action of these remedies, it is well that they be followed by a saline cathartic without delay.

Magnesii Sulphas.—Full-blooded maniacs, evidently suffering from cerebral congestion, with red faces, suffused conjunctivæ, and heavily pulsating carotids, are well bled through their intestines by a concentrated solution of sulphate of magnesium(℥ ij.), which abstracts serum the length of the primæ viæ, and results in profuse watery stools. When this intestinal derivation of the serum of the blood is not desired, the larger the amount of liquid in which the drug is dissolved, the smaller need be the dose, and the quicker will be the evacuation.

Elaterium.—For depletive purposes there is no surer hydragogue cathartic than elaterium, which may be given in the form of the neutral principle elaterin, grain $\frac{1}{30}$, or the officinal trituration of elaterin.

Colocynthis (U. S.) is an another well-known hydragogue cathartic, which is given in combination with other drugs, and forms one of the chief ingredients in Pil. Cathart. Co. (U. S.).

Colocynth is only to be employed occasionally for the purpose mentioned, and not continuously to break a habit of constipation. It is capable of producing severe gastro-intestinal irritation. The extracts of colocynth and belladonna combined make a good purge.

In the use of purgatives in mental disorders there will be encountered surprising intestinal inertia, which is due to paresis of the muscular coat of the intestines, or to anæsthesia of the mucous membranes, and to absence of normal reflexes.

In the failure of response to strong remedies, such purgatives should not be repeated, but recourse must be had to other means, such as massage, electricity, and intestinal lavage.

Emetics.—Hippocrates gave emetics to limit the course of Insanity, and they have been used in all ages in the treatment of mental diseases, and even within the present century they have been thus employed, but within the last twenty-five years they have gone completely out of use, except in the emergencies of mental disorders.

Purging, vomiting, and bleeding are apt to be numbered among the heroic and mistaken remedies of the last generation, but the powerful alkaloids and extracted active principles of poisons which have replaced them may possibly be regarded in the same light by the coming generation. There are cases of strong maniacal men, with foul and overloaded stomach, much benefited by a full emetic dose of ipecac, which improves the gastric condition and may restore quietude for a whole day, and even result in refreshing sleep; and if, as is often the case, there be laryngo-trachitis from loud shouting, it will also be favorably influenced by the emetic.

The chief indication for emetics, however, in psychiatry is in emergencies demanding the immediate evacuation of the stomach. On such occasions the patient is often resistive in the extreme to the employment of the stomach-pump or œsophageal tube, and more danger and delay may attend the mechanical than the therapeutic means of emptying the stomach.

Apomorphinæ Hydrochloras (U. S.).—This is the best drug for emetic use, and is to be given subcutaneously, in doses from grain $\frac{1}{10}$ to grain $\frac{1}{5}$. Emesis is produced in a few moments without special nausea, but if the doses have been large there may be some depression. The solution used must be fresh and reliable.

Digestives.—In most forms of acute mental disease there are disorders of the digestive processes and a corresponding need of artificial aids to digestion.

The subjective symptoms of gastric indigestion may not be obtained from the patient, but in patients requiring gastric lavage the nature of the contents of the stomach can be studied, and valuable information may be thus gained as to the appropriate remedy to be employed in the case.

Pancreatin.—The pancreatic juice contains four ferments having special digestive power, and pancreatin is supposed to represent effectually at least the chief elements of the pancreatic secretion in this regard. In the predigestion of foods it is the most valuable of the animal extracts. For pancreatized and predigested foods in general reference is made to the section on Dietetics in this chapter. Pancreatin, in dose of from ten to thirty grains, should be given immediately after a meal, that it may act before the gastric acids are present in such quantity as to interfere with its action, or not until gastric digestion is ended and the contents of the stomach are passing into the intestine for further digestion. It is theoretically probable that it is most efficient employed in pancreatized preparations of food for the insane, and especially in melancholia, in which hyperchlorydria is a very constant symptom.

Pepsinum.—This digestive principle of the gastric juice in the presence of the normal hydrochloric acid converts albuminous substances into peptones.

Owing to the feeble state of the gastric glandular apparatus in mental disorders there is a defective supply of this digestive ferment, which can be artificially furnished to good advantage in many cases.

Pepsin is best given at the time of eating, in doses of from fifteen grains to a drachm. Pure pepsin of a reliable kind is the best form to employ, and hydrochloric acid may usually be of service given at the same time. Peptonized foods are also valuable.

Acidum Hydrochloricum.—When the normal hydrochloric acid of the stomach is deficient the bicarbonate of sodium or alkaline mineral waters taken in small quantities before meals may remedy the defect, but in some insane patients the deficiency is to be supplied artificially.

The acidum hydrochloricum dilutum (U. S.) in doses of from ten to twenty minims may be given largely diluted and taken through a glass tube to avoid injury to the teeth. The acid is also to be combined with pepsin to aid the digestive action of the latter in the stomach or in the peptonizing of foods previous to their administration.

Papain.—The juice of carica papaya, or, rather, the ferment obtained from the same, has remarkable artificial digestive properties, but how far it will in the future prove itself available in the actual therapy of digestive disorders remains to be seen. The dose of papain is from one to ten grains, to be given in form of pills. The writer has had no experience with the drug, but if it possess the virtues claimed for it, it ought to be an addition of some value to the rather meagre list of digestives at present known to be of any real service.

Tonics.—The general debility which is present in many forms of mental disorder is due to a variety of causes and calls for different kinds of tonics.

During the stadium debilitatis, which follows the stadium acutum of mental disorders, there is urgent need of tonics, which may even prevent the passage into chronic Insanity.

Cinchona.—The various kinds of cinchona bark, and the several alkaloids which they contain, are among the best tonics for general use in mental disease.

Quinine in small doses stimulates the circulation, respiration, and the cerebral centres. It congests the cerebrum in full doses, and is contra-indicated in inflammatory states of the brain or of its membranes, or of the eye or ear. It increases tinnitus aurium when the latter is not due to anæmia, and may render the aural hallucinations more troublesome. Apart from these inconveniences in psychiatry, it is one of the best tonics, and is conveniently given in soluble capsules, that it may act while in the stomach, as it is usually inefficient in the intestines.

Quinine is not only a bitter tonic, but it also has hæmatinic qualities.

When patients get delusions about its extreme bitter taste, which may not always be hidden even by capsules, which they sometimes bite upon, it may be used hypodermically in form of the bisulphate of quinine with the addition of tartaric acid, one part to six of the drug, or five grains of the hydrochlorate of quinine with a half drachm each of glycerine and distilled water, may be injected in gluteal regions, or an enema may be used, though rectal irritation will result from repetitions of this mode of administration.

The tannate of quinine, though tasteless, is much less efficient than other preparations.

In large hospitals, as a matter of economy, some of the other

alkaloids of cinchona may be employed, such as cinchonidine, quinidine, or chinoidinum. Sulphate of cinchonidine is an eligible preparation, according to some authorities.

Tinctura cinchona composita (U. S.) is an old and reliable tonic mixture, and of this Huxam's tincture is a most agreeable preparation.

Strychnine.—As a remedy in the types of mental disorder of toxic origin strychnine may almost be called a specific tonic. In the alcoholic form of toxic Insanity no other tonic can be compared with it. In mental disease from lead-poisoning it is of the utmost value. In morphinism, cocainism, chloroformism, etherism, and in mental disease from addiction to other toxic agents, it is an indispensable tonic. It is best to begin its use with grain $\frac{1}{30}$, to be increased until its physiological effects are obtained, and then the remedy is to be discontinued, and to be renewed at the end of a few days. It is contra-indicated in inflammatory affections of the central or peripheral nervous system.

Acidum Arsenosum.—Arsenic, next to strychnine, is the most useful tonic in Insanity. In choreic forms of mental disorder it has a very special value, and in phthisical Insanity it often gives remarkable relief when other remedies have failed.

In malarial mental disease it is of great value, and in all the psychoses complicated with well-marked leucocythæmia it has a very special application.

Syphilitic Insanity and the chronic forms of mental disease, with various cutaneous eruptions, are also types in which arsenic is a valuable tonic remedy of special utility.

Liquor Potassii Arsenitis, beginning with two-minim doses on a full stomach, is the best form for administration, and the blood should be tested every few days for increase of red blood-corpuscles. Gastro-intestinal irritation is a sign that the remedy is to be stopped for the time being, at least.

Phosphorus.—In consideration that phosphorus is a natural constituent in osseous and nervous tissues, it would appear to be a physiological tonic in wasting nervous diseases like the depressed forms of acute mental disorder.

It certainly is a valuable tonic, not only in melancholic types, but especially in post-febrile Insanity, in the mental disorders of children of rickety conformation, in the sexually exhausted insane, and in the various types of neurasthenic Insanity.

In organic dementia and forms of mental aberration from focal

brain disease of a chronic nature, phosphorus may be advantageously employed, but in all acute inflammations of nervous structures it is well to avoid its use.

The initial dose of phosphorus should not be more than grain $\frac{1}{100}$, to be cautiously increased.

Phosphide of zinc, in the dose of grain $\frac{1}{10}$, in pillular form, is a convenient preparation.

Calumba.—This may be taken as a type of vegetable bitter tonics than which few are better.

It is a good stomachic as well as a bitter tonic, and is usually given in form of an infusion with an aromatic adjuvant.

Ferrum.—Iron is a tonic because it is a blood-food, and it should not be indiscriminately used in mental disorder, and should only be given for anæmia or to meet some distinct indication.

In scrofulous young persons the Syrupus Ferri Iodidi is a good form of the drug. Tinctura Ferri Chloridi is used in Insanity with Bright's disease, and is generally one of the most reliable preparations of iron, but it is injurious to the teeth if not taken through a glass tube. The pyrophosphate of iron is sometimes of special use in anæmic forms of mental depression.

Acidum Nitro-hydrochloricum.—In melancholia and other forms of mental disease, with chronic hepatic congestion, this acid, in doses of from one to three drops, largely diluted and taken after meals through a glass tube, is a most valuable gastro-hepatic stimulant and tonic.

ALTERATIVES.—In diathetic Insanity, and especially in that which springs from the luetic virus, the therapeutic treatment is based largely on the use of alteratives.

Hydrargyrum.—In mental disorder arising after syphilitic infection it is safest to regard the latter as the etiological factor of the disease and to treat it accordingly.

It is best not to wait for the appearance of secondary symptoms, if there has been a distinct primary lesion, as the eruption of the mental disorder may itself constitute the first secondary symptom of the specific disease.

So soon, therefore, as the diagnosis is established beyond any doubt, the mercurial treatment should be commenced as the best means of relief for the acute symptoms of the mental disorder.

No opinion is here expressed as to the relative merits of the expectant treatment, of the mixed treatment, or of any particular

order in the use of mercury and the iodides in the cure of luetic disease in general; but the writer's experience is very decided that in syphilitic Insanity, if specific remedies are to be used, they should be employed so soon as the diagnosis is made with certainty as to the fact of infection.

The protiodide of mercury is the best form in these cases, increased from grain $\frac{1}{6}$ *ter in die*, but in urgent instances a rapid inunction-cure is indicated.

As the mental symptoms are sometimes the first to appear, so, too, they are often the first to yield to the treatment mentioned, and a combination of the iodides with the mercury is, in most cases, advisable from the very first, together with cod-liver oil and tonics.

Insanity resulting from tertiary syphilitic disease of nervous centres calls for the most decided treatment, beginning with an active use of mercury and followed by large doses of the iodides.

Without regard to luetic disease, the alterative action of bichloride of mercury in mental disease must be recognized. When given in small and continued doses, the hæmatinic action in anæmic Insanity, and in the paludal cachexia, and in mental disorder with Bright's disease is remarkable.

In traumatic Insanity the extending meningitic lesions are best limited by the administration of the bichloride of mercury.

In luetic cases the hypodermic use of the bichloride, and the employment of mercurial baths, as well as inunctions, play an important rôle in the antisyphilitic treatment.

Iodine.—The alterative value of this drug resides largely in its stimulant action upon tissue changes.

In exophthalmic goitre and its associated form of Insanity it has been used with success, and it is the most efficient remedy for the reduction of the hypertrophied gland.

In mental disorder arising from chronic phthisis pulmonalis it sometimes renders good service, and the same may be said also of its value in scrofulous diathetic Insanity of the young.

The Iodides of Potassium and Sodium.—The use of these drugs in syphilitic Insanity has already been considered under the head of mercury.

As alteratives in various cachexias they are of much service in mental disease. In rheumatic Insanity the iodide of potassium is of value sometimes, and in malarial Insanity with enlarged spleen, and in the atheromatous vascular degenerations of both syphilitic

and alcoholic Insanity it serves a good purpose given in continuous alterative doses. The gastric irritation can be largely avoided by giving the drug only after meals and never upon an empty stomach.

In chronic maniacal conditions due to persistent subacute meningitic affections, the iodides are often of great benefit. The patient should be given a specially generous diet while under their influence and should be encouraged in long hours of sleep.

Oleum Morrhuæ.—This remedy is active not on account of its oleaginous material, but of its varied chemical constituents, among which are iodine, phosphorus, and bromine. It may be ranked as an alterative on account of its effects on general nutrition.

It is useful not only in most diathetic Insanities, but in all states of malnutrition in which it can be borne by the stomach. None of the elegant emulsions are as efficient as the pure oil, which may be given with an equal amount of whiskey, or in strong coffee, which hides the taste, or in capsules.

Morrhuol is an extractive of cod-liver oil and contains its chief active principles, and it may be given in doses of from three to five grains in cases in which the crude oil does not agree.

Ichthyol.—Ichthyol is here recommended merely for its beneficial effects in the many skin diseases which abound among the insane. It is to be used topically in form of ointment, which may contain from ten to twenty per cent. of the drug, or as a solution in equal parts in glycerine.

Colchicum.—The only application of this drug in psychiatry is in gouty Insanity, in which the remedy doubtless has a decided beneficial influence, though it is always a powerful irritant and must be used most guardedly.

Sarsaparilla.—Out of respect for the belief of thousands of practitioners, it may be well to mention the supposed alterative effects of this drug when combined with others in the treatment, more especially of specific disease.

Arsenic.—Arsenic in small and continued doses is possessed of remarkable alterative effects on general tissue changes.

In the cachexias and diatheses out of which Insanity often arises, it has a wide application as a modifier of faulty nutrition.

In malarial and marasmatic cases of Insanity drifting into chronic states of mental enfeeblement, it sometimes works wonders in both the mental and physical state, when given with cod-liver oil and a generous regimen, including out-of-door life.

ELIMINATORS.—The toxic origin of Insanity in a vast number of cases create the need of remedies which serve to eliminate the toxic agents from the system, and, for want of a better term, drugs which thus act are here classed as eliminators.

Iodide of Potassium.—In mental disorder from plumbism, hydrargyrism, or from other metallic poisoning, a part of the treatment consists in the use of iodide of potassium, which forms soluble salts with the toxic metals, and thus aids in their elimination from the system. When employed as an eliminator in toxic Insanity, the iodide of potassium should be given in large doses of from ten to twenty grains, repeated three times a day.

In lead-poisoning aromatic sulphuric-acid lemonade, and sulphate of magnesium may be given, and sulphuret of potassium baths administered.

Jaborandi.—In the Insanity of Bright's disease this drug is of service in the elimination of the uræmic poison by its action on the kidneys and the skin. It is best given in the form of its alkaloid pilocarpine.

Lithium.—The carbonate and citrate of lithium are good eliminators in gouty and in diabetic Insanity in doses of from five to twenty grains.

ANTIPERIODICS.—Insanity as the result of malarial intoxication is not rare. In other cases the mental disorder is a sequel of the more permanent malarial cachexia with its varied changes in internal organs and in the vascular system. The indication is to treat the malarial affection in order to relieve the mental symptoms.

Quinine.—This is the most reliable remedy in malarial Insanity.

When the paroxysms of mental excitement are vicarious of the malarial access, and have a distinct periodicity, they demand the same therapeutic treatment as the malarial access itself. Quinine in this form of Insanity is to be given in one large dose, so that it will have its maximum effect just before, and in time to check the return of the malarial access or its equivalent mental excitement.

Eucalyptus.—The writer has employed this drug with indifferent success in malarial cases bearing quinine badly. Still, eucalyptus and its derivative, eucalyptol, are to be named among the antiperiodics.

Warburg's Tincture.—A trial may be made of this decided antimalarial mixture in malarial Insanity.

Hare, in his "Practical Therapeutics," advises its antimalarial

use in two half-ounce doses three hours apart, after a saline purgative. Mention is also made of spurious preparations sold as Warburg's Tincture.

Arsenic.—The writer has derived more good results from arsenic than from any other antiperiodic in Insanity from the malarial cachexia. The periodicity consists in mental exacerbations and markedly long intervals of comparative lucidity in many of these chronic malarial cases. Quinine may be used to ward off the immediate exacerbation, but in the interim the only effectual remedy is arsenic.

EMMENAGOGUES.—There is a critical period at puberty, and the prophylaxis of Insanity may then depend on the prompt intervention of emmenagogues to establish the menstrual function and restore mental stability.

Menstruatio suppressa may in itself constitute a cause of the Insanity to be treated by remedies addressed directly to the restoration of the function.

In the convalescent stage of Insanity the menstrual molimen may be tardy in reappearance, and emmenagogues are then indicated to restore the natural order of things.

Mangani Dioxidum (U. S.).—The binoxide of manganese, in doses of from three to five grains two or three times a day, for ten days previous to the menstrual epoch, is one of the best emmenagogues.

Potassii Permanganas.—This is a good emmenagogue, and D. Hack Tuke cites it as the most effectual, in his "Dictionary of Psychological Medicine," p. 1291. It may be given in from three to five-grain doses three times a day, some days prior to the catamenial period.

Apiol.—Given in capsules containing from three to five minims *ter in die* for ten days before the expected menstrual return, this is a remedy which may be tried with occasional success.

Aloes.—Among the insane, in whom anæmia and intestinal atony are such constant symptoms, the writer has had the most uniform success with aloes combined with iron in amenorrhœa. In addition, hot sitz-baths and electricity at the right time will provoke a response on the part of nature if there is a physiological readiness, and if not, it is worse than useless to attempt to force things.

Tincture of aloes and myrrh is also an old but reliable preparation for this purpose. It should be given three times a day for two

weeks before the date of menstruation, in drachm doses, increased to two drachms two or three days before the expected return.

Sabina.—The oil of sabine is a very active remedy, not without considerable danger. It has decided oxytocic properties, and it has been abused to produce miscarriages.

Tanacetum.—Tansy-tea has long been a favorite domestic remedy for amenorrhœa and for dysmenorrhœa. The oil, in doses of from one to four drops, is an active emmenagogue.

Cimicifuga.—In neurotic women with anæmic neuralgia and a general hyperæsthetic state of the reproductive organs, this remedy with iron may relieve amenorrhœa and other symptoms at the same time. Only the officinal forms of the drug should be employed. There is an active principle, cimicifugin, too powerful to be employed as an emmenagogue.

ANAPHRODISIACS.—There is abundant occasion for remedies to diminish and control sexual desire, which is pathologically heightened in acute mental disease. Unfortunately, there are no very reliable anaphrodisiacs, though many poisons given to the point of great vital depression will, for the time being, abolish sexual passion. The most effectual means of dealing with morbidly intense sexual appetite are not therapeutic, and will be mentioned elsewhere.

Camphora Monobromata.—This drug is a sedative which seems to influence the spinal sexual centre, and to have some anaphrodisiac action. It is to be given in pillular form in doses of from three to ten grains, or in mucilaginous solution.

Bromide of Potassium.—In large doses, continued as the occasion may require or the strength of the patient may permit, this drug is an anaphrodisiac.

Small doses are of no avail in nymphomania or satyriasis, and doses large enough to control these symptoms usually produce bromism if continued any length of time.

There are numerous reputed anaphrodisiacs, but they are not as reliable as those above mentioned.

ANTISEPTICS.—The insane are subject to abscesses, abrasions of the skin, bruises, furunculosis, and a variety of accidents which demand the resources of minor surgery. For this reason, as well as on account of the care of the sick-room and of the discharges and uncleanly persons of the insane, the use of antiseptics is an important point in psychiatric practice.

The list of agents having power to prevent putrefaction, or to

destroy the putrefactive germs, is very long, but only the most approved substances are here mentioned.

Bichloride of Mercury.—This drug is the most powerful antiseptic and germicide in solutions of from 1 to 500 to 1 to 1,000 for cleansing the skin, and of from 1 to 2,000 to 1 to 10,000 for direct application to open wounds. The solution should contain several parts of tartaric acid or of sodium chloride to one of the bichloride to prevent decomposition by albumen in the water or in the blood-serum of the parts treated.

Great care is required in working about the insane with poisonous solutions lest they suddenly swallow them or the antiseptic dressings if left alone long enough to remove and tear them in bits. The danger of toxic absorption from large open wounds is considerable. When applied in strong solution to disinfect wood-work in rooms used for infectious diseases, it should not be allowed to soak into the floors. It acts in a short time as a germicide, and it is the strength and thoroughness of the application of the solution which is important, and hot water and soap should then be used to scrub the floors and wood-work. For the removal of bacteria painted or papered walls may be rubbed down with fresh baked bread, and plastered walls may be treated with lime wash, according to a recent authority. In bed-pans and spit-cups, for alvine evacuations and for tuberculous sputa, bichloride in solution is effectual.

Carbolic Acid.—This is a most reliable antiseptic, used in solution 1 to 30 for cutaneous cleansing and 1 to 50 for surgical instruments, sponges, and the hands of the operator, and its chief objection is its toxic effects, which must be carefully guarded against. It should not be applied directly to the open tissues. It evaporates readily and should not be kept about sick-rooms in quantities, either for disinfecting stools or sterilizing bed linen. In strong solution it is a deadly poison, and acts so quickly after ingestion that antidotes are seldom of any avail.

Carbolic acid, combined with the bichloride of mercury in solution, makes a reliable antiseptic for surgical purposes, uniting the advantages of the two germicides.

Carbolic acid is used largely in the sterilizing of gauze for surgical purposes.

Double Cyanide of Mercury and Zinc.—Lister introduced this antiseptic, which is used in surgery and in the preparation of gauze. It is not soluble by the serous discharges. Solution of bichloride

of mercury was used in the preparation of the gauze, but it is said that more recently a carbolic-acid solution has been employed for this purpose (Gould, "Dictionary of Medicine," p. 697).

Sulphocarbolate of Zinc.—This is a good antiseptic for surgical purposes; it is comparatively free from toxic danger, and is also employed for intestinal antisepsis.

Creolin.—Creolin is a most valuable antiseptic, which is not irritating and has very slight toxic properties. It is not soluble in water, but in from one to five per cent. strength in emulsions it is employed in surgery and in gynæcology, and as a general disinfectant.

Peroxide of Hydrogen.—In solution, bottled for ready use, this is a very convenient and efficient antiseptic, which may be diluted ten times or less, or employed in full strength in foul sinuses. It is a deodorizer as well as a germicide. In hospital use the chief objection to it is its expense. It is useful in decubitus among the insane.

Iodoform.—This drug is not germicidal and must be sterilized before being applied to cut surfaces. It is used as an antiseptic in surgery. Its odor is penetrating and disagreeable, but it is still very extensively employed.

Boric Acid.—This is useful in boiling saturated solution for the preparation of borated lint. It is used for throat, nose, eyes, and other mucous surfaces, and for skin diseases, and to correct the foul perspiration of feet arising from bacterium fœtidum. It is antiseptic, but not germicidal.

Permanganate of Potassium.—Owing to its affinity for oxygen, this is a good antiseptic and deodorizer. It is a good wash for foul ulcers in solution of one drachm to the quart of water. Hare, in his "Practical Therapeutics," says it is the best disinfectant wash for the hands of the operator, followed by oxalic-acid solution.

DISINFECTANTS.—Some of the chief substances used to destroy the germs of disease and of putrefaction must be constantly used in hospitals for the insane, and only the more important are here mentioned.

Dry heat, if carried to nearly300° F., will kill all forms of pathogenic bacteria and spores.

Every public hospital should have an apparatus large enough to disinfect clothing and bedding by dry heat.

Steam at a temperature of 200° F. will kill infectious germs, and

an apparatus for this purpose should be provided in all well-appointed hospitals. Steam-jets are specially effective. In the absence of any apparatus, boiling clothing is the best means of disinfection. Exposure to extreme cold and sunlight will destroy some disease germs, and fresh air is nature's universal disinfectant.

Chlorinated Lime.—This is a powerful disinfectant on account of the chlorine gas which it gives off. Chlorine has an affinity for hydrogen, which is a constituent of foul odors, which are thus chemically broken up by the chlorine gas. Much of the chlorinated lime sold is useless because it contains so little chlorine. The addition of hydrochloric acid causes a liberation of chlorine from the chloride of lime. Chlorinated lime is a useful disinfectant in privies and urinals and sewers, but it should never be placed in open dishes in sick-rooms, and it may become too irritant when placed under the patient in bed-pans to receive the discharges.

Labarraque's solution is far superior to carbolic acid as a deodorizer of foul bed-sores and decomposing tissues, on account of the chemical disinfectant action of chlorine above mentioned. In bed-pans it disinfects alvine discharges.

Sulphur Dioxide.—For fumigating a room after the doors and windows have been made air-tight, if possible, sulphur, to the amount of from three to five pounds, is placed in an iron vessel set upon bricks in a tub partly filled with water, in the middle of the room. A little alcohol is poured over the sulphur, a match lights the flame, and, the door being locked, the fumigation takes place; at the end of twenty-four hours the room is opened and thoroughly aired.

Chlorine Gas.—Fumigation of apartments by chlorine gas is effective as a disinfectant measure after infectious disease has been treated in them. Everything is first to be removed from the apartments.

Bichloride of Mercury.—The use of this drug as a surgical antiseptic has already been mentioned.

In solution 1 to 1,000 it is the best disinfectant for soiled bed-linen before it is boiled. The discharges of the patient suffering from contagious disease are best disinfected by a solution of the bichloride, 1 to 400, in which they are allowed to remain for a half hour, and the bed-pan is then emptied, scalded, and provided with another portion of the disinfectant solution. All these poisonous solutions should be locked in the wash-stand or closet or in a trunk

placed in the room, if there be no other place, in the treatment of the insane, who from suicidal or deluded motive, may make a sudden effort to swallow the fluids.

Sulphate of Iron.—On account of its cheapness, sulphate of iron in strong solution, mixed with crude coal-tar products, has often been used for wholesale disinfection of large sewers in times of epidemics. It certainly is of some value thus employed, though much reliance is not to be placed on this mode of disinfection.

Chloride of Zinc.—It may be employed in solution as a disinfectant in water-closets, but it is vastly inferior to chloride of lime.

Sulphate of Copper.—This is useful for disinfection, on a large scale, of privy vaults and sewers, and collections of decomposing refuse.

For the disinfection the rough proportion is an ounce each of the sulphate of copper and of sulphuric acid to the gallon of the contents of the privy.

Organic Extracts.—In closing this therapeutical chapter, it is thought best to give a little space to organo-therapy, about which many physicians in many lands have of late much concerned themselves.

The history of medicine shows that the idea of using parts of the organs of animals as special means of cure for disease is one of the oldest and most constant of medical theories which have prevailed in both the professional and popular practice of the healing art. There are, in fact, few organs or tissues of animals, and no excretion or secretion of man, which has not been at some time applied to the cure of human ailments.

The most recent impetus in organo-therapy was given by Brown-Séquard in 1888, when he announced the beneficial effects of orchic fluid used by injections to impart renewed vitality in senile decline.

Testin.—Testicular extract has been employed by many physicians, who have given characteristically divergent views of its usefulness or worthlessness. It certainly is not an inert remedy, and there can be no doubt but that it is a nervous stimulant, which would be more generally employed were it not for certain practical difficulties and also uncertainties in its preparation and in its use. It has been employed in general paresis and in ataxic cases, and it would seem to be indicated, if of any real value, in the senile cases of mental disease.

Thyroid Extract.—Murray, of England, in 1891 used the extract

of sheep's thyroid in myxœdema, and there has since been widespread employment of the thyroid extracts in myxœdematous Insanity, in sporadic cretinism, and in cachexia strumipriva, and in Graves's disease. Going outside of these theoretically legitimate cases for the use of the extract, physicians have empirically applied it in the treatment of all sorts of cases of mental disorder, and, with an inconsistency of results demonstrating the honesty of the experimenters, have reported decidedly for and against the utility of the extract in the treatment of Insanity.

After a careful perusal of the literature of the subject, conjoined to the writer's experience, the following opinion is given:

The thyroid extracts are of some real value in cretinous and myxœdematous Insanity, and they may be employed to advantage in mental disease complicated with Graves's disease, sporadic cretinism, and cachexia strumipriva. Thyroid extract, in the vast majority of cases of mental disorder, is harmful, but in an occasional instance, from idiosyncrasy or some unknown pathological peculiarity of the patient, it has a beneficial effect, which can never be predicated in advance and can only be determined by experimental use of the remedy. It is of some value in skin diseases in psychiatry. It matters little whether liquid extracts are injected, or dry extracts are given per oram, or the fresh gland is given slightly cooked. Abscess may follow the hypodermic use of the extracts.

Cerebrin.—This extract from the gray matter of brain may be tried in neurasthenic Insanity. It has been considerably used.

Pancreatin.—This organic extract of pancreas is theoretically adapted to the Insanity of Bright's disease, in which it is known that there is often disease of the pancreas. It has already been tried with dubious results in diabetes mellitus with pancreatic disease.

Ovarin.—Experimental use could only be made of this extract in climacteric cases, and in those complicated with special troubles of the reproductive organs.

Cardin.—This extract is said to increase the force of the heart's action in neurasthenic cases.

Tuberculin.—This ptomainic derivative from tubercle bacilli, has been extensively tried. It is applicable, if at all, in phthisical Insanity. Its proved value thus far is chiefly as a diagnostic means in the tuberculosis of cattle.

Medulla of Supra-renal Capsules.—The organic extract from the supra-renal capsules is one of the latest and most remarkably

powerful known. It has a very decided cardiac influence, rapidly slowing the heart's action, while increasing systolic force. It contracts the arterioles like ergotine, and in very minute doses raises the intra-arterial blood-pressure. It might be of some temporary benefit in Insanity through its effect on cerebral blood-supply.

Section VII.—Surgical Procedures.

In the treatment of Insanity it becomes advisable in certain cases to resort to surgical procedures, which may be radical for the removal of the cause of the mental disease, or palliative and in the nature merely of symptomatic surgery.

Most of these surgical procedures pertain to minor surgery, but some of them are capital operations, and, in any case, they are only to be undertaken under all modern antiseptic precautions.

Trephining.—This is one of the most ancient operations, which has been practised for the cure of nervous and mental disease, at times, for more than three thousand years past.

Within the last ten years this operation has again been utilized for the relief of special types of Insanity, and renewed interest has been centred in the results obtained by the recent extensions of this surgical procedure. Space will not permit a review of the recent literature of this subject, nor of the technique of the surgical operation, but an attempt is made to summarize very briefly the pathological conditions which justify surgical interference of this nature.

In the first place, traumatic injuries of the cranium, of the membranes of the brain, or of the cerebrum itself may cause Insanity, which may be relieved by the operation of trephining.

Cases of this kind have been reported by Skae, Horsley, Althaus, Bacon, Talcott, Burckhardt, Mickle, Hartmann, and others.

Insanity complicated with any of the following pathological conditions may demand a decision as to the advisability of trephining, which will be deemed all the more justifiable if the mental disease be the direct sequel of the morbid affection in question.

The conditions which may indicate the operation are: Simple cranial fracture with firm cicatrix, fracture with evident depression of the skull, fracture compound and with penetrating spicula of bone, extensive cranial exostoses, neoplasms of the membranes of the brain, large extradural hemorrhages and cystic formations, accumulation of pus in meningeal cavity, cerebral tumors, cerebral

abscess, bullets and other foreign bodies in the brain, and continuous cortical irritation from localized lesions.

The earlier the operation is undertaken, generally speaking, and the more thoroughly all diseased parts are removed, the better will be the result to be anticipated; for, when secondary lesions and degenerations have taken place, the hope of benefit from operative interference is reduced to a minimum.

In the second place, traumatic injuries of the cranium may give rise to epilepsy, which in turn is followed by Insanity, or the convulsive neurosis and the psycho-neurosis may be simultaneous results of the trauma capitis.

In such cases the precedent of successful surgical interference already frequently practised encourages a judicious employment of the operation of trephining.

French, German, English, and American writers have reported cases of trephining for epilepsy with more or less favorable results. If the case be hopeless without operative procedure, the responsibility of a decision is at least much diminished if surgical treatment fail in the end.

There is this favorable feature to be recorded, that in epileptic cases the operation, though not a success in regard to the seizures, has in several instances been followed by decided improvement in the mental condition of the patient. It is not easy to assign a physiological reason for this, though it accords with observation of cases of Insanity cured by accidental traumatism, probably on the principle of powerful revulsion.

Finally, the pathological condition which prevails in the intracranial pressure and pachymeningitic lesions of general paralysis have, in the opinion of some prominent psychiatrists, justified the operation of trephining and of still further surgical procedures. Batty Tuke and Claye Shaw resorted to this surgical measure in general paresis, with at least temporary success, in 1889, but subsequent experience has failed to establish trephining as an accepted part of the treatment of general paresis.

What the future may bring forth in these days of rapidly advancing antiseptic brain-surgery remains to be seen. Burckhardt has even gone so far as to propose and to practise with some success, judging by reports, the excision or surgical severance of the medullated connections of certain sensory cortical areas, known to be the seat of irritation and the source of constant hallucinations.

Craniectomy.—This operation consists in the removal of linear strips of the cranium so as to permit of expansion, and more ready growth of the cerebrum. It has usually been practised in the vicinity and direction of the vertical sutures, but it has been modified and so adapted as to give necessary freedom to any contracted portion of the brain too closely confined by bony walls.

The operation of craniectomy has been employed for the relief of microcephalus, in which, as Virchow first pointed out, there is often synostosis basilaris and premature closure of other cranial sutures, and also of the fontanelles and subsequent thickening of the tables of the skull by which the limited cranial capacity is still further diminished.

Lannelongue, of Paris, in 1891, first gave an extended account of craniectomy in microcephalus, and at the Surgical Congress in that year there were reported twenty-eight cases thus treated with good results. Pain and cephalalgia were relieved and the mental improvement was rapid after the operation. Subsequently, within two or three years, craniectomy was performed in most countries, and successful cases were reported by numerous operators in America as well as in Europe.

The opponents of the operation have denied that premature closure of sutures occurs, and they claim that the arrest of cerebral growth is primary and due to a variety of causes other than compression by cranial walls, all of which is only a continuation of a discussion now historical. The operation must be judged by results and not by theories, and it will doubtless continue to be performed. It seems to promise most success at a very early period of infancy, and in fact, within the first year of life in cases of premature closure of the fontanelles. It is doubtful whether much benefit could be expected from craniectomy in any case after the tenth year, as the fit time for educational methods in microcephalic cases of that age has already passed, to say nothing of anatomical reasons.

Craniotomy.—This is only a broader term for the great variety of excisions of portions of the skull for the purposes above mentioned. Craniectomy is regarded as one form of this operation and is spoken of as linear craniotomy. Circular craniotomy completely loosens the vertex of the skull.

Crescentic excision in parietal region corresponding in direction to the temporal ridge is also made, and a second and lower excision in the same case may be made, following in the general line of the squamo-parietal suture.

Trap-door excisions are also made, preserving the attachment of soft parts to the bone to continue circulation and nutrition. After the use of the trephine, the bone-forceps are used by some in preference to revolving saws with electric motor for excision of bone. Many prefer limited and repeated operations as being less severe and equally good in final results.

Craniotomy must be varied in each case to suit the asymmetry and the special cause of it.

Thus the indication is very plain, for instance, in plagiocephaly, which is one of the most common cranial deformities, caused by closure of the fronto-parietal suture on one side only. In general, cases of acquired arrest of development are more favorable for operation than congenital cases. In the latter there is more apt to be radical defect of anatomical structure of brain-mantle and of medullary tracts, as well as the results of compression.

Even in the most favorable event craniotomy can only remove obstruction to educational training, which will have to be persistently pursued for many years in order to reap the benefit of the operation.

Laminectomy.—This operation consists in the excision of parts of the posterior vertebral arches, and one danger arises from anæsthesia of the patient in the prone position. The necessity of the operation may occur in insane patients with Pott's disease of the spine, or in syphilitic Insanity with spinal caries. In young hydrocephalic patients with tubercular meningitis it has been practised, and in general paresis spinal drainage also has been thus effected.

In simple or compound fractures of the spine the operation may also become advisable, but as a means of relief of pressure from cerebro-spinal fluid, even in cases of vertebral disease, it has been replaced by vertebral puncture in some instances.

Spinal Drainage.—The relief of the pressure of the cerebro-spinal fluid in disease has been accomplished by a variety of operations. At one time the occipital bone was trephined and the subarachnoid space was reached under the cerebellum. The other extreme in direction is the comparatively recent spinal drainage by puncture between the last lumbar and the first sacral vertebra in the lumbo-sacral space.

Vertebral puncture for some years has been practised by Quincke, Von Ziemssen, Lichtheim, and others for several purposes, and also by Furbinger, Morton, Paget, and by John Turner in general paresis, and likewise by W. L. Babcock. It has been utilized in cerebro-spinal

meningitis, in hydrocephalus, in cases with brain-tumors, and in tubercular meningitis with puncture between the third and fourth or between the fourth and fifth lumbar vertebræ. It has also been employed for diagnostic purposes. The normal cerebro-spinal fluid has a specific gravity of from 1.007 to 1.009, and contains from .005 to .01 per cent. of albumen, and has a pressure under 150 mm. which often has a pathological increase to more than 500 mm.; and in inflammatory conditions the specific gravity and albumen may be greatly increased, and in special affections bacilli may be found. Vertebral puncture, both in Europe and America, has been used as a palliative measure in general paresis. It usually causes severe cephalalgia and other distressing symptoms as the immediate result of the diminution of cerebro-spinal pressure, but it is claimed that in an occasional case there has been established a species of remission of some of the manifestations, in the motor and mental sphere alike, as the final outcome of the surgical intervention. Knowing, however, that in general paresis the excess of fluid is only compensatory, it is hardly to be supposed that its partial withdrawal by puncture would amount to much more than a species of depletion, which, if repeated often, would only be the equivalent of venesection.

The operation is simple, and cocaine injected is best for local anæsthesia. It may be necessary to use aspiration if the fluid does not escape in sufficient amount upon puncture. The patient may be recumbent or seated and inclined forward to increase the facility of puncture in the lumbar region. The danger of wounding the cord or the breaking of the needle is to be guarded against.

No permanent spinal drainage has been practicable by this operative measure, which, independently of all theoretical objections, should be given a fair trial, and impartially judged by its final results.

Thyroidectomy.—Mental disorders are frequently complicated and sometimes caused by thyroid disease, or by operative procedures upon the thyroid gland. Extirpation of the whole gland is followed in many instances by myxœdema or tetanus, and the latter affection may arise from even partial resection of the thyroid.

Cachexia thyreopriva results in thirty per cent. of all total thyroidectomies.

Predisposition to Insanity renders operations for the removal of goitres all the more serious.

In addition to partial or complete removal of the gland there is

incision of cystic growths, and enucleation of pathological nodules of the thyroid, which is less dangerous. Graves's disease is often associated with Insanity, to which it may bear a direct causative relation. About seventy per cent. of all cases of Graves's disease occur in women, in whom there is a physiological relation between the thyroid gland and the reproductive functions.

The chances of thyroidectomy in Graves's disease are shown in a review of one hundred and eighty-seven cases by Kinnicutt. Out of one hundred and eighty-seven cases operated upon sixty recovered, forty-seven improved, eleven were unimproved, thirteen died, and the result in others was unknown.

In Insanity with exophthalmic goitre it becomes a serious question, therefore, as to the value of operative interference.

In all thyroidectomies the use of thyroid extract as a part of the after-treatment promises some prophylaxis against untoward sequels.

Degenerations of the thyroid gland give rise to myxœdema and subsequent Insanity with the same certainty that cachexia strumipriva results from thyroidectomy.

The chief value of thyroidectomy, if performed in time for the arrest of thyroid disease, would be in the nature of prophylactic treatment of Insanity.

Hysterectomy.—Insanity may be caused by pathological growths and diseased states of the uterus, and hysterectomy may offer the only radical means of deliverance from the uterine disease and of cure for the mental disorder. The fact that hysterectomy is known to be one of the possible factors of Insanity is a matter of serious consideration for the gynæcological surgeon before operation in cases having hereditary predisposition to mental disease.

On the other hand, Insanity, already confirmed, does not contraindicate, but may favor hysterectomy, which is to be advised or discouraged according to the general principles of gynæcological surgery.

Oöphorectomy.—The operation for the removal of the ovaries has now been performed extensively in all parts of the world for fifteen years past, and the literature of the subject is too large for review in this connection. Oöphorectomy, in its relations to mental disease, is also a subject too extensive for discussion here, and the most varied opinions are held as to its advisability either for the prophylaxis or cure of mental disorder.

From the writer's experience in the treatment of insane women,

who have undergone the operation, and from a careful study of all sides of the subject, the following summary of conclusions is reached in regard to this surgical procedure:

1. Oöphorectomy has occasionally caused Insanity.

2. Battey's operation in climacteric Insanity may hasten the menopause, and limit the duration of the psychosis.

3. In ovario-mania from organic ovarian disease demanding Tait's operation, relief of the mental symptoms has followed the surgical procedure.

4. Oöphorectomy, as regards Insanity, is curative or causative through its psychic as well as physical effects.

Clitoridectomy.—The excision of the clitoris has been done to relieve sexual erethism in neurotic women, and as a cure for masturbation among the insane. It is a temporary check to the masturbatic habit, which in rare cases may be permanently cured by it.

When masturbation has been carried so far as to become a part of cortically organized habit, neither clitoridectomy nor oöphorectomy are of any permanent benefit.

In cases of moral Insanity in young girls given to the habit, the prepuce of the clitoris might perhaps be with some benefit stripped off under cocaine anæsthesia, just as circumcision in boys under like circumstances is sometimes curative.

At the present time clitoridectomy is rarely advised in psychiatric practice, and is completely out of vogue.

Orchidectomy.—Castration in mental disease has been done sometimes by physicians, and at other times by the patients themselves, acting under delusions which led to self-mutilation. The results of the operations thus performed upon the insane have been various.

Double and complete orchidectomy does not remove all sexual desire, and will not cure a chronic habit of cortical masturbation, though it may terminate other forms of sexual self-abuse.

Orchidectomy, self-inflicted, like other traumatic accidents, may be followed by prompt recovery from the Insanity. Unilateral castration produces no appreciable change in adult sexual appetite, but, like complete emasculation, it may terminate an attack of mental disorder by force of venesection and physical and mental revulsion when it is self-inflicted.

Orchidectomy at the senile involutional epoch has never been suggested, so far as the writer knows, by any enthusiastic performer of oöphorectomy at the menopause, and it is not used at present in

psychiatry, except in malignant or other organic affection of the testes, which require ablation on surgical grounds.

Phlebotomy.—General bloodletting was almost universal with the last generation of psychiatrists, but for forty years past it has not been recognized as useful in the treatment of mental disorders.

Still local bloodletting is practised by leeching and cupping in marked cerebral congestion to the extent of some ounces of blood; and there should be no prejudice against venesection should there be a positive indication for it. Accidental injuries in sthenic mania followed by immediate improvement after the sudden loss of blood cannot but cause reflection. It is not reasonable to suppose that all the distinguished medical men who relied upon bloodletting were merely following a fashion. It is a fact, that Insanity has become more asthenic and neurasthenic within a generation, and if the great Rush were now living he doubtless would see less indication for his favorite remedy of phlebotomy, which it is probable might still be of occasional service.

Transfusion.—According to Dr. Hack Tuke, transfusion was practised in Paris, in 1667, by Denis upon an insane patient who recovered his reason soon after the operation, and in 1879 Roussel, of Paris, performed transfusion at Bethlehem Hospital, London, in one case without success.

It would seem as if this procedure might be of great service in cases of Insanity with impoverished and deficient blood-supply, and there is here at least an open field for reasonable experimentation.

In post-partum Insanity with profuse hemorrhage immediate benefit might be expected. In the absence of a donor of fresh blood, a properly prepared saline solution is almost equally effective, as the serum, and not the corpuscles, is accepted for immediate use from the donor. The writer, who served through the Asiatic cholera epidemic of one hundred and fifty cases in the New York City Lunatic Asylum, was struck with the temporary improvement in the patients upon whom transfusion was practised, even though the method was not direct but abdominal. One and one-half drachms of chloride of sodium to one quart of boiled and filtered water at 100° F. is the strength of the solution employed in transfusion.

Hypodermoclysis.—A sterilized solution of seven parts of chloride of sodium to one thousand parts of water is introduced by means of a trocar into the subcutaneous tissues of the thighs or abdomen.

This method has already been used to replace lost fluids in cholera

and hemorrhages, and also to depurate the system of toxic material which is eliminated by the kidneys so long as the hypodermoclysis is continued and not carried to excess.

It is probable that it might be used to advantage in Insanity in post-partum hemorrhage, in diabetic, uræmic, and other toxic conditions.

Revulsion.—This surgical procedure is based on a very important principle of medical practice in mental disorders, which have been observed to improve remarkably after eruptions and suppurations, carbuncles on the neck, and severe attacks of hemorrhoids, and other causes of decided derivation from central to peripheral regions. The principle, therefore, is to imitate nature and to establish by artificial means peripheral irritation of some kind in order to influence the processes of disease through reflex nervous channels. Just as in general medicine neuralgic affections and inflammatory diseases of internal organs are treated by counter-irritants, so in psychiatry pathological states of cerebral centres are influenced by revulsives.

As in eye disease the blister is applied behind the ear, and in intercostal neuralgia over the spine, and in inflammations of thoracic or abdominal organs at certain points of selection, so in mental disorders the scalp, the nape of the neck, and the central spinal region are the preferable points for local attack by revulsion.

Vesication.—Various kinds of vesicants have been employed in the treatment of mental disorders. Tartar emetic ointment has been largely used to the shaven scalp, and although there is much severity in its use, curative results have been claimed for it.

Oleum Tiglii rubbed into the scalp for vesication is favorably mentioned by Bucknill and Tuke.

The writer has found blisters to the nape of the neck to have about the same effect as when applied to the scalp, while being free from some of the inconveniences of the latter.

A cantharidal blister is the most ready form for the nape of the neck. Frequent superficial blisters are more efficacious than one deep blister, since the object is to affect the peripheral distribution of nerves to cutaneous and not to deeper tissues. In patients tending to dementia after acute Insanity, and in maniacal states assuming a chronic type, a good lively course of vesication ad nucham sometimes has a happy effect.

Also in melancholia there is an occasional tedious phase, tinged with hypochondria and self-pity, in which a blister to the neck is valuable for its psychic as well as derivative effect.

The use of moxa affords a still more decided means of counter-irritation.

Thermo-cautery.—In cases which demand a deeper counter-irritant, Paquelin's cautery or the thermo-cautery may be employed. The effect will vary somewhat with the red or white heat at which it is applied, as the former is more irritant. It is sometimes of benefit in incipient Insanity and also in delayed convalescence with stuporous tendency after acute symptoms have subsided.

Electro-cautery.—This is a still more convenient and readily regulated form of cautery for use among the insane.

The back of the neck is a good place for cauterization in chronic maniacal cases, in sequential stupor, in certain cases of primary dementia, and in an occasional case of melancholia in the first stage.

Setons.—The writer has used setons in the treatment of different forms of mental disease, and is inclined to regard them as the most useful form of prolonged counter-irritation. In turbulent maniacal patients with chronic meningeal inflammations they afford remarkable relief. In epileptic mania they are valuable, and in some cases of melancholia tending to dementia they prove useful. The seton for a fortnight in the back of the neck of an acute maniac will sometimes act as a surer sedative than many drugs, and will do more to relieve the cerebral trouble.

Aquapuncture.—As a final very convenient means of counter-irritation in the insane, aquapuncture is mentioned. It consists in a very fine jet of water, hot or cold, directed with some force against the skin. It is readily applied while the patient is bathing, and may not be objected to by patients, who would oppose other forms of counter-irritation.

Acupuncture.—The piercing of the skin or muscles with fine-pointed instruments has been practised with some success for the relief of muscular and sciatic pain and for other neuralgic troubles.

Acupuncture should be done under antiseptic precautions. The neuralgic pains of hypochondriacal and neurasthenic patients may be relieved by this measure, in part, through psychic effect.

Hepatic Aspiration.—Dr. W. H. Hammond attributes importance to hepatic abscess as a cause of melancholia, which he has relieved by hepatic aspiration. Possibly the ancient doctrine of the liver as the seat of melancholia may have been due not so much to black bile as to pus undiagnosed.

Enteroclysis.—This operation consists in the cleansing of the

lower part of the intestinal tract by means of water or slightly saline solutions, which for special purposes may also be medicated. The water is allowed to pass into the intestines by its own weight, which can be regulated by elevation of the water-bag or vessel. The pressure should not exceed five pounds at any time, and a small and steady stream is alone permissible, and an outflow tube should be provided large enough to allow small solid particles to pass, and the fluid employed should have a temperature of not less than 100° F. and not more than 103° F. The object is to irrigate the large intestine and even to pass the ileo-cæcal valve in certain cases. A Davidson syringe should never be used to force the water, which, if used in large amounts, should contain one drachm of chloride of sodium to the pint. The indications which may exist for this operation in mental disorders are intestinal atony and fecal accumulations, foul state of the alvine evacuations, and toxic conditions and reabsorption of toxines from intestinal surfaces. In the latter instance a little boric acid may well be added to the warm water.

Four years ago a patient, who had been treated for melancholia until deemed probably incurable, came under the writer's care emaciated, with offensive stools, perverted secretions, and evidently suffering from toxic intestinal reabsorption.

Enteroclysis was practised and was practically the main treatment. The patient improved from the very first, gained fifteen pounds in four weeks, and had completely recovered at the end of six weeks.

Cataphoresis.—The introduction of drugs into the system may be accomplished by the galvanic current, ten to fifteen milliampères by anodal diffusion. An effect is thus procured in cases unwilling or unable, for any reason, to take medicine by the mouth.

The drugs are used in solution applied on absorbent cotton on the positive electrode.

In goitrous patients iodine may be locally used. Chloroform irritates the skin, but in neuralgia a ten per cent. solution of cocaine may be locally employed.

Anæsthetic Congelation.—There are many occasions for local anæsthesia in minor surgical operations among the insane, and anæsthetic congelation is often preferable to cocaine in the cutting operations. A mixture of one part of salt and two parts of ice, quickly pulverized, mixed, and applied in gauze to the skin, will produce local anæsthesia sufficient for incision for the release of pus, or for

the use of the cautery to the neck. Ether spray with an atomizer, and rhigolene, likewise act as frigoric anæsthetics for operations, and are also used for the relief of neuralgia. Methyl chloride is still more rapid, and care is to be taken not to prolong the congelation, which is complete at the end of a few seconds, and, if carried too far, may result in sphacelation of the part.

Gastric Lavage.—In gastric dilatations and fermentation, and for other reasons, it may become desirable or necessary to wash out the stomach before the introduction of food. The proper apparatus for this is a flexible red-rubber tube, about four feet in length, with a blind end, and two large lateral end openings, large enough to admit the entrance of some solid particles of food and of the mucus of the stomach. The inside diameter of the tube should correspond to catheter sizes 20 to 23 American system, or 30 to 35 French, and the length of the tube inserted, measuring from the lips downward, will vary with the size of the patient, which is to be estimated in each case, and which, on the average, is sixteen inches.

For children a tube thirty inches long and with an inside diameter of a catheter 14, will answer the purpose. The tube should not be cold, and is simply moistened, as the mucus lubricates it; it is introduced within the grasp of the pharyngeal constrictors, and it is then swallowed involuntarily; in children it may disappear completely if care is not taken to attach the external end. A funnel is adjusted, either before or after the passage of the tube, to the outer end; fluid is poured into the stomach to the desired amount, and then the funnel is suddenly lowered; by siphonage the stomach is emptied, and by a repetition of this process until the fluid comes away clear the stomach is thoroughly cleansed. If the funnel end of the tube is not lowered while there is still fluid in the tube, siphonage may not be established unless suction is used.

If the stomach contain much solid material the stomach-pump may be necessary, but it is very rare that the tube will not answer every purpose.

The water used for gastric lavage may contain a little boric acid for antiseptic purposes.

In resistant patients a wooden mouth-piece with a central opening for the passage of the tube may be necessary, and the head of the patient is carefully held by an attendant.

Gynæcological Local Treatment.—It has already been pointed out that disease of the uterus and of its adnexa is an occasional cause of

Insanity, and in such an instance the gynæcological local treatment may remove the continuous etiological factor of the psychosis. The gynæcological affections which may bear a causative relation to the mental disorder are uterine displacements, endometritis, parametritis, tumors of the uterus or ovaries, and functional disorders of the reproductive organs.

The question of resort to gynæcological surgery in mental disorders turns on the relation of cause and effect, as between the local disease and the psychosis. It is to be considered also that anæmia, general disorder of nutrition and reflex disorder of the whole nervous system may arise from the gynæcological affection, and that until it is removed the first step toward the cure of the Insanity cannot be taken.

On the other hand, existing uterine disease may not have contributed to the mental disorder, which may be known to be due to other definite causes, and gynæcological treatment might only add another source of irritation to a suffering nervous system.

It becomes necessary, therefore, to weigh closely in each individual case the indications and contra-indications for gynæcological operations among the insane.

Insanity *per se* is not a contra-indication to gynæcological surgery, provided the latter eventually prove remedial. Most all radical measures of treatment impart some new phase to the Insanity which they finally tend to cure. The delusions which local treatment may favor have been illogically cited as an argument against gynæcological treatment, but the same reasoning would exclude all medicines and other decided measures enforced in Insanity.

The gynæcological question, therefore, will ever remain the same in all cases of mental disease, and it is summed up in two brief phrases, viz.: Is the gynæcological operation indicated on etiological grounds? Does the general physical condition of the patient admit of the operation? Otherwise the sensible practitioner would never think of an attack of Insanity as an opportune occasion for any kind of surgical procedure.

Galvanism, Faradism, Franklinism.—The application of electricity to the bodies of insane patients should be regarded as a surgical procedure, and it should never be intrusted to any but medical hands.

Electricity is only of advantage in psychiatry when skilfully administered, and it is a betrayal of science and of the best interests

of the patients to tolerate nurses to wield this powerful instrument of physical and mental good and evil. The fact is that there are few physicians, be they even psychiatrists and neurologists, who possess sufficient skill to select the best form of electricity in the varying conditions of mental disorder, to manipulate the currents to the best advantage in each case, and to regulate the dosage so that the patient may derive the greatest benefit and sustain the least shock from the operation.

Electro-therapy cannot be learned practically from books, and those who have had no special opportunity to acquire skill in electrization will do well to dispense with this technical surgical procedure in the treatment of the insane.

Galvanism.—Of the three forms of electricity, galvanism is unquestionably the most generally useful in the treatment of mental disorders. It is stimulant, sedative, electrolytic, and more deeply influences nutrition than the frictional or interrupted forms of electricity.

The galvanic current is sedative when used with the anode as the active electrode, and with the cathode with a large surface as indifferent, and the reversal of these conditions and the interruption of the current gives a stimulant effect. The mode of the application of the current and its strength and duration have much to do with the nature of the effect produced. The insane do not bear large doses of electricity well, generally speaking, but light and prolonged currents are most commonly applicable. There are certain disorders of the muscular system and some spinal applications which require currents of from fifty to one hundred milliampères, and with these, of course, very large electrodes are used to the spine. Every hospital for the insane should be supplied with reliable electrical apparatus, giving every variety and strength of current. The operator must not rely upon his milliampèremeter entirely, but must test the current upon himself and watch the effect upon the patient, as idiosyncrasy is common and exceptional action will often be seen among the insane. Séances vary from ten to twenty minutes ordinarily. In neurasthenic and melancholic cases central galvanization is valuable for its effect on the general nervous system, and the cervical sympathetic may be cautiously submitted to the action of the current in the same class of cases.

In states of cerebral anæmia the galvanization of the cervical sympathetic is to be practised with the anodal action upon the supe-

rior cervical ganglion, and the positive pole is used, therefore, in most cases of melancholia and anæmic stupor. In general paresis and in maniacal cases with cerebral congestion the cathode is applied to the cervical point, since the clinical experience of this method shows that it relieves the cerebral hyperæmia.

The general nervousness and extreme restlessness of acute mental disorders is best treated by general galvanization with a large cathode plate at the feet and the anode sponge applied over occipital regions, with slowly increased current, which is to be gradually diminished at the close of the séance.

The neuralgias, hypalgias, and paræsthesias are treated with the anodal application of the galvanic current, which has been known to favorably influence auditory hallucinations when applied to mastoid regions.

The galvanic current is a good vasomotor stimulant in cutaneous capillary stasis of the extremities, so common among the insane. The cathode, in this instance, is at the neck, and the extremities are stroked with the anode in the direction of the venous circulation.

Insomnia may be relieved by the galvanic bath, warm and prolonged ten minutes, with a feeble current and with the anode applied to the head at the end of this time.

Cerebral galvanization is a good sedative in the acute stage of both exalted and depressed conditions. The electrodes are large and the anode is applied to the forehead, and the cathode to the back of the neck. The current at first is very feeble and very slowly increased, and never to exceed a few milliampères, and the first application should be extremely brief. A current of from one to two milliampères thus employed for ten minutes will sometimes produce the much-needed sleep.

Galvanization of the spinal cord is useful in ataxic and paretic cases, and in some toxic insanities with atrophic muscular disorders. Only strong currents of from twenty to fifty milliampères reach the cord, and a still greater strength may be used to advantage in some instances. The electrodes must be very large; the anode is placed at the upper part of the back and the cathode at the lower part, and the currents are slowly increased and not long applied.

A descending spinal current has a sedative effect in some cases.

Faradism.—The Faradic current varies in its properties in accordance with the length of the coils, the size of the wire, and the number of the interruptions.

Short coils, with large wires, and few interruptions, give a rough current which rasps the sensory nerves and causes strong muscular contractions.

Long coils, with fine wires and rapid interruptions, give a smooth current, which is much less exciting.

In a battery constructed by Kidder for the writer some years ago, there was an outer coil of very long and fine wire, and a secondarily induced high-tension current, which had effects more like the constant current, and it would relieve the soreness of the muscles caused by rough currents of low tension.

The different kinds of Faradic currents have their applications in the treatment of mental disorders. In apathetic mental states with relaxed muscles the rough current arouses the patient and brings about the desired muscular contractions. It serves a purpose also in the primary and sequential forms of stupor, and in those dangerous moments of exhaustion after acute symptoms when the patient is on the verge of sinking into secondary dementia, which can only be prevented by roborant and excitant treatment.

The action of the Faradic current is also of value in vasoparetic conditions, in which the patient presents livid hands and feet.

The dry electrode and the electric brush affect the sensory periphery directly, but in a reflex way they influence other parts of the nervous system.

The deeper action of the current can only be obtained by moistening the skin and the electrodes.

General faradization, when thoroughly performed, is beneficial in neurasthenic Insanity and in many states of exhaustion after the acute stage of mental disorder. In general faradization the negative pole is placed, in the form of a sheet of copper, at the feet, and the positive pole, with a large sponge, is applied to the back of the neck, and then to all parts of the surface by various attachments.

One of the most convenient electrodes is with a long wire handle and flat disc covered with sponge to reach all parts of the surface without removal of clothing. The hand of the operator is the most perfect electrode for adaptation and complete application of the current to every inequality of the surface, and in this case the operator holds the anode with his left hand while applying the current with his right hand. This form of application is often borne better than any other by sensitive patients, as the body of the operator is interposed between the patient and the battery.

With strong currents and the negative plate at the feet, the contractions of the ankle muscles is an objection, and it is then best to use a large soft sponge at the lower end of the spine as the negative pole.

The faradic bath may be employed for its sedative effect.

It is sometimes well to alternate general faradization with general galvanization and with special electrization of nerve-centres, and with electric massage.

Franklinism.—Frictional or static electricity has not the same wide therapeutic uses in Insanity as the forms just mentioned, and it is more expensive and difficult of management. On the other hand, it is agreeable in some of its applications, and calculated to impress the patient favorably, and to have a decided psychic influence, and the static induced current might be of real value in the diagnosis and treatment of muscular disorders among the insane, as it is somewhat similar to the secondary induced current of the faradic battery, though less effective.

The static form of electricity is chiefly of value in mental disorders as a counter-irritant, stimulant, and reflex excitant.

The depressed and stuporous may be stimulated and aroused on the insulated stool by drawing sparks from all parts of the body. Perverted sensations, occipital pains, and the cephalalgias of the insane are sometimes benefited by the electrical breeze. Sparks drawn from the back of the neck are useful in counter-irritant effects. The psychic effect is greater than with any other form of electricity, and it is probable that the static electrical bath has some real effect as a stimulant of the circulation, and indirectly favors tissue changes by increasing cutaneous activity and capillary circulation.

The sedative effects of static electricity are only secondary and such as follow primary stimulation.

Section VIII.—Hygienic Measures.

The most skilful therapeutic, surgical, or psychic treatment is in vain when it is not based on sound hygienic conditions of environment.

Some of the chief hygienic measures, which it is the first duty of the physician to provide, will now receive separate consideration.

The Hygiene of the Residence.—The site of the residence in which

the patient is to be treated is important. The air in the country, with the exception of malarial districts, is always purer than the air of large cities or towns.

It is better that the position be somewhat elevated and partially sheltered from powerful winds in winter. The southeastern slope of a large hill is usually an eligible site for a winter residence.

It is of the utmost importance that the quarters occupied by the patient should have an exposure to sunlight, which purifies the air and is an essential element in the recovery of health. In large cities the rear of houses on the south side of streets running east and west often has the best exposure to sun and the greatest air-space over open back yards. The plumbing of a house in cities is to be carefully inquired into, and in the country the drainage is to be examined, and especial care is to be taken to avoid a house with a damp cellar, or a stone house with damp walls, or an old house with large cesspool drainage in the immediate vicinity.

All modern hospitals for the insane are supposed to remedy any defects of plumbing or drainage, even at great expense, if need be.

Ventilation of the residence is the next point to which the physician must attend, for the patient is sustained by the air he breathes as much as by the food he consumes. The chief impurity of air which has been berathed is carbon dioxide, of which a grown person exhales six-tenths of a cubic foot hourly, so an adult requires three thousand cubic feet of fresh air an hour to prevent the carbon dioxide from rising above the safety limit of six-tenths per centum.

In hospital structures the rule has been to allow a thousand cubic feet of space per patient, with artificial renewal of the air to reach the physiological quantum of three thousand cubic feet per hour, as above mentioned.

Atmospheric pressure, differences of temperature, and the diffusion of gases chiefly cause currents and renewal of air in dwellings. Natural ventilation is accomplished by doors, windows, and the chimneys of ordinary houses. The air in the patient's room should be kept purer, and perhaps at a different temperature, than that in the house generally, but if the door of the room is kept open it may only become a passage-way for the ventilation of the lower part of the house. The first thing is to make the sick-room independent of the rest of the house, as far as possible, by air-tight strips at the top and bottom of the door, and then by a fireplace and outside windows any desired temperature and abundant fresh air can

be provided. If there is only one window, it may be opened a little at the top and bottom, and if there are two windows one may be opened at the top and the other at the bottom.

The theory is that the warm and impure air goes out at the top, and the fresh and cool air comes in at the bottom of the window-openings. In the main this is so, but the forces controlling ventilation are so complex that their resultant cannot be foretold with theoretical certainty, and when a window is opened at top and bottom there will often be at both places a double current outgoing and incoming, and the various gases in the room will rise or fall, according to their density, the degree to which they are heated, and relative differences between outside and inside currents established. The main point is to accomplish the admixture of fresh air without undue draughts upon the patient.

The temperature of an artificially heated room should not rise above 68° F., on the average. The flame of a candle may be sufficient to start upward ventilation in a chimney, and a fire creates a powerful exhaust from the room in this way and is a capital means of ventilation, provided there is an inlet for pure air.

Artificial methods of ventilation are used in hospitals in which heating-flues and separate ventilating-flues are built in each room. The air is sometimes renewed by forced ventilation by large fans keeping a plenum of warm air, which displaces that in the rooms, and, again, exhaust-fans are used to draw the air out of rooms. The modern electric fans are efficient in the latter method. Space will not permit a description of the many methods of ventilation and heating of hospitals. They all have advantages and disadvantages, and none are perfect. The whole system of heating-flues has the defect that dust and germs accumulate in them and are then blown into the air which is to be breathed.

Open fireplaces are the best means of heating, but in cold climates they are inadequate and should be supplanted by a system of hot-water pipes.

Direct radiation, which heats the patient rather than the air, is preferable, and the temperature of the room is not then required to be kept at such a high degree as to debilitate the patient.

All kinds of thin metal stoves are unhygienic and allow gases to escape into the room. The burning of gas-jets and of oil-lamps is a source of impurity in the air. Every such flame consumes twice as much oxygen as a person. Electricity is vastly preferable on this account as a means of illumination.

Carpets, rugs, tapestry, and all articles which collect dust and germs are unhygienic. Dusting a room should be done with a soft rag, moistened in antiseptic solution in some instances and carried from the room, and care is to be taken that dust is not simply stirred up into the air instead of being completely removed. A hard-wood polished floor is best, and strips of carpet, which can be daily shaken in the open air, are cheaper and better than rugs. A room is better without anything of the kind, and a strip of blanket warmed at the fireplace and spread beside the bed for the patient to stand upon while dressing is all that is necessary for the most delicate patient.

The bed is a hygienic point of great importance, as more than a third of the patient's time, on the average, is passed in bed.

The best bedstead for general use among the insane is made of iron and is adjustable as to height, for which twenty inches is a good standard, and the breadth should be nearer four than three feet. A removable wire mattress is attached to this bedstead, which is cheap, cleanly, and durable, and, if enamelled white, is also a presentable article of furniture.

A hair-mattress of full size, and weight not less than twenty pounds, made of thoroughly cleaned and dusted hair, completes the bed.

Cotton sheets and fine, medium-weight, woollen blankets, and a plain cotton coverlet makes up the outfit, with the exception of two pillows of feathers. A hop-pillow and an air-pillow may be used for special cases.

Cleanly neurasthenic cases, in cold weather, sleep better between blankets without sheets. In patients with deficient vital heat, in winter it is well to have a blanket between the lower sheet and the hair-mattress, as the latter alone admits of the ready abstraction of heat. A rubber-sheet and a draw-sheet are to be used in some uncleanly cases. In exceptional cases water-beds or air-beds are of service.

If blinds at the windows are not sufficient, a roller-curtain may be employed, with a duplicate in dark color for more complete exclusion of light. Hanging curtains collect dust and germs. A folding screen is a useful article for shutting off light and draughts of air, but it should be removed from the room when not in use.

The Hygiene of the Person.—The insane patient, through general excitement, delusion, or stupor, is neglectful of personal hygiene, and the nurse, under the direction of the physician, must

provide for the sanitary condition of the person and clothing of the patient. This is a difficult matter in practice, and relates to the final result obtained more directly than may be supposed, and the physician must concern himself with it, for it is not a mere question of nursing.

The clothing of the insane must vary in different cases, and in the various phases of the malady, and it demands medical judgment to adapt the clothing to the hygienic requirements of the case. The psychic influence of dress, especially with women, is very decided, and a new gown will buoy their drooping spirits and prop their self-esteem in the critical fluctuations of the malady.

Take a woman in the debilitated stage after acute mania, whose reason is hanging in the balance between convalescence or hopeless dementia, clothe her anew in handsome attire, let her drive out with some lady friend less well-clad, let the prop remain on the return from her outing, and the new suit be worn continuously, and the scale of recovery may be thus turned in her favor. All convalescent patients should be clothed as becomes their station in life, and somewhat better than has been their custom. It is a serious mistake to prolong the usage of such plain dress as is appropriate in the acute phases of mental disorder.

The maniacal patient who, despite the closest attendance, will ruin a suit in a brief space of time, should be clad in plain, washable material, which may be completely changed every few days, if need be, in order to preserve a perfectly cleanly and presentable appearance.

Strong quilted gowns and canvas suits which are indestructible are, in the rarest instances, to be employed, but their frequent use points to inefficiency on the part of the nurses, who are to be advised to this effect by the physician.

The numerous primary dements, stuporous melancholiacs, and periodical maniacs in the depressed stage are seldom clad warmly enough to conserve the slight animal heat resulting from their impaired metabolism. After electric baths to stimulate their cyanotic skin, their extremities should be clothed in woollen underwear, which should only be removed in hot weather.

It is a hygienic necessity that certain neurasthenic cases of Insanity should wear fine and full-weight woollen underclothes the year round, and this is true also of many women not of this particular type, but possessed of delicate constitutions and susceptible pelvic organs.

Intestinal fermentations, toxæmias, and vasoparetic states in Insanity account in part for the peculiar abdominal vulnerability to cold, which is best guarded against by a flannel binder, to be worn about intestinal and renal regions, even in warm weather.

Strong and warm maniacs, with full turgor vitalis and roseate skin, which is hyperæsthetic often, actually suffer from woollen wear, and they persistently strip themselves to get relief. They seldom, if ever, take cold in this condition, and they should be given light linen wear, which is a comfort to them, and they should not, by a thoughtless routine, be afflicted with the regulation underwear until they reach the stadium debilitatis.

Then, again, there are cases of toxic Insanity demanding extra heavy woollen wear; not alone that it is warm, but also hygroscopic, and the object is to promote elimination of the deleterious material by cutaneous perspiration.

Puerperal maniacs having suffered extensive losses of blood need very warm underwear, especially for the lower extremities, in addition to the flannel binder.

All these are instances for medical direction in dress.

The shoes are very important, and there should be supplied two pairs, to be worn alternately, that they may be ventilated and dried thoroughly after use. They should be of the walking-shoe pattern, and as waterproof as practicable.

Indoors, house-shoes or slippers should be worn, but in winter they should be warm and come well up on the ankle.

The night-dress is best of soft flannel or woollen-wove. It should be one garment from neck to ankles, with full-length sleeves, and should have only one straight buttoned opening, from the left side of the neck to the tip of the left shoulder, and should be large in all dimensions, and it is slipped on and off over the head.

Cases of Insanity with rheumatic and gouty diathesis often do best with red flannel underwear.

Coarse woollen wear, which might be intolerably irritating to hyperæsthetic patients, may be of benefit to apathetic cases with sluggish capillary circulation and hypæsthetic cutaneous surfaces.

Cleanliness and the care of the skin in the insane is a hygienic measure calling for constant attention. Hot-water baths and a free use of a good toilet soap are essential.

The special uses of water-cure in mental disorders will be presently described.

The mouth and teeth must not be neglected. Caries of the teeth is unusually common among the insane, and in the toxic insanities a specially constant symptom. Dental neuralgia may be a permanent obstacle to recovery, and the constant contamination of the buccal secretions by carious teeth, which taint the saliva and food, should receive prompt treatment by a dental surgeon.

Irrespective of carious teeth the mouth is sometimes offensive from foul secretions, sordes, and micro-organisms, and a mouth-wash of biborate of sodium, chlorate of potassium, glycerine, and lemon-juice is effective as an antiseptic measure.

The insane frequently rub filth into their hair, which in men had better be kept close-cut, and the scalp is to be occasionally shampooed. After the latter process in women great care is to be taken to properly dry the hair to prevent aggravation of the neuralgic pains of the scalp so common in Insanity.

Rubbish and foreign particles often get into the eyes, nose, and ears of patients, who, through delusion or perversity, stuff their nares and auditory canals until they develop local inflammations. The otorrhœa and middle-ear disease of the insane is partly due to this cause. Patients having this propensity should be examined by the physician daily. The nurse may pick loose bits of paper, straw, or wood from the ear, but should report at once to the physician anything which has passed deeply into the ear.

The eye is so delicate an organ that, except to remove small foreign particles with the moistened corner of a handkerchief, the nurse will do well to make known any unusual condition at once to the physician, and not to go further than to evert the lid in search of the irritant material. It often requires all the skill of the surgeon to extract foreign bodies from eyes and ears without damage to the organ, and neither fluids nor crude instruments should be used by nurses.

Pruritus vulvæ, among the insane, is often due to lack of cleanliness, and sitz-baths and vaginal douches are to be employed.

Pruritus ani arises also from personal neglect, and even when toilet paper is supplied it is not properly used by many of the insane. The hemorrhoids among the insane are often the result of local irritation from uncleanliness.

A bidet in water-closets is a very useful arrangement for delivering a small stream of water of graduated temperature to perineal parts after stool while the patient is still seated.

The writer long ago discovered that hot-water enemas, absolute cleanliness, and cocoa-butter suppositories would cure many forms of hemorrhoids in the early stages.

Masturbation in insane women not infrequently arises from local hyperæmias, and hyperæsthesias due to uncleanliness, and by vaginal and rectal enemas and the use of the bidet the symptom may be relieved.

The nurse, while bathing men, should see to preputial cleanliness, and circumcision is often of advantage and occasionally may obviate a tendency to masturbation.

The strong odor of maniacal women is due in part to axillary bromidrosis and to vulvar hypersecretions, best relieved by a stream of hot water to the parts, followed by an antiseptic wash of permanganate of potassium.

There are many other minor points in the hygiene of the person of the patient for which the nurse and the physician must provide in order to place the patient in the most favorable conditions for recovery, but space will not here permit further details on this score.

The Open-air Cure.—When the writer took charge of the New York City Asylum for the Insane an unusual amount of freedom and open-air life was given to many of the patients, and the cures which resulted proved an instructive lesson, which has been continuously applied with profit in both hospital and private practice. The provision for open-air life is the most powerful hygienic measure for recovery. The patient is to live out of doors and to enter the house only to take rations of food and sleep, or for necessary purposes.

In rainy weather arbors and open-air pavilions, with secure roofs, are to be utilized, and appropriate seats are to be provided, and in cool weather heavy, warm lap-robes and cushions are indispensable. In summer a pine-grove is a desirable locality, but in cooler weather open exposure to the sun is to be sought.

Camping-out and life on a yacht have been tried with success. In hot weather tenting-out in the mountains or at the sea-shore may be a practical measure.

The open-air cure is not contra-indicated in maniacal patients, who often become more composed at the end of a few days of this treatment, which so strongly favors appetite and sleep.

An army-cot, with warm robes and a pillow, should afford an opportunity for sleep in the open air, so often as the patient feels

drowsy, and every hour thus spent is so much solid gain in acute cases. If hammocks are used, they are to be secured against turning, that there may be no falls.

On return to the house at night windows are to be left open in sleeping apartments, which are not to be heated above 65° F. at any time during the trial of this method, which, if perseveringly carried out for some weeks, often yields surprisingly good results.

Care is to be taken that the patient is kept warm at all times, and is supplied with concentrated nourishment in small amounts between meals.

The Rest-cure.—Dr. S. Weir Mitchell deserves the credit of this method of treatment, as now practised from three to eight weeks together. A large, sunny, well-ventilated room is chosen, with an adjoining room for a nurse, who proceeds, by a daily time-schedule, to feed, bathe, and rub the patient, who is isolated, recumbent, and quiescent at all times. Massage takes the place of active exercise, and dressing and undressing is done by the nurse, should there be any special occasion for it. The bed-pan is used, and in most cases the patient is not even allowed to assume the sitting posture in bed.

The diet consists largely of milk and concentrated beef essence. The milk, in part, may be predigested.

Fresh eggs, beef, and mutton are given in generous amounts in certain cases. There are three principal meals, and between times some liquid nourishment. Supper is to be light, and, if need be, some liquid food may be taken during the night. Massage suffices at first, then electricity is used to contract muscles, and, finally, Swedish movements are employed. Malt extract before meals and tonics after meals, with special drugs if indicated, completes the treatment, which is terminated by a gradual return to active habits.

The following is quoted from Professor Dana's "Text-Book of Nervous Diseases," p. 519: "A typical schedule for a rest-cure patient, as given by Dr. John K. Mitchell, is the following: 7 A.M., cocoa, cool sponge-bath, with rough rub, and toilet for the day. 8 A.M., milk breakfast. Rest an hour. 10 A.M., 8 ounces of peptonized milk. 11 A.M., massage. 12 noon, milk or soup. Reading aloud by nurse. 1.30 P.M., dinner. Rest an hour. 3.30 P.M., 8 ounces of peptonized milk. 4 P.M., electricity. 6 P.M., supper, with milk. 8 P.M., reading aloud by nurse one-half hour. 9 P.M., light rubbing by nurse with drip-sheet."

The rest-cure may be used to good advantage in some neurasthenic and hysteric cases of Insanity.

This class of cases often take to bed instinctively, and the chief danger is that the bed-habit will become confirmed, as in many other cases of Insanity, in which the will-power is much impaired.

Forced Recumbence Versus Forced Exercise.—Many years ago the writer became impressed with the idea that perfect quiescence was required by the brain, as the suffering organ in mental disorders, and, in order to favor the heart also, treated large numbers of insane in bed.

Most cases thus treated in forced recumbence improved for the first two weeks, and some continue to improve for six weeks, while others, at the end of the fortnight, begin to lose appetite and weight, and at the end of a month have suffered general vascular and muscular debility, as well as psychical relaxation to the point of complete abulia. Rubbing and bathing will not prevent this latter result in many cases.

Forced recumbence does well in feeble senile maniacs, in mania arising in puerperio, in all cases of acute exhaustion from mental disease, and in acquired neurasthenic Insanity from excessive overstrain of mind or body, and in choreic youthful cases. Mental alienation as a sequel of acute infectious diseases may be attended with general systemic exhaustion, which indicates the recumbent mode of treatment. Post-febrile Insanity in children, severe cases from trauma capitis or spinal concussion, and intercurrent surgical affections demand forced recumbence, but all other classes of cases, almost without exception, do better without it.

All the hereditary neurasthenics, hysterics, and hypochondriacs become more abulic and get a bed-habit, and the contest with them is best made in the directly opposite direction of systematic exercise and occupation. The muscular activity of maniacs is a natural channel of discharge for irritated cortical centres, and is a safety valve not to be checked by forced recumbence.

Even general paretics, in the last stage, live longer and do better sitting up than in bed, and this is true of organic dements, and of nearly every other type of terminal Insanity.

Forced exercise is a hygienic agency which has cured many patients.

Most cases of Insanity from the neuroses have a constitutional indisposition to exercise, which they should be forced to take daily, even if they cannot be induced to engage in any useful occupation. Their walks should stop just short of actual fatigue, and even a

little of the latter in those of strong musculature is of decided benefit.

Strong, turbulent maniacs, upon whom drugs and other means had been tried in vain, the writer has time and again cured outright by putting them at farm-work, and he has seen many chronic maniacs work out their own cure in this same way.

In acute mania severe muscular exertions are not to be prescribed, ordinarily, as theoretically, at least, the state is one of cerebral exhaustion. It is a mistake, however, to suppose that this is always the case. Some sane men always find most immediate relief from cerebral exhaustion and mental strain by severe muscular exercise, and in the same way some muscular acute maniacs equalize their circulation, derive from congested cerebral centres, discharge pent-up cortical nerve-force, and improve their nutrition and sleep by out-of-door labor of an accustomed kind. Acute maniacs have been known to rapidly recover in this very way when generously fed. These same patients, if not allowed to expend their force in the open air, put forth continuous muscular efforts while breathing house-air, and in practice, contrary to neurological theories, the suppression of these same efforts is harmful rather than otherwise.

Expert judgment is required to decide in what acute maniacal cases out-of-door customary exercise is to be permitted. The patient must not be allowed to expend more force than can be daily renewed. If held by attendants to suppress all activity, he may in a brief hour put forth vastly more nervous energy than in a week's outdoor occupation, and, on account of the suddenness of the expenditure, may not be able to recuperate from it for weeks.

Forced exercise is essential in all stuporous and demented conditions, and a daily walk out-of-doors should be practised, even in cataleptic cases, and in melancholic patients with complete muscular atony.

Forced exercise is an effective means of arousing the patient in the early convalescent stage following acute attacks, at which time there is danger of secondary dementia. Such patients are to be taken between two attendants, if need be, and urged to a lively pace. Dancing to lively music is sometimes good to overcome the torpor of such sluggish patients.

The muscular inhibition of melancholic cases becomes a confirmed habit, which requires to be broken up by forced exercise at the termination of the acute stage.

It requires much judgment to decide in what cases forced recumbence or exercise may give the best result, and this important decision is by no means to be left to nurses.

Gymnastics.—All hospitals for the insane should have a well-equipped gymnasium as a hygienic resort for patients during the ice, snow, and storms of winter. At such times regular classes should be formed under a competent teacher, and in accordance with the physician's directions in each case. The more dangerous forms of exercise are to be avoided, but all the ordinary gymnastic apparatus admit of useful and safe application in certain cases. In women, of course, the range of gymnastic performances is more limited, but still of much value.

Practice in classes is a distinct advantage in abulic cases, and with women especially the force of numbers and of example is a decided aid in gymnastics.

Light wooden dumb-bells are best for class use, and regular movements should be simultaneously executed by all, the teacher setting the example and standing in full view of the class.

Swedish Movements.—In the absence of gymnastic apparatus Swedish movements make a very good substitute for use, singly or in classes, among the insane. Every muscle in the body may be exercised by this method, which must be pursued in each case under the physician's instructions. Not only passive and active movements, but concentric movements, made by the patient while resisted by the teacher, are of special value to the patient, who sometimes takes pleasure in overcoming the operator, who is to be careful not to tax their strength. Reference must be had to special manuals for full details of Ling's system.

Calisthenics.—Many years ago, among the writer's patients, calisthenics were employed at the New York City Lunatic Asylum. A regular gymnastic room was provided, a teacher was employed, and music was daily furnished. The calisthenics consisted in rhythmical movements of body and limbs in time to music, marching and countermarching, the formation of pleasing figures, with long, wooden wands, and a variety of motions modelled after the Swedish system.

Patients who could not be induced to perform singly learned to take pleasure in calisthenics in classes, and in time to music.

Great importance in this connection is to be attached to music, which fitly furnishes the necessary psychomotor impetus in those devoid of spontaneity.

Outdoor Games.—To say nothing of the psychic effect, outdoor games supply needful exercise, which by many patients will only be taken in this way. Croquet is appropriate for the less active women, and lawn-tennis will satisfy those fond of more agile movements.

Quoits are fitted for middle-aged and elderly men, and ball games for the young and active. There is an element of danger in baseball, but, as it is the American game and excites more enthusiasm than any other among patients, it is not to be denied them. Match games between patients and attendants are often watched with keen interest by hundreds of insane patients, who applaud the good strokes with great promptness and gusto.

Horseback and Bicycle Exercise.—Horseback riding is beneficial to certain patients with torpid livers and defective peristalsis, and, in those accustomed to it, is a most exhilarating and desirable exercise. It should never be tried with patients who are not skilful horsemen, and should only be allowed under close attendance, and with perfectly safe saddle-horses.

Bicycle exercise on good roads without any steep hills, when the patient already possesses the necessary skill, is one of the best forms of exercise. Unfortunately, there is a lurking danger in bicycling, which the physician can only prescribe after a full understanding with the relatives of the patient as to the risk incurred. Great moderation must be observed in the use of this hygienic agency among the insane, and one hour of gentle cycling is about the extreme limit for a single outing.

With a good machine, a properly conformed saddle, the erect posture, and with the weight equally distributed between handle-bar, pedals, and saddle, most muscles in the body are brought into play and a highly animating form of exercise is enjoyed.

Hydrotherapy in Insanity.—All hydro-therapeutic effects are produced chiefly through the physiological action of heat and cold upon the peripheral nervous system, and in a reflex way upon vasomotor and trophic centres.

Cold, widely and briefly applied to the external nervous periphery, causes first contraction and then dilatation of cutaneous capillaries, increases the frequency and force of the heart and the number of the respirations, stimulates the heat centre, and increases metabolism and the excretion of urea and carbon dioxide.

The temporary application of heat to the periphery of the ner-

vous system has similar results to those mentioned, except that the heat centre is not stimulated and the capillary dilatation is more immediate and not secondary to blood withdrawal to central organs, and hence the reaction is not felt.

The alternate use of heat and cold to the nervous periphery has still more powerful effects.

Hydrotherapy in Insanity is employed to stimulate the vasomotor system, to increase tissue changes, to diminish temperature, to promote cutaneous elimination, and to effect nervous sedation.

Some of the chief forms of hydrotherapy in mental disorders will now be described. Thermometers must always be employed.

The tepid bath ranges in temperature from 82° to 92° F. It is useful in maniacal patients of full habit, in whom excitement and muscular exertions have raised the temperature one or two degrees. In such cases a tepid bath in the evening, lasting from ten to twenty minutes, with superficial friction of skin while in the water to preserve capillary activity, will restore normal temperature and quietude, and often produce several hours of refreshing sleep.

It may be employed in maniacal cases of less robust constitution and having less vital warmth, but the duration must not be more than five minutes. The tepid bath in delicate and neurasthenic women is used for its tonic influence, as the cold bath is in strong persons, and it should then be brief and followed by friction of the entire surface to establish a reaction. In feeble persons with a rise of temperature the tepid, rather than the cold, bath is employed to abstract heat.

The warm bath varies from 92° to 102° F., and its most customary use is for purposes of cleanliness, with a free use of soap.

A warm bath, from 96° to 100° F., is the safest and most universally applicable form of sedative in all asthenic maniacal cases, and its duration must vary from ten minutes to a half hour, according to its effects, which must be personally observed by the physician in this class of cases. It is well to give an eggnog before the bath in exhausted maniacal cases, and to repeat the stimulus during the immersion, if need be.

Cases of melancholia do not bear tepid baths well, as a rule, but warm baths have a full sedative effect when continued for a half hour at a temperature not above 99° F. Cold applied after removal from the bath negatives the sedative effect, and is therefore to be avoided. Cold is applied to the head during the bath. Prolonged

warm baths have been largely employed in Insanity by both Continental and English physicians. The bath varies from 85° to 98° F., and is prolonged from one to twenty-four hours. In fact, patients have been thus immersed several days at a time. Cold compresses, or a small stream of water, have usually been applied to the head in the meantime.

Maniacal patients have been cured outright by this heroic treatment, but there have also been cases of dangerous collapse, and fatal results are liable to occur. The writer's experience is that all the beneficial results may be obtained by baths nearer the temperature of the body, and not prolonged beyond two hours, but repeated during the day.

The dangers of the more heroic method are largely avoided by giving repeated immersions of not more than an hour, or, exceptionally, two hours, at a temperature of from 92° to 96° F. Cold applications to the head are essential to prevent cerebral congestion. The result of such a prolonged immersion is that the maniacal patient is composed for four or five hours, and sometimes for a whole day, and, so soon as signs of cerebral excitement reappear, the patient is again to have a combined bath with cold to the head. The prolonged bath is applicable also to the excitement of acute melancholia.

The hot bath has a temperature of from 102° to 112° F.

There are some patients who will not bear prolonged warm baths, but do better with hot baths from 102° to 105° F., and, strange to say, the effect is sedative and not excitant.

In the use of the prolonged hot bath cold affusions, or the ice-cap, to the head are indispensable, and one-half hour is the usual time limit. The physician should always be present to observe pulse, respiration, and cerebral effects. Women may wear a cotton night-dress, or a sheet may be fastened about the neck at one end and the other end drawn over the foot of the bath-tub and spread out, and so fastened as to cover the patient completely from view. Dr. Bucknill uses a reclining chair in some cases for prolonged baths, and thus patients are lifted into a large bath-tub.

Wooden covers, with openings for the head, are not without danger among the insane, and cannot be recommended, and anything giving the impression of forced confinement while bathing is specially objectionable, and often causes violent emotional or delusional excitement.

In neurasthenic Insanity the stimulant effect of brief hot baths of not more than three minutes' duration, at the temperature of 105° to 110° F., is more decided than cold applications, which are seldom well borne, and this is also true of many of the diathetic and toxic melancholias. In most states of mental depression, stimulation is better accomplished by heat than by cold.

The debilitating effects of repeated hot baths are avoided by the momentary application of a cold drip-sheet to the whole cutaneous surface immediately upon leaving the bath.

In tabetic cases, immersion of the lower extremities in a hot bath often gives temporary relief from pain. A hot half bath may also temporarily relieve the paræsthesia in alcoholic and syphilitic cases.

Hot baths diminish the tactile illusions and the muscular pains in toxic Insanity, and they are occasionally of service in congestive dysmenorrhœal conditions common among insane women. In the choreic Insanity of children they may be employed to relieve the spasmodic affection and procure sleep.

Hot sitz-baths are indicated in mental aberration from suppression of menstruation after exposure to cold. In the dysmenorrhœa of Insanity, for their emmenagogue effect at the time of the regular return, they may be conjoined to other remedies.

They relieve vulvar paræsthesia, and are more useful than cold sitz-baths in hyperæsthesia of the membranous portion of the urethra in masturbatic cases. Hot sitz-baths range in temperature from 102° to 122° F.

The hot wet-pack is, in patients unable to bear a full bath, an efficient sedative. A blanket is spread out, and a cotton sheet wrung out of water, as hot as can be borne, is quickly spread over the blanket, and upon this the naked patient lies and is folded in the sheet and blanket.

A cool application may be made to the head and another blanket may be thrown over the patient if the room is cool and the pack continued from twenty minutes to an hour. In still feebler cases hot dry-packs may be given. The patient is folded in a warm dry blanket and a second blanket is also employed, and the result is usually perspiration and a sedative effect and sleep. In delicate women patients, this is a good introduction to a hydrotherapeutic course of treatment to be followed by the hot wet-pack and then the wet-pack at diminishing temperatures.

The hot dry-pack is useful in exhausted maniacal or melancholic patients, and in feeble senile dements.

The hot spinal douche may be given in a bath-tub having hot and cold water connections, so as to graduate the temperature and a certain pressure of the stream through a piece of rubber tubing, to which different shaped nozzles may be adjusted so as to give a stream of hot water, from the size of a lead-pencil to an inch or more in diameter. The patient sits in the bath-tub and the stream is directed the entire length of the spine, or immediately over such portions as are especially to be influenced. A powerful counter-irritant influence may be thus exerted with water as hot as can be borne without injury to the skin, which is to be carefully avoided. The spinal douche may also be siphoned down upon the patient through rubber tubes from vessels of known temperature placed above the patient, but the impact of the falling water must be considered in large jets. It is possible to get very decided effects on cerebral circulation, and to influence the thoracic, abdominal, and pelvic viscera by the hot spinal douche.

Hot spinal bags are more convenient, but less decided than the spinal douche in general effect. They are applied to any portion of the spine at a temperature not exceeding 120° F., for periods varying from one-half hour to several hours, according to the degree of heat and the effect desired. They are specially useful in melancholic cases with subnormal temperature, and in restless senile dements lacking in vital heat they sometimes produce sleep. They have this latter effect also in some cases when applied over epigastric or abdominal regions.

Hot spinal bags often relieve the paræsthetic and neuralgic symptoms of neurasthenic, hysteric, and hypochondriacal cases. They are useful in spinal anæmia in melancholic women, and they may be applied over the sexual lumbar centre in the spinal exhaustion of masturbatic men.

Hot-water bottles, made of rubber and covered with cloth, of all shapes and sizes, for the local application of heat, are very convenient.

Fomentations are chiefly moist, but they may be dry, and they are made usually by flannel wrung out of hot water and immediately applied to relieve pain or inflammation or to promote suppuration, and in the latter instance spongiopiline is better than flannel. Myalgia and muscular spasms are so common among the insane, as well as ulcers, abscesses, cellulitis, arthritic troubles, and colic, that there is often occasion to use fomentations, either of simple hot water

or with the addition of mustard, turpentine, or laudanum. Hot dry fomentations are palliative in the trigeminal neuralgias of the insane.

Rubber coils of small flexible tubing, which can be passed about a limb like a spiral bandage, are convenient for the continuous application of heat by means of hot water, which is siphoned through the tubing from a hot-water vessel placed above the patient and caught at the lower end of the coil in another vessel beside the bed. The same tubing can be stitched to cloth, holding it in any desired shape and applied to any part of the body for either hot or cold water applications. A continuous coil of it thus arranged is a practical means of constant use of heat or cold to the head, as it readily adjusts itself like a cap to vertical regions. The flow of water may be started by suction at the lower end of the tubing.

In anæmic insomnia due to spastic vascular conditions in melancholia, the hot coil to vertical regions will often give prompt relief. It is to be gently removed as soon as sleep begins. The neuralgic pains in the extremities arising in alcoholic and ataxic cases of Insanity are best relieved by heat, not to the limbs, but over posterior spinal nerve-roots corresponding to parts affected.

Foot-baths, from 110° to 120° F., are used chiefly for their derivative effect on the circulation of the brain, and in this way they favor sleep. Mustard may be added to the water when a more decided local stimulation is desired.

Cold baths, varying from 40° to 70° F., are employed for their tonic effect on circulation and nutrition. Reaction must follow, otherwise the tone of the system is not increased. Insane patients do not react well, as a rule, after cold baths, but cutis anserina and lowered temperature and increased depression result in many melancholic cases and also in some maniacal cases.

In sthenic mania, especially when there is a rise of temperature, the cold bath at 70° F., continued from ten to twenty minutes, is both tonic and quieting.

While in the bath the surface of the patient should be gently rubbed to continue capillary activity, and, if cutaneous circulation is still good at the close of the bath, a cold affusion of water at 40° F. may be used.

In the hyperpyrexia of acute delirious mania, provided the heart and lungs are sound, a brief cold bath at 50° F. abstracts heat and diminishes cerebral excitement. Repeated cold baths are safer than

prolonged immersions, and five minutes in these cases is about the proper duration, as there is always danger of cardiac failure.

Plunge baths, from 50° to 60° F., have a tonic influence, and they are sometimes borne by patients who cannot profit by the cold bath. The tub should be large and well filled, and the patient has one complete immersion, and is then rubbed dry briskly while standing on a warm blanket.

Reaction often follows, even in cases of physical and mental depression, if the proceeding is promptly conducted, and a tonic result follows.

Men bear the plunge better than women, and the latter should be prepared for it by previous hydrotherapeutic treatment. Insomnia due to cerebral anæmia is sometimes relieved by a cold plunge just before bed-time.

The cold drip-sheet has less severity than cold baths or plunges, and is adapted to a larger class of insane patients who need the stimulant and tonic effects of cold water.

The nude patient, standing in a little warm water, is quickly wrapped in a sheet dipped in water from 60° to 70° F. and applied with friction to every part of the surface, which is then promptly dried.

The water at first may be at 80° F., and the drip-sheet then serves as a good introduction to more severe hydrotherapeutic measures in neurasthenic and melancholic cases. The temperature of the water may be finally reduced to 40° F.

The cold wet-pack has been more widely used in mental disorders than any other form of water cure, though the fact that it is deemed a form of restraint in England has diminished, in a measure, its popularity in that country. It is prepared by a rubber sheet, over which is spread a blanket, and over the blanket is extended a sheet, which has been partially wrung out of water from 60° to 70° F. The naked patient is then stretched full length upon the sheet, which is folded about every portion of the body except head and feet. A cold compress is applied to the head and warmth to the feet. The blankets are folded over the sheet about the patient, who perspires freely and often sleeps while in the pack, which may be renewed every fifteen minutes for an hour, if the object is to abstract heat. The sedative effect of the cold wet-pack is the chief one sought, and when sleep results the patient may be allowed to remain in the pack for hours while the sleep lasts. Renal secretion

and alvine evacuations are increased decidedly by the use of wet-packs, as is the case generally in cold water continuously applied to the cutaneous surface.

The wet-pack is especially indicated in overheated and sleepless maniacal patients. It should never be used for purposes of restraint.

Sponge-baths are given in very feeble patients by light, rapid sponging of the separate extremities with very cold water and without exposure of the whole body at any one time.

In a full sponge-bath to reduce temperature, a double sheet is folded lengthwise under the patient, who is fully gone over by light, quick strokes of sponges well squeezed out of ice-water, which need never drip from the surface so as to wet through to the under sheet. Alcohol may be added to the water to hasten evaporation. Large, flat pieces of ice, carved perfectly smooth and slightly concave, may be passed over the surface instead of the sponge in hyperpyrexia. If skilfully applied, without disturbing the patient especially, sponge baths are very refreshing in exhaustion from acute mental disease, and they usually answer all necessary purposes in the abstraction of heat in delirium acutum, in the status epilepticus, and in the focal brain disease of organic dementia in which other cold baths are contra-indicated.

Cold affusion-baths are given by means of an army cot or a single folding-bed, on which is spread a rubber blanket, gathered at the foot of the cot into a vessel which catches the water because the head of the cot is slightly raised and the sides are higher than the middle. The patient lies upon the cot and is wrapped in a sheet. Cold water, from 50° to 75° F., is poured over all portions of the body and limbs, or, better still, is sprinkled over them by a flower-sprinkler. A rapid reduction of bodily temperature is thus accomplished, and a thermometer in the rectum should test the progress of the bath, which is used in the hyperpyrexia of delirium acutum and of sthenic forms of acute mania. When the bodily temperature has been lowered to 100° F. from 104° F. or more, the bath should be discontinued to avoid the danger of collapse.

Cold affusion-baths have also been employed for their decided sedative effect in acute mental disease. They are almost as severe as the full cold bath, and fifteen minutes is their ordinary duration, and they should be terminated by friction with dry towels.

Cold sitz-baths, from 40° to 60° F., may be used in masturbatic cases for their local tonic effect, and also for pruritus vulvæ and

perineal paræsthesia, of which patients often complain. The vascular relaxation in scrotal regions, which is a source of delusions sometimes, especially in hot weather, may be relieved by cold sitz-baths night and morning.

Douches, showers, and sprays are tonic and stimulant. They can only be given to advantage in rooms with central drainage and water-tight walls and floor, and with apparatus for graduating the force of the stream of water, and the temperature from hot to cold, with instant precision, as shown by thermometers in full view of the operator.

In addition to the sudden alternation of hot and cold douches there is the counter-irritant effect of powerful jets of water thrown eight or ten feet before striking the patient. The impact of such jets exercises a decided species of massage on the various parts of the body and actively stimulates the peripheral nerves and vessels. The shower-bath or needle-spray may be combined well with the douche in order to get the most complete effects.

Graduated baths accomplished a cure, in five days, of a violent case of acute mania treated by the writer seventeen years ago, and since that time experience has confirmed the opinion that they are of great service in the treatment of acute mental disease. Their use is attended by no disagreeable shock to the patient, who is placed in water at 95° F., and the temperature is gradually reduced by water of a lower degree added and evenly distributed by the hand of the nurse until the lowest temperature desired is attained just before the removal of the patient from the bath.

The graduated bath should last from thirty minutes to an hour, and range from 95° to 65° F. There should be a constant and steady reduction of temperature as graduated by a bath-thermometer mounted in a wooden handle, which prevents breakage. As the cooler degrees are reached, friction of the surface is to be gently practised by the hand of the nurse, and a cold compress is kept upon the head, and the bath is promptly terminated should the pulse or respiration indicate the need of it. It is well to graduate the first bath from 95° to 85° F., which is as low a temperature as some cases will bear to advantage. Each successive bath may be graduated five degrees lower, beginning always at 95° F., and not more than two baths are given within twenty-four hours. In sthenic maniacs with sound heart and lungs the improvement is often remarkably rapid.

The graduated bath is also a useful sedative and quickly reduces high temperatures in cerebral excitement, and has even been used in the pyrexia of maniacal paretics with good effect and with no bad sequels. The gradual reduction of temperature, not only of the first bath, but of each successive bath of the series, is an important point.

The Turkish bath has been largely used in the treatment of mental disorders. In England, Dr. Lockhart Robertson first employed and advocated it as a remedy among the insane.

In America the writer first used it extensively in Insanity, and published the results of more than three thousand Turkish baths administered in various forms of mental disease, in his Annual Report, as Physician in Charge of the New York City Asylum for the Insane, and quotations from this report, on this subject, were at the same time published in the *Utica Journal of Insanity.* The Turkish bath is unquestionably more widely applicable in the treatment of Insanity than any other one hydrotherapeutic agency.

The Turkish bath consists in an exposure from one quarter to a half hour to dry air heated from 125° to 150° F., until free perspiration is established, and then to a higher degree of heat, ranging from 150° to 200° F. for five minutes, more or less. A thorough shampooing then follows, and immediately a warm needle-spray, and then a cold douche or cold plunge, and, finally, the patient reclines in a cooling room for a half-hour, and the processes of the bath are then complete. Among the insane a higher degree of heat than 150° F. is seldom required, and the hottest room is never to be entered until there is copious perspiration, which is often promoted by gentle friction of the surface.

The Turkish bath stimulates cutaneous functions, equalizes capillary circulation, hastens tissue changes, and has a permanent tonic result.

It is useful for its eliminative effect in nearly all toxic insanities. Acute alcoholic cases derive great benefit from it. Cases of melancholia with dry, harsh skin, impaired capillary circulation, and anidrosis are promptly improved by it.

Primary dements, stuporous cases, and melancholic patients with cyanotic extremities and vasoparetic conditions are, in a measure, relieved by a course of Turkish baths. The pulse becomes stronger, the color of the skin more natural, and the subnormal temperature is restored to that of health in these cases, in whom massage is prac-

tised at every bath. The primary loss of weight is followed by increased appetite and gain of flesh.

A needle-spray, Scottish douche, rain-bath, and cold tank of water for a complete plunge should be attached to the Turkish bath, which should be perfectly ventilated. The Scottish douche alternates hot and cold. Pulmonary and cardiac disease are contra-indications, but Insanity with Bright's disease, and gouty and chronic rheumatic cases are often remarkably relieved by the bath, which also is decidedly favorable in many instances of syphilitic Insanity, over the cutaneous and other local lesions of which it exerts an influence.

In the absence of a Turkish bath a hot-air bath may be improvised by an alcohol lamp, or by numerous very hot water bottles, and the air is confined about the patient by blankets.

The Russian bath is a hot moist air-bath, followed by a douche and massage. It is rather severe, and still it is said to be of service in mental disease. The writer has never employed it.

Medicated baths are occasionally used in the treatment of Insanity.

The mercurial bath, in urgent syphilitic cases, is a prompt means of getting the effect of the drug.

The sulphur bath, in the same class of cases, is of service and is also employed in Insanity from plumbism. The bath is prepared by the addition of one-quarter of an ounce of potassium sulphide to the gallon of warm water.

Sea-salt baths are stimulating and are made by the solution of ten pounds of sea-salt or bay-salt in thirty gallons of water. They may be given to advantage hot, even in the most delicate cases of Insanity, to improve cutaneous circulation. When employed cold they are decidedly tonic. *Pine-extract baths* are also tonic in effect.

The ice-cap, made of rubber, to be filled with ice-water, is convenient for the application of cold to the head in prolonged baths or whenever cerebral congestion indicates it.

Spinal bags, for tonic and sedative effect, made of rubber and covered with cloth, are used in neurasthenic and hysterical Insanity.

Sun-baths are a hygienic means of considerable importance. The patient, partially dressed or completely nude, is exposed, in a room with glass walls, to the rays of the sun for variable periods, from a half hour to two hours, according to the effects desired and the actual force of the solar rays, and cold sponging is sometimes

used at the close of the séance. A solarium should be provided in hospitals for the insane.

Some remarkable effects have been procured by the exposure of patients to colored lights, which are excitant or sedative, and vary also somewhat according to the subjective mental state of the patient.

Colored-light cure demands further investigation, and has a physiological relation to photisms and suggested reflex sensations of special interest among the insane. It remains to be seen whether the physiological effects of colored light are sufficiently definite to be utilized in the treatment of Insanity.

Massage.—The application, by the hands of an operator, or by instruments, of various kinds of force, to the skin, subcutaneous tissues, muscles, and internal organs is termed massage. There are many kinds of massage.

Effleurage is light stroking with the tips of the fingers or palms of the hands in the direction of the venous and lymphatic circulation, which is thus facilitated, and a soothing effect is exerted through the gentle stimulation of the peripheral nerves.

Massage à friction is practised with finger-tips, ball of the thumb, or palm of the hand by circular rubbing of the parts to be treated, and is usually accompanied by centripetal stroking with the opposite hand.

Pétrissage is the kneading of muscles in the grasp of one hand or between two hands or thumbs, and the object is to exert force on the deeper muscular tissues and vessels.

Tapotement is the delivery of quick, short blows from the wrist by the palms of the hands (spatting), or with the outer edge of the hand (hachage), or tips of the fingers (punctation), or with the closed fist (beating), or with a variety of instruments (percussion).

These are some of the chief forms of massage, but it is needless to attempt any further description, for every conceivable form of force which the hand of an operator can exert on the body has been practised, and the terms descriptive of the same are not uniformly used by the different schools of massage. An operator should have large, soft, flexible, and powerful hands. There are few who have the necessary skill and strength.

The forcible effects of massage are tonic and sedative upon the general system. The circulation is aided, tissue changes are hastened, local pains are relieved, and the general results of active ex-

ercise are obtained without expenditure of force on the part of the patient.

In melancholic and abulic patients who will not exercise massage is most useful. It is employed to arouse patients in secondary stupor and in danger of passing into terminal dementia. It is sedative in the extreme restlessness of climacteric and senile melancholia.

It often alleviates the neuralgias of the insane, diminishes the cutaneous paræsthesias and the tactile illusions of neurasthenic and hypochondriacal patients, and procures sleep when drugs fail in those continuously in bed.

It is an essential part of the rest-cure, and is well supplemented by the primary faradic current applied with double electrodes over the belly of all large muscles.

Abdominal massage is efficient in the constipation of melancholic patients with impaired peristalsis. It is not without good effect in chronic hepatic congestion, in splenic enlargement, and in uterine troubles so common among the insane.

It is employed in primary dementia and melancholic stupor to stimulate cutaneous circulation and promote metabolism in muscular tissues.

It serves to break up tetanoid and cataleptoid rigidity, especially when used in connection with the Turkish bath, in which the rheumatic and syphilitic insane are also immensely relieved by massage.

Massage, like hydrotherapeutic treatment, should be gradually and systematically applied, according to individual needs.

General massage, for tonic purposes, is one thing, and local massage, for specific purposes, is another, and the physician should know enough of the methods and effects of massage to intelligently prescribe it according to the indications in individual cases.

Cardiac disease, sclerosed arteries, extensive pulmonary lesions, and diffused cutaneous eruptions are contra-indications for massage.

Climato-therapy in Mental Disorders.—Climatic factors which influence disease are temperature, humidity, barometric pressure, winds, sunshine, and impurities of the air from telluric and organic sources.

A careful study of all available statistics leads the writer to the conclusion that, as regards seasonal influences upon Insanity, the maximum occurrence of attacks coincides with the nisus generativus of the vernal trimester.

Other evidence of climatic influence in mental disorders is found

in the large percentage of suicidal and melancholic aberration of Northern Europe. Endemic cretinism affords an example of barometric and telluric influences.

The every-day experience of patients as affected by climatic changes is sufficient proof of the fact that psychical states are greatly modified by conditions of the atmosphere. The choice, however, of a climate adapted to any particular case of mental disorder is often as complex a question as the variety of organic lesions which may underlie the psychosis.

The purity of the air is greatest on small ocean islands or on the tops of high mountains. The rarefied air of high altitudes is too excitant for the large class of neurotic and neurasthenic insane, who sleep better and do better generally in marine climates, like the Bermudas, the Florida coast, the Italian Riviera, or the Pacific coast in Southern California.

The phthisical insane are divided about equally between those who do best in mountain climates, like Colorado Springs, with an elevation of about six thousand feet, or at a lesser altitute of twenty-two hundred feet, as at Asheville, N. C., or upon the great plateau of the Adirondacks, N. Y., or the White Mountains, N. H., and those who thrive best in a continuously mild marine climate like that of San Diego, Cal., or the Bermudas. As a rule, tubercular cases do better in the mountains in the early stages of the disease and at the sea-shore with fully developed pulmonary lesions.

Syphilitic and alcoholic cases of Insanity, with arterio-sclerosis and renal disease and cardiac complications, uniformly, should, by preference, be treated at the sea-side rather than at high altitudes, and this rule also applies to mental disorders from focal brain disease, to general paresis, and to epileptic Insanity. In fact, whenever the cerebral and spinal centres are damaged by gross organic lesions, a high rather than a low barometric pressure is indicated, other things being equal.

Of course, a most essential point in all climatic treatment is sunshine and out-of-door life, and there is no disease of the nervous system which is more dependent on these two elements for recovery than Insanity. As mental disease runs a lengthy course, ordinarily, a climate is to be preferred which admits of the open-air cure, independent of seasons. With absolute freedom of choice made without regard to secondary considerations, the French or Italian Riviera or Southern California would be selected for a mild and sunny climate from October to April.

The Mediterranean winds are more objectionable than the Pacific winds of the Southern Californian coast.

Mental disorder from functional brain exhaustion, with anæmic conditions, provided the thoracic organs are sounds, may profit by the dry and stimulating air of high mountain regions, which quicken respiration, circulation, and nutrition, and acquired neurasthenic conditions occasionally do well for many months in elevated localities.

It is well known that a prolonged residence at high altitudes on the eastern slope of the Rocky Mountains favors the development of functional nervous diseases, but this is not so clearly the case at high elevations in Switzerland, on account, perhaps, of a greater amount of moisture in the air. It is the combination of dryness and rarefaction of air which becomes over-stimulating to the nervous system.

Senile Insanity almost invariably goes on better at low than at high altitudes, and, in fact, the latter are directly contra-indicated by the arterial degenerations and cardiac feebleness of senile involution.

The epileptic insane generally do better at sea-level than at high elevations, but exceptions to this rule exist.

Cases of mental disorder from diathetic and toxic conditions do best in a warm climate, except malarial Insanity, which recovers more promptly and completely in cold and elevated climates.

Business men in large cities, who break down mentally from long worry and have dyspepsia, torpid livers, and loss of appetite, do well to resort for some months to mineral springs in mountain resorts. For such cases Manitou Springs, Col., with an elevation of several thousands of feet and alkaline and chalybeate springs, may be tried.

The prophylactic influence of climate is considerable, and patients who are sleepless, nervous, and emaciating in foreign countries are often restored to accustomed health by a return to their native air.

Even after Insanity has declared itself in the case of a foreigner, a return to the native climate without other treatment may work a cure. Some persons, like plants, do not bear transplantation well, and, after a certain age, acclimatization with them is a physical impossibility.

Permanent changes from cold to hot climates in mental disorders are especially deleterious, except in snile Insanity, but a so-

journ of years in a cold climate, substituted for a native hot one, may prove curative.

Mineral Springs.—A hygienic measure not to be ignored is resort to mineral springs in the treatment of Insanity. It is the purity of the water which is especially to be sought, and which is beneficial in many cases with foul gastro-intestinal secretions and internal organs surcharged with effete material, which can be literally washed out of the system by the copious use of pure water. The toxic insanities may be thus treated, and also rheumatic, gouty, and diabetic cases. The use of bottled lithia, vichy, Kissingen, and other mineral waters cannot replace successfully the taking of these waters at their native source.

Syphilitic cases of Insanity may go to the Hot Springs, Ark., cases of saturnism to the White Sulphur Springs, W. Va., or Sharon Springs, N. Y., the rheumatic and gouty to Saratoga Springs, N. Y., the anæmic insane to Bedford Springs, Penn., Richfield Springs, N. Y., or Schuyler County Springs, Ill., and the dyspeptic and neurasthenic insane may try the stimulant waters of the Old Sweet Springs, W. Va., or of the Clysmic Spring, Waukesha, Wis., or some of the more highly carbonated Saratoga waters. Treatment at mineral springs can only be of benefit when taken systematically in accordance with medical advice, and the indiscriminate use of mineral waters has often hastened an attack of mental disease in the incipient stage. Hydrotherapeutic facilities are provided also at most of the mineral springs above mentioned, but, like the waters, they should be used only under expert medical advice.

Section IX.—The Dietetics of Insanity.

The various kinds of raw material appropriated in the growth and sustenance of organized beings are known as *food.* The vegetable organisms derive an elemental supply directly from earth, air, and water, and the animal kingdom lives largely upon the vegetable, and is also self-devouring. Thus the carnivora consume the herbivora, and man, being omnivorous, seeks his food in both the animal and vegetable world, and in a primitive state of nature devours his own kind by preference to all other sorts of food. This anthropophagy would seem to be a brutal obedience to the evolutionary law of sustenance, that organized creatures generally assimilate most readily tissues constituted like their own, and among

the insane it is a question whether it is not to be regarded as a reversion rather than a perversion of appetite.

In the light of modern physiology there is no doubt that in man the nitrogenous substances indispensable as food are most promptly assimilable when derived from the animal rather than the vegetable kingdom.

In mental disorders and other exhausted states of the nervous system, a largely nitrogenous diet is best adapted to the recuperation of the patient, with certain exceptions presently to be noticed, and this supply of albuminates should be tendered in the form of animal food.

All foods may be divided, on a chemical basis, into inorganic, containing water and salts, and metallic substances; and organic, consisting of albuminates, fats, carbohydrates, and vegetable acids, combined ordinarily with the salts just mentioned.

There is no one article of diet which contains all the elements essential to the nutrition of the human organism. The two most complete foods known for man are milk and eggs, but the former, although rich in nitrogenous material, contains so little carbon that about nine quarts a day would be required to supply the physiological quantum.

The organic need of food is declared by increased appetite, which discriminates both as to the amount and kind of food demanded by the system, and in full health this is a reliable guide to the ingestion of nourishment, but in disease of the nervous system, like Insanity, appetite is deranged, and science must furnish a standard of the requirements of the various kinds of aliments, based on the average amounts consumed daily in the organism.

Physiologists differ slightly as to the quantity of albuminates or proteids, fats, carbohydrates, and salts required daily by an adult male while performing ordinary work, but the following is an average of the estimates of Moleschott, Pettenkofer, Voit and Ranke, of the water-free food needed per diem, viz.: Proteids, 4.31 ounces; fats, 3.53 ounces; carbohydrates, 11.71 ounces; salts, 1 ounce, giving a total of 20.55 ounces average dry food. To this is to be added the percentage of water contained in ordinary solid food, and there results a daily ration of from 40 to 60 ounces of ordinary solid food. In addition to this the estimate allows 60 ounces of water extra daily.

The size of the body has some relation to total amounts of a

physiological ration, which is roughly fixed at a little more than one-hundredth part of the body-weight for the total water-free food, and a half ounce of water for each pound of the total body-weight.

In general, then, it may be said that an adult male requires, when doing ordinary work, from 40 to 60 ounces of solid food and from 50 to 70 ounces of water daily, and that during severe labor twenty per cent. should be added to total allowance of both liquids and solids. Women require as much less food than men relatively as exists in the proportion of difference in total bodily weight.

The following table gives the percental composition of some of the more ordinary articles of diet (Parkes, quoted by Needham):

Articles of Food.	In One Hundred Parts.				
	Water.	Albuminates.	Fats.	Carbohydrates.	Salts.
Uncooked Meat	75.0	15.0	8 4	—	1.6
Wheat Bread	40.0	8.0	1 5	49.2	1.3
Rice	10.0	5.0	0.8	83.2	0.5
Oatmeal	15.0	12.6	5.6	63.8	3.0
Potatoes	74.0	1.5	0.1	23.4	1 0
Butter	6 0	0.3	91.1	—	2.7
Eggs	73 5	13.5	11.6	—	1.4
Cheese	36.8	33.5	24.3	—	5.4
Milk	86.7	4.0	3.7	5.0	0.6
Sugar	3 0	—	—	96.5	0.5

Knowing the physiological ration required by an adult, it is possible, by means of this table, to calculate with considerable accuracy hospital dietaries, and also to detect insufficiencies in established diet lists.

In this review of food-stuffs, which must constitute the diet of the insane, there are to be mentioned accessory substances known as condiments, used to excite appetite, or to impart a relish, and stimulants, such as tea, coffee, cocoa, and alcoholic beverages. The action of tea, coffee, and cocoa on the cerebro-spinal nervous system is dependent on alkaloidal substances: thein, caffein, and theobromin, nearly identical in composition. A great variety of nervous and dyspeptic symptoms are due to the abuse of these domestic drinks, which it is often well to dispense with completely in the treatment of mental disorders, in which there is always a tendency to gratify artificial rather than natural appetites. Women in particular are prone to appease their appetite with tea and coffee, to the

neglect of the much-needed food. In psychiatric practice no form of alcohol should be permitted, except when prescribed for its specific effect as a stimulant. The alimentary value of alcoholic drinks is so slight, as compared to more assimilable forms of nourishment, that it is now ignored, and even in England the beer, which formerly entered into dietary lists of hospitals for the insane, has been largely abolished.

The physiological objection to these food accessories, tea, coffee, and alcohol, is that they retard the tissue-changes and the renewal of structures, which in Insanity are very frequently diseased, and in need of elimination and reconstruction. These artificial stimulants satiate an abnormal appetite, which needs to be restored by natural means, and gratified only with concentrated nourishment, which will best serve the purpose of constructive metabolism.

A first disagreeable duty, therefore, of the physician in the dietetics of Insanity is often the complete abolition of tea, coffee, alcoholic drinks, and tobacco. The first struggle is like the breaking of a drug-habit, but the rapid improvement which follows is often an agreeable surprise to both patient and physician.

Patients past the acute stage and entered upon the probable limits of incurability may have these food-accessories in part as an indulgence and in part as a means of economy in large public institutions, as there is a saving of food-supplies when patients retain their old tissues instead of building them up anew, and, if given the choice, they invariably prefer artificial indulgence to increased vitality without it.

Speaking generally of the dietary of the insane, it should be such as they have been accustomed to in their station in life.

A brain-worker, even in health, would find the coarse food on which a laborer has always thrived almost intolerable, and when a professional man is treated in a public institution for the insane and fed on the routine diet alone, a serious obstacle is thrown in the way of his recovery, not from deficient quantity, but from defective modes of preparation and service of food. A short-sighted dietetic economy has caused many an insane person to become a life-charge to the State. It would be a public saving, in the long run, to have food of the best quality prepared and served in a first-class manner to all acute cases of Insanity, and to all patients who have not distinctly passed into terminal and incurable states. The food should be rendered palatable, on account of the very general

anorexia in acute cases; and, to offset the impaired gastric functions which prevail, it should be presented in as digestible a form as possible. There should also be a variety not only from day to day, but from one week to another. Certain dietary variations must be observed with the sequence of the seasons, and in very cold climates an increase in the fats and carbohydrates is demanded. The individual peculiarities which exist as regards choice and digestibility of food in health should be ascertained from relatives, and patients should, as far as practicable, have their tastes consulted in this regard.

The insane are drawn largely from a neurotic class, and often have life-long dietetic idiosyncrasies, and the physician who ignores these personal differences and feeds his patients by chemical formula alone will be taught a lesson wiser than the physiology of digestion.

Turning from these general considerations of the quality and quantity of food needed in Insanity, attention is next directed to the dietetic indications in special stages and forms of mental disease.

The Dietetics of the Acute Stage of Mental Disorders.—In nine-tenths of the cases of acute mental disorder, nutrition is decidedly impaired. The excitability, irritability, and sleeplessness are often symptomatic of the malnutrition, and disappear as soon as the patient becomes well nourished.

In puerperal cases there are often extensive losses of blood to be made good, in post-febrile Insanity there is general wasting to be repaired; in diathetic and toxic patients there are constitutional, muscular, and visceral defects of assimilation, which can only be compensated for by generous alimentation; in mental disease from domestic worry and business anxiety there is prolonged neglect of proper nourishment; and in acute Insanity from any cause there is usually loss of weight and a tendency to continued emaciation to be combated.

The constant and powerful muscular efforts of the acute maniac lead to an enormous waste of tissues, and the loss is not much less in the violent tension of the terrified melancholiac.

The actual waste of structures in these cases is greater every day than in the laborer performing the most severe work. The amount of food required by these cases is at least twenty per cent. greater than the average daily ration already given in the case of an adult.

The gross amounts needed to sustain the nutritive equilibrium

are the equivalent of four pounds of ordinary solid food and about five pints of fluids daily. One-quarter of this very large allowance should be given in the form of nitrogenous food, preferably of animal origin, such as fresh eggs and milk and meats variously prepared.

Fats are very essential in these cases, and are best given as cream and butter of good quality, and, if the latter is rancid, it should not be served to the patients in hospitals.

Cod-liver oil, when assimilated, is a useful hydrocarbon in these cases, and when not well borne glyconin emulsion may be tried, and, should this not be well tolerated, two or three ounces of lipanin daily is a good substitute.

The administration of cream in acute melancholia in large amounts serves a triple purpose; it supplies the needed fatty food, it relieves the habitual constipation, and it often has a decided somnolent effect, which meets the indication in the constant insomnia of this stage. One pint a day of fresh skimmed cream may often be given, with the best results. The breaking of oil-globules by the mechanical process of the centrifugal churn gives a heavier cream less well borne by the stomach. If half a glass of cream at a time is not acceptable to the stomach, small and frequent amounts should be given.

The necessary amount of carbohydrates is supplied in wheat-bread of first quality flour, in potatoes steamed by preference until mealy, in a small amount of cracked wheat or oatmeal well cooked, and served with cream and sugar, and in rice boiled and served in the form of pudding, or plain, with cream and sugar.

The mode of preparing the animal nitrogenous food is important.

Beefsteaks are best quickly broiled on the surface and underdone inside; roast beef, rare, is an excellent mode of preparation; a quarter of a pound of beef chopped fine, pressed into a roll, and exposed to heat sufficient to slightly cook it is a good dish; scraped, shredded, or pounded beef, seasoned with salt, and sandwiched between slices of bread, or served as a pulp in small amounts, is more readily assimilated than cooked meat. None of the beef-extracts or essences sold in the market are as good as those prepared directly from fresh beef, and the difference is as great as that which exists between canned milks and fresh milk. As a convenience and to save trouble the canned articles will always continue to be used.

Beef-essence is prepared from a pound of the round of beef chopped fine and freed from fat, to which is added half a pint of

water, half a dozen drops of hydrochloric acid, and half a drachm of salt. The whole is well stirred and allowed to stand for a couple of hours, and the liquor is then strained off with slight pressure and is ready for use as a good form of beef-essence to be taken without further dilution.

Beef-essence is also obtained from a pound of lean beef minced fine and placed in a tightly covered jar with a half pint of water and a pinch of salt, and exposed to a gentle heat for several hours, and then strained off ready for use.

Beef-tea is a useful preparation made by mincing a pound of the round of beef, to which is added a pint of water, and, after one hour's exposure to a gentle heat, it is finally brought to the boiling-point for a moment, and then strained and seasoned to suit the taste. It should never be kept and warmed over anew for service to a patient, but should be freshly prepared as needed.

Raw beef-juice is a most excellent form of nourishment in the acute exhaustion of Insanity. A pound of the round of beef is chopped fine and stirred with four ounces of water and allowed to stand for an hour, and then strained by twisting in a strong muslin cloth. The juice of finely chopped meat may also be at once expressed by a meat-press, or by placing the meat in the twisted end of a napkind and using a lemon-squeezer.

All these liquid preparations of beef contain much less of the strength of the meat than is commonly supposed, so that serious error often results in patients fed entirely on these liquid preparations while refusing solid food.

The strongest beef-tea represents less than twenty per cent. of the actual nutrient value of the beef from which it is made.

Meat-pulp is the most reliable and concentrated nourishment which can be given. It is obtained by scraping, with the edge of a strong knife, crosswise of the fibre, sections of the round of beef, or by the reduction, by pestle and mortar, of finely chopped beef to a pulp, which is then strained through a coarse sieve. It may be made more palatable by being served as a salad, with a little finely chopped celery or white lettuce, or hashed with freshly boiled potatoes. It is fed mixed with various fluids in artificial feeding.

Fresh eggs are most readily taken into the system uncooked. A pinch of salt or pepper may give a little aid, as some persons cannot take raw eggs or raw oysters. If stimulant is indicated the egg may be swallowed with a little sherry wine, or made into eggnog with

milk. Fresh eggs may also be beaten into a custard or into milk or beef-tea in forced feeding.

Milk in phthisical Insanity and in neurasthenic and feeble cases is often most readily assimilated taken fresh milked. In other instances, in carrying out a milk diet, skimmed milk alone is used. In large cities in which milk arrives after long travel and change from one vessel to others before reaching the consumer, it is well to resort to such sterilization as heating affords.

Koumiss is a very digestible form of milk. It is fermented mare's milk, but in this country it is made from the fermentation of cow's milk, and it is composed, in 100 parts, as follows: Water, 90.0; milk sugar, 4.0; lactic acid, 0.5; albuminoids, 2.0; fats, 1.5; alcohol, 1.0; carbon dioxide, 1.0. From one to two quarts a day may be given in exhaustion from acute mental disease.

The koumiss-cures effected in phthisical and other cases on the steppes near Orenberg are doubtless due largely to the open-air cure and climatic influences. Koumiss, as made in this country, has a dietetic but not a therapeutic value in phthisical Insanity.

In addition to the nitrogenous, fatty, and carbohydrate foods just mentioned, there is a special need of the fresh juices of fruits in acute mental disease with perverted secretions of the primæ viæ. The tartaric acid of grapes, the malic acid of apples, and the citric acid of oranges, free or combined with potassium and other salts, serve a most refreshing and corrective purpose in these acute cases. The fruit must be neither under or over ripe. The seeds of grapes and pulp of oranges are to be rejected, and apples are often digestible scraped raw with a spoon, when not well borne cooked.

An important point in the dietetics of acute mental disorders is to feed early and often. Alimentation is the ever-constant indication. Foul stomach, tongue, and breath are often only symptomatic of partial starvation. Many of the deaths attributed to exhaustion from acute mental disease might, with scientific accuracy, be assigned to toxic inanition. While the acute case is indifferent to or refuses solid food, the immense waste of tissues goes rapidly on, and the quart of beef-tea and two quarts of milk daily which are taken after much persuasion are only a fraction of the quantity needed to sustain the nutritive equilibrium. A full physiological ration should be at once and continuously given, by means described under forced feeding, including all the essential food elements heretofore mentioned.

The Diet of the Chronic Insane.—While it is "penny wise and pound foolish" to stint in any way the food-allowances of the acute and curable insane, it is just to the public, heavily taxed to support large numbers of chronic insane, to practise economy within humane limits in the dietary of the practically incurable class. It can be safely affirmed that the majority of terminal dements, whose daily expenditure of energy is reduced to a minimum, can subsist in comparative health and comfort of body on less than the physiological ration already mentioned for an adult. No reduction should be made, though, in those patients of this class who are daily workers, but in those living a vegetative life merely the dietary of an ordinary hospital is sufficient.

For purposes of comparison the average dietaries of ten general hospitals in London is given, and the same is also stated for the ten New York State hospitals for the insane. The daily dietary, giving the average of the ten London hospitals, is as follows: Bread, 12 ounces; cooked meat, 6 ounces; fish, 8 ounces (once a week); potatoes, 8 ounces; milk, 8 ounces; porter or beer, 1 pint; tea (sweetened), 2 pints.

In addition, there may be ordered by the physician such "extras" as chicken, rabbit, oysters, custard-pudding, beef-tea, gruel, eggs, and fruits.

The following dietary for the ten New York State hospitals for the insane is quoted from Dr. P. M. Wise's "Text-book for Nurses." The daily ration is this: "Meat (including poultry and fish), 12 ounces; flour, 12 ounces; potatoes, 12 ounces; milk, 16 ounces; sugar, 2 ounces; butter, 2 ounces; cheese, 1 ounce; rice, hominy, beans, peas, 3 ounces; tea, coffee, and one egg. In addition to this can be added the fruits in their season."

This daily ration is for the acute as well as the chronic insane in these hospitals, in which there is no class distinction as to diet.

The same proportionate difference as to amounts in the sexes holds good in mental disorders as in the ordinary physiological requirements already stated with reference to sexual variation in bodily weight.

It is not possible to cite broader illustrations than those just given of dietaries actually provided for those who become inmates of hospitals. The special practical application of these dietaries to the chronic insane is that when suffering from acute or chronic intercurrent diseases they require dietetic allowances, as in general

hospitals, and at other times the dietary of the New York State hospitals above given is adequate, in so far as it embodies in full the recommendations of the distinguished physiologist, Professor Austin Flint, as to amounts required.

As regards laboring patients of the chronic class, the physiological need is not for increased albuminates, which are seldom used up by such work as is done by the insane, but for more fats and carbohydrates, which should be supplied in proportion to the severity of the labor performed. If the patient is to derive his potential energy from fats, about 350 grammes are needed daily, but if from starchy foods, 600 grammes are required. In hard work continuously performed, so that there is an actual renewal of the musculature, a corresponding increase in the ration of the albuminates is necessary.

Diet in Special Forms of Mental Disease.—Certain forms of Insanity present special dietetic indications, which the physician must observe, though the enforcing of special dietary regulations among the insane is sometimes difficult.

Diabetic Insanity calls for the avoidance of all carbohydrates, all starchy, saccharine, and farinaceous foods, such as rice, sweet fruits, bread, potatoes, and any food-stuffs readily converted into sugar.

The diabetic insane may have meats, cream, cabbage, lettuce, spinach, gluten bread, almond cakes, or soya bread.

In the Insanity of Bright's disease a milk diet is the most advantageous, and skimmed milk is not preferable, provided the patient digests readily the cream of the milk, which is needed to sustain the nutrition of nervous centres in Insanity.

In organic dementia from cerebral hemorrhage, food causing gastric and intestinal irritation is to be carefully avoided, as well as all stimulants, but fatty food, if digested, is advantageous.

If the patient is plethoric the allowance of fluids is to be limited, and laxative foods are to be employed.

In gouty Insanity, eggs, cheese, and animal food are to be curtailed and sweet pastries and sweet drinks are to be avoided, and alkaline drinks are to be allowed. Fruits, milk, chicken in small amounts, and hot water instead of coffee are allowable, and alcoholic beverages are to be forbidden. Koumiss may be taken freely, as it contains only one per cent. of alcohol, and by its action on the kidneys tends to the elimination of effete material.

Anæmic Insanity presents special dietetic indications. The food should be easily digested and palatable, and largely nitrogenous. Raw meat-juice and meat-pulp, as already described, are here in order. Eggs, raw, and cream, if well borne, are useful.

Bone-marrow is a special article of food to be administered in these cases, as it has hæmatinic qualities, and good results have already been reported from its use in anæmic Insanity.

Fresh bullock's blood has been taken with advantage in some cases, and dried preparations are also dissolved for use in the form of enemas.

Fresh butter and lipanin, or cod-liver oil, if well borne, are also indicated.

In the toxic insanities with arteriosclerosis a full milk diet for a time is good to eliminate toxins by the kidneys.

In puerperal mania, with uremic tendency and œdematous extremities, a milk diet also acts well by its diuretic effect. Buttermilk is sometimes better borne than skimmed milk, and is recommended in these cases. It should always be quite fresh, as it readily undergoes changes and does not keep well.

In stuporous Insanity in stout patients with enfeebled heart's action and œdematous infiltration of tissues, which pit on pressure, a dry diet is indicated. Fluids are reduced to a minimum, and concentrated nourishment is given, and in this way the œdema is in part relieved and the bulk of the fluid in the system is diminished, and the heart is less overtaxed in forcing it through vascular channels.

Tabetic cases of Insanity require a highly nourishing diet, including a large amount of fats. Fresh butter, cream, and cod-liver oil are indicated, but the latter is often not well borne by tabetics. During the gastric crises in these cases koumiss and buttermilk are to be tried.

Scorbutus, in its less declared forms, which are not always recognized, is not uncommon in large public institutions for the insane. It is a mistake to suppose that potatoes are always preventive of scorbutus, which may even result while the patient is having an excess of potatoes to the exclusion of a properly varied diet. The special indication in all scorbutic cases is for the vegetable acids contained in fruits, and especially citric acid in lemons, always preferable to the pharmacopœial form of the acid. Limes are almost as antiscorbutic as lemons. Oranges are also useful and contain citric acid.

The gastric irritation caused by lemonade is in part obviated by using boiling hot water to make the lemonade, and by the addition of a little bicarbonate of sodium to neutralize the extreme acidity of the drink to be taken on a full stomach after meals.

In general paresis food must be prepared to facilitate deglutition, which is so defective that suffocation may occur if a large bolus is present. Meats must be minced, and food in a moist, pulpy form is best. The same care is often necessary in senile cases with loss of teeth and inability to masticate, and in hysterical cases with œsophageal spasm.

The state of the teeth, mouth, and throat must be considered in all cases, and with bitten tongues, buccal ulcers, ulitis, alveolar abscesses, and a variety of affections of these parts, liquid or semi-solid food is to be furnished.

Epileptic insane are not to be denied nitrogenous or animal food. They seem to improve, as regards the convulsions, with a change of diet as with a change of drug, but eventually they do best on a full mixed diet of digestible material, which leaves little irritable residue in the intestinal tract, and completely sustains the nutrition of the entire system. There are some anæmic epileptics who for a time do best on a diet largely animal. Sweets, pastries, and alcoholic beverages are contra-indicated.

The neurasthenic insane do best on an animal diet of milk, fresh eggs, and meat, with butter and cream, to the exclusion of cereals, coarse vegetables, and sweets, except as contained in the fresh juices of fruits. Sweetbreads are good in some cases, especially the true sweetbread, which is the thymus gland of the calf, instead of the pancreas, which is served ordinarily as sweetbread. Brains are thought to be a delicacy, but they are too rich for the invalid stomach. Some neurasthenics digest fish readily. Veal and lamb are less digestible than the meat of older animals, and the short fibre and tender nature of the white meat of poultry render it appropriate for the delicate stomach. The full amount of fluid needed in neurasthenia is best supplied in pure spring water, and when this is not available koumiss and buttermilk, if fresh made, are vastly preferable to light alcoholic beverages or to bottled waters.

In melancholia the toxins of the gastro-intestinal tract and the habitual constipation indicate a free use of fluids to favor elimination. It is to be considered that the normal constituent ratio of water in the human body is fifty-nine per cent., and the diminished

secretions and general dry state of the system in melancholia is best met by the plentiful ingestion of water, which relieves the intra-arterial blood-pressure and wiry pulse by restoring the moisture and suppressed excretion of the dry skin, and relaxing the cutaneous capillary spasm, which lends the lifeless hue to the surface of the melancholic patient.

Predigested Foods.—The enfeebled powers of digestion in mental disorders creates a need for predigestion of some of the nourishment to be administered. By Peptonizing the albuminates are digested and the carbo-hydrates are also acted upon by the amylolytic properties of the pancreatic extract.

Peptonized milk is thus prepared: One quarter of a pint of cold water is shaken up in a clean quart glass bottle with the contents of one of Fairchild's peptonizing tubes, and one pint of perfectly fresh milk is added, and the whole is shaken, and the bottle is placed for twenty minutes in water at 150° F. The milk is then digested, and, to prevent further peptonizing, it is at once placed on ice until used, or boiled two or three minutes, which prevents further formation of peptones.

Peptonized gruel, in which the starch is converted into sugar and the albuminates digested, is thus made: Thick gruel of oat-meal, barley, or wheat, while boiling hot, is stirred with an equal amount of fresh, cool milk and one peptonizing tube to each pint of the mixture, and kept at 150° F. for a couple of hours and then boiled three minutes or kept on ice until used.

Peptonized beef-tea is thus prepared (Yeo): Mince one-half pound of lean beef, add one pint of cold water, and cook till boiling. Pour off beef-tea, rub meat into a paste, and add it to the beef-tea and mix in another pint of cold water, reducing temperature to 140° F. Add half an ounce of liquor pancreaticus or sixty grains of pancreatic extract and twenty grains of sodium bicarbonatis. Stand in a warm place three hours, shaking occasionally, and then boil quickly three minutes and strain.

In a like manner, meats, oysters, and other articles may be predigested, but all these articles quickly spoil if not kept on ice or boiled, and they have a bitter taste if the digestion is carried too far, and a little flavoring of some kind is often necessary.

Rectal Alimentation.—There are exceptional cases of Insanity, in which it is desirable to take advantage of the fact that, for a brief period at least, nearly one-third of the necessary nourishment may be absorbed from the rectum.

There may be thus taken up into the system from the rectum albuminous and peptonoid solutions and emulsified fats. At the furthest, life can only be thus prolonged a few weeks.

Subcutaneous injections in these cases afford no substantial aid.

The rectum finally becomes so irritable or inflamed that further alimentation through this channel is impossible.

The enemata are best delivered high up in the rectum by an enema-tube, and great gentleness and care in oiling the apparatus are necessary to avoid soreness of the parts. The enema must be about six or eight degrees less than the bodily temperature, and is given with the patient on his left side, with elevated hips, or the enema may be retained by means of a compress until the first tendency to expulsion is over. It is a mistake to use large injections, and from two to four ounces at a time are sufficient. The rectum should be thoroughly cleansed a half hour before the nutrient enema is given.

Fresh eggs, milk, and beef-essence may be thus employed as nutrient enemata, but it is a decided advantage to predigest the alimentary substances in the manner already described.

Thus, predigested milk, gruel, beef-tea, and eggs are the most available articles for this purpose.

One entire fresh egg and eight ounces of fresh milk are beaten together and peptonized, and thus constitute a sufficient amount for two enemata. A little stimulus or a few minims of tincture opii deodorata may be added.

A small, semi-fluid and concentrated form of enema is sometimes to be used.

For this purpose two ounces of fresh, raw meat-pulp, and one ounce of pancreas are mixed to a fine pulp, strained through a sieve, and warmed before injection through a wide-mouthed tube.

Fresh white of egg alone is sometimes used, or fresh warm milk and a simple saline solution is not without some value.

It is well never to rely long on rectal alimentation, which is to be regarded merely as a supplemental and emergent form of sustentation.

Forced Feeding of Patients.—Of the necessity of forced feeding there can be no question. Some patients are firmly convinced that they cannot swallow, or that they are forbidden by the Almighty to take food, or that the food is poisoned, and others resist food desperately with suicidal intent.

Before resorting to forced feeding every persuasion and device should be resorted to with these patients, who are to be entreated, urged, and commanded, but in many instances all efforts will be in vain.

Food may be tasted in their presence to aver the idea of poison, or it may be left near them over night, or some special friend may bring them some delicacy, or they may be allowed to choose from a common store of provisions.

The length of time which it is safe to wait before forced feeding varies according to the actual physical state of the patient, and the condition of the digestive organs. After a certain time the stomach loses its functional activity, and if inanition reaches a certain point neither digestion nor assimilation is possible, and death will surely follow in spite of forced alimentation. It is always best to be on the safe side, and, if there is great exhaustion from mental disease, the patient should be fed immediately.

A feeble patient, who has fasted a whole day, should be compelled to take food.

A patient of a fair amount of strength should be given nourishment at the end of the second day's fast.

A vigorous and violent maniac may be allowed to go three or four days without food if it is positively known that he had eaten well up to the beginning of his refusal of food, and provided there are no signs of inanition in the meantime.

There is an unmistakable odor of starvation in acute cases, and it always indicates the immediate need of forced alimentation.

Of the modes of forced feeding there are many, and it is well to try the simple methods first.

Some patients, from religious delusion, will not feed themselves, but will swallow food placed in their mouth to save them any responsibility in the matter. Others are to be fed with two tablespoons with smooth edges, one inverted being used to depress the tongue slightly, and the other for feeding the seated patient. Some patients open the mouth and allow themselves to be fed, a spoonful at a time, when the nose is closed to prevent breathing. In others a round, tapering, wooden wedge, one-half inch in diameter, is to be inserted between the molar teeth while spoon-feeding, and the head must not be thrown far back, which is a common mistake, which prevents swallowing. The whole body may be inclined backward. In all cases the clothing is to be perfectly loose about the neck, chest, and

waist, upon which no pressure is ever to be made while holding the patient.

When the teeth are held firmly closed, food may be poured between the cheek and molar teeth by drawing the cheek out with the forefinger while the patient is recumbent. Also, a flexible tube may be passed back of the molar along the side of the cheek, into the mouth, and a wooden wedge is held ready at the edge of the teeth, should the patient try to bite upon the tube. One nostril may be closed and fluid poured through the other into the pharynx.

All these methods work in some cases, but fail completely if the patient is very resistant.

Wooden spoons and pap-boats are also inserted between the teeth, and, the opening being through the centre, the nourishment is discharged continuously or interruptedly, by a spring, at the will of the operator, into the back of the mouth.

Some use a round wooden wedge with a hole through the centre, and by a syringe attached fluids are forced through the wedge, inserted between the teeth over the tongue into the back of the mouth. There are other devices too numerous to mention.

All these means succeed in some cases, but they are incomplete in the instance of determined patients.

The only radical operations are feeding by the stomach-pump, and by œsophageal and nasal tubes. These only fail in œsophageal stricture.

A physician sometimes becomes skilled in some one of the above or similar incomplete methods of feeding, and thinks that the radical operations just mentioned are not necessary. The writer thought so in the early years of his hospital practice, but, with an experience embracing ten thousand insane, who have come under his charge and observation, and after a trial of all methods of forced feeding, he has come to regard the stomach-pump, the œsophageal tubes, and the nasal tubes as indispensable. They are by no means to be used indiscriminately, but with adaptation to the case in hand. Probably the nasal tube meets with an easier success in a larger number of cases, but with odd-shaped noses and narrow nostrils it is not practicable, and there are tumefied and diseased states of the nasal mucous membranes which contra-indicate, and in some cases tubes of sufficient size cannot be passed to feed thick liquid food, and this is a serious objection in prolonged cases. In unskilful hands the danger of entering the larynx is greater with the nasal tube.

On the other hand, the moral effect of feeding through the nose is such that one operation often determines the patient to eat, for to some it is disgusting and to others astounding to be fed through the nose. The practical difficulties of opening the closed teeth are also avoided, and the respiration is less obstructed than by the larger stomach-pump tubes.

Nasal feeding-methods are, first, that already mentioned of pouring food into one nostril while the other is closed. It is well in all nasal feeding to have the patient blow the nose first, and then the operator on the right of the seated patient passes his left arm around the head, which he draws against his side, and with his right hand he pours fluid from a spoon, shaped for the purpose, into the right nostril, while closing the left with his thumb.

A funnel may be inserted into one nostril for the passage of the fluid, or a soft catheter may deliver the fluid as far back as the posterior nares or into the pharynx, and in this instance the funnel is attached to the external end of the catheter by elastic tubing. In the recumbent posture a feeding-cup may be inserted into one nostril through which the fluid is poured. Some operators pass a tube through the nose into the œsophagus about six inches and then pour through a funnel attached to the outer end of the tube.

The regular nasal tube for entering the stomach should be of tan rubber, flexible, smooth, and finely finished, having a length of thirty inches and a gauge of from 18 to 24 French catheter system. It is convenient to have a funnel of the same material attached, the whole being one piece, otherwise a hard rubber funnel is affixed after the passage of the tube.

During the operation the patient is seated or recumbent. Both positions have their special advocates, and their advantages and disadvantages, and, as the methods are the same for nasal, œsophageal, or stomach-pump tubes, they are here described in full.

The sitting posture is more convenient for the operator. A solid wooden arm-chair fastened to the floor is best. In this the patient is fastened immovably by the broad bands of sheets about the arms, resting comfortably on the arms of the chair, and about the ankles and the legs of the chair. Another sheet goes in front of the knees and around the back of the chair, and one over the thighs is fastened underneath the chair.

Nothing is tied about the chest or abdomen, as breathing must be free and a support to the abdomen renders vomiting easy, which is especially to be avoided.

If properly tied, the patient cannot slip down in the chair, and is absolutely fixed in position and more secure than if held by half a dozen persons, and much less apt to struggle. The patient can still move his head freely, and it is important that it should be held steadily. A nurse stands close behind the patient, wraps a soft, folded towel about his head, which he grasps firmly between his hands and draws against his body and there holds immovably.

The operator now measures, according to the size of the patient, the length of tube to reach from the nostrils to the pharynx. The nasal tube is then dipped in the warmed fluid to be fed, which lubricates it; or smeared with vaseline, and, holding it pen-like, the operator passes it rapidly but gently into the nares until the point noted as sufficient to reach the pharynx is at the nostril. Now the turning point in the whole operation has been reached. The patient's head has properly been held backward with his chin out, but while in this position, should the operator continue to pass the tube, it will strike the posterior pharyngeal wall and be deflected by the atlas into the larynx in very many instances.

When this pharyngeal point is reached, therefore, the operator must wait until the chin of the patient is brought in to the chest by forcible flexion of the head, and then pass the tube promptly, and it will not fail to go into the œsophagus, and it then provokes deglutition and is carried down to the stomach, and care is to be taken that it is not completely swallowed. From fourteen to eighteen inches of tube are required to reach from the nostrils into the stomach, according to the size of the patient. The funnel being attached to the exterior end of the tube, is held above the patient's head, and the fluid poured in passes down of its own weight into the stomach. The flow of fluid can be arrested at any moment by pinching the tube, which should be quickly withdrawn should there be vomiting, regurgitation, or choking. It is seldom well to feed more than one quart of fluid at a time, and one-half the amount is better in irritable stomachs. The tube should be withdrawn slowly until it reaches the pharynx, when it is quickly pulled past the back of the throat, that it may not excite vomiting. The patient had better recline for a half hour after the operation.

Feeding in the recumbent position is thus carried out: A hair-mattress is placed on the floor and the patient is placed on his back on the mattress with his head on a pillow. A sheet is thrown over the patient's legs and the lower part of the body, and one attendant

on each side kneels on the sheet, drawn tight to prevent the patient from bending his knees. The attendants take the patient by the wrists and hold the shoulders with the other hands. An attendant kneels at the patient's head, which is wrapped in a towel and held between the attendant's hands, reinforced by one knee on each side of the head.

If the patient is very resistant, two more attendants may be required to place their hands above the patient's knees.

The operator then kneels at the right side of the patient's head and passes the nasal tube in the manner described.

Care is to be taken that the patient is not pressed upon by the attendants, and the clothing must be loose about the neck, chest, and waist, as before said, and the sheet must not press upon the abdomen. The collar is to be removed in men and the corsets in women.

The food which can be fed thus through the nose must be liquid and free from solid particles, which will obstruct the flow.

The tube may be obstructed with mucus when it is first inserted into the nose, and it must then be withdrawn and cleansed, or the fluid will not pass. While in the stomach, if fluid fails to pass, the tube may be withdrawn an inch or two and the exterior part of the tube must be kept straight. Milk, eggs beaten in milk, strained beef-tea, beef-essence, expressed meat-juice, and gruels, koumiss, and alcoholic beverages may be thus fed by the nasal tube.

Feeding with œsophageal tubes has the advantage that wider tubes can be used, and fluids containing a larger amount of solid material may be administered. The œsophageal tubes should be of soft rubber, with a fine and soft finish, having a diameter from 27 to 35 French gauge (catheter system), and a length of not less than 32 inches, and furnished with a hard-rubber funnel, as shown in the following illustration. The openings may be at the sides of the lower end of the tube, but for thickened fluids a wide-open end is sometimes preferable. It is well to have a tube with, as well as without, a rubber bulb attachment.

The positions in œsophageal tube-feeding are the same as those already described as the sitting or recumbent postures.

The opening of the mouth and the use of the mouth-piece are additional features of the operation calling for the services of another attendant to hold the mouth-piece in position while the operator passes the tube. There are various forms of apparatus for opening the mouth and keeping the teeth apart during the feeding.

They are all open to some objection, such as danger of injury to teeth or soft parts about the mouth. The ordinary mouth-piece is a hard-wood bit with a hole in the centre for the passage of the tube. Patients obstruct the hole with the tongue sometimes, but in other cases it serves the purpose. It is better held by an attendant, and tying it behind the head is insecure.

Other gags are composed of metal, wedge-shaped, and made of two plates, which, after insertion between the teeth, are separated by turning a screw, which forcibly opens the mouth. The force required to overcome the power of closure of the mouth is very great, and, although this instrument accomplishes the purpose, it is necessarily not without danger to the teeth, and even to the jaw itself. It requires to be held in place by an attendant, and it interferes somewhat with the passage of the tube. The writer seldom find it necessary to use the above apparatus.

The patient's head is firmly held by one attendant; a second attendant on the right and a little back of the patient, so as to be out of the way of the physician who operates, holds a mouth-piece between the back teeth on the right side, and a third attendant on the left of the patient, whom he faces, holds a second mouth-piece between the molar teeth on the left side of the patient's mouth.

These mouth-pieces are eight inches long, round, and taper from three-quarters to one inch, and have a circular groove, which prevents slipping, and they are not inserted in the mouth more than a half inch beyond the inner edge of the teeth, and in nowise obstruct the operator, as do other forms of gags.

In some patients bits of broad cotton bandage tightly rolled may be inserted and held in like manner between fragile teeth on both sides of the mouth. The expedients for separating the teeth are the same in the use of all gags.

Thin wooden wedges, flat or round, are first inserted. The handles of spoons and other metal instruments are more dangerous to the teeth, which may be broken if the wedges are used as levers to pry the mouth open. The knack is to press patiently and gently inward, taking advantage of every relaxation brought about by such devices as closing the nostrils, pouring a spoonful of water into the nose to excite deglutition, closing the nose and covering the mouth with a handkerchief until the patient suddenly opens the mouth to breathe, or passing back of the teeth, by a catheter, a little fluid, or, finally, which almost invariably succeeds, passing a nasal tube as far back as the soft palate.

With a patient's head and mouth secured as above described and perfectly fixed, there is no trouble whatever in passing the tube into the œsophagus. Should the patient obstruct the tube with the tongue in a very persistent manner, the operator takes a small well-oiled rubber catheter in his left hand, holding the tube ready in his right, and slipping the catheter by into the pharynx causes involuntary opening of the throat and depression of the tongue, which gives just the needed chance of slipping the œsophageal tube back, where it is grasped by the sphincters and swallowed. If the patient's head is held a little forward instead of far backward, which is a common mistake, the tube will never pass into the larynx. Still, if the operator is inexperienced and fearful, he may oil and place his right forefinger over the tube and conduct it as far back as the œsophageal sphincter. The largest tubes are less apt to enter the larynx, and in passing the tube, if suffocation occurs, the tube is to be withdrawn.

Eighteen inches of the œsophageal tube are to be passed, and when this has been done the operator may know that the tube is not in the trachea, especially if the tube is of the larger size. If the funnel is not attached to the tube, and the latter is not held or secured, it may be swallowed, and this may occur should it be bitten in two. Such a case, attended by a fatal result, has been reported.

Even when the tube is properly passed there may be reflex dyspnœa to alarm the operator, who may feel doubt as to whether the tube has not entered the larynx, or doubled upon itself. There is a simple auscultatory test to determine that the tube is in the stomach, where it will be heard by the listening operator if an attendant blows in the outer end of it.

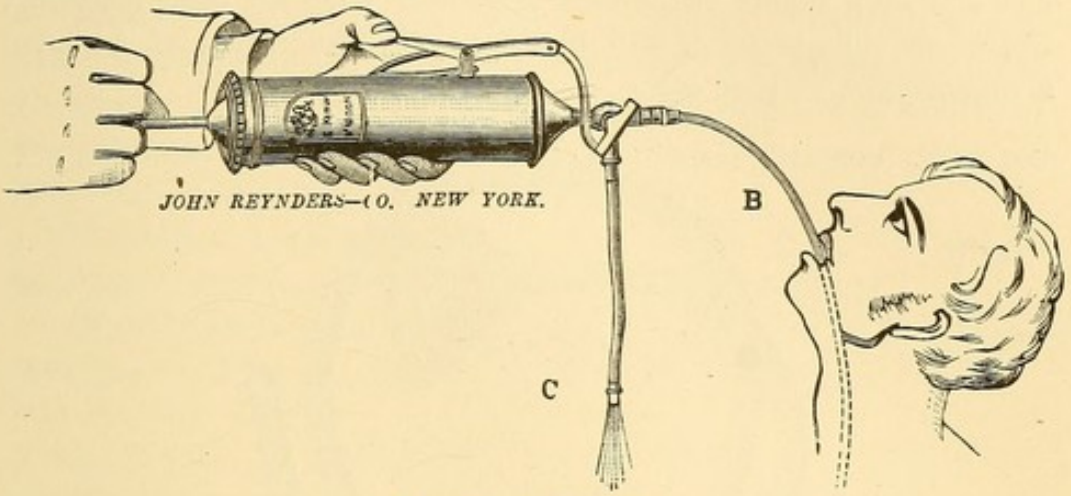
The foods which may be administered by œsophageal tubes are milk, eggs, beef-tea, raw beef-pulp mixed with mashed potatoes and stirred to a creamlike consistence with milk, and all predigested liquid foods already described in this chapter, and eggnog, cod-liver oil, koumiss, and alcoholic beverages.

It is well to warm everything to be fed through the tube, which is itself to be warm and dipped in the liquid to be given or lubricated with oil or vaseline.

Some use a bottle instead of a funnel, and others attach a syringe to the outer end of the tube. The necessity of this is obviated by the bulb attachment figured in the following illustration.

Some operators do not pass the tube more than six inches into

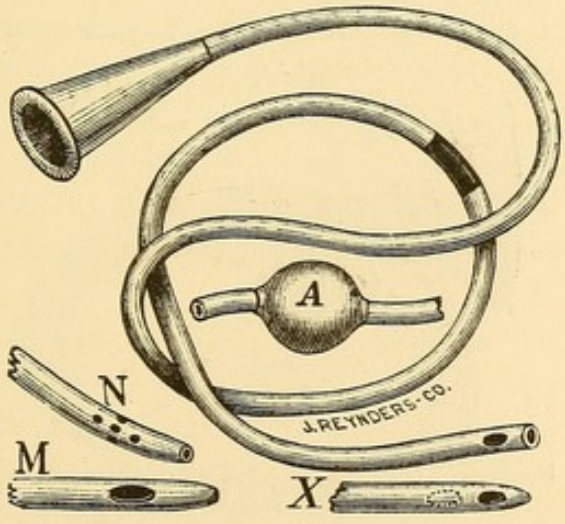
the œsophagus at any time, which is more apt to excite regurgitation of fluids. If there should be discovered stricture of the œsophagus



Lever stomach-pump.

it is not well to pass it with the tube until a complete examination has been made.

Stomach-pump Feeding.—There is nothing in the position of the patient, or in the entire technique of the operation of stomach-pump feeding different from that which has already been described, with the single exception of the pump mechanism itself, and as to this five minutes' personal trial of the pump is worth more than a page of description. The operator should use the pump for a few

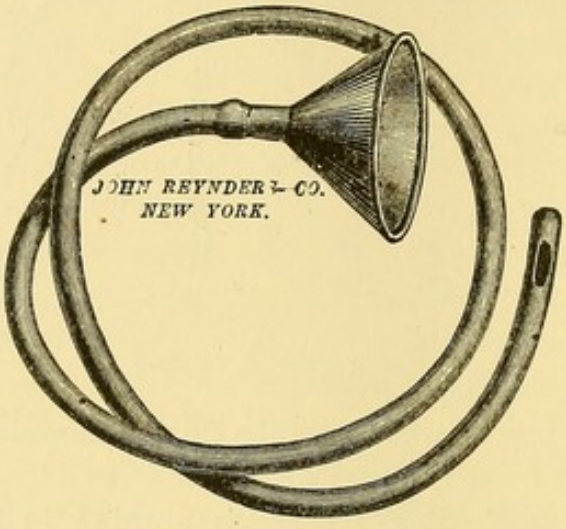


Soft rubber stomach-tube with bulb.

minutes until perfectly familiar with its action before the operation, and see that everything is clean and in good working order.

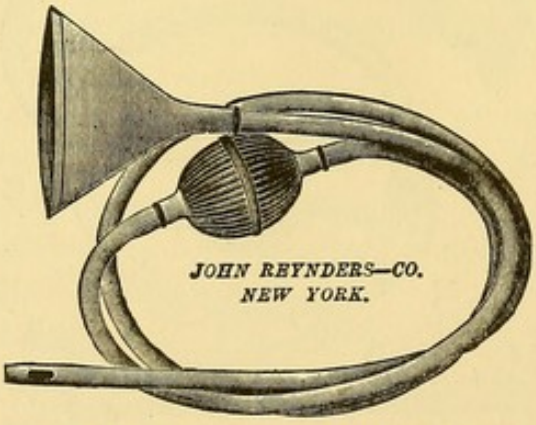
The sitting posture for the patient is preferable in this instance.

No sudden force in injecting the fluid is to be used. The stomach-pump tubes with stiff hard-rubber ends are not without danger, and the wide rubber tubes with large side openings are preferable, the whole tube being of one material. An illustration of the lever stomach-pump is here given.



Soft rubber œsophageal tube with funnel attached.

All the predigested foods, and meat ground fine or reduced to a pulp in a mortar, meat-juice obtained by a regular hand meat-press, which is very convenient in these cases, vegetable purée of various kinds, and grated cracker and various foods mixed with milk to form a thick fluid, can be given by the stomach-pump.



Same as above, with bulb adjusted.

In American hospitals for the insane the œsophageal and nasal tubes have almost entirely replaced the stomach-pump in the forcible feeding of patients.

Finally, it is to be stated that there is a certain nervous shock attending all methods of feeding by tubes, and the physician may be called to a patient starved to such a point of exhaustion that the shock of the operation might endanger life. In this case stimulant enemata may rally the patient to a degree which will render the passage of a small nasal tube safe, or subcutaneous injection may be a final resort for the same purpose.

Patients soon fall into a habit of being fed. Care is to be taken that such a habit may not be formed and not indulged.

The illustrations of feeding apparatus on pages 495, 496, were furnished by John Reynders & Co., of New York City.

Section X.—Psychotherapy.

By the term psychotherapy is signified all that was formerly embraced under the term "moral treatment," and also every means and every possible agency which primarily affects the psychical rather than the physical organization of the patient in a curative direction.

Psychical causes disorder the mind, in the first instance, and psychical influences continue powerful for good or evil, as to the mind thus disordered.

To control and to apply to individual cases of Insanity, in accordance with skilled insight into their natural character and special form of aberration, the mental influences best adapted to aid in the cure is the object of psychotherapy. The utility of psychotherapeutic treatment is only real in patients who react to external surroundings and to personal impressions. In greatly depressed, stuporous, or demented patients the application of psychotherapy is out of the question. The modes and means of psychotherapy will now be described, but a few words must first be said of the basis of the science.

General Principles of Mental Therapeutics.—The general principles of mental therapeutics are based on the fact that all mental manifestations are but the adaptive reaction of an individual to his environment, in accordance with the general laws of human mind and character. A change in the individual or in the environment makes a difference in the resulting manifestation. Eccentric exceptions do not alter the general law of uniformity of reaction to definite influences, so that the conduct and feelings of most persons under given circumstances can be foretold with much certainty.

In the practice of mental therapeutics the physician must create

the environment and arrange the circumstances which are to cause the patient to react in a given manner, just as the skilled chemist mingles definite compounds to get certain results. The patient is the fixed quantity and the environment the variable factor. The patient, by inheritance, education, and life-long habit, is cast in a certain mould, and it is a common error to attempt to break him all up and make him over to suit the environment in which he chances to be, or the ideas of the physician as to how he would like to have him.

The fundamental principle of psychotherapy is to conserve the original personality of the patient, which has already been somewhat shattered by the shocks which have caused the Insanity. The individuality of the patient, which has been borne down by the weight of disease and the force of circumstances, is to be lifted up and restored. Even in case of complete psychical wreck the reconstruction must be on the old lines of mental being.

In the psychoses parts of the cerebral structures are functionally incapacitated, but the others continue their habitual activities, and the aim must ever be to sustain the old, and not to strive for entirely new action of the cerebral mechanism.

The damaged brain is not like a fractured limb, to be broken up at the will of the physician for a better reunion of parts.

In the incipient and convalescent stages of the mental disease, therefore, when psychotherapy is most generally useful, the effort must be to arouse the natural thoughts and feelings of the patient, to recall former habits, tastes, desires, ambitions, social tendencies, and sentiments, and to revive activity in old ways of industry. If any decided changes are to be wrought in the whole life and nature of the patient, they had better be accomplished as an after-cure by gradual modification, when the original mental status has been safely regained. The acute stage of mental disease runs its course without regard to psychotherapy, which can fill only occasional symptomatic indications at this period.

Another principle of great importance in mental therapeutics is frankness, truthfulness, and honesty of dealing with the patient. It may be possible to practise deceit with occasional success, and to outwit the insane, but such subterfuges are liable at any time to be detected by the patient, who then loses all confidence in the physician. It is impossible to create a false environment and to have nurses playing fictitious rôles, which will long deceive the patient.

In the incipient stage of Insanity the plots and plans and ama-

teur detective performances of relatives for the benefit of the patient often drive the latter to desperation and suicide. The skilful psychotherapeutist must have sufficient sympathy and imagination to place himself at the patient's point of view, and to foresee the different impressions which the same event may cause in the patient.

The benevolent stupidity of relatives surmises that a prearranged deception will affect the patient in a certain way, whereas a diametrically opposite influence often results.

The psychiatrist must at once abolish all shams and deceptions, and be the soul of candor to the patient swung loose from his moorings and in dire need of some constant point to which to anchor.

The physician must furnish a personal environment for the patient, not of cunning actors, prevaricators, detectives, and schemers, but of outspoken, truthful, and sympathetic nurses. The whole environment and all its influences must be real and not fictitious. It is even well to instruct the nurses, in part, in the presence of the patient, as to the reason for certain things to be done. The nurses are to answer the patient truthfully, and to refer doubtful questions to the physician for a reply.

The experimenters who attempt to practise psychotherapy on other principles than these are doomed to failure, and are liable to inflict secret mental torture, instead of extending relief to the suffering patient.

Isolation from Family and Friends.—Separation from family and friends is one of the most effective psychotherapeutic means. There is a double reason for this measure. In the first place, the disordered feelings and ideas of the patient are so completely interwoven with family or friends that their presence is a constant source of morbid symptoms. Removal of all sources of emotional irritation and of delusions is a first means of cure, and the sooner this is accomplished the better it will be for the patient and also for the family.

The second reason is that isolation thus carried out is the surest way to procure the absolute rest which is demanded in the early stage of the disease in many patients, who instinctively seek solitude and repose of mind. The peace which comes to the patient thus removed to perfect quietude broken only by the assistance of a cheerful nurse must be witnessed to be understood. The physician himself then constitutes largely the personal environment of the patient, and he thus gains an opportunity to exercise the highest form of

psychotherapy, which is the prevailing influence of a strong and sympathetic person on a mind diseased.

Institutional Environment.—A well-ordered institution for the insane affords a chance of removal from former influences, and it furnishes the power of example of orderly obedience to rules, of perfect regularity of life, of conformity to daily habits of exercise, occupation, diversion, diet, and sleep, and it secures regular medical attendance, and a higher grade of care to the indigent than they could otherwise obtain.

The self-concentration and overbearing selfishness of certain forms of Insanity is not encouraged in hospital life. The patient is no longer the centre of attention, as in a family, where everything has to be regulated with reference to the demands of the sick one, but the egoistic and exacting insane find that they are only one of a large number, and the moral effect and discipline of hospital life is often most salutary in effect.

The force of the whole machinery of a well-appointed hospital, moving like clock-work, and of large numbers of surrounding persons conforming to the rules of the house, is one of the most irresistible psychical means of introducing order into the disordered life of the patient. This effect is the same in kind, though not in degree, as that obtained in all industrial and educational institutions.

Trained Nurses.—A thoroughly trained nurse is an invaluable aid in mental therapeutics. Indeed, the psychical influence of the trained nurse on the patient is second only to that of the physician himself.

Individualized treatment, and even a moderate degree of success, can only be attained by competently trained nurses.

While the modern training-schools for nurses afford every means of education, they do not insure it, and some of the best nurses have been trained simply at the bedside by intelligent instructions of physicians, which, indeed, is the highest form of teaching for the nurse. As the self-made man, educated only in the school of life, is more practical and successful often than the college graduate with his vain pride of intellect, so the hard-working, strong, good-natured, ever-ready, and quick-witted nurse, schooled by years of bedside experience only, is the one often chosen by preference, when the physician desires to practise psychotherapy on a difficult case of Insanity.

There is a demand in psychiatric practice for companion-nurses, who should be the educational and social equals of the patient. As companions and equals of the patient in culture and refinement of

manner, they should be able to fill a higher psychotherapeutic rôle than the ordinary nurse, whose routine duties they should not be expected to perform. The intelligent sympathy of such a companion is, in the incipient and convalescent stage of mental disorder, of the utmost value in cases judiciously denied the society of their own relatives.

Social Readjustment.—Insanity, practically, is loss of the power of conformity to the social medium in which the patient lives.

This power is regained in convalescence gradually, and it is a part of psychotherapy to furnish a normal personal environment to which the patient is to practise adjustment. This social opportunity is a most valuable measure in mental therapeutics, and one never to be neglected at the proper stage of recovery.

Hospitals for the insane should throw open their doors more frequently, not for large receptions and balls, but for quiet little tea-parties and gatherings to favor the social readjustment of convalescent patients. In these tentative efforts at gradual restoration of the patient to the full enjoyments of social life, there is a chance for the exercise of great tact and skill on the part of the physician.

To deny the confined patient the opportunity of social readjustment is a medical error like the surgical mistake of confinement of a limb which should be regaining its muscular functions, and this form of psychiatric malpractice has made many a social cripple for life.

The Conduct of the Physician Toward the Patient.—The physician must be not only a medical adviser but a friend for the time being. To enforce discipline and retain the good-will of the patient is no easy task. The lesion of volition in mental disease does not prevent the insane from being extremely wilful, and if the physician has not firmness of purpose he will soon cease to be master of the situation. It is not only practical but best to have the same sincerity and directness of conduct toward the insane as toward any other class of patients. Any deceptive course of conduct is a mistake. The same tact, discretion, and knowledge of human nature which secure success for the physician in general practice are essential in his conduct toward the insane patient, but he must be consistent and uniform, as he represents the sane standard and the chief part of the personal environment to which the patient must adjust himself. If the conduct of the physician toward the patient is wavering and deceitful, there result suspicion, loss of confidence, and complete demoralization of the patient.

The physician must be the great psychotherapeutic agent, and

exercise a continuous sort of suggestive cure upon the mind diseased. The hopeful view is ever to be kept before the patient by the physician.

Influence of the Opposite Sex.—So fundamental is the influence of sex that it is only lost in complete obnubilation of intellect. The writer has known insane mutism of years' standing to be broken up under its influence. There are certain cases sinking into secondary dementia which can be aroused by no other psychical means.

The influence of sex will, in certain instances, avert impending Insanity more effectually than any other agent known to psychotherapeutic science.

The application of the influence of sex in psychiatry, from the very nature of all social relations of the sexes, is attended by questions of propriety and delicacy, which interpose practical difficulties, which the wisdom of the physician can usually overcome. Some superintendents of hospitals for the insane have gone so far as to employ women attendants on the male wards, and they claim only beneficial results from the influence of sex thus exerted. Melancholia from disappointment in love has been cured by a timely intervention of this psychotherapeutic agency, which is especially efficient in young persons, and is seldom inert at any age in man.

The complete social readjustment of the convalescent patient can only be accomplished under the influence of the commingled society of the sexes.

Occupation.—Functional activity of mind and body is one of the surest means of cure. The occupation is to be chosen as far as possible with regard to the special taste or desire of the patient. Customary employment often fatigues the patient less, and reassures him of his ability to perform, and results in more evident success with less expense of nerve-force, than attempts at new attainments. The occupation is to be manual or mental, largely in keeping with former habits. Professional men enjoy working with their brains and laborers with their hands; but it is well that all patients should have a certain amount of out-door employment. Every large public hospital for the insane should have a great variety of means of occupation to suit the various trades of its inmates. As Physician-in-Charge of the New York City Asylum for the Insane, the writer in his published Annual Report advocated the whole system of work-shops, and manufacturing manual employments, being equipped with tools and skilled attendants to supervise the labor performed.

The object of thus employing patients at their own trades is entirely curative, and the financial result, which is often considerable, must always remain a secondary consideration. The physician who allows his patients to overwork to gratify his own economical or pecuniary ambition is unfaithful to his high trust.

In the main, farming, gardening, and out-of-door occupations are the most beneficial to patients, and yield the most substantial profit. For women, the kitchen, the laundry, the sewing-room, general housekeeping, and the care of their own apartments afford the most natural sort of useful work. There is great need of out-of-door employment for women. The cultivation of flowers, fruits, and vegetables, and the breeding of poultry are appropriate modes of employment for them. The gathering of fruits, and the picking of berries, and the tending of hot-house productions are also pleasing occupations for women.

The principle in all occupation is, that the more useful it is, the more it restores the self-respect of the patient, and the more real are its benefits. For patients not capable of serious work, the lighter and more pleasing occupations are to be chosen.

For many years the writer has seen the good results of a school for patients. Common English branches are taught, and also languages, music, modelling, drawing, and painting. Patients may also teach. For men printing and the editing of a paper has proved diverting, and also sufficiently serious to carry with it a lasting and salutary effect.

Women may occasionally be allowed to exercise their natural bent in waiting upon the sick, which is often especially gratifying to them. Such nursing is to be done under observation, of course, and for its psychical effect, but the promiscuous discharge of nurses' duties by patients is not to be tolerated under any circumstances, as it leads to gross abuses, and nurses only too quickly learn to turn their work over to patients to perform.

Occupation, in a word, is the most powerful of all psychotherapeutic remedies.

Diversions.—Second only to occupation in value in mental therapeutics are the various diversions, which dispel the dark clouds of melancholy, enliven the drooping spirit, arouse the apathetic, and restore lively tone to the convalescent.

Diversions are to be judiciously prescribed in the acute and convalescent stages of mental disorder according to the needs of the case. In chronic Insanity they only form an agreeable feature of

the routine life of the patient, and are not regarded as remedial. Like all efficient means of psychotherapy they may be harmful as well as useful if carried to extremes.

Tastes differ greatly in amusements, and hence there is need of a great variety of pastimes to suit the fancy of patients. Out-door recreations are preferable, and they have already been described in the section on hygienic measures. Boating, fishing, and coursing with dogs, and actual sports will often arouse an interest when other recreations fail.

A powerful diversion, which involves continuous muscular effort and hastens the circulation in an unusual manner, will sometimes furnish precisely the cerebral stimulus required for a recovery. A young woman settling into silent stupor after an acute attack, responding neither to visits of relatives nor other appeals, was dressed for the occasion, taken to an evening dance, and placed in the hands of a judicious gentleman waltzer. She first moved mechanically, but the music, the muscular exertion, the active flow of blood to the brain, and the dance of which she was once fond, banished apathy at the end of an hour, and gave an impetus which from that time went right on to complete and rapid recovery. Within doors, games of chance and skill, singing and dancing classes, card and tea-parties, concerts, magic-lantern exhibitions, lectures, prestidigitation, impersonations, private theatricals, and professional dramatic entertainments, tableaux vivants, minstrel performances, billiards, and bowling are available diversions.

The power of music in mental therapeutics is very great, and as yet it has never been thoroughly utilized as a remedy. The ordinary amateur devotion to musical instruments among the insane is known to be a source of great gratification to them, and they also enjoy the mediocre entertainment furnished by the improvised bands of hospitals. But a few old pianos and music-boxes and a volunteer band cannot furnish the real first-class and varied music necessary to make a fair test of the remedy, which, if it cured a few cases in a year in a large hospital, would be an economical curative agent.

Every large institution for the insane should have good supplies of superior musical instruments and a first-class orchestra. Once a week there should be a classical musical entertainment for those having a cultivated taste for the art. Twice a week there should be well-rendered popular musical concerts.

Perfect dance-music should enliven the weekly soirée dansante.

The charm of good music should be lent to the dinner hour in large associated dining-rooms. The effect of particular kinds of music on special cases should be studied by the physician, who should at any hour prescribe music for a patient as he would order electricity or calisthenics.

The chronic insane are often made happy and kept out of idle mischief by games of checkers or cards, or by much simpler means. It is well to let such patients cultivate a fancy for some particular thing, which fills out the vacancy of their otherwise idle life.

It is not wise to allow diversions to crowd out useful occupation, but there should be a well-proportioned distribution of work and play among the insane.

Travel and Change of Scene.—As a means of psychotherapy, travel and change of scene in certain cases are unsurpassed. This form of treatment has been greatly abused by the sending of acute cases of Insanity on a rampage from one country to another. The remedy is suitable in occasional cases in the initial stage of mental disease, but it is chiefly important when acute symptoms are at an end, and there is need of novelty and change to hasten and complete the mental restoration.

In intelligent patients convalescence is often marked by mental depression, due to surging memories of the painful causes of the Insanity, and to a certain conscious feeling of loss of social standing and of the confidence of friends.

Instead of a return to old surroundings and a host of disagreeable recollections, travel and change of scene are of the utmost benefit in confirming the cure in these cases.

Some harmless paranoiacs who, about once in a given length of time, grow a new set of delusions, or transpose the old ones to fit the new environment, are kept relatively comfortable by a life of travel. But the physician should not imperil public safety by the recommendation of this course in the case of a dangerous paranoiac.

Young victims of the tender passion, sunken in despondency, may engage in well-planned travel, meeting, by prearranged itinerary, some attractive person of their own age but of the opposite sex, and be restored to a cheerful state of sanity in a few weeks. There is no danger of an immediate transfer of affection on the part of the afflicted one, but so soon as the first keen suffering is banished a second companion in travel had better be substituted as a psychotherapeutic agent to aid unconsciously in the cure. It is not

necessary to have any explanation or understanding, unless between parents of the invalid and of the second young person, who happens to be one of the party, and unaware of the influence which will naturally result between self and a chance companion, allowed to divert themselves under the pleasing novelties of travel.

The rich insane, partially recovered with permanent defect, and without dangerous tendencies, should be allowed such pleasure in life as can be derived from travel. The view that all mentally unsound should be confined is grossly unjust, and hundreds of thousands of such persons are living in enjoyment of perfect freedom and comparative happiness.

Some insane persons have a veritable mania errabunda, which should be checked rather than indulged.

Travel for the sake of climatic influence has been discussed under climatotherapy. Those not subject to seasickness may derive benefit from a prolonged sea-voyage, not only on account of the great purity of the air, but of removal from disturbing influences and a psychotherapeutic effect of the ocean itself.

Certain Intellectual and Emotional Effects.—The sudden presentation to a patient of the visible proof of the falsity of his delusions sometimes causes their disappearance.

The senile melancholiac, accusing the nurse of stealing his glasses, is cured of his delusion when he is told to look in the mirror and behold them on his own nose. The mother who believes her children have been killed abandons her delusion when they appear before her. The man who is sure his house has been burned recognizes his delusion when driven to see that it is undamaged.

Though insane delusions disappear often before ocular evidence, they seldom yield to the force of argument; but it is a mistake to suppose that this is never the case. A strong argument, forcibly put, will sometimes convince them against their will, and a little sharp, well-timed ridicule, in the early convalescent stage, abridges the duration of delusions. Some comparatively intelligent patients indulge in self-commiseration and in exaggerated flights of imagination as to daily persecutions. This persecutory day-dreaming habit of mind can be largely broken up by timely severity and disapproval of manner and forced exercise, if, as often happens, the patient is sedentary.

The repetition of delusional complaints and the sympathy excited by them serves to fix them permanently. If some strong

impression or intellectual counter-force is constantly opposed to the delusion, as often as it is on the verge of reappearance, the tendency to its revival may eventually become very slight. Severe methods unquestionably had this effect formerly, but the substitution of an agreeable impression is now to be tried. Most patients have some degree of self-control, which personal influence may stimulate them to exert.

Appeals to their reason and self-respect may arouse dormant self-control, and are by no means always in vain. The proof that personal influence controls the insane manifestations is seen in the quiet and orderly state of patients under a skilful attendant, and their disorderly condition under a poor attendant.

Disorderly actions, like disorderly ideas, are to be anticipated in a measure, and this is accomplished by a knowledge of the individual tendencies of patients. Surprises and emotional shocks are not conventionally recommended, but the good which sometimes results from their accidental occurrence shows that they are not without decided curative effects. Just as a patient is cured occasionally by accidental physical injury, so may a cure follow emotional shock.

Not only the conduct of the patient, but, in certain cases, the duration of the disease, may be affected by the influence of religious emotion. A maniac approaching convalescence will sometimes display surprising self-control if allowed to attend church.

Religious observances and religious administrations by clergymen are matters for medical decision in the first instance, for the emotion is so deep-seated that lasting injury may result, in certain patients, by its premature revival.

Chaplains of hospitals for the insane come to understand these things and to exercise a wise discretion.

Religious administrations in the main have a most beneficial effect, and among the insane appeals to the religious emotion are, of all others, most potent for good or evil. Those who have become insane from religious excitement, or whose symptoms have been of a devout complexion, should not, until convalescent, be allowed to occupy their minds with religious affairs.

Discipline, Rewards, and Punishments.—The insane from brain disease have lost self-control in a measure. There are all degrees of this loss and of remaining self-control. The discipline in a well-ordered hospital for the insane is complete, and extends not alone

to nurses but also to patients, who with few exceptions learn to observe all the regulations of the house. This discipline, which is increased by the force of example and of numbers, is a strong psychotherapeutic agency.

There are also certain rewards which influence the conduct of the insane and arouse their efforts of self-control. These rewards consist in extended privileges, carriage drives, entertainments, and, in fact, in such incentives as parents hold out to members of their household to bring about the desired conformity to their wishes.

The punishments consist in deprivation of these same privileges, and they are rarely to be employed. It is useless to ignore the fact that they have a beneficial effect, though, theoretically, they are not to be advised in the light of punishments.

Discipline, rewards, and punishments are simply plain terms, seldom used, for things euphemistically described and daily practised by all physicians, who treat the insane, some of whom are recognized to be entirely irresponsible, and others to possess volitional power and modified responsibility.

The severity of measures recommended by Leuret, though not endorsed by the profession, was founded on perfectly correct observation of psychotherapeutic influences.

Seclusion.—Seclusion has a decided psychical effect. It serves to remove the patient from external excitants and to quiet sensorial disturbances.

The fact that this remedy has been greatly abused does not detract from its usefulness. It must never be allowed to serve merely as a substitute for the care of attendants, or as a convenient way of disposing of a troublesome patient.

Acute hallucinatory excitement is best treated by seclusion in a darkened room, when it is dependent on sensorial hyperæsthesia.

Many cases of acute exhaustion from mania are to be treated in seclusion and in bed. Choreic mania in the young is to be likewise dealt with.

The blind fury of epileptics, and the frenzy of precordial anxiety, calls for seclusion for a brief period.

There are some patients who for a time are in active dread of bodily injury, and derive the greatest relief from seclusion during the height of their fears.

Perfect ventilation and an even temperature are to be provided in a room serving for seclusion. Padded rooms are seldom used as formerly.

Seclusion, as a means of discipline, is not to be employed.

In psychotherapy seclusion is used mainly for its calmative effect.

Mechanical Restraint.—The most enlightened physicians believe in non-restraint, so far as it is practical and humane.

There are three forms of restraint: first, by the hands of attendants; second, chemical, by powerful sedatives; and, third, mechanical, by a great variety of material devices.

All three forms of restraint are evils, and sometimes one, and sometimes the other, is the lesser evil, according to the nature of the case. No physician, who successfully treats the acute forms of mental disorder, can truthfully declare that he does not make use of some one of these forms of restraint. In many cases they are essential to the preservation of the life of the patient and to the safety of those about him.

Chemical restraint often depresses the vital powers, deranges digestion, and contributes to the impending exhaustion.

Restraint by the hands of attendants is felt by many patients as a personal assault, and arouses intense anger, or insane fear of life, and desperate resistance, which sometimes can only be controlled by such force as leaves the patient bruised and completely exhausted by the continuous and enormous efforts to which he is provoked.

Mechanical restraint, though often less outraging than the personal laying on of hands by attendants, and less apt to result in physical injury to the patient, is open to great facility of abuse, and it is only to be employed in certain extreme cases. The simplest and best form of mechanical restraint is a strong sheet, fastened at the head, foot, and sides of the bedstead, with free opening for the neck and arms, which are unrestrained, except in desperate cases, in which blind sleeves may be necessary. The cases in which mechanical restraint may be justified are: violently suicidal and self-mutilating cases, desperately homicidal cases, surgical cases to retain dressings, cases requiring the recumbent posture to prevent fatal exhaustion from mania, and very exceptionally masturbatic cases.

The readiness of capillary rupture and the pathological state of the subcutaneous tissues in some patients cause them to become a mass of bruises when held by the most skilful attendants, and humanity demands the use of the restraining sheet in these cases when there is absolute need of some restraint. Mechanical restraint may

have a psychotherapeutic effect, as when applied at the request of a suicidal or homicidal patient to give relief from the fear of their own irresistible impulses. A patient has also been known to beg to have his hands restrained to save the constant struggle against the impulse to tear and remove his clothes.

In hospitals for the insane in the United States, as in England, the occasions upon which mechanical restraint are employed are recorded in a book kept for that purpose.

Hypnotism.—The popular idea of the hypnotic state as produced by magnetic or other peculiar personal influence of the operator on the subject has long since been abandoned by scientific investigators.

It is now known that hypnotism is dependent on two factors: first, on a neurotic and abnormally sensitive condition of the nervous centres, and, secondly, on the voluntary surrender of the subject to the hypnotic condition. No person can be hypnotized against his will in the first instance, and all the modes of the induction of the hypnosis are absolutely immaterial, except as suggestive aids to the voluntary surrender of the patient to the hypnotic condition, which can be self-induced just as well without any of the ordinary passes, bright objects, or pressure on sensitive regions.

The essential point is that the subjects hypnotize themselves. If they choose to go into the hypnotic state in the absence of the operator they can so do. There are persons having precisely the same abnormally sensitive nervous centres who can go into the hysterical state at will, and they almost invariably choose to have their paroxysms, not when they know they will be unobserved, but in the presence of others. Some of these same persons can go into the syncopal state at will. Women who have the power of fainting at will are not inclined to admit it, but such cases exist beyond a doubt. It is true that hysterical seizures and fainting-spells and many similar psychopathic and neuropathic conditions can be cultivated with great facility, and that the voluntary element may gradually disappear, and that eventually the manifestations may escape the volitional control of the subject in a great measure. But this never occurs until there has been such constant repetition that the proceedings have become automatic, and even then the train of actions is initiated by conscious process. Just so is it with hypnotism.

Many intelligent physicians have a strange misconception still that the whole train of hypnotic phenomena are involuntary on

the part of the subject. The subject wills not once but twice for all he does at the command of the operator. He first wills to go into the hypnotic state, and to do just as the operator bids him, and to inhibit all other actions. When he has, by his own act of will, gone into the hypnotic state, he wills to await, and does await, the commands of the operator, and as soon as they are given he wills to act, and by an effort of volition, like that in health, co-ordinates his muscles to perform skilful and difficult acts, which he again arrests at will, to perform other acts in accordance with his first resolve to follow the commands of the operator.

Hypnotism seldom succeeds among the insane because they do not choose to go into the hypnotic state, or, more accurately speaking, they have not the concentration of will-power needed to hypnotize themselves. This is true also of children and imbeciles.

Some relatively intelligent hypochondriacal, neurasthenic, and hysterical patients have the necessary sensitive nervous centres and the volitional intensity required, and the willingness to go into the hypnotic state, and in this class of patients some favorable results have been claimed for hypnotism among the insane.

The writer cannot recommend the experimental use of hypnotism in psychiatry. Even the sane who continuously yield themselves to this morbid nervous condition endanger their mental integrity.

Suggestion.—People are governed largely by special ideas, both in health and disease. Insane persons especially are under the control of certain ideas, which may be opposed by the suggestion of counter-ideas. An idea suggested to a patient by word of mouth, by look, gesture, or any other means, may have a decided influence on the mind, and indirectly on the physical state. Definite ideas thus suggested to influence thought, emotion, or nutrition and innervation of parts of the body have of late years received much attention. The principle is very old in medicine, but the thing under its new form is termed *therapeutic suggestion.* The recent interest in it has grown out of hypnotic suggestion, which is an idea suggested for special effect during the hypnotic state.

Therapeutic suggestion has a very wide application in the initial and convalescent stages of nearly all forms of Insanity.

The suggestions should be of a hopeful, cheerful, and stimulating nature, and they may be heightened in effect by repetition by more than one person. The whole neurotic class of patients are

especially susceptible to suggestion. Patients sometimes detect this susceptibility and play upon the morbid fears of hypochondriacs or others by suggestion.

Delusions and illusions may result in the insane from suggestion.

Placebos.—An inert substance given instead of an active drug may have a real effect upon the patient. If the bread-pill is given as a laxative, and the patient's attention is directed to this fact, the result may be similar to that which would have been produced by a laxative actually administered.

This form of psychotherapy is really a mode of suggestive treatment.

Soporific effects may be produced in this way, and also the alleviation of neuralgic pains.

The disorders of common sensation in hysterical, neurasthenic, and hypochondriacal cases are also, in occasional cases, capable of modification by this form of mental therapeutics.

The danger in the use of placebos is in the discovery of the deception and in the consequent loss of the confidence of the patient.

Hypodermic injections, as placebos, in which distilled water simply, instead of medicated solutions, is used, may perhaps be occasionally substituted, but in general this, like all other subterfuges among the insane, is not advisable.

Section XI.—The Convalescent Period.

The period of convalescence brings a variety of responsible questions which the physician must decide, and of the more important of these something will now be said.

Removal from Institutional Care.—The period at which a patient should be removed from a hospital for the insane should be decided absolutely by expert judgment as to the future mental welfare of the patient.

Unfortunately, the general public does not understand the gradual nature of recovery from mental disease, nor the danger of relapses from premature removals. Undue pressure is thus brought to bear on medical officers to discharge patients whom scientific judgment would longer detain.

The physician must consider, first, the actual physical and mental condition of the patient, and, secondly, all the environmental conditions to which the patient is to be subjected on discharge.

Of two patients, equally convalescent, one may safely be discharged to a pleasant home circle, and the other retained for further fortification against inevitable trials, which await a return to former surroundings, which might occasion early relapse and chronic Insanity.

If the physician were to act upon the legal idea, that the moment reason is restored a release should follow, he would be very unwise and unjust toward his patients, and he would be guilty of the same mistake as a surgeon who should allow a workman to resume labor and again break a limb which had already united from fracture completely, but had not yet regained strength sufficient to withstand the severity of a former occupation.

In some patients the mental balance is regained somewhat in advance of the true convalescence, based on a restoration of the nervous centres and of general nutrition.

The physician must have the courage of his scientific convictions, based on actual experience, as to the proper time for the removal from institutional care.

The Cessation of All Treatment.—The cessation of all treatment is in itself a form of treatment. The patient is to be untaught the idea that he is sick and in need of medication, and he is to be distinctly given to understand, by word and action of those about him, that he is a free and responsible agent again and fully restored to his right mind. The patient is entitled to this assurance from the physician to restore his self-confidence and self-respect.

If in hospital, the patient should be placed on parole and allowed perfect freedom to go and act his own pleasure, and to correspond and receive visits as he pleases, and to prearrange his affairs for a return to his accustomed pursuits.

It is well to stop all medication for at least a short period before the recovery is pronounced complete, for the double purpose of seeing the patient free from the effects of therapeutic influences, and also for the moral effect upon the patient, who can by no means throw off at short notice the idea of invalidism, which has been impressed upon him by long months of treatment. It is precisely at this period, in cases of recurrent Insanity and in a few other types, that a tentative sojourn at home or return to work is of advantage before the final discharge from the institution. No legal provision for a temporary leave of absence from institutional care has been provided, and the order of the judge committing the patient in-

plies that the latter will be kept under treatment until restored to his right mind. Still the custom of paroles has established a sort of precedent which is followed in many hospitals.

The Danger of Prolonged Treatment.—There is a real danger in treatment prolonged beyond a certain point. The position of a patient who has been deprived of individual rights and treated as insane is often keenly felt as convalescence declares itself. The patient may be grateful for his recovery, but the humiliation of his position cannot but be felt so long as he is under treatment as an insane patient. The personality of the patient reasserts itself with different degrees of strength at this period, and the independence of character reacts feebly in some cases, and if once repressed at this critical convalescent stage it may never reappear, and the patient will sink into terminal dementia.

The danger of treatment too prolonged is but little less than that of premature return to the affairs of life.

Return to Business and Social Rights.—An immediate return to a responsible business is not always wise, and yet to assume less than complete charge of one's affairs is in itself a cause of depression and anxiety to many business men. If there is no person in whom the convalescent has perfect confidence it is better that he should again resume all business responsibilities.

If a committee of the estate of the patient has been appointed, the physician is to aid the patient, if need be, in regaining control of his property. The physician should sustain the patient in renewing the battle of life, and use his influence, if need be, to protect him against the greed of business partners or of designing relatives.

Social rights are to be restored at once, and the father is to become the head of his household, and to command customary obedience and respect. Social functions are a tax on vital energy, and a convalescent occupying a position in the social world should gradually resume society relations, unless the latter constitute practically the whole of life, as in the case of some ladies.

Convalescents of the industrial and laboring class often find great difficulty in regaining lost positions, or in procuring any remunerative occupation. There is the stigma and public suspicion between them and the means of livelihood. The physician should lend his influence, and in public or private hospitals should, by previous correspondence and interviews with friends, prepare the

way for the patient to some early occupation which will afford a living and moral strength to face a suspicious and selfish world.

The great need of charitable organizations which should undertake to find employment for, and to protect and aid the convalescent insane of the poorer class, has already been described.

Cases for Partial Restoration to Civil Rights.—There are cases of recurrent Insanity destined to pass much of their life under treatment, with lucid intervals steadily diminishing in length. It is not safe to completely restore to them their property and civil rights, but they should be given their liberty as often as convalescence is complete, with a charge to relatives to return them to hospital upon the first appearance of symptoms of mental disorder.

Many of the epileptic insane may also enjoy a partial restoration to civil rights, and this is also true of some organic dements, and certain paretics with exceptionally long intermission of symptoms, and harmless paranoiacs, and hypochondriacs, and cases of recovery with defect of mind. Imbeciles, after acute attacks, are also in this class, and cases of moral Insanity without active antisocial tendencies, and some cases of secondary monomania.

In all these cases it is for the physician to pronounce upon the exact mental status of the patient, and to determine the degree of restitution of rights and responsibilities advisable.

The Final Advice of the Physician to the Patient.—The physician who has conducted a case of mental disorder through all the vicissitudes of an acute attack to perfect recovery has a final duty to perform. There are to be laid down definite rules of life, points in physical and mental hygiene, suggestions of the best way to meet social and business difficulties, and advice as to domestic relations.

Precautions will also be given from an etiological point of view as to the special avoidance of a possible return of the mental trouble.

While it is not well to declare the full gloomy outlook according to average percental chances of a recurrence, it is still best to keep the danger of any excess or self-indulgence before the patient, and to suggest an early consultation in case of any unusual symptoms.

Conjugal rights are the same after recovery as before Insanity, but still the convalescent is to be advised that the nearer the birth of the child to Insanity of the parent the greater is the danger of heredity.

Patients recovered from syphilitic, alcoholic, epileptic, and strongly hereditary Insanity are to be dissuaded from marriage under any circumstances.

Young persons without heredity, convalescent from an ordinary acute psychosis, may marry into some healthy family.

Patients who have had a second attack of mental disorder should never marry, even though there be no inherited taint, and though the second convalescence may be apparently complete.

With such final advice the physician bids adieu to the patient in whom he has often become greatly interested, and to whom he extends the privilege of correspondence for continued professional consultation.

From this chapter on the general treatment of Insanity the reader may turn to the treatment of the special clinical types of mental disorder for more special information.

PART II.

PART II.

THE SPECIAL GROUPS AND THE TYPICAL FORMS OF INSANITY.

CHAPTER I.

INSANITY FROM GENERAL ORGANIC ARREST OF DEVELOPMENT.

Group: Idiocy, Imbecility, and Cretinism.

All normal manifestations of mind are dependent on complete structural development of the nervous system. The clinical group of this chapter includes Idiocy, Imbecility, and Cretinism, in which there are all grades of morphological defects of the nervous system, and corresponding degrees of mental deficiency. Within this clinical group might be arranged, from the lowest grade of idiocy to the slightest grade of imbecility, a complete ascending scale of various degrees of arrest of physical and mental development.

The mental manifestations in this clinical group are not only deficient, but aberrant, and dependent largely on the absence of the primordial faculty of inhibition, and hence arises the propriety of their inclusion within the general term Insanity.

Section I.—Idiocy.

By a consensus of medical opinion the extremely numerous class of persons recognizably below the average of intelligence is divided into those of gross defects of mind, known as idiots; into those of less decided mental deficiency, termed imbeciles; and into the weak-minded, whose psychical inferiority is still slighter, ranking them but little below the common mental average. It is useful and practically of both medical and legal importance to recognize these three

grades of mental defect, and as a designation is needed for those of slight psychical inferiority, it is well to follow the usage of many in confining the term weak-minded to this third division of the total of all the feeble-minded in the community.

Definition.—Idiocy is a state of gross mental defect, congenital or acquired, accompanied by structural and functional anomalies of physical constitution.

Esquirol distinguished between loss of mind from Insanity and congenital absence of mind, and he graded idiots into those having only inarticulate sounds, those capable of monosyllabic words and brief phrases, and those having some higher power of speech.

Others are inclined to a simple psychical division of idiots into teachable and non-teachable. Some group idiots according to physical peculiarities and abnormalities of the cerebro-spinal nervous system, with teratological specimens at one end of the scale, and those with only slight sensorial defects at the other.

One of the best and most recent divisions, based on morphological peculiarities and etiological considerations, is by a practical authority, G. E. Shuttleworth, M.D., as follows: Congenital types—1. Microcephalus. 2. Hydrocephalus. 3. Mongol or Kalmuc. 4. Scrofulous. 5. Birth-palsies, with athetosis. 6. Cretinism. 7. Primarily neurotic. Non-congenital types: A. Developmental—1. Eclampsic. 2. Epileptic. 3. Syphilitic. B. Acquired—1. Traumatic. 2. Post-febrile. 3. Emotional. 4. Toxic.

Clinical Delineation.—The clinical forms of idiocy are so various that space will permit the delineation of only the chief types.

Microcephalic Type.—Head less than sixteen inches in circumference, contracted and retreating forehead, sharp nose, small, close-set eyes, diminutive stature, quick and frequent muscular movements, inclined and festinating gait on balls of feet, puerile reproductive organs, occasional sensorial defects.

Response quick to sensory stimuli, slight power of attention, quick and lively expression, imitative memory, repetition of short phrases, often some musical faculty, capability of very limited education.

Macrocephalic Type.—Head twenty-three to thirty-five inches in circumference, and round in hydrocephalic, and square-shaped in hypertrophic cases.

In hypertrophy of brain full face and features, dull expression, slow motions, delayed co-ordination and dragging gait, stature be-

low the average, organs of reproduction full formed, but function often absent, speech thick and limited to few sentences. Hydrocephalic cases have pinched faces and features, wide-set eyes, projecting foreheads, looks serious and suffering, slight muscular activity, ocular inco-ordination, heavy gait, drawling speech limited to short phrases usually, imitation of musical sounds, and some faculty of education.

The Mongolian Type.—This interesting ethnic type of genetous idiocy includes about ten per cent. of all cases. The clinical delineation is, in brief: Short stature, wide, low head, with small occiput, flat nose, eyes far apart and fissure oblique à la chinois, macroglossia, cretinoid integuments, malformed extremities, loose, shuffling gait with head advanced and inclined downward, deficient warmth, circulation, and trophic functions; quick perception, considerable memory, and much imitation and some teachability.

Other ethnic types are Negroid, Malay, and American Indian, and the latter is said to be more frequent in the United States.

The type of idiot with remarkable one-sided talent for music, numbers, mimicry, and local memory are of the congenital class ordinarily and present interesting features.

Causes.—The etiology of idiocy is very largely a questionable one, dependent on the interpretation of existing facts.

Thus the eclampsiæ so often present are by many regarded as causative of the idiocy, while a broader view might consider them as only symptomatic of the general abnormality of nervous centres.

The heredity of idiocy is made to include all allied and distant neuroses and phthisical tendency, which may be concomitants, while the active cause may be embryonic accident or incompatibility between the germal and spermal elements.

Primogeniture may be a coincidence as well as a cause, for which it is set down in nearly twenty per cent. of all cases by some authorities, and the same may be said for accidental mental influences affecting the mother during gestation.

By the latest census returns in the United States there are 95,609 feeble-minded, or a ratio of 152.4 per 100,000 of the living population, which is a greater proportion than in most other countries. The ratio for males is 165.2 and 139.6 for females.

As to causes, out of 95,571 feeble-minded 19,530 were unknown, 1,214 were senile, 10,064 were miscellaneous, 4,956 were due to general diseases of a febrile or infectious nature, 10,598 were due

to diseases of the nervous system, 477 to reproductive organs, 5,927 to accidents and injuries, such as falls, blows, sunstroke, burns, and exposure, and lightning, and there were set down as congenital the remaining 42,805 of the total first stated.

While the above returns are avowedly not such as to justify reliable etiological deductions, they still give a general idea of the causes usually assigned in this class of cases. Percentages given in Tuke's "Psychological Dictionary" in 2,380 cases in all were attributed as follows in idiocy and imbecility: Causes acting before birth—Phthisis, 28.31; insanity and imbecility, 21.38; epilepsy and other neuroses, 20.0; intemperance, 16.38; syphilis, 1.17; consanguinity, 4.20; abnormal condition of mother during gestation, 29.87; old age of parents, 0.25; illegitimacy, 1.76. Causes acting at birth—Premature birth, 3.52; primogeniture, 20.67; prolonged parturition with pressure, 14.24; instrumental delivery, 3.31; accident at birth, 1.51; twin birth, 0.96. Causes acting after birth—Eclampsia, 27.39; epilepsy, 8.11; paralysis, 0.92; injury to head, 6.17; fright, 3.06; sunstroke, 0.54; febrile illness, scarlatina, whooping-cough, measles, typhoid fever, small-pox, 5.96; overpressure at school, 0.16.

The above figures show the drift of medical expert opinion as to the causes in this class of cases.

There are in most instances a great variety of predisposing and exciting causes, and it is difficult to fix other than a hypothetical percental relation of any one factor in idiocy.

If the remote as well as immediate effects of intemperance are considered the estimate above given is undoubtedly too small.

Toxic causes are also probably greater than estimated, and of the causes acting after birth infectious diseases should likely occupy a more prominent numerical position.

Stadia.—In all congenital cases the pathological condition begins and ends with life. The amelioration produced by treatment is not the equivalent of a convalescent stadium.

In non-congenital cases there may be a long initial stadium while epileptic or other deterioration is progressing to complete idiocy. In physical or mental traumatism there may be only a very brief initial stadium before complete development of the fatuous state.

As the sequel of acute mental disorder in childhood dementia should not be deemed the terminal equivalent of idiocy.

Symptoms.—As space will not admit a complete symptomatology

of the various types, a *résumé* is given of the chief somatic and psychical symptoms of idiocy.

The chief somatic symptoms are as follows: Diminutive and malformed structure, often due to rachitic or scrofulous disease, spinal curvatures, crooked long bones, and deformities of extremities.

Cranial asymmetries, microcephalus, macrocephalus, hydrocephalus, porencephalus, and rachischisis and cranioschisis. Ankyloses and arthritis deformans. Muscular atrophies, paralyses, contractures, tonic and clonic spasms, and general muscular inco-ordination. Partial or complete defects in the special muscular mechanisms of speech and locomotion. Anomalies in structure and distribution of vessels, and defective cerebral supply from the narrowing of cranial foramina. Hypertrophy of cutaneous tissues, eruptions, hirsuties, cyanosis, cutaneous anæsthesia, thermo-anæsthesia, and perverted excretions of the skin.

Malformations or infantile state of the reproductive organs. Amenorrhœa, aspermatism, impotence, barrenness. Cerebral hypertrophy, simplicity or absence of convolutions, atrophic and sclerotic cerebro-spinal processes, and functional perversions, eclampsia, chorea, epilepsy, and ataxia; all grades of structural and functional imperfections of the organs of special sense; trophic and vaso-motor disorders; cardiac feebleness and valvular disease; tuberculous, asthmatic, and bronchitic affections; indigestion and gastro-intestinal catarrh, and general malnutrition.

The psychical symptoms, in brief, are: Loss of muscular sense, impaired tactile perception, deafness, deaf-mutism, amblyopia, loss of color-sense; consciousness, confused or clear only in limited directions—imperfect or absent conscious personality; memory radically defective, except in limited directions, and intentional memory never present; imagination childish and usually mere play of fantasy; incoherence of ideas, feeble power of attention, automatic language, and no power of reason by comparison. Cœnæsthesis is either depressed or expansive. Emotions are superficial and changeable, alternate crying and laughing, which may become automatic. Higher sentiments exceptionally present, but usually are absent. Appetites instinctive and uncontrolled, and there may be reversion of low types. Sleep unsound or excessive, anorexia or polyphagia, sexual torpor or masturbatic indulgence; general activity is not psychomotor but reflex and automatic.

Volition profoundly impaired. All higher forms of inhibition wanting, and this is a chief characteristic of idiocy.

This symptomatic summary gives a more comprehensive view than would verbal descriptions of special cases, of which some nearer idea has already been conveyed in the delineation of the special types.

Pathology.—All degrees of anæmia and hyperæmia of the brain are found in idiocy in connection with structural cerebral lesions. These abnormal vascular conditions, though, are not in themselves probably ever the cause of the deficiency of intellect, but symptomatic of the deep-seated organic changes.

Hypertrophy of the brain is the true pathology of very exceptional cases of idiocy. It is chiefly a congenital affection, and may or may not be associated with rickets and with cerebral sclerosis. It is not due to excessive growth of cells or fibres, and is not recognized as inflammatory or sarcomatous, though Virchow long ago attributed it to hyperplasia of the neuroglia. The actual cranial size attained is less than in hydrocephalic cases, and appears chiefly above superciliary ridges. Cerebro-spinal atrophy may be the pathology in congenital microcephaly. It also may be in some of its acquired and partial forms the chief pathological factor of idiocy.

Atrophic processes are present in paralytic forms of idiocy, and are due to inflammatory affections of the cortical substance or of the meninges. There is often in these atrophic cases compensatory thickening of the calvarium and effusion of serum and descending degeneration of systemic fibres. The origin of some cases is hemorrhagic, embolic, or thrombotic. Cystic compensation sometimes occurs in this form of cerebral atrophy attended by paraplegia, hemiplegia, or diplegia.

Porencephalus, due to intra-uterine trophic arrest of brain-growths, is a cause of idiocy, with paraplegic or diplegic symptoms, since the porencephalus may be double and may be acquired as well as congenital.

Chronic hydrocephalus is the chief pathological condition in chanical result of a vacuum, and not accounted for by obstructive proves fatal within the first few years of life. The hydrocephalus is probably due to trophic arrest of medullary development, and the presence of fluid in the ventricles is merely a coincident and mechanical result of a vacuum, and not accounted for by obstructive or inflammatory theories.

Encephalitic processes, abscesses, and local softenings are pathological causes of idiocy, and also sclerosis of the brain, both of cor-

tical and medullary substance, and of the diffused form rather than multiple. Some of these affections may be of microbic origin.

Tumors of the brain, especially tubercular and gliomatous, hold some position in the pathology of idiocy, and also chronic meningeal inflammations. The spinal degenerations are secondary or coincident phenomena, and causatively are of minor pathological import, so far as the actual mental defects are concerned.

The particular form of the morbid anatomy of idiocy may be said to be accidental, dependent on trophic arrest in embryonic life, or on inflammatory or hemorrhagic processes at a later period of infantile development. The actual formative defects are gyral, commisural, ganglionic, and extend to both cortical and medullary elements, and are primarily due to intra-uterine arrest of development.

Differential Diagnosis.—The differential diagnosis of idiocy is to be made from simple retardation of mental growth. There are families in which retarded mental development is the rule and not the exception, and members of such families may even attain a high order of intelligence after puberty.

Idiocy is to be differentiated from the state of general debility which prevents physical and psychical activity in some infants who have suffered early from infectious diseases and are undergoing slow recuperation.

Idiocy is to be differentiated from the secondary states of mental weakness, which are the direct sequels of attacks of acute mental disorder, or the terminal states of the major neuroses.

Finally, the differential diagnosis is to be made between idiocy and the diathetic and toxic states of infantile life, from which complete recovery is possible.

Many of those classed as idiots in strict scientific differentiation are in the terminal stage of infantile psychoses, of which there had been failure of diagnosis.

Prognosis.—The prognosis is not so unqualifiedly bad as was once supposed. Operative procedure has brought radical relief in a few instances, and pedagogic measures have ameliorated the condition of vast numbers of cases. In idiots with gross organic brain lesions only slight improvement is to be expected even from early and continued treatment. About twenty-five per cent. of all cases are complicated with epilepsy which is unfavorable.

Idiocy with cerebral hypertrophy is of bad prognosis, and also

hydrocephalus, with few exceptions, is a hopeless complication. External configuration and stigmata degenerationis are not safe guides in prognosis as to the actual improvement attainable by educational methods, though extreme microcephaly is a uniform exception to this statement.

The prognosis is bad in those idiots whose treatment has been neglected during the first ten years of life, and in those in whom there is double heredity and cumulative neurotic influence in both parental lines.

There are unexpected possibilities of improvement in some cases contradictory of the general rule of prognosis, so that it is always well to continue treatment.

Treatment.—The treatment of idiocy is not a question of weeks and months, but, to be of any avail, must be carried out systematically for years, and it may be divided into measures for strengthening the physical condition, and educational methods for developing the intellect.

In the physical treatment hygienic means are of first importance.

The climate, by preference, should be mild and sunny to permit of continuous out-of-door life. The dwelling should be well-ventilated, kept at an equal temperature, and, above all, free from dampness.

The diet should be highly nutritious and digestible, and nourishment is to be administered at frequent intervals.

The clothing should be warm and of fine flannel, the year around, on account of impaired circulation and deficient bodily warmth, with such modifications as personal peculiarities of patients demand.

Long hours of sleep are essential, and a siesta after meals is of advantage in some cases of feeble digestive powers. Absolute cleanliness is to be enforced at all times.

Hydrotherapy and massage in their milder forms are of much use.

Exercise, by preference always in the open air, is to be taken at frequent and regular intervals during the day. Systematic habits regulated with daily uniformity are of the utmost importance.

The medicinal treatment covers a wide range of symptomatic indications drawn from the etiology of the case, and corresponding to toxic, diathetic, and neurotic conditions actually present. The state of the muscular system, of the cutaneous tissues, of the organs

of special sense, of the thoracic and abdominal organs often present special indications for treatment. There is a wise prophylaxis to be exercised in a therapeutic way against known tendencies to disease in the patient.

Tubercular, syphilitic, and epileptic complications are treated with a knowledge that idiots bear drugs less well than persons in health.

Psychical treatment resolves itself into a complete series of systematic means of education of the muscles, of the senses, and of the mental faculties.

Co-ordination of muscles is first to be taught in simple adaptive movements, and the restless activity of the child is to be utilized to establish habits of purposive action. As the microkinesis of infancy is converted into co-ordinate motions, so the choreoid actions of idiots are to be brought into orderly forms of gesture, station, and gait. A great variety of simple means may be used in the training of the hand, which, as in the normal infant, may be effected before locomotion is complete. In fact, perfect control of the mechanism of gait is acquired very late in most idiots, and in some not at all. Kindergarten methods are used to cultivate the special senses and the perceptive faculties. Taste, smell, sight, including the sense of color, hearing, and touch, are developed slowly but surely by daily object-lessons and tests.

Speech is cultivated in very methodical ways, and certain mechanical aids are of service. The simple vowel sounds are mastered and then combined with consonants in words for common objects. Music is a means in teaching rhythmical movements of speech and gait, and has other important applications, as idiots are susceptible and attentive to it.

When perception, attention, the special senses, muscular co-ordination, articulation, and simple accomplishments have been taught, some of the early rudiments of English branches may be undertaken. A constant repetition and review of lessons already acquired is necessary to further advancement. Some useful manual employment is also possible, and out-door games and in-door diversions are not without value.

The controlling effect must be personal kindness in the moral treatment, and thus orderly habits may be taught, and ideas of right conduct inculcated. Severity and repressive measures have a baneful result, and defeat all educational advance, as the beginnings of mind only expand under genial influences.

Persevering and skilful treatment is followed by decided improvement in fifty per cent. of cases of idiocy. A still greater proportion of idiots are rendered cleanly and orderly, and cease to be an annoyance to their relatives, as the result of proper training. In the main, therefore, treatment is highly desirable.

Section II.—Cretinism.

This is a generic term loosely applied to a large number of endemic forms of idiocy, and also to sporadic cases having accidental features of resemblance. The term should be limited to cases of arrested development with abnormal condition of the thyroid gland and of the connective tissues in general.

Cretinism, in this sense of the word, is found in the mountainous regions of Europe, Asia, and South America, and it is specially endemic in Switzerland.

Genuine cases of cretinism occur sporadically in various countries, but some of the cases thus classed are merely pseudo-cretinic from accidental dermic anomalies.

Definition.—Cretinism is toxic and degenerative organic arrest of development of mind and body with thyroid and dermoid abnormalities.

Clinical Delineation.—There are exceptional types, but the ordinary form presents the following clinical outlines: Short stature, crooked back, thick, goitrous neck, broad skull, variously misshaped, flat nose, sunken at root, eyes wide apart, defective and carious teeth, earthy or ash-pale complexion, large mouth, thick lips, large red tongue, puffy, ill-formed hands and feet, skin coarse and wrinkled or œdematous, and general clumsy and helpless appearance.

The psychical aspect stuporous, dull expression, slow perception, husky voice, and slight power of speech, imperfect hearing, and general deficiency of intelligence.

Causes.—Governmental investigation of cretinism has only fortified the popular belief that the earth, the air, and the water and poor food are the causes of the disease. The damp earth contains much lime, the air is moist and enclosed by mountain-heights, and the water is calcareous and has other deleterious mineral ingredients, and the general food-supply is defective in quality and variety.

The endemic nature of the disease is shown strikingly in the fact that healthy persons becoming residents of the district may suffer

finally, and may beget cretinous children, and even animals—horses, cows, and cats—show symptoms of the same affection.

Some springs are avoided finally because of their goitrous influence, and increase or decrease of cretinism is said to have been directly traced in certain neighborhoods to the opening or closing of certain springs. The water of these springs contains a great variety of mineral ingredients derived from the soil through which it filters, and efforts have been made to connect the effects of geological formations with the causation of the disease.

The sunlight is shut out from dwellings by their defective structure, and by the trees and mountains.

This combination of unhygienic influences is supposed to generate the cretinous condition, but there are still other factors to be considered.

Some of the cretinous regions are known to be miasmatic, and it is probable that a continuous paludal influence contributes in no small degree to the cretinous cachexia in many instances.

There is also the possibility of an infection of a microbic nature, which would serve to fully explain the clinical symptoms, which would seem to point to a toxic origin of the disease.

The heredity of the disease is shown by the fact that full cretins almost invariably beget cretins. This heredity is endemically engendered, as shown by the ready reversion to a normal type of offspring after removal to a non-cretinous district.

Some regard cretinism as allied to rachitis, and there is a similarity in some of the symptoms.

Congenital cretinism might thus be accounted for on the hypothesis of embryonic rachitis, but this theory is not sufficient to cover all congenital cretinic symptoms.

The most recent etiological theory is that cretinism is due to the loss of function of the thyroid gland, which is supposedly eliminative, and directly influences biochemical changes in the connective tissues. Experimental extirpation of the thyroid gland in animals gives rise to cachexia strumipriva, which is characterized by stupor, œdema of connective tissues, general malnutrition, and death. Surgical removal of the thyroid gland has produced myxœdema in some patients, with mucin in the connective tissues, pachyderma, and cretinoid symptoms, such as arise spontaneously in atrophy of the thyroid gland. According to this theory cachexia strumipriva,

myxœdema, and cretinism are closely allied conditions, arising from loss of thyroid functions.

This theory is based on the fact that in cretinism the thyroid gland is congenitally arrested in growth, or from inflammatory action undergoes atrophy, and in other instances is the seat of goitre, causing loss of function of the gland.

It may be well to add the further fact that the thymus gland, which is active in fetal life and during early infancy, is also atrophied or absent in some congenital cretins at birth, and the loss of the function of this gland may not be without causative influence.

It is just possible that the glandular atrophies and the whole organic arrest of all parts of the organism are alike attributable to a common toxic cause, and, upon the whole, this would seem to be the most satisfactory hypothesis.

Stadia.—In rare instances there is an embryonic stadium of cretinism, and the infant is born with all the physical signs of the disease, and with absence or atrophy of the thyroid gland, and death usually follows soon after birth. In another class the initial stadium begins with birth, and continues for several years, during which there is a very gradual development of all the symptoms, and the height of the affection is attained about the tenth year, though death often follows at an earlier period.

In still another class of cases the infant is born without any apparent signs of cretinism, and the initial stadium does not begin until the fourth year, or later, and continues during a slow increment of all the cretinoid anomalies for many years. The stadium of complete development of all the symptoms occurs between the fifteenth and twentieth year in these cases. In those mild cases early removed from the endemic region to healthful surroundings there is sometimes a convalescent stadium extending over some years, and ending in recovery, with slight permanent defects of mind and body.

In sporadic cretinism the initial stadium usually begins about the age of the second dentition, and has a duration of many years, and the stadium of maximum abnormalities occurs about the ordinary age of puberty, which is often absent in these cases.

Symptoms.—There are full cretins and half cretins. The full cretins are mentally to be classed chiefly as idiots and partly as imbeciles. The half cretins range in intelligence among imbeciles for the greater part, but occasionally they are simply weak-minded, and exceptionally possess a fair amount of talent.

The population in the regions of endemic cretinism are largely of a low order of intelligence, and there is added the stupefying effect of miasmatic and other local deleterious influences. There is, therefore, every grade of mental and bodily defect among cretins, and half cretins, and among the people who inhabit the cretinous region, but have not the outward signs of the disease.

The cretinous symptoms of mind and body vary in grade in keeping with these facts, and the symptomatology here given is that of the full cretinous state.

The physical symptoms of full cretinism are: Stunted growth with body broad in proportion to length, prominent abdomen from lordosis, often lateral spinal curvature, short neck, often goitrous, brachycephalic head, frontal insufficiency, and in the most cases occipital flattening, flat nose, depressed at root, dull, wide-set eyes, puffy eyelids, swollen lips, defective teeth, prognathous or retreating jaw, tumefaction of nasal membranes, mouth-breathing and macroglossia, livid skin is hypertrophied and anæsthetic, plump and clumsy hands, arrested growth or malformation of reproductive organs, impotence, sterility, amenorrhœa, feeble circulation, impaired co-ordination of muscles, enlarged joints, heavy and shuffling gait, sluggish digestion and respiration, and general torpor of vital functions.

The mental symptoms are: Perception blunted, feeble memory, absence of reasoning power, general apathy, defective special senses, slovenly habits, limited power of speech, incapability of self-care, absence of sexual appetite, lack of all spontaneity, and feeble volition.

The half cretins, ranking as imbeciles in intelligence, are partly capable of self-care and of some useful occupation when taught. They are said to be salacious and inclined to propagate, and it is observed that women cretins, more uniformly than men, transmit the disease to offspring in case of marriage with healthy persons.

Goitre exists in the greater proportion of the cases, and in others there is atrophy of the thyroid gland. There are some without apparent thyroid disease, but with many of the physical appearances of cretinism; and there are others without the bodily peculiarities, but with the mental traits of the affection.

Pathology.—There are several orders of pathological facts to be named in cretinism. First, there is the fact of the greatly hypertrophied thyroid gland, and the pressure which it exerts on vessels and its effect on cerebral circulation. Second, there is a premature

synostosis basilaris of the cranium, and narrowing of the vascular foramina, which has an influence on cerebral nutrition. Third, there are such structural defects and diseases as have already been described under the pathology of idiocy; and, finally, there is the specific pathology of the suppression of the function of the thyroid gland, which, by recent hypothesis, is regarded as the essential factor in the disease.

It may be that further research will yet reveal microbic infection or special toxic agent to account for all the phenomena of the disease.

Differential Diagnosis.—The symptoms of cretinism are so characteristic, and its limitation to certain regions so uniform, that there is seldom difficulty in differential diagnosis. The only practical need of differentiation is between sporadic cretinism with atrophied or goitrous thyroid, and simple idiocy, with accidental resemblances to cretinism.

These chance-cases with hypertrophied skin and cretinoid similarity, but without thyroid disease, are not to be classed as cretinism unless they occur in endemic regions.

Prognosis.—The prognosis is bad where there is strong heredity to cretinism, also in congenital cases, and in all cases not early removed from the endemic districts, and in all cases with atrophy of the thyroid gland. There is a possibility of amelioration in cases emigrating early to a healthful locality, and the prognosis is sometimes favorable in healthy young children, who have acquired cretinism by residence in cretinous regions, provided they return to hygienic surroundings.

The change of residence from the cretinous neighborhood is, in all cases, without regard to the form of treatment, essential to a favorable prognosis.

Treatment.—The broadest treatment is prophylactic, and should become a part of state medicine. The endemic districts should be drained, pure water should be supplied, habitations should be made hygienic, and general rules of health should be enforced; the diet should be regulated, and the propagation of cretins by cretins should be forbidden, and marriage with healthy persons should alone be permitted.

The most effective means of treatment is, first, removal from the endemic region, as already stated.

Other means are hygienic, with educational and symptomatic therapeutic measures, as in other forms of idiocy.

The specific treatment is by the administration of thyroid extracts to substitute the lost function of the gland.

Thyroid transplantation has been undertaken, with some show of success. It remains to be seen whether this heroic surgical measure is destined to have success in the future treatment of cretinism.

Section III.—Imbecility.

The mental defect in imbecility ranges through every possible gradation, from idiocy to such slight want of intelligence as is termed weak-mindedness, and the latter condition is also included under imbecility by many writers. The weak-minded will not be treated of as a separate pathological class. It is important that the physician should recognize their mental status as beneath that of the average of mankind, though not such as to justify the application of the term imbecile. There is an arrest of mental development in utero, at birth, or in early childhood in imbecility, which must be distinguished from the mental weakness following the developmental or involutional crises or secondary to the psychoses. The failure to make this distinction has led to much confusion in medical returns as to the statistics of the entire feeble-minded class in all countries.

In the statistical statement as to idiocy, the total figures given embraced the whole feeble-minded population, and, for want of any line of demarcation, it is not possible to state the number of imbeciles in this or any other country as distinguished from idiots and weak-minded.

Definition.—Imbecility is a state of congenital or acquired functional deficiency of mind, usually accompanied by structural defects of bodily conformation and of the nervous mechanism.

Medical men specially concerned with the care of idiots have failed to draw any clear dividing line between idiots and imbeciles, and yet it is important that such a division should be made, and there are clear grounds for such a demarcation. A full definition of imbecility requires this differentiation from idiocy, and the grounds for it are here given.

The power of inhibition is the first ground of distinction, and it is possessed by imbeciles to a considerable degree, but not by idiots. The inhibition of ideas implies the voluntary fixation of attention on a different class of ideas, and of such an act of volition the idiot is absolutely incapable.

The ideation of the idiot is automatic within the narrow circle of the instinctive wants and of the special senses, and can only be controlled by appeal to these.

The imbecile has a much wider field of ideas, and power of attention to fix a choice between two sets of notions, and hence a certain control of ideas, or, in other words, voluntary inhibition. Therefore arises the medico-legal importance of this distinction, which recognizes modified responsibility in the imbecile, which exists not at all in the idiot, for inhibition of ideas implies inhibition of actions as well, or, in other words, control of conduct.

The second ground of distinction is the acquisition of speech. Idiots connect a sensorial stimulus with a vocal sign, and the former provokes the latter in a purely reflex way. A few idiots are educated to an automatic use of phrases, but they do not attain a constructive power of language. The independent formation of sentences appropriate to the occasions of life shows that the grade of idiocy is surpassed and that imbecility exists. The grossest imbeciles have only slight formative independence of language, which is chiefly parrot-like repetition, as in idiots, but in the slightest grades of imbecility there is exceptionally much fluency of speech.

The third ground of distinction is the general teachability of the imbecile as compared with the idiot.

The idiot has organic memory merely—the disjointed residua of sensorial impressions—but no recollective combination of ideas, and hence cannot be taught, except through sensorial stimuli, and can never rise to the comprehension of abstract things or of any but the simplest things.

The imbecile has both memory and comprehension sufficient to be taught, and only lacks motives, perseverance, definite aim, and continuous purpose.

The fourth ground of distinction lies in the fact that idiots do not develop a distinct conscious personality. Imbeciles, on the other hand, have a distinct ego, which invariably asserts itself as a feeble or decided personality.

These points are sufficient to differentiate between idiocy and imbecility in all cases.

Clinical Delineation.—Allusion has been made to the variety of degrees of imbecility, and the average grade is here delineated.

The physical growth is beneath the mean for the osseous and muscular systems in most cases, but there is exceptionally dwarfism

or giantism. There are frequently cranial malformations, but a large class of imbeciles have exceptionally symmetrical heads, with a circumference and a contents slightly below the average.

The physical stigmata degenerationis are present more or less in a large percentage of all imbeciles.

There is apparent deficiency in the special muscular mechanisms; the gait has a peculiar lack of co-ordination; and a characteristic deficiency of articulation exists, independent of stuttering and special defects of speech, which are common.

The whole bearing is often childish or devoid of force and directness of purpose. There is often retarded development of the reproductive organs. Defects of the special senses are not uncommon. Epilepsy, chorea, and other nervous diseases are frequent. The physiognomy, in spite of evenness of features, constituting imbecile beauty in some cases, lacks intelligent expression. Digestive, respiratory, and circulatory functions are often functionally deranged, though in occasional cases apparently normal or even vigorous.

The psychical picture varies, but the ordinary mental outlines are as follows: There is apathy or liveliness predominant in two classes of cases. The apathetic talk little, and show little interest in persons or things; they are dull of comprehension, slow to learn any occupation, indolent, sleep and eat, and care for little else. The lively imbeciles are talkative, restless, mischievous, learn to work, but will not apply themselves continuously to anything. They have quick memories for certain things, but are incapable of general education. They sometimes have talent for music, drawing, numbers, or mechanical pursuits, but are very superficial in most of their knowledge. They are vain, boastful, incapable of knowing their true relation to the world, and meddlesome to a degree, which keeps them in constant trouble. Not infrequently they are given to lying and thieving, and, being subject to sudden bursts of passion, are liable to commit assaults.

Occasionally they have perverted or exaggerated sexual appetites, which lead them into offences punishable by law.

They lack self-control, are governed by their feelings, and are without judgment or foresight in the affairs of life.

They get very incorrect ideas of their surroundings, and reach one-sided conclusions readily, and are obstinate in their mistaken views of people and events. They have lively imaginations, and it

becomes impossible to know whether they are lying or sincere in their delusive statements as to occurrences in which they have taken part.

The less intelligent may be uniformly good-natured, but others are changeful, laughing and crying and scolding by turns.

Selfishness predominates, and complete thoughtlessness or indifference to the welfare of others is the rule in imbecility.

Irresistible impulses are common, and anger sometimes arouses suicidal tendencies.

Causes.—The first important cause of imbecility is heredity. Imbeciles beget imbeciles with great uniformity. If the mother is imbecile and the father of average intelligence, the majority of the children are apt to be imbecile.

The transformation of the neuroses and toxic diatheses in propagation result often in imbecility. Thus the children of hysteric, epileptic, hypochondriac, and syphilitic or alcoholic parents are liable to be imbecile. Phthisical parents frequently beget imbecile children, and other cachexia tend to a like result in the offspring.

In the progressive degeneracy which leads to the extinction of families imbecility is the next to the final stage, which ends with idiotic incapacity of reproduction.

Consanguinity, incompatibility of germal and spermal elements, embryonic accidents, physical and mental shocks to the mother during gestation, primogeniture, instrumental delivery of child and prolonged labor, eclampsic attacks, infantile infectious diseases, physical and emotional traumatism of the child, and exposure to excessive heat are the chief etiological factors of imbecility. All the pathological affections of the nervous system mentioned under the etiology of idiocy are occasionally present in the light of causes in imbecility.

For the imbecility of semi-cretinism the causes of the latter affection are to be taken into consideration.

Stadia.—Congenital imbecility has often an acute intra-uterine stadium, due to toxic or traumatic influences, and the whole of life is but a chronic state of imperfect recovery from damage sustained to nervous centres "in utero."

In other cases the acute stadium begins with the infectious diseases of childhood from which there is only partial convalescence of mental strength. There is also a long and gradual initial stadium in cases developed from epilepsy or other chronic neuroses, of which

the final outcome is imbecility, and an after-stadium of life-long persistence.

There are cases having a fatal degenerative impetus, which culminates in imbecility only at the crisis of secondary dentition, or still more frequently at puberty. This is the stadium of hereditary latency passing into complete imbecility most often at the second evolutionary crisis of puberty.

A true "stadium convalescens" cannot be said to exist in any case, though vast improvement may result from prolonged pedagogic methods of systematic training.

Symptoms.—The mental phenomena of imbecility may be thus summarized: Perception is less active than normal, and there are defects of the special senses. The sense of touch is less acute, and in a few cases there is tactile loss of discrimination, as shown by the æsthesiometer; hearing is often defective, color sense is feeble, taste and smell lack precision occasionally, the muscular sense is imperfect, giving rise to general clumsiness of movements.

Conscious personality exists, but a strong individuality is wanting.

Memory is good for special things, names, places, numbers, music, or mechanical things, but higher forms of memory for general principles and abstract truths are entirely wanting. Thought is confined to limited range, and directed chiefly by sensorial impressions, and is often childish and rambling.

Reasoning is confined to the most simple deductions, and higher abstractions are not attained.

Emotional tone is subject to sudden fluctuations, from sad to gay, without cause, and depression is frequent. Irascibility and reckless gayety are to be observed.

The painful emotions predominate in the majority of imbeciles.

The sentiments are egoistic in the main, and moral perversion is common.

The appetites are excessive for food, and unnatural often in sexual directions, and there is a craving for artificial stimulus, and a ready yielding to alcohol, tobacco, and drugs.

Volition is impaired, both as to control of ideas and actions, and the higher forms of self-denial in view of future good are specially wanting.

The somatic symptoms of imbecility are as follows: Arrest of skeletal growth is perceptible, with angular or lateral spinal curva-

ture, in a considerable percentage of cases. Cranial asymmetries in exceptional instances are found, and a diminished cranial circumference is common. Facial, dental, palatal, aural, and sexual stigmata degenerationis are found. Muscular inco-ordination, spasm, atrophies, contractures and other disorders are common. Peculiarities of speech and gait are very frequent.

Defects in the vital functions of digestion, respiration, and circulation are not very uncommon.

In the grossest form of imbecility impotence and sterility may exist, and arrest or malformation of the reproductive organs. Masturbation and contrary sexual feelings are also symptoms in a certain class of cases. Abnormalities in convolutions, fissures, and brain-structures are common. Epilepsy, chorea, stammering and other neurotic affections abound.

Sensorial defects are both organic and functional. Deaf-mutism is both a symptom and a cause of imbecility.

Some imbeciles attain old age, but the average of life is shortened. Trophic and vasomotor disturbances are occasionally to be observed.

Pathology.—In the grosser cases of imbecility there are to be found post-mortem asymmetry of the hemispheres and of the convolutions; defective formation of central ganglia or of the commissures; deficiency in cortical or medullary substance; embryonic simplicity of convolutions; poverty of ganglionic elements, and in some instances such gross pathological conditions as have been described under the pathology of idiocy. Atavistic reversion of gyral types, globose cells and arrest of ganglionic elements of the second cortical layer are sometimes found.

In other instances the morbid anatomy of imbecility cannot be detected by the microscope, and the lack of mental manifestation must be termed a functional deficiency.

Differential Diagnosis.—Imbecility is to be differentiated from idiocy on the grounds given under the head of *Definition.*

It is, on the other hand, to be distinguished from such slight mental deficiency as belongs to the weak-minded class.

It is not to be confounded with the mental enfeeblement following attacks of mental disorder, from which there is recovery with defect of intelligence, nor with the decline of mind as a sequel of the involutional crises.

Epileptic deterioration is not imbecility, nor is senile fatuity, nor the premature decline of mental faculties sometimes sequent of the menopause.

Imbecility must also be differentiated from the psychical weakness following the infantile psychoses which admit of final recovery.

Prognosis.—The prognosis of imbecility is always unfavorable as to complete recovery, which is an impossibility. Great improvement and life-long usefulness and capability of self-care may result from early and prolonged treatment.

Prognosis as to life is favorable, except in gross organic lesions of the nervous centres, but the expectation of life at any given age is diminished by the fact of imbecility.

Treatment.—The treatment as regards physical complications is symptomatic and largely hygienic. The etiology of imbecility sometimes furnishes special therapeutic indications, as in congenital syphilitic taint, and cretinous imbecility from malarial infection.

The main reliance is upon educational treatment, which must be prolonged for years, and can only be carried out to advantage in special institutions, or under the direction of some individual having knowledge and patient skill to devote to the task. Regularity of habits, the learning of trades or manual occupations, constant discipline under uniform kindness, and a progressive development of intelligence by easy methods are the means to final success in the treatment of imbecility.

CHAPTER II.

INSANITY FROM CONSTITUTIONAL NEUROPATHIC STATES.

Group: Insanity of Childhood, Primary Monomania, Moral Insanity, Periodical Insanity.

This clinical group, embracing the forms of Insanity above named, is based on a strong constitutional neuropathic state, which is only less marked than the gross degeneracy described in the last group of organic arrest of mental development.

The constitutional instability of the nervous centres in this group reveals itself early in infantile mental disorder, in primary monomania, in moral Insanity, or in periodical outbreaks of psychical disturbance.

It is of all the clinical groups the one most strongly tainted with degenerate heredity, with the single exception of the outright failure of mental development in idiocy.

The clinical types constituting this group will now receive separate consideration.

Section I.—Insanity of Childhood.

The temporal limits of this type of Insanity are from birth to puberty, but it is intended more especially to embrace the cases of mental disorder which occur during the first decade of life. This type is found before the mind has fully expanded, and individual differences of age and precocity of intellect are to be borne in mind.

Definition.—The Insanity of childhood is a type of mental aberration arising from a constitutional neuropathic state, and characterized by excitement or depression, and by motor and hallucinatory disorders, and by anomalies of appetite, sleep, digestion, respiration, and circulation.

Clinical Delineation.—There is an excited, a depressed, and a stuporous type to be delineated.

In the excited type of mental disorder the child is restless, mischievous, noisy, destructive, heedless of what is said, and has bursts of anger if restrained, neglects playthings and playmates, eats voraciously and without choice, or throws food away, loses sleep at night and has visions which keep it awake, strikes nurse or mother, and fails to recognize them, laughs loudly without apparent cause, has convulsive motor disturbances during sleep, and hastened or retarded respiration and circulation.

In the depressed type the child becomes shy and furtive, seeks solitude, seems in constant dread of some harm, cries and is painfully affected by every new impression, becomes suspicious of nurse and parents, shrinks from other children, has disturbed sleep and night-terrors, screams when left alone in the dark, has diurnal as well as nocturnal hallucinations, mistakes common objects and persons, refuses food, has cold hands and feet, disordered digestion, feeble circulation, and constipation, with headache and vertigo, and occasionally syncopal attacks.

The clinical picture of the stuporous type is very different. The child has a dull, staring look, and remains almost motionless, and takes no part in play, and has no interest in anything. It forgets what it is told, and does not always understand what is said; it does not ask for food, and eats without relish, and sometimes lies in bed in a sort of cataleptoid state, and has to be dressed and led about, and seems only partially conscious of its surroundings, and without ideas or desires or any independent initiative, and there is disorder of the vital functions.

These types are the correlatives of mania, melancholia, and stupor in adult mental disorders. As an exceptional type, even at this early age, must be recognized also the cycle of excitement and depression, alternating and forming the prototype of the periodical and alternating Insanity of later life.

There is also the critical type, appearing only during the crises of primary or secondary dentition, and corresponding to the aberration of physiological crises of more advanced years.

These are the chief types to be outlined, though there are many sub-varieties and mixed forms dependent on special etiological factors now to be mentioned.

Causes.—In this particular instance the cause of causes is hered-

ity, which is so strong as to declare itself as soon as the child is exposed to the first untoward influences of life. It may be heredity transformed from the neuroses in the parents, or from alcoholic or syphilitic or phthisical degeneracy. In other cases it is direct heritage from Insanity or imbecility in the parents, or atavistic, and still in direct line of transmission.

Consanguinity and parental incompatibility account for a few cases, while embryonic accidents, difficult birth, mental and physical shocks of parents just before the conception of the child, or diseases of the mother during gestation, are responsible for many more cases.

Thermic injury to nervous centres from direct insolation, or more often from exposure to artificial heat prolonged, near stoves, fireplaces, or in hot, close rooms, while the child is closely wrapped in numerous coverings, is a frequent cause.

Diseases of the eyes, ears, nose, and throat, and of the gastro-intestinal tract, parasitic affections, skin diseases, traumatic injuries, especially of the head and spine, and the accidental ingestion of toxic agents are among the exciting causes, which, acting on unstable nervous centres, result in mental disorder.

Great importance is to be attributed to insufficient and defective diet, and to the resulting malnutrition of the nervous system, and to unhygienic conditions common among the poor in large cities.

The infectious diseases of childhood are frequent etiological factors, and all forms of microbic infection are to be considered under this head. There is no question that auto-intoxication is an occasional exciting cause at this age, and atrophy of the thymus or thyroid glands may be causative during the first year of life.

In exceptional cases irritation, or disease, or abuse of the reproductive organs may at this early period be an exciting cause of mental disturbance.

Moral causes are sometimes active, and fright, parental severity, overstudy in school, disappointments, and religious apprehension, and other emotional excitement may become a determining cause of mental disturbance.

Numerous infantile insanities are due directly to organic brain-lesions or to malnutrition of cerebral structures from toxic influences. All the pathological conditions described under the head of arrested mental development may reappear in a less decided form as causes of mental disorder in childhood.

The degeneracy may be more than a morbid tendency in these

cases and consist in actual morphological abnormalities, and in positive defects of cerebral structures in extreme instances. The relation of epileptic, choreic, and other spasmodic disorder may be causative or only symptomatic as to the mental disease. Undoubtedly the psychosis may be the equivalent of the spasmodic neurosis in certain cases, in which these two pathological affections may be seen to alternate even as in adults. The writer saw these cases clinically demonstrated, long years ago, by Bouchut in Paris, and more especially in connection with chorea.

Stadia.—The regular stadia of mental disease are seldom wanting in the Insanity of childhood, but they are much less pronounced than in the regular psychoses of adult life, and more difficult to recognize. The writer has treated cases in children, following fevers, in which there was the usual incubatory stadium, the stadium acutum, stadium debilitatis, and the stadium convalescens in customary order. In Insanity of childhood from fright the stadium acutum takes the place of the initial stadium, but in mental disorder from falls or blows on the head there is often a long incubatory stadium, corresponding to progressive meningeal or cortical changes, before the stadium acutum declares itself, and instead of a stadium convalescens there is in many of these traumatic cases the hopeless stadium dementiæ.

There is also a long incubatory stadium in many cases in which secondary dentition determines the appearance of the stadium acutum. The latter may also suddenly follow cortical epileptic discharge or choreic exhaustion of cerebral and spinal centres.

However varied the etiology of the Insanity of childhood, careful inquiry will usually detect the customary stadia of mental disease, and also in some cases the stadial prototype of psychical disorder destined to endure throughout the whole life of the patient. The line of psychiatric study in these cases is most interesting, with an initial stadium in the cradle and a terminal stadium extending to the grave, and between the two extremes the long cyclical stadia of alternating exaltation and depression.

Symptoms.—The special senses are sometimes deranged, and both illusions and hallucinations are common. The night-terrors and frightful visions in the dark are due to cortical irritation of sensory regions. The disturbances of hearing are often the result of middle-ear disease, but may also have a cortical origin, or arise from cerebral anæmia and other causes of tinnitus aurium.

The perversion of taste is the result of coated tongue and changed

buccal secretions, and the loss of smell often arises from some affection of the upper air-passages.

Conscious personality is not strongly developed at this early age, but there are still decided feelings of well-being or ill-being, and in some cases very marked hypochondriacal states with absurd exaggeration of the slightest ailments. The change in cœnæsthetic consciousness is so great that the child does not recognize itself, and may declare that it is changed, and may attempt suicide or inflict self-injury in various ways on account of this changed and suffering feeling. Anæsthesia sometimes favors this self-mutilation, which may be practised with sharp instruments or by striking the head against the wall. Homicidal as well as suicidal attempts are not very rare. In certain cases there may be a permanent obscuration of consciousness. The memory is confused, wrong impressions are received, and correct perceptions are not registered, and the child lives in a fantastic and unreal world, and has a constant succession of false ideas, which are too changeful to become fixed delusions.

The play of fantasy is very lively in the excited types, and the child often raves all day and part of the night about these fantastic things, which it fails to distinguish from realities. This is not true sensorial delirium, but simply complete absence of inhibition of an over-excited imagination, and it only becomes delirium in the maniacal state, which occasionally is present. There are confusion of ideas, failure of recognition of persons, violent emotional outbreaks of fear or anger, perverted appetites, morbid impulses, and destructive tendencies, and well-marked hysterical attacks.

In the depressed form there are hiding away in dark corners, constant dread and vague fears, nightmare and somnambulism, terrifying hallucinations, anorexia, insomnia, and suicidal tendencies.

In the stuporous cases there are cataleptoid states, torpor of all mental processes, and partial loss of consciousness, anæsthesia of skin, filthy habits, loss of desire for food, and in some cases continued somnolence.

The physical symptoms are: Perverted secretion and excretions, depraved appetites, spasmodic muscular disorders, vasomotor disturbances, gastro-intestinal diseases, sexual precocity or perversity, eclampsia, inco-ordinations and peculiarities of speech and gait, strabismus and anomalies of organs of special sense, and pneumogastric disorders, with disturbances of respiration and circulation.

Pathology.—The hereditary instability of nervous centres in the Insanity of childhood is shown by the frequent association of eclamp-

tic, choreic, and epileptic states. The spasmodic neurosis and the infantile psychosis are expressions of the pathological state of the brain-cortex. In a large percentage of cases the pathology is nutritive and circulatory disorder of cortical regions. Tubercular meningitis is the pathology of a few cases of the depressed type, in which there are active hallucinations. Hereditary syphilitic affections of nervous centres are the pathological conditions in other instances.

The morbid anatomy is similar in the most hopeless cases to that found in the organic arrests of nervous centres, and all the pathological cerebral conditions there described may exist in a minor degree in the Insanity of childhood.

Differential Diagnosis.—Cases of Insanity of childhood are to be differentiated from idiocy and imbecility. If the child has never shown ordinary intelligence, and becomes maniacal or melancholic, it is not a case of Insanity of childhood, but of the maniacal or melancholic state intercurrent during imbecility of childhood. Perfect recovery is impossible in the latter instance, but might follow promptly in the maniacal type of the Insanity of childhood. When called to such a case the history, carefully gathered, will render the differential diagnosis possible.

The differentiation from the delirious states attendant upon fevers and other acute diseases presents no special difficulties. Chronic malarial intoxication may give rise to doubt, as the mental disorder may be vicarious of the attack, but periodicity here aids in the diagnosis.

Prognosis.—The constitutional neuropathic state, out of which the vast majority of the cases of Insanity of childhood emerge, renders the prognosis unfavorable as to complete recovery. The active mental disorder is often recovered from, but the inherent weakness and the tendency to relapse remain, and the result is recurrence in subsequent life of various forms of mental alienation.

The association of mental disease with epilepsy in early life ordinarily results in mental deterioration.

The rare instances in which infectious diseases occasion Insanity in children free from hereditary taint permit of a favorable prognosis. Children becoming insane from exposure to hardships, cruelty, and deprivation of sufficient food may recover when restored to more favorable influences.

Periodicity and cyclical tendencies in Insanity of childhood justify a bad prognosis.

The prognosis is unfavorable in cases complicated with scrofulous, tubercular, and syphilitic cachexias.

Treatment.—Isolation is often the first step toward cure when the child is in an unfavorable environment. This is best accomplished in an institution, or, still better, in the family of some skilful physician willing to undertake the care and constant responsibility of the case. It is not a question merely of immediate relief from acute symptoms of mental disturbance in these cases, but of prolonged and systematic treatment, of the continued enforcement of prophylactic measures, and of educational methods to be carried out under wise supervision for several years. This is the only radical way of rebuilding a faulty and neuropathic constitution, and the only plan of treatment which promises permanent cure.

Hygienic measures indicated are fresh air, out-door life, nourishing food at frequent intervals, long hours of sleep, manual in preference to mental occupation, regularity in all the habits of life, and cheerful surroundings.

The therapeutic means employed are to be based on etiological considerations largely. The hereditary, syphilitic cases, and the malarial, scrofulous, tubercular, chlorotic, rickety, and epileptic symptoms are to be met with appropriate remedies.

Psychotherapeutic treatment consists in unvarying kindness, with firm but gentle persuasion; constant repetition of orderly ways of conduct, which become established by force of habit; occupation constantly sustained, but varied with hours of diversion; education adapted to the individual case, and always to be carried on by easy gradation and without mental stress.

This is the fundamental plan of treatment to correct the constitutional neuropathic state. The immediate symptomatic treatment in acute maniacal cases is often carried out best by isolation and the rest-cure. The acute hallucinatory excitement may be relieved by confinement in bed in a darkened room. The choreic maniacal cases are best treated in bed also. Nutrition is uniformly defective, and forced alimentation may be of advantage, and in all cases the dietetic treatment must be carefully adapted to the needs of the case. Hydrotherapy is of much avail, both for sedative and tonic purposes, and may in some instances replace the use of drugs.

Manual trades and active occupations in the open air should be chosen for these cases, and sedentary employment and literary or professional work should be avoided, and in this way the threatened relapse may possibly be averted in adult life.

Section II.—Primary Monomania.

The effort to abolish the idea of partial Insanity has been a failure, because there are cases in which mental alienation shows itself only in a limited range of delusions or hallucinations. It is understood that the mind acts as a whole, and that there must be general impairment of mental faculties to permit of this state of limited delusions, but the obstinate clinical fact remains that there are many patients who appear rational in conduct and conversation, except in connection with their monomaniacal notions. Monomania, therefore, is just as real as any other symptomatic type of Insanity. The idea that every morbid impulse to steal, burn, kill, drink, or indulge some passion should be termed monomania has long been abandoned, and it is now recognized that such impulses are common to a great many forms of Insanity. This promiscuous abuse of the term has given place to a more uniform application of the word to Insanity having a definite origin, course, and termination, such as will now be described. The term paranoia, which was at one time used more or less as a synonym of monomania, has become a generic term applied by continental writers to a vast number of sub-varieties of Insanity, and it is no longer a specific definition for any one type, and it has ceased to be the equivalent of monomania.

Definition.—Primary monomania is a type of Insanity emerging from a constitutional neuropathic state, ordinarily hereditary, though exceptionally acquired, and characterized mainly by delusional ideation as to personal environment and by hallucinations correlative to a dominant and systematized delusion.

The main definitive points are the degenerative psychopathic state, the dominant delusion in the light of which all the events of life are interpreted, and the confirmatory hallucinations, and the apparent rationality of the patient outside of the limited range of delusional ideation.

Clinical Delineation.—Primary monomania fully developed presents the following clinical outlines: Perception and memory are active, thought is coherent and unchanged in rate, customary processes of reasoning are carried on as usual, except in relation to the dominant delusion, capacity for business or acquisition of knowledge often remains, there is no general emotional disturbance, conversation and conduct are in the main rational to casual observers. To

confidential friends there are known to exist eccentricities of manner, persistent false ideas, and egoistic preoccupation, with perverted, mystic, or persecutory notions.

The primary monomaniac is engaged in the endless and hopeless task of reconciling all the events, and even the most minute occurrences of life, with his predominant false belief. The latter is a major premise in all his reasoning, and his conclusions are thus vitiated before they are drawn. The reasoning tendency is irresistible and a constant feature in the clinical picture, which represents the perpetual motion of false attempts of adjustment to one's environment.

The somatic outlines usually include cranial asymmetries, insane physiognomy, and other physical stigmata degenerationis.

A considerable portion of cases arise among the hereditarily weak-minded class. Though this intellectual deficiency does not reach the grade of imbecility, it facilitates the comprehension of those cases of youthful primary monomania which in a few years pass into a fatuous state.

Causes.—In most instances the prime cause is the inheritance of a constitutional psychopathic state, which may not be the direct result of Insanity in the parentage, but of allied neuroses, syphilis, alcoholism, or phthisis pulmonalis. In these cases of direct neuropathic heritage it will be found that the first symptom of singularity of thought and conduct can be traced often to the earliest years of childhood, and almost invariably date back to the period of puberty at least.

In another class of cases the constitutional neuropathic state is not inherited, but acquired by severe infectious disease, traumatism, insolation, long mental strain in business or domestic worry, or by other great stress of mind or body.

The cases developed by puberty or the grand climacteric are not to be numbered in this class of acquired monomaniacal aberration, for inherited taint will be found almost without exception on careful inquiry.

In still more exceptional instances primary monomania is the result of gross defects of cerebral structure, or of acquired brain lesions of demonstrable character.

In very rare cases the deprivation of the special senses and the loss of the true correspondence between the internal world of ideas and the external world of realities has been the prime source of the monomaniacal delusional growth.

Stadia.—In the principal degenerative type of primary monomania the initial stadium begins in the eccentricities of childhood, evolves delusional ideation at puberty, and passes into the stadium of complete development with systematized delusions and confirmatory hallucinations between the fifteenth and twenty-fifth year. This second stadium (stadium acutum) of the full height of the mental disease may cease only with the life of the patient, or at the end of some years it is followed by a stadium debilitatis. This latter stadium of mental weakness is ushered in often by a transformation of delusions of persecution into delusions of grandeur. This delusional state of mental weakness lasts the remainder of life or very exceptionally passes into a final stadium dementiæ.

In other degenerative cases the initial stadium does not begin until adolescence, and the stadium acutum is not fully developed until the fourth decennium (thirty to forty years), and in women may coincide with the climacteric involution, and in these cases of late development, a stadium debilitatis is the exception, and a final stadium dementiæ is still more rare.

In the cases of acquired neuropathic state, out of which the monomania arises, the initial stadium is much shorter, varying from a month to a year, and the stadium acutum in these non-hereditary cases is on an average shorter and may pass into a stadium debilitatis, or into a stadium convalescens, which affords the surprising instance of recovery from acquired primary monomania, for in the hereditary patients there are long remissions but no real recoveries.

Symptoms.—The psychical symptoms are first in order of consideration. General perception of sensorial impressions is active and positive sensorial defects do not often exist from organic lesions of the organs of special sense, but functional disorder, tinnitus aurium, loss of color sense, illusions and hallucinations, are frequent. These illusions and hallucinations often arise after the appearance of delusions, which they serve to confirm. Though this is the usual order, it is a mistake to suppose that delusions always precede the sensorial disorder, which yields the first symptoms during the development of primary monomania in childhood. Auditory hallucinations are always the leading sensorial anomaly, though all the special senses, including the muscular sense, are apt to become involved. Memory is active, but attention finally is so preoccupied with delusive conceptions, that those things come to be best remembered which relate to the false beliefs.

Thought is coherent, but largely engaged in explanatory efforts of events relating to the fixed ideas.

Imagination is very active and morbid, and plays tricks with the sober senses. Everything is sensorially perceived in the light of expectant attention and distorted to suit the purposes of the dominant delusions. In the play of expectant imagination every look, word, gesture, or motion of surrounding objects, animate or inanimate, are exaggerated into special signs relative to the patient. The manner in which people walk upon the street, the chance motions made with their hands, the expression of their faces, the accidental position of furniture in the house, the way in which the doorbell rings, the ticking of the clock, all are imagined to signify something or to have some hidden meaning.

Reasoning by comparison takes place as usual, except that reason is enslaved by the tyranny of the persistent central idea, to which all other ideas become subsidiary. Ideation is apt to be within a narrow range and largely repetitive, and is sometimes controlled from organic sources, as in the hypochondriacal type.

Consciousness is at first undisturbed, but finally personality may undergo a transformation.

The delusions cluster about a central false belief, which is slowly evolved and systematized. The form which this central and dominant delusion chances to take depends upon the age, sex, education, social position, occupation, and inherited tendencies of the patient, and upon the personal environment in which he happens to be. It is not a scientific basis of division to classify monomanias, therefore, according to the character of the delusions, which appear chiefly under the following clinical forms, which give variety to the symptomatology, but in no way alter the essential nature of the psychical disease.

Delusions of persecution are first noted as perhaps more common than any other. The false interpretation of the minute events of every-day life, in accordance with fear and suspicion, which are the pervading emotions, give rise to delusions, which finally place the patient in the position of expectant antagonism to the whole world. It is precisely because the patient is fearful and suspicious and foreboding evil that he discovers impending danger and personal persecutions in trifles light as air. The patient soon weaves a complete network of delusions of persecution, involving his entire personal environment, and toward those in most intimate relations of life with

him his persecutory delusions may reach the height of homicidal violence. Others resort to litigation to right their imaginary wrongs, or persecute in many ways their fancied enemies.

It would take pages to even name the endless variety of these delusions of persecution, confirmed by hallucinations of all the special senses and of general sensation. Electricity, hypnotism, drugs, gases, invisible agencies, diabolical instruments of torture, sexual assaults, vile abuse, the mixing of filth with food, the communication of diseases, and every conceivable insane fancy form the material of these delusions. The vast majority of patients suffering from these delusions only seek to escape persecution, but those who try to avenge it are so aggressive as to be the most dangerous of all the insane.

Religious delusions constitute another form. Patients of this type of false belief have often played the rôle of prophets, and have converted many followers, who have usually abandoned them after their incarceration in lunatic asylums. Ordinarily these patients come to interpret texts of the Bible to suit their delusions; they have communications from on high, believe in mystic signs, commingle sexual ideas with symbols of religion, and on the ground of divine authority justify acts of self-mutilation, suicide or homicide. Fortunately most of this class are harmless, but a few are merciless even to their own children, whom they offer up on the altar of insane religious belief.

The erotic delusions form another type. The person of whom patients are enamoured may have been seen only once, or not at all. Some patients pursue with their attentions the object of their erotic delusions. Women as well as men are aggressive in this regard in various degrees, being content with seeking a distant view, or resorting to letters or forced interviews. Several patients of this description, released from confinement after some months, persistently renewed erotic attentions, and were again placed under treatment. Clergymen and physicians are sometimes annoyed by this class of patients, who may with insane cunning take advantage of circumstances to make personal accusations.

Several cases of primary monomania under the writer's care manifested only these erotic delusions for several years before wider manifestations of mental alienation occurred. In one case a respectable woman declared her intuitive knowledge of the desire of a responsible gentleman to marry her. She had exchanged a few business words with the gentleman on several occasions, but had never been

socially acquainted with him and he had never called upon her, and her delusion was avowedly based only on something in his manner which could not be expressed in words. The diagnosis of Insanity was made on the strength of the delusion, which was fixed and unalterable and had continued for more than a year, but the medical conclusion was resented by all who best knew the patient, who had no other irrational ideas. In a short time the patient met the gentleman, and openly demanded an explanation of his matrimonial intentions toward her, and her friends then recognized the nature of her mental disorder. The assurance by the gentleman of her mistake only served to develop the further delusion that he was intimidated from declaring his true feeling for her. She continued to annoy the gentleman by seeking interviews, and derived no special benefit from treatment, and was firm in her delusion at the end of two years. Her general conduct and conversation were so rational that she was not known as insane except to her intimate friends.

Hypochondriacal delusions are another form of persistent false beliefs which may constitute the essence of primary monomania for years consecutively. Perversions of common sensation often exist in connection with this form of delusions, which may relate to any one or to several of the internal organs or to the sexual functions. Delusions of grandeur are primary in some monomaniacs, while in others they appear by transformation of persecutory ideas, and they then often announce the beginning of mental weakness.

In other instances the two classes of delusions, depressive and expansive, exist side by side throughout the whole course of the mental disorder.

The above are the chief clinical varieties of monomaniacal delusions, but the principal characteristic is the same in all, and that is the logical organization of the delusions with reference to a central and dominating false belief.

There is a gradual change in personal identity in primary monomania, and there may come a time when there is a conscious division between the old and the new personality, a sort of double personality.

The egoistic sentiments of the monomaniac predominate over the altruistic at all times.

Appetites are often perverted, and contrary sexual feeling is sometimes present. Irresistible impulses and instinctive violent tendencies are frequent symptoms.

Volition is impaired in all cases, and the loss of self-control is most evident in all things which relate to the prevailing delusion.

The somatic symptoms of primary monomania are cranial and facial asymmetries, marked insane physiognomy, a masculine or effeminate conformation at variance with the actual sex, various stigmata degenerationis, and in rare instances gross organic diseases of the cerebro-spinal nervous system.

Cutaneous and visceral paræsthesias and paralgesias are constant symptoms in some cases, especially those of the hypochondriacal type. Abnormalities of vasomotor innervation are also common, and also disorder of pneumogastric functions. Spasmodic muscular disorders are not uncommon, and trophic disturbances of epithelial structures are occasional symptoms.

Anomalies of vital functions are not prominent symptoms, but are usually present in the terminal stage of primary monomania.

Pathology.—Inequality of cerebral hemispheres, asymmetry of cerebral convolutions, the degenerate and criminal type of brain conformation, anomalous distribution of vertebral and carotid arteries, the narrowing of basal foramina from premature synostosis basilaris, poverty of ganglionic elements of cortex, atrophic congenital arrests of cerebral development, and occasional gross brain lesions, have been found in cases of primary monomania.

Neither these post mortem findings nor the present knowledge of cortical localizations justify an attempt to define the pathological anatomy of primary monomania. The pathology of this affection must for the present be deemed to consist essentially in the degenerative taint transmitted, or in the acquired neuropathic state.

Differential Diagnosis.—Primary monomania must be differentiated from imbecility, with eccentricities and exaggerated notions of self-importance and a few narrow delusions. It must not, in its hypochondriacal type, be confounded with the exceptional early hypochondriacal symptoms of general paresis. This mistake has led to the belief that primary monomania often ends in general paresis.

It must be differentiated from those chronic states of limited delusions which are the sequels of the acute forms of Insanity. These secondary states of partial and delusional mental weakness are instances of secondary monomania, and differ "in toto" from primary monomania. The differential diagnosis must be made from subacute mania and melancholia, with retention of reasoning faculty and few delusions.

The differential diagnosis from the mental deterioration of the major neuroses presents slight difficulties.

Prognosis.—The prognosis as to recovery is unfavorable. The only instances of recovery occur in the non-hereditary cases emerging from the acquired neuropathic state. The prognosis as to expectation of life is favorable, and in some cases the actual duration of existence cannot be said to be affected by the mental disease. The prognosis concerning general usefulness in life is not altogether bad. Some cases discharge responsible duties for a long term of years.

The prognosis as to final mental deterioration is worse in cases having an initial stadium in childhood than in those developing at a later period of life, and the complication of epilepsy is especially bad. A few recoveries after traumatism or fever have been reported.

Treatment.—Isolation in an institution is necessary in the anti-social, dangerous, and homicidal class of monomaniacs. The harmless cases with delusions of persecution find most relief often in travel, since they shed the burden of their delusions with each change of residence, and the more complete organization of their delusive ideas in reference to their surroundings is in some measure thus prevented.

In cases beginning in childhood, prolonged disciplinary and educational treatment affords the only hope of establishing habits of usefulness and the possibility of self-support in life.

In cases acquired later in life the etiology may furnish certain therapeutic or surgical indications for treatment. In the main, there must be palliative and symptomatic treatment. The avoidance of physical and mental strain and the provision of a favorable personal environment is of importance. The turmoil of large cities is a bad environment for such cases. A country life or a seafaring life is adapted to some patients. One case was miserable everywhere except on the broad ocean or the wide expanse of Western prairies. In patients with phthisical or other cachexia there may be climatic indications.

Psychotherapy is of no avail as regards the dominant delusion, which is the essence of the mental affection. Efforts to remove the delusion by the inoculation of a counter-delusion always fail, as do arguments, entreaties, or threats, or even immersion to the point of insensibility, which was formerly tried in vain.

Hygienic measures and general improvement of nutrition have sometimes been attended by apparent remissions of the more decided mental symptoms. This amelioration is only surface deep, and is to be compared to the voluntary repression of deluded manifestation on the part of the patient for the sake of release from confinement.

Let not the physician be deceived in these cases. The disease which is bred in the bone will again manifest itself in the flesh.

Prophylactic wisdom for the good of the race forbids marriage and propagation, but there can be but little doubt that so far as the particular individual is concerned marriage may avert for some years the full development of the mental disease. This fact does not justify the physician in advice to this effect to the incipient monomaniac.

In primary monomania due to trauma capitis surgical procedure may constitute the only rational treatment.

The administration of specific remedies is never to be neglected in patients with hereditary syphilis, and stimulants are to be avoided in those with alcoholic heredity.

The development of primary monomania in brain-workers calls for an entire change of occupation to some active employment out of doors.

Patients of this class always do best when busily occupied, and by proper management most of them may still be kept within the number of self-supporting members of the community.

Section III.—Moral Insanity.

No question in mental medicine has given rise to much more discussion and variety of opinion than the doctrine of moral Insanity, which carries with it important juridical consequences. Space will not permit notice here of the diverse views expressed by different writers, of whom no one has grasped all the clinical facts with sufficient analytic thoroughness to bring logical order out of confusion. Let an effort then be made to briefly marshal all the facts from which to deduce a medical conclusion, for theories are worse than idle. First, then, what is the clinical group of symptoms constituting that which has been termed moral Insanity, and under what circumstances and in what class of persons do these symptoms appear?

The clinical symptoms are that in the presence of active perception, memory, coherence of ideas, quickness of understanding of the ordinary events of life, and the power of connected reasoning, and the general appearance of rationality, there is absence of moral feelings of right and wrong, of shame, decency, respect for self or others, or for lawful observances, and in the most pronounced cases there are brutal passions, cruelty, gross immorality, and criminality without pity or remorse.

Some or many of these symptoms may appear in the following class of persons:

1. Imbeciles may fail to intellectually grasp the complex sentiments of pity, mercy, justice, and all the higher ethical relations of life. Such perverse symptoms as occur in them are due to organic failure of mental and moral growth.

2. In the first stage of general paresis the sensual depravity and silly and motiveless acts of criminal nature are only the first results of cerebral degeneration. They are a part of general paresis and not of moral Insanity.

3. In the incubatory stage of melancholia or mania, while coherence of ideas and reasoning power are still present, the instinctive perversion may manifest itself in immoral acts or criminal attempts. Such early symptoms of mania and melancholia are not moral Insanity.

4. Moral deterioration, as one of the first symptoms of epileptic Insanity, must not be confounded with moral Insanity.

5. The diffused cerebral lesions, which occasion eventually alcoholic Insanity, are early announced by a decided moral perversion, sensuality, and brutality of conduct, which does not constitute moral Insanity.

6. Gross brain disease may be followed by loss of all altruistic feeling and shocking lapses of morality. These are symptoms of the first failure of mental power ending ordinarily in organic dementia, and they are not moral Insanity.

Two distinctly different things cannot be the same thing. The distinct types of Insanity above named cannot be moral Insanity, if the latter itself be a distinct form, nor can the one be a part of the other. Such illogical theories lead to hopeless confusion, and to the mistaking of symptoms for distinct types of Insanity.

Reasoning by exclusion of all the above instances, the analysis is to be carried to a conclusion if there are clinical facts to justify it. Such facts do exist in spite of all theories. Independently of all the above-named conditions and patients, there are very exceptional persons, some youthful and some adult, who manifest the characteristic clinical group of symptoms heretofore mentioned as constituting moral Insanity, which term must be strictly confined to these cases, and which will now be studied simply in keeping with known facts and without regard to special hypotheses.

Definition.—Moral Insanity is a form of alienation arising from a constitutional neuropathic state, ordinarily inherited, though excep-

tionally acquired, and characterized by deficiency of moral understanding, by perversion of the emotional nature, by brutal instinctive tendencies, and by shameful conduct unrestrained by any sense of right or wrong, or by any fear for self or respect for others.

It is the desire in this definition of moral Insanity to lay stress on the deficiency of moral perceptions, on the perverted feelings, on the pressure of low instincts forcing the patient toward brutal acts, on the absence of higher sentiments inhibiting the lower passions, and especially on the fact that the patient is not restrained from outrageous conduct from ill consequences to self any more than from injury to feelings of others. This latter point is important as indicative of a perversion of the fundamental instinct of self-preservation.

Clinical Delineation.—There is considerable activity of attention, perception, memory, and reason. There is no incoherence of thought and no special delusive idea. The positive features are low cunning, selfishness, cruelty, untruthfulness, lying, stealing, sexual depravity, anger, hatred, personal violence, impulses to burn and destroy and maim, homicidal and suicidal tendencies, and reckless disregard of punishment or other severe results to self for evil deeds performed.

There is a degenerate physical appearance often in the hereditary cases, with many of the physical signs of deterioration, as expressed in the entire bodily conformation, as well as in the physiognomy and the organs of special sense. In the acquired cases there may be no very decided changes in physical outlines, and symmetrical features may wear a sort of perpetual smile strikingly at variance with the general tenor of conduct. In youthful subjects the most impish disposition may be hidden beneath a childlike innocence of face, and in the female patients typical imbecile beauty may mask the very incarnation of deviltry.

Causes.—The etiology of moral Insanity is greatly narrowed by the elimination of types of early depravity from congenital arrest of growth, and of moral perversion as an intercurrent symptom of other forms of Insanity. There remains still hereditary taint as the prime cause.

Criminal life, sexual debauchery, and drunkenness in the parents are probably as potent hereditary factors as parental Insanity itself.

The constitutional neuropathic state out of which moral Insanity emerges may be acquired by severe mental shock, or by physical traumatism, or it may be the sequel of infectious diseases. It is possible that moral Insanity, in the absence of degenerative taint, may be developed by the prolonged strain of business or of domestic life, but

such cases must be extremely rare. The accidents of embryonic life and the maternal influences during gestation doubtless may have some causative relation.

Stadia.—Moral Insanity, in the strict sense here employed, when it is the immediate outcome of hereditary taint, has an initial stadium in early childhood, with a not infrequent recrudescence at second dentition, and a stadium of full development dating from puberty. Under long-continued and judicious treatment there may be apparent relief, which is, in fact, only a specious remission lasting, in a few cases, during the most favorable influences, but followed by a full return of symptoms upon the first stress of mind or body, or upon the removal of wise restraints and artificial aids to self-control. The stadium of full development lasts for a lifetime, therefore, or is followed very rarely by a terminal stadium dementiæ.

Moral Insanity resulting from the acquired neuropathic state may have a brief or prolonged initial stadium, according to etiological factors involved, and the stadium of full development may last for months or years, and pass into a terminal stadium of mental weakness, or into a convalescent stadium, which is exceptional. In the latter instance the convalescence is very gradual and marked by occasional lapses, but the possibility of final cure must be recognized.

Symptoms.—The chief mental anomaly is the activity of the mental faculties and the torpor of the moral feelings. There is the cunning quickness of perception, memory, and reason for all the ways and means of immorality, and the sluggard comprehension of the simplest relation of duty or of right and wrong conduct. This contrast is all the more remarkable in cases with considerable ability to acquire general information and special aptitudes in certain directions, but absolute mental impotence to grasp the most simple moral ideas. The severest punishment, or suffering inflicted by deprivation of food or liberty, does not arouse the conscience or stimulate the understanding of the common observances of propriety, or deter from the repetition of brutal or unlawful acts. This incorrigibility may appear like voluntary wickedness, but it is due to actual deficiency of moral understanding.

There is also emotional perversion, and a predominance of anger, hatred, jealousy, vain pride, and all the selfish over the altruistic feelings. There is absence of pity, sympathy, or natural affection. The animal appetites are strong and there may be sexual perversion.

Suicidal, pyromaniac, kleptomaniac, and homicidal impulses are occasional symptoms. Volition is always impaired in the sense that

there are disproportionately strong animal passions, and no higher moral sentiments to inhibit the lower feelings. The failure of organized inhibition of thoughts and feelings results in loss of control of actions.

The somatic symptoms are confined chiefly to the stigmata degenerationis. In a few instances there are physical signs of arrested bodily growth or of cretinoid degeneration.

In the acquired cases anomalies of the muscular system, and of digestion, circulation, and respiration may appear, but ordinarily the somatic symptomatology is not very pronounced.

Pathology.—The pathogenesis of moral Insanity is presumably the inherited taint from degenerate parents. An evil heritage, like in kind, but not so extreme in degree, is seen in the moral obliquity, along with considerable mental activity, transmitted for generations in criminal families. In tracing the parental history in cases of moral Insanity, no instances of mental disorder or of nervous disease may be found, but it may be that the parents have been mean, suspicious, hypocritical, cruel, selfish, cunning, keeping within the letter of human law, but violating the whole spirit of the decalogue, and that the just conclusion is reached that the moral Insanity of the offspring is only intensified transmission of parental depravity. The greater the degree of degenerate taint, the more frequent are morphological rather than mere functional abnormalities. Thus, in the most degenerate cases occur cranial malformations, asymmetries of convolutions, and structural deficiencies of cortical and medullary structures.

In acquired cases from trauma capitis, or from severe cerebrospinal concussion, the pathological lesions will vary with the nature of the original injury.

In the present state of science no rational explanation can be offered for the fact that cerebral lesions are followed by mania or melancholia in some cases, and by moral Insanity in others.

Differential Diagnosis.—Moral Insanity is to be differentiated from such congenital arrest of intelligence as renders the comprehension of any of the higher sentiments or any ethical relations or any moral ideas impossible. The defect of intelligence will in this instance be found to be general and not confined to moral conceptions alone, as in moral Insanity.

The differential diagnosis must be made from the decline of the moral powers in senility. In old age the moral faculties decline "pari passu" with the intellectual powers, until eventually morality in second childhood is but an automatic observance. If, as occasionally

happens, the moral decline anticipates the intellectual involution, the senile subject displays moral inconsistencies which are not to be mistaken for moral Insanity, inasmuch as they are only the advanced symptoms of senility.

Moral Insanity is to be differentiated from the mere symptom of moral perversion antecedent, intercurrent, or sequent, as to general paresis, mania, melancholia, or other distinct forms of Insanity.

The differential diagnosis is to be made from the general mental and moral impairment in gross brain disease. The emotional and moral perversity will be found here to be accompanied by a general reduction of intelligence, and the general conditions differ in toto from those of moral Insanity.

Finally the differential diagnosis is to be made from depravity, from habitual bad associations, by the simple fact of former good manners before they were corrupted by bad company. Conscience may be hardened, but moral understanding is not lacking in these cases.

The most difficult, and the most important in medico-legal relations, is the differentiation of moral Insanity from mere criminality. The fact is that criminals are sometimes cases of moral Insanity, and as such they are blind and reckless of their own good. They are terribly punished for disobedience of prison rules, and immediately repeat their offences, and are put to the rack again and again, and become the despair of prison authorities, who finally come to recognize their mental defect. They show the perversion of the prime instinct of self-preservation. This differential diagnosis between moral Insanity and criminality in certain cases can only be made by a careful review of the entire history of the case, by searching physical and mental examination, and by a comparison of all the facts according to their combined significance in each individual case.

Prognosis.—The prognosis as to recovery is bad. Cases with strong degenerate taint never recover, and the acquired form rarely progresses to a perfect cure.

The prognosis is bad as to duration of life, which is shortened by evil habits and various injuries sustained, and by diseases contracted.

Treatment.—The degenerate cases demand isolation in an institution, or such wise disciplinary management as can only be given by a medical man willing to assume constant care of a most troublesome case. The acquired form is also best treated in public or private hos-

pitals for the insane, in order to assure isolation from evil influences, and the continuous surveillance which the nature of the complaint renders necessary.

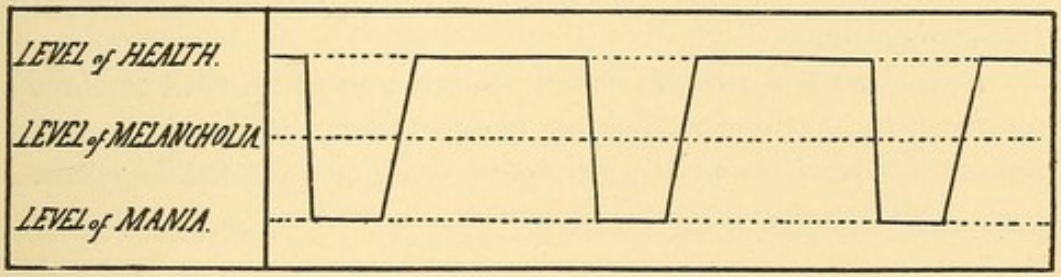
The general good of the public also calls for the confinement of these cases, which are in every sense of the word dangerous to themselves and to others.

Section IV.—Periodical Insanity.

Periodicity is characteristic of many forms of Insanity, for which, unfortunately, there is not in psychiatric science any uniform terminology. Periodical Insanity is here used as a generic term to embrace all types of periodic alienation, and an effort is here made to analyze and apply consistent names to such periodic forms of mental disorder as are most often met with in actual practice.

These periodic forms belong to the hereditary order, and arise from a constitutional neuropathic state, and the subdivision of these periodic types here given is based on the mode of the periodicity, and is as follows:

1. *Intermittent Mania.*—An attack of mania of some months' duration, on the average, is followed by a period of perfect health



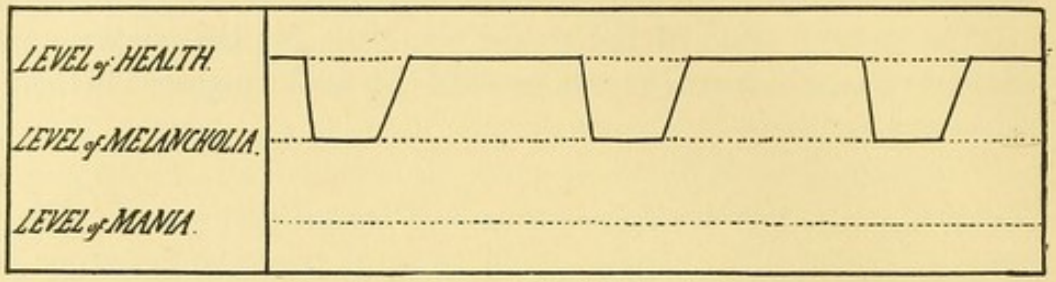
Tracing of Intermittent Mania.

of a year or more on the average. Then another attack of mania occurs, followed by another interval of health, and this form of periodicity may continue indefinitely or for a life-time. The maniacal attacks and the free intervals of health may vary in length from weeks to years. Attacks gradually become longer and intermissions shorter.

Intermittent melancholia occurs in precisely the same way between periods of health of relatively longer average duration than the attacks.

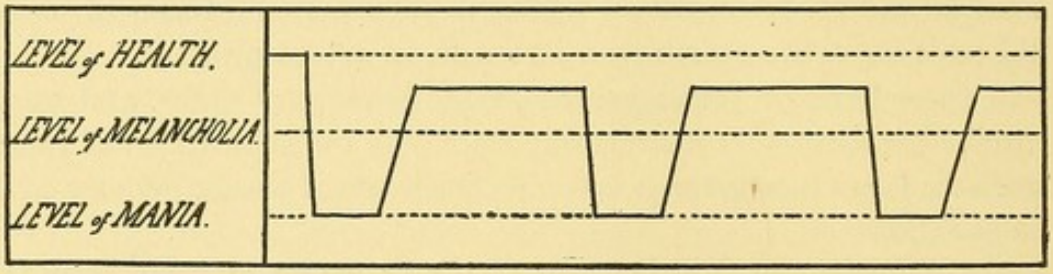
A simple linear diagram here shows the level of mental health and the decline of intelligence to the maniacal and melancholic level dur-

ing the course of intermittent mania and melancholia, and the average length of intervals of health.



Tracing of Intermittent Melancholia.

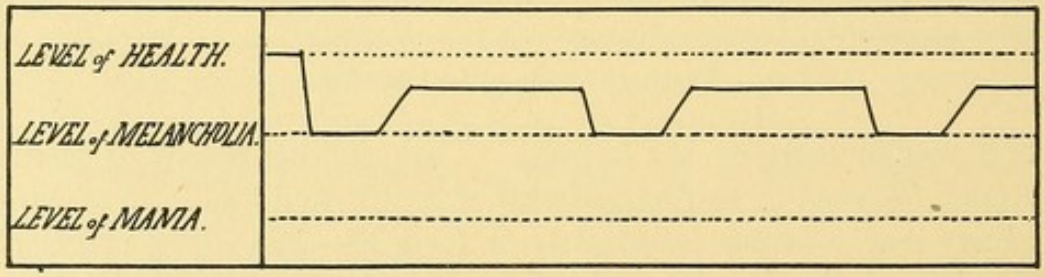
2. *Remittent Mania.*—An attack of mania lasting for months or years is characterized by remissions of all the symptoms, but the full



Tracing of Remittent Mania.

level of mental health is not reached at any time, as shown by the linear diagram.

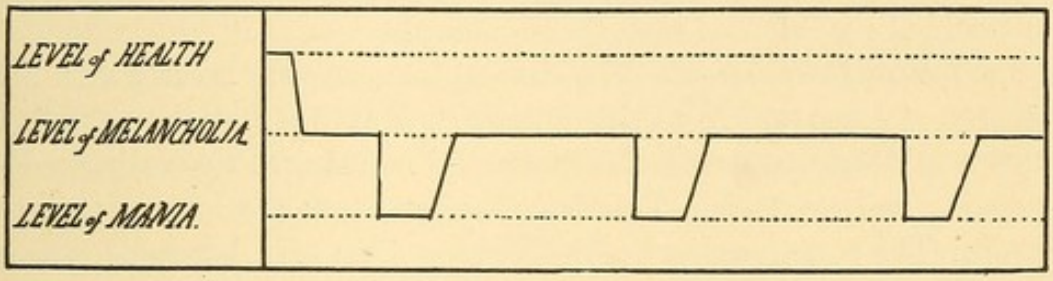
Remittent melancholia, lasting months or years, with remissions approaching, but never reaching, complete health, likewise occurs as here indicated to the eye by a simple tracing of the mental decline.



Tracing of Remittent Melancholia.

The above tracings show about the average relative duration of the attacks to the remissions during the first ten years in cases beginning as early as the twentieth year. Subsequently the attacks become longer than the remissions, and they may finally coalesce toward the close of life, for remittent Insanity often lasts indefinitely and may finally become practically continuous.

3. *Circular Insanity.*—In this periodic form of Insanity the melancholic state is followed by the maniacal state, and the two states constitute a single cycle. This cycle then repeats itself, beginning with the melancholic and ending with the maniacal state, and continues to repeat itself in this same order for years or for a lifetime.



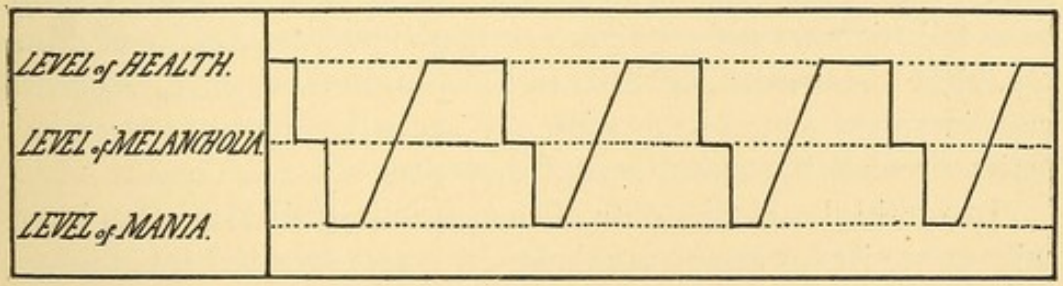
Tracing of Circular Insanity.

When the cycle is short the melancholic and maniacal states are of about equal length, but when the cycle is long and of more than a year's duration the melancholic state has a longer duration than the maniacal. This latter course of circular Insanity is shown above in the tracing.

In true circular Insanity the lowered intelligence never attains the level of health in the transition from the melancholic to the maniacal state, as the latter is a still deeper departure from mental health.

The various exceptions to these typical outlines of the periodic forms of Insanity are purposely withheld for the present, and will be fully discussed later in this section.

4. *Intermittent Circular Insanity.*—In this periodic form the cycle, consisting of the melancholic followed by the maniacal state,



Tracing of Intermittent Circular Insanity.

does not repeat itself immediately, but only after an interval of health. This intermission of symptoms follows every repetition of the cycle. The above tracing shows the return to the level of mental health between the repetitions of the cycle.

The above are the main types of periodical Insanity, and the ex-

ceptional features and sub-varieties will be described under the different headings of this section.

Definition.—Periodical Insanity is a type of mental disorder issuing from a constitutional neuropathic state, and marked by periodic and extremely sudden departures from and returns to the normal mental standard, and characterized by abrupt changes in greatly diversified psychic and somatic phenomena.

Clinical Delineation.—The clinical features vary greatly with the degree of departure from the normal standard, and at the very first this is seldom complete melancholia and mania, but cœnæsthetic depression and exaltation. The first manifestations are apt to occur in youth. The young person has the slightest form of melancholia, which is cœnæsthetic depression arising from a painful sum-total of all the peripheral impressions of the organism. There are manifested no delusions, but tension and inhibition of ideas, the painful moods, loss of interest in everything and of working ability, inactivity of mind and body, emotional indifference to friends and family, loss of will-power, neglect of personal appearance, anorexia, insomnia, sluggish circulation, and impaired digestion. This state of cœnæsthetic depression may appear intermittently or remittently, and then at the end of a few years and often at the crisis of puberty be replaced by the full form of intermittent or remittent melancholia, or it may constitute the stadium cœnæstheticum in a cycle of circular Insanity.

The state of cœnæsthetic exaltation, resulting from general pleasurable organic sensations with heightened vasomotor activity, is the mildest form of expansive mental disorder.

There are no delusions and no incoherence of ideas, but heightened thought-rate, some exaggeration of ideas and of self-feeling, great talkativeness and activity to no special purpose, facility of memory, vivid imagination, egotistic and mischievous behavior, impulsive acts, increased sexual tendencies, and excessive animal passions and active circulation, respiration, and digestion.

In youthful cases the state of cœnæsthetic exaltation often intermits or remits for some years before it passes into full intermittent or remittent mania, or it forms, with cœnæsthetic depression, the cycles of circular Insanity before these two milder states give place to the melancholic and maniacal states in circular Insanity.

The clinical picture is more decided when the full maniacal and melancholic states appear intermittently, remittently, or in the cycles of circular Insanity. In order to avoid repetition reference is made to the chapter on Symptomatology for a full description of the mani-

acal and melancholic states, which here constitute the cycles, which, in extreme instances, are of only two days' duration, and hence the inconsistency of mistaking these states for complete attacks of mania and melancholia. Cœnæsthetic depression may unite with the maniacal state to make out a cycle, or cœnæsthetic exaltation followed by the melancholic state may form a cycle, which will then continue to repeat itself in circular Insanity.

The clinical outline changes much in certain exceptional cases in which melancholic stupor and the maniacal state form the cycle. In a single night the patient may lose all the mental and bodily symptoms of the maniacal state, and, passing at once into melancholic stupor, be found speechless, expressionless, staring vacantly, making no reply to questions, not heeding the calls of nature, moving slowly and mechanically or not at all, without motive or initiative, and with vasoparetic conditions, cutaneous anæsthesia, slowed pulse and respiration and torpor of the vegetative functions. In a typical case of circular Insanity under the writer's care the maniacal state was followed by melancholic stupor with well-marked cataleptoid symptoms.

Causes.—Degenerative taint is the etiology of periodical Insanity in seventy-five per cent. of all cases. The heredity is in many patients direct or collateral as regards ancestral mental disorder, and in a few instances it has been homogeneous as to periodical Insanity itself. Still, periodical cases of Insanity by no means transmit other than a direct tendency to mental aberration, which may assume several types as well as the periodical one. In many instances the heredity is transformed from other neuroses, from syphilitic or phthisical cachexia, and especially from alcoholic degeneracy of parents.

It must be admitted that the constitutional neuropathic state may result also from cerebral trauma or from isolation. It appears to follow eclampsia in childhood, but whether it is a result or a concomitant may be a question. Emotional traumatism, the puerperal state, luetic disease, microbic infection, alcoholic excess, the evolutional and involutional crises, and especially the menopause, are to be recognized as occasional causes of periodical Insanity. Menstruation is provocative of the maniacal state merely, and is not a prime cause of the alienation.

In fact, the relation of cause and effect is not very clear between the coincidence of the menstrual function and the maniacal exacerbation. Monthly periodicity of maniacal excitement is a common form, and the coincidence with the menstrual molimen is accidental in some cases at least. Sex would seem to be a predisposing cause, judging

from the fact that many more women than men are periodical cases of Insanity. Age favors the outbreak in the decade fifteen to twenty-five years, and again in the decade forty-five to fifty-five years, or at least these would seem to be the more vulnerable periods, as shown by the appearance of the greatest number of first attacks.

It is a question whether epilepsy and the other neuroses are to be regarded as causes, or as common manifestations of the inherited instability of nervous centres. The association of epilepsy and periodical Insanity is very frequent, and hysteria is also a common complication or prodrome. Malarial intoxication causes periodical mental disturbance, but it does not originate true periodical Insanity, so far as the writer has observed.

It is possible that auto-intoxication might favor the development of periodic Insanity.

Stadia.—Periodical Insanity often begins in early childhood and is not recognized. The state of cœnæsthetic depression or exaltation runs a remittent or intermittent course in childhood, and passes for unaccountable sadness or gayety. Sometimes these two opposite conditions form a cycle of circular Insanity, until the full melancholic and maniacal states are developed in their stead.

Usually, about puberty, the full remittent and intermittent types of mania and melancholia begin to manifest themselves, and from fifteen to twenty-five years the greatest number of first attacks occur, and the second most fruitful decade as regards this form of mental disorder is from forty-five to fifty-five, as already stated.

The attacks of mania and melancholia appear and disappear so suddenly that the initial stadium has been ignored, but there is a brief cœnæsthetic stadium before the full maniacal and melancholic state in nearly every case. This cœnæsthetic stadium consists in a disturbance of organic functions of circulation, respiration, digestion, and in peripheral sensations, paræsthesias, anæsthesias, paralgesias, and changed emotional tone, and it is recognized and announced often, both by patients and attendants, who understand that it is the precursor of the melancholic and maniacal outbreaks. The stadial progression in intermittent mania, therefore, in the strictest sense, is not 1, stadium maniacale; 2, intervallum lucidum; 1, stadium maniacale; 2, intervallum lucidum; but, 1, stadium cœnæstheticum; 2, stadium maniacale; 3, intervallum lucidum; 1, stadium cœnæstheticum; 2, stadium maniacale; 3, intervallum lucidum.

It is of practical importance to learn to recognize this cœnæsthetic stadium in order to take precautions against the maniacal outbreak,

and it is not difficult to do this, since the peripheral sensory disturbances are often as uniform in their recurrence as the epileptic aura before the seizure.

Circular Insanity may begin in early life with the regular cycle of the melancholic followed by the maniacal state, and have a continuous repetition of the cycle without any intermission. In other instances it is preceded first by intermittent mania or melancholia. As the particular form of circular Insanity once established usually continues for years or a life-time, the sub-varieties will now be stated. The cycle, which continues to repeat itself, is regularly composed thus: 1, stadium melancholicum; 2, stadium maniacale. The sub-varieties, in order of frequency, are first: 1, stadium maniacale; 2, stadium melancholicum; second, 1, stadium maniacale; 2, stadium stuporosum; third, 1, stadium cœnæstheticum; 2, stadium maniacale. The cycle once established in any of the above ways may repeat itself indefinitely.

The transition between the two stadia which compose the cycle may be sudden when the stadia are short, or gradual when the stadia are long; or there may be fluctuations from one stadium to the other during symptomatic transition. Thus, if the cycle last two weeks the patient would be in the melancholic stadium a week, and in the course of a night would pass into the maniacal stadium, and this would be a very sudden transition.

If the cycle lasted a year, as is not infrequently the case, the patient would be probably in the melancholic stadium eight months, and in the course of a month would very gradually change into the maniacal stadium, which would continue for three months. If the cycle lasted two years the melancholic stadium would probably take fourteen months, and then there would be fluctuations from the melancholic to the maniacal state for a month, and then the maniacal stadium would continue nine months to complete the cycle of two years.

In the intermittent form of circular Insanity there is an intermission between the repetitions of the cycle as shown in the tracing previously given. The exception to this rule is that there may be two, three, or even four repetitions of the cycle before the intermission occurs. The more numerous the uninterrupted repetitions of the cycle the longer is the intermission of health ordinarily.

A cycle in circular Insanity may last a few days or a few years. The average duration of a cycle is a few months. Monthly periodicity is common in women and often coincides with ovulation. Yearly

periodicity, with the melancholic stadium in autumn and winter and the maniacal stadium in spring and summer, has often been observed. In general, the more severe the stadia the more decided is the lucid interval, and the converse is also true.

A distinct intermission of all symptoms only occurs in intermittent circular Insanity, and it is a misapprehension to suppose that in regular cases of circular Insanity the transition from the melancholic to the maniacal state is through a brief lucid interval.

Periodical Insanity may last a lifetime and not end in a state of mental weakness, but there is finally, in most cases, a certain mental impairment, and occasionally a final stadium dementiæ.

Circular Insanity may terminate in intermittent mania or melancholia, but this is very exceptional, and it is questionable whether there is ever a termination in a convalescent stadium. The long intermissions in periodical Insanity are often mistaken for recoveries.

Symptoms.—Periodical Insanity, like other degenerative types, has protean and varied types of symptoms. There are the various degrees of depression, known as cœnæsthetic depression, simple melancholia, melancholia with stupor, and the corresponding expansive states of cœnæsthetic exaltation, simple mania, and maniacal stupor from exhaustion. Hallucinatory states are more rare, but do occur.

There is usually a self-conscious and reasoning manifestation in all the principal phases of periodical Insanity, which is surprising in this regard, and a memory for the whole attack is often retained, even after severe maniacal exacerbations. During the maniacal stadium there are what the attendants call "good days," during which the patient seems almost rational in speech and manner. These fluctuations and pseudo-intermissions are highly characteristic, and they appear and disappear without apparent cause very suddenly.

Insanity of acts rather than of speech is common, and maniacal patients will assign plausible reasons for extraordinary conduct. The suicidal or violent patients display cunning and offer excuses for their crafty preparation for injury to self or others, and they are often dangerous and destructive in many ways.

Delusions are very common, and irresistible tendencies, perverted instincts, and brutal passions abound in the maniacal states. Hypochondriacal ideas, religious despondency, self-accusation, vague fears, delusional apprehension, dread of poisoning, and precordial anxiety are frequent in the melancholic states.

The extravagance, vanity, and acquisitive tendency of some of the exalted patients may suggest general paresis, but the general weakness

of mind of the latter affection is wanting. Hysterical and epileptic symptoms are, like the corresponding affections, rather to be viewed as complications than as a legitimate part of periodical Insanity.

Periodicity in hysteria and epilepsy is very marked, because they belong to the same degenerate type as periodical Insanity, and when they are superimposed upon the latter there are reduplicated periods and cycles within cycles. The hysterical and epileptic discharges are usually more frequent than the stadial changes of circular Insanity, and during the maniacal stadium of the latter the epileptic and hysterical exacerbations recur several times, and they may render the melancholic stadium difficult to recognize and introduce clinical mixture of symptoms and some difficulty of diagnosis in the first instance. Epileptic furor and epileptic automatism are different from anything found in periodical Insanity, and differentially diagnostic, as well as epileptic delirium and stupor.

The stupor of periodical Insanity is not without clear consciousness, and often a connected memory of events. The greatest lapse of attention is in the maniacal stupor sequent to the exhaustion of severe maniacal exacerbations, but the stupor of the melancholic stadium is ordinarily conscious, fearful, and delusional in character. A close symptomatic analysis solves all other clinical difficulties of differential diagnosis when epilepsy and hysteria are epiphenomena of periodical Insanity. The somatic symptoms previously described as a part of the melancholic and maniacal states reappear in the cycles of circular Insanity and do not require further notice here.

Pathology.—The degenerative heritage or the exceptionally acquired neuropathic state are to be regarded as the pathology of periodical Insanity. The pathological explanation of the sudden changes in the melancholic and maniacal stadia, Meynert long ago gave in the spastic and paretic vasomotor conditions, which respectively characterize the depressed and exalted states. This hypothesis best accords with the sudden and diversified changes in both psychic and somatic manifestations, and with the self-evident fact that the derangement is functional, since it seldom ends in dementia at the end of a score of years.

The morbid anatomy cannot be defined, and has not been shown to exist in the form of gross lesions, but in cases from cranial injury some fixed and permanent cerebral changes doubtless exist. The vasomotor disturbances of cerebral centres are inevitably attended with nutritional deficiencies. The pathogenesis of the cyclic explosions is in the nature of cortical discharges directly analogous to those which

attend the epileptic neurosis. The prevailing symptom of periodicity is only a revelation of the inherited tendency of the tension-storage of nervous energy spasmodically liberated from cortical regions at regular intervals. The pathological anatomy in the few cases recorded is too meagre to justify any definite statements.

Differential Diagnosis.—The appearance in early life of cœnæsthetic depression, in the absence of delusions and with rational behavior, if repeated at regular intervals, is diagnostic of periodical Insanity. In the same way cœnæsthetic exaltation, with a reasoning tendency and freedom from delusions, when periodically manifested, forebodes periodical Insanity. The diagnosis can be made beyond a doubt when there is periodic alternation of cœnæsthetic depression and exaltation.

The simple development of the melancholia followed by the maniacal state occurs in many psychoses, but a repetition of this sequence at regular intervals signifies the periodical nature of the Insanity. Time is an element in the differential diagnosis in certain cases.

Exaggerated self-feeling and extravagant delusions in the maniacal stage of periodic Insanity are to be differentiated from general paresis by the absence of the physical signs of the latter disease, and of general mental weakness, which rarely results at any time in periodic Insanity.

The cyclic return of symptoms in periodic Insanity is to be differentiated from the periodicity of paludal intoxication, and of hysteria and epilepsy, and from the monthly exacerbations attendant upon ovulation in many psychoses.

The differential diagnosis must be made between periodical Insanity and repeated attacks of alcoholic mania. It is to be considered that periodical Insanity may manifest dipsomaniacal tendencies. The absence of periodicity in the history of the alcoholic case, and the fact that aberration is hallucinatory in a characteristic way in alcoholic mania, which has more confusion of ideas and less reasoning facility, and marked cutaneous paræsthesia, and certain delusional characteristics, are sufficient points of differentiation.

Occupation psychoses may repeat themselves at intervals of a few years, so long as there is continued exposure to toxic agents and no change of calling to avoid the same, and they are not to be classed as periodical Insanity. The differential diagnosis is to be made from primary monomania, in which the same reasoning tendency exists, but the delusions are more systematized and slowly developed, and the exacerbations have not the same regularity, and the development

of the entire mental disease is lacking the abrupt changes found in periodical Insanity.

Prognosis.—The seventy-five per cent. of cases of periodical Insanity which have the pathogenesis of degenerate heredity must be regarded as having an unqualifiedly bad prognosis as to recovery. They may, during intermissions, enjoy some privileges in social life and perform some useful duties in business relations, but they are predestined to repeated returns of mental disorder while cerebral activity endures, or until gross brain disease extinguishes all intelligence.

Periodical Insanity, from the acquired neuropathic state, is but little more favorable in prognosis. Apparent recoveries occur, but the mental disorder almost invariably returns at the end of a few years. Theoretically, the possibility of recovery is to be admitted, and it may be deemed a matter of interpretation as to whether the long intermissions are in the nature of actual recoveries. A long intermission cannot consistently be considered as a recovery when a return of the disease is impending with absolute certainty.

Treatment.—The earliest evidences of periodicity in the depressed and exalted moods of childhood should be indications for systematic treatment. Education should then be conducted with special reference to strengthening the entire physical constitution. Order, regularity, discipline with uniform kindness, and habits of self-control are to be constantly inculcated in the child. Open-air life and all other hygienic means are to be perseveringly tried. Some active manual employment is by preference to be learned. Prophylactic treatment thus conducted may avert for many years the complete development of the disease.

When once fully declared, periodical Insanity can only be mitigated during the attacks by symptomatic treatment, and isolation in an institution is usually necessary for the longer attacks, but the more brief ones may be managed in private. During the intervals, as the time of the return approaches, bromide of potassium in full doses lessens the force of the explosions, just as in epilepsy.

Cannabis Indica has been recommended also, and some regard quinine appropriate for its antiperiodic effects, which certainly must be admitted in cases complicated with malaria.

The writer must confess that the bromides, while controlling in great measure the exacerbations, have in some cases on cessation been followed by still more violent outbreaks. They require to be given in large doses, and for the immediate control of symptoms are thus far the best known remedy because better borne than hyoscin or other

powerful sedatives. Opium is the most generally applicable remedy in the depressed stadia and the deodorized tincture one of the most available preparations.

The above are the only special points to be noted in the psychiatric management of periodical Insanity, which otherwise is to be dealt with on the general principles laid down in the chapter on Treatment.

When private treatment is undertaken, great precaution is necessary to guard against the lurking suicidal tendencies which characterize the depressed stadia of periodical Insanity. Two-thirds of all cases have suicidal, homicidal, or violent impulses, and about this proportion of cases are more securely treated in institutions than in private.

CHAPTER III.

INSANITY WITH ESTABLISHED NEUROSES.

Group: Epileptic, Hysterical, Hypochondriacal, Choreic, and Neurasthenic Insanity.

Section I.—Epileptic Insanity.

The intimate relation of epilepsy and Insanity is abundantly confirmed by statistical facts. The immense majority of all cases of epilepsy occur between second dentition and adolescence, and the numerical maximum of cases is attained at the crisis of puberty. Of the epileptic cases developing between and inclusive of the crises of second dentition and puberty, fifty per cent. ultimately suffer some mental or moral deterioration, which in fifteen per cent. of the cases reaches the grade of Insanity. More than twelve per cent. of all epileptics display distinct mental alienation. Out of 74,000 insane, in hospitals and asylums in the United States, for whom the form of disease was reported for the last census, the proportion of epileptics for each 1,000 was, for both sexes, 45.1; for males, 50.6; for females, 39.4.

Epilepsy as a degenerative neurosis, and hence hereditary, is here under consideration—that form usually termed idiopathic, and which ordinarily pursues a chronic course. Symptomatic epilepsy has less intimate relations to Insanity, and it may arise in connection with brain tumor or other focal brain disease, syphilis, alcoholism, and other toxic states, and from uræmia, diabetes, and auto-intoxications. Accidental and reflex epileptiform seizures from sensorial, visceral, and peripheral irritations have also less psychiatric interest, and even from a strict neurological point of view can hardly be ranked as true epilepsy, any more than Jacksonian spasms of groups of muscles from limited irritations of motor cortical regions. It was known as long ago as tickling was a mode of torture that peripheral irritation might cause convulsive syncopal attacks, just as olfactory stimuli in form

of certain odors will do the same thing in susceptible persons, or sexual titillation, but these accidental reflex phenomena are not epilepsy.

The epilepsy related to Insanity manifests itself in major attacks (grand mal), minor attacks (petit mal), and masked attacks, known as the psychical epileptic equivalent. The mental disorder precedes, attends, or follows these attacks, or it may be intercurrent as regards the seizures.

The types of Insanity appearing with epilepsia vera will now be considered.

Definition.—Epileptic Insanity is a degenerative form of mental disorder having the same pathological instability of nervous centres as the spasmodic neurosis to which the morbid mental manifestations bear intimate temporal and genetic relations.

The psychic explosions and the general convulsibility are common manifestations from discharge of unstable cortical regions, but this close relationship between the mental disease and the spasmodic disorder does not always exist when they occur together. Thus epilepsy may be an accidental intercurrent symptom in cases of Insanity with embolic softening, or syphilitic gummata, or paretic pachymeningitis, or alcoholic cortical changes, or senile cerebral involution, or the rapid cortico-meningeal lesions in delirium acutum. In the above definition of epileptic Insanity these accidental epileptic seizures, having no causative relation to the mental symptoms, are excluded, and it is necessary to make this exclusion in clinical practice, for the diagnostic and prognostic bearings are different in the two classes of cases.

Clinical Delineation.—The clinical features of epileptic Insanity are so varied that they can only be presented in brief outline. The mental symptoms appear in the following morbid states:

1. Cœnæsthetic depression or exaltation usually preceding the attack.

2. The melancholic state, with suspicious, hypochondriacal, or persecutory delusions. This state ordinarily precedes but may follow the attacks.

3. The maniacal state, with vivid hallucinations and delusions and destructive and violent tendencies. This state is most often the immediate sequel of the seizure, of which it is occasionally the psychical equivalent.

4. Epileptic furor, characterized by blind, unconscious, and brutal

violence. The patient is suddenly transformed into a demon of destruction toward all animate or inanimate objects. This furor is most often the immediate sequel of the seizure, but it may constitute the larvated attack itself.

5. Epileptic stupor, directly resulting from the complete exhaustion of emotional and intellectual centres by the sudden epileptic cortical discharge, and chiefly a post-paroxysmal state.

6. Epileptic moral perversion, which consists in a gradual deterioration of the whole character, entire loss of the altruistic sentiments, intensification of the egoistic feelings, perverted appetites, and irresistible impulses, and loss of control of the animal passions.

This state of moral perversion is most promptly developed as the sequence of epilepsia minor in youthful subjects, but it often follows epilepsia major when the attacks of grand mal are frequent and recurrent for some years in succession.

7. Epileptic automatism, lasting for hours, days, or weeks, during which the most highly co-ordinated acts or complete adjustment of conduct to all the affairs of life may take place.

Personal consciousness is partially or completely abolished during the shorter automatic states, of which there is no subsequent memory. In the prolonged automatic states there may be loss of personal identity, and of memory, so far as recollection of the events of this state is concerned after recovery from it, but upon subsequent reversion to this state its past memories may be revived.

Epileptic automatic states are usually sequels of the seizures, but they may be vicarious of the same.

8. Epileptic dementia is a general enfeeblement of all the mental faculties following chronic duration of the minor attacks most frequently, though it may be also a result of grand mal at the end of some years when the seizures are very near together.

The above clinical outlines portray the chief states of aberration in epileptic Insanity, and the more minute features of the disorder will be found under the head of symptoms.

Causes.—The psychic manifestations in epileptic Insanity stand in the light of effects of the epileptic neurosis regarded as an exciting cause, so that the causes of the epilepsy may be in the same sense regarded as the causes of the Insanity. A still broader etiological view might be to consider both the epileptic neurosis and the Insanity as parallel symptoms of the pathological instability of cortical centres.

As a matter of fact, an epileptic or insane parentage is found in thirty per cent. of all cases of epileptic Insanity. Imbecility, alcohol-

ism, debauchery and poverty, phthisis pulmonalis, and syphilis in the parents are hereditary influences. Direct exciting causes in patients are, cranial injury, insolation, alcoholic excess, acute infectious diseases, microbic infections, and auto-intoxications; and in early life the crises of birth, dentition, and puberty, as well as disorders of the primæ viæ and of the reproductive organs.

Stadia.—The stadial progression of epileptic Insanity will first be considered in its entirety, and then as regards its separate attacks. The intermissions between the seizures and the accompanying outbreaks of mental disorder may be so long that the latter may be regarded in some cases as independent attacks of Insanity.

In most instances, however, it is more scientific to regard the epileptic patient as suffering from a chronic form of mental disease, with remissions between the seizures; and viewing epileptic Insanity thus with reference to its entire course, there can be said to be but one attack having an initial, an acute, and a terminal stadium. The initial stadium in this sense begins in most cases in early life, at the maximum epileptic period, and is marked by youthful eccentricities and perversity of conduct, by depraved appetites and irresistible impulses, but seldom by more decided symptoms. The acute stadium then develops in acute modes of mental disorder, having all the types already enumerated as maniacal, melancholic, stuporous, and automatic. This stadium may continue for years, with constant remissions between the epileptic seizures and no very marked mental deterioration, but in the course of time it passes into a stadium dementiæ. This stadium dementiæ is terminal, and illustrates every degree of mental enfeeblement, even to the most abject loss of all mind. It is a typical degradation—moral, intellectual, and physical.

This is the stadial progression of epileptic Insanity viewed in its entirety.

Other epileptics, with months or years between their seizures causing mental disturbances, and no intellectual impairment in the meantime, may be regarded as suffering from independent attacks of Insanity, of which the separate stadia will now be studied.

The "stadium prodromale" may last for some hours or for a fortnight before the epileptic seizure and the acute mental disturbance. It is marked by simple cœnæsthetic depression or exaltation, or by hypochondriacal ideas and conduct, or by morose and irritable moods and restless and anxious feelings.

The exaltation takes the form of selfish, domineering, exaggeration of personal importance, with meddlesome interference in the

affairs of others and constant garrulity and quarrelsome tendencies, and a persistent impudence of speech and manner. Neuralgias, cephalalgias, gastralgias, vertiginous feelings, paræsthesias, and local cutaneous hyperæmias and anorexia and insomnia are physical symptoms of this prodromal stadium.

The stadium acutum is often ushered in by visual, auditory, olfactory, tactile, or visceral auræ, and then follows the convulsion with partial or complete loss of consciousness, the spasmodic glottic closure, with the tetanic contraction of expiratory muscles giving the "epileptic cry," and all the muscular phenomena and circulatory and respiratory changes too familiar to need description here. The psychical equivalent replacing this seizure may assume maniacal, melancholic, stuporous, or automatic forms. These same types of mental disorder are also post-paroxysmal and are a part of the stadium acutum, as is also the blind epileptic furor and the continued states of epileptic automatism. The epileptic mania may last for weeks or only for a few hours.

This stadium acutum gradually passes off, sometimes in prolonged sleep, from which the patient awakens rational. In other severe cases there follows a gradual convalescent stadium of a week's duration, with some mental feebleness and confusion of ideas, and clearness of intellect finally returns, and in these cases there is no interparoxysmal obscuration of mind. In other words, the attack of Insanity is at an end.

When this attack develops in connection with "petit mal" the epileptic psychical equivalent is more frequent, or the seizure is more often overlooked, and there is sometimes the appearance of attacks of Insanity independent of the epileptic seizure. The probability is that the seizure takes place without muscular, but with vasomotor, completeness, and with the full cortical discharge of nervous force. The violence of the mental disturbance bears no relation to the severity of the convulsions, and the maniacal attacks are sometimes more prolonged in "petit mal" than in cases with "grand mal." Active mental disorder after the status epilepticus is extremely rare.

The status epilepticus among the epileptic insane is a very grave complication, and it frequently gives a fatal termination to the stadium acutum of the mental disorder.

Symptoms.—The psychic symptoms in epileptic Insanity in a series of cases would include the following anomalies:

Hallucinations and illusions of all the special senses and functional excess or diminution of the same. Anæsthesias, paræsthesias,

and hyperæsthesias. Visual, auditory, tactile, gustatory, olfactory, and kinæsthetic auræ epilepticæ. Partial or complete losses of consciousness, with occasional changes of personal identity and double consciousness. Feebleness, confusion, and sudden losses of memory, and mistakes in places and identity of persons. Distorted imagination and wild play of fantasy, with characteristic phantasmagoria epileptica.

Slowed reaction time for visual and auditory stimuli, and greatly retarded thought-rate in some cases. Confusion of ideas and anomalous association of same. Delusions of both primordial and hallucinatory character.

Changes in the cœnæsthesis as based on the sum total of organic sensations.

Vivid and changeful emotional states often tinged with religious or sexual ideas.

Violent passions, continued irascibility, and explosions of anger and hatred and of all the antisocial feelings. Loss of ethical sense and of natural affection, and of all the higher sentiments. Perversion of the appetites, polydipsia, bulimia, anthropophagy, and contrary sexual feeling.

Abulia, irresistible impulses, suicidal and homicidal tendencies.

The somatic symptoms which are liable to be encountered in epileptic Insanity may be briefly summarized as follows:

Imperfect osteological formation, and often diminutive skeletal growth. Cranial deformities, and deflexions of vertebral column. Facial asymmetries and palatal and dental abnormalities. Muscular inco--ordinations, atrophies, pareses, spasms, tonic and clonic ; tendinous contractions, blepharospasm, strabismus, nystagmus, choreiform tics, and cataleptoid and tetanoid states. Paroxysmal tachycardia, vascular hypertony, cortical angiospasm, local cutaneous hyperæmias and ischæmias, hyperidrosis, chromidrosis, and ptyalism.

Neuralgias, hemicrania, crossed variation of cranial temperature, neuralgic herpes, scotoma, dyschromotopsia, astigmatism (seventy-five per cent. cases), disturbed innervation of ocular muscles and megalopsia.

Insomnia, incubus, somnambulism, or somniloquism. Modifications of respiration and pneumogastric disorders, gastro-intestinal disturbances, constipation, anorexia, and general trophic anomalies.

It is of great diagnostic importance to recognize the fact that vasomotor, muscular, or sensory disturbances may be vicarious of the epileptic seizure, just as much as the psychical equivalent.

Thus, in lieu of the epileptic seizure there are sometimes witnessed cutaneous hyperæmia unilateralis, spastic migraine, paroxysmal bradycardia or tachycardia, with a pulse of 40 or 150 per minute.

The vicarious muscular symptoms are still more important and consist in twitching of certain muscular groups, monospasms, clonic fibrillar action, ocular spasms, and facial inequalities of innervation, which resemble hemiplegic or paretic conditions.

The sensory equivalent of the seizure consists in various forms of neuralgia, resistant to quinine, but yielding to bromide treatment, and in paroxysmal visceralgias, which likewise are mitigated by anti-epileptic rather than by anti-malarial remedies.

It would be appropriate to depict here the epileptic physiognomy, but words fail to convey that which the expert eye at once detects. That there is a "facies epileptica" is proved by the ability of some hospital physicians to diagnose many cases at a glance. The obliteration of facial lines of expression is as great in some epileptic dements as in paretics.

Disturbances of speech occur after epileptic seizures in a few cases. The slowed speech is due to retarded thought-rate. There are actual impairments of articulation temporarily, and balbuties and scanning speech may occur, and also echo-speech. Vocal tremor may be present and due to defective diaphragmatic innervation. Brief aphasic attacks are not uncommon and are post-paroxysmal.

Pathology.—Epileptic Insanity is dependent on hereditary instability of nervous centres in very many cases. This cortical tendency to discharge of nervous force may be acquired. The prime factor is presumably an anomaly in the periodical rhythm of nutrition of cortical cells. The morbid histological changes are, according to Bevan Lewis, increase of the neuroglia and fatty change in the nucleus of sensory nerve-cells of the second layer of the cortex which exercise inhibitive influence over the large motor cells, which discharge when this influence fails from disease of the sensory cells.

The nuclei of the cells later undergo vacuolation, which is the characteristic change in this form of Insanity. At a still later period connective tissue and vascular changes may occur. The sclerotic lesions sometimes found in cortical regions probably are secondary results and more apt to be found in alcoholic cases.

As hereditary taint can be traced in nearly a third of the cases, it is well to know that most direct pathological relations exist between epileptic Insanity and alcoholism, debauchery, criminality, and malnutrition in the parents.

A pathological consideration of great importance is incompatibility of the spermal and germal parental elements. To this is probably due the great relative excess of epileptics in half-bred races. Among the colored insane in institutions in the United States (as shown by the last census), many of whom were half-bred, the ratio of epileptics per 1,000 was for males, 94.8, and for females, 73.0 ; while the same ratio among whites was for males, 50.6, and for females, 39.4.

Differential Diagnosis.—The differential diagnosis is dependent in the first instance on the diagnosis of epilepsy itself. Genuine epilepsy must here be differentiated from symptomatic attacks from cerebral disease, and toxic states, or from reflex causes, and also from hysterical seizures. The spasmodic features of true epilepsy are not always sufficient for this differential diagnosis. If the whole symptom complex of "grand mal" is present, the aura, the cry, the loss of consciousness, the vasomotor and respiratory and muscular phenomena, there is no difficulty, but in cases with "petit mal" the objective signs are inadequate. In doubtful cases the history and the subsequent course of the disease in connection with the special character of all the physical and mental signs can alone decide. Without this history and this course of the disease it would be impossible to decide between certain cases of general paresis with epileptiform seizures, and epileptic Insanity with the frequent symptom of inequality of pupillary and facial innervation.

In organic dementia the differentiation is to be made on the ground of absence of an epileptic neurosis, and on the intercurrent nature of the seizures and on their subsequent disappearance while the cerebral disease and dementia persist.

The syncopal attacks with twitchings of facial muscles in senile Insanity are not to be mistaken for epileptic seizures, any more than similar symptoms in climacteric Insanity marked by vasomotor anomalies and occasional cerebral angiospasm, or fainting spells, as they are called.

In a word, Insanity, with accidental syncopal attacks or even epileptic attacks intercurrent and due to coarse brain disease or toxic agents, is not epileptic Insanity, which is alone intimately associated with the epileptic neurosis and the chronic and genuine epilepsy.

Prognosis.—When the seizures of "grand mal" occur once in several years and the accompanying mental disorder disappears for the same length of time, recovery may be admitted once, twice, and possibly a third time. This is a question of opinion. The fact is that the attacks become more frequent and mental deterioration begins

after the first few attacks of mental disorder, even though they be brief. The mental decline is more rapid in "petit mal" than in "grand mal," and still more decided in the mixed forms of "grand" and "petit mal," and the prognosis is more unfavorable the earlier the onset of the epilepsy, which leads to dementia in insane cases epileptic before twenty years of age.

Regarding epileptic Insanity in its entirety and from a strictly scientific point of view remissions but no recoveries would be recognized in the vast majority of all cases.

Prognosis as to general usefulness is bad, for most insane epileptics are a constant menace to public safety, and seclusion in institutions is usually advisable.

Prognosis as to life is not decidedly bad. The expectation of life is lessened, but death does not often follow, except by the status epilepticus, and such suicidal and other violent accidents as other insane patients meet. The actual duration of life is somewhat shorter than in certain other forms of Insanity.

Treatment.—Treatment should be begun early in children, and continued for consecutive years, and long after the cessation of the seizures; for it is only in this way that prophylaxis as to Insanity can be exerted.

Cases developing in later life must undergo the same prolonged treatment. Bromides of potassium, sodium, and ammonium are most effective in the order named. The dose is to be carried to the full physiological effect of the drug without regard to the number of grains. Men bear larger doses than women, and the latter larger than children. A tolerance of the drug is soon established in some cases, and in others it must be gradually increased to avoid digestive disorder. The bromide of sodium disturbs the stomach less, and it is better to give the drug after meals, because it is then less apt to derange the stomach. If there is periodicity distinctly marked in the attacks the drug should be given in large antiperiodic doses just before the seizures.

Bromide of ammonium is the most irritant of the bromides, and should only be used in combination with other bromides. In the anæmic cases bromide of iron may be given, and arsenic for its effect on general nutrition is highly useful, and also to prevent acne. Digitalis, in sustaining cardiac action, is of special value in nocturnal epilepsy, which occurs when circulation and other vital functions are at lowest ebb, in the small hours of the morning.

Bevan Lewis commends cannabis indica in connection with bro-

mides. Chloral hydrate combined in small doses with the bromides heightens the effect of the latter. Quinine should only be used in malarial cases, for it increases the convulsive tendency.

Iodide of potassium is needed in syphilitic cases and in plumbism. Hydrotherapy is useful in most cases. Out-door occupation and all hygienic measures are to be tried systematically. The diet should be whatever the patient assimilates most easily, and that which best sustains the general strength and nutrition. All limitations of diet lowering the general vigor and nutritive level are bad without regard to theories as to nitrogenous food, which is not harmful *per se*.

Operative procedure is indicated in traumatic cases, and the surgical removal of sources of irritation in reproductive organs may be effective. Phimosis in masturbatic boys calls for circumcision. The status epilepticus may be treated by chloral per enema, croton oil, two drops on the tongue, nitrite of amyl inhalation, chloroform inhaled with caution, and, if cerebral congestion is intense, venesection may give more prompt relief than other remedies. Cold to surface to reduce temperature is indicated. Death is inevitable in many cases. Of late a preliminary opium treatment has been used, and then a sudden change is made to bromides in the confirmed epileptic cases. Good results are claimed.

Acetanelid, antipyrine, borax, and many other recent remedies are highly recommended for the treatment of epilepsy, for which new cures have been discovered every year for the last two thousand years. Any new remedy seems to have some effect on certain cases, and others respond favorably to none.

Psychotherapy is by no means in vain, and cheerful surroundings, occupation, and the personal influence of the physician have astonishing effects in epileptic cases.

In children reflex sources of convulsions, such as ascarides or other forms of worms, gastric, intestinal, dental, ocular, and aural irritations, are to be removed. Toxic and diathetic states are to be treated and all prime causes removed so far as possible.

Special treatment should be continued after the disappearance of the seizures for at least one year.

Section II.—Hysterical Insanity.

The term hysteria in popular use signifies every form of emotional, extravagant, and uncontrolled actions, accompanied by a nervous manner. It is here strictly limited to a distinct psychopathic state, which is itself dependent on a pathological condition of the

nervous system, inherited in most instances, but exceptionally developed by etiological factors, which will presently be noticed. This hysterical neurosis may exist in minor or major form, and, in fact, in every conceivable degree, but it is usually strongly pronounced in cases which eventuate in Insanity.

It will be found in such cases that the history of great instability of feelings and conduct can be traced to early childhood, that life was begun on hysterical lines, and that there was an exacerbation of all the symptoms at puberty, at which time the first decided manifestations of mental disorder often appear.

A description will now be given of the hysterical Insanity, which is the direct outcome of this permanent constitutional hysterical neurosis.

Definition.—Hysterical Insanity is a form of alienation springing from permanent unstable equilibrium of nervous centres, and loss of inhibition of the higher cortical regions, marked by loss of control of ideas and actions, exaggerated impressionability, morbid self-pity and desire for sympathy, emotional explosions, illusions, delusions, disorders of consciousness, psychic stigmata, and transient and changeful symptoms of functional disorder of the whole physical organization.

In this definition two facts are to be specially noted: First, that the instability of cortical centres is permanent—an organized trait; and second, that the inhibition of the higher cortical regions, of the intellectual centres, over the emotional, sensory, and motor centres is greatly impaired.

Clinical Delineation.—The hysterical stigmata, the sensory, vasomotor, and muscular disorders, and other disturbances of the physical organization will receive attention under the head of symptoms, and only the chief types of the protean psychic disturbances will be here outlined. These typical states of hysterical Insanity may be thus classified:

1. Youthful State of Perverted Feelings and Impulses.—The complete hysterical neurosis is seldom developed before the sixth year, but the complete prodromes often appear in early childhood. There is then to be observed the morbid impressionability and extreme reaction to slight causes which may throw the child into paroxysms of hilarity or depression, which may verge on suicide. In the same way follow outbursts of anger and destructive tendencies. There is often precocity of sexual feeling, or of religious emotion, during which trance-like visions may be described. Night terrors and sleep-

talking are common. Day-dreaming and fantastic ideas and a failure to distinguish the real from the unreal are characteristic. Lying springs in part from this cause, and also from an actual perversity, which reveals itself in mischief, cruelty, loss of natural affection, and in irresistible impulses to all kinds of evil doings.

When punished for wrong-doing the child falls into hysterical spasms of rage, which may last for hours, until terminated by sheer physical and mental exhaustion, followed by a stuporous state of some hours. Severe anger or other emotion in these cases may also give rise to syncopal attacks. Morbid love of sympathy even at this early age, and exaggerated self-pity are to be witnessed. The child magnifies slight ailments or inflicts slight self-injuries to enjoy the commiseration of others. The degree of perversion of the feelings and impulses may be very great, and lead to violent, destructive, and revengeful acts. In rare cases, both in boys and girls before the sixth year, sensory as well as motor symptoms appear in full force with the complete spasmodic attack. Hysterical cough, aphonia, and limited spasmodic affections are also to be observed in children.

2. Hysterical Mania.—The hysterical maniacal state may precede, supplant, or succeed the hysterical attacks. It may last for days or weeks, during which the patient may be boisterous, destructive, hallucinated, and deluded, but still having a keen wit and apparent complete comprehension of surrounding events. These glimpses of clear consciousness and of reasoning tendency extend through the attack and contrast strangely with the conduct, which is often of the most outrageous character. Patients in this state are mischievous and malicious, stick pins in other patients, pull their hair, destroy and throw things out of the windows, strip themselves and make indecent exposures, are profane and obscene, neglect cleanliness, and soil their rooms, upset their food at table and break dishes, and require constant watching. They come out of this mania very suddenly. While in it they lose flesh and the vital functions are more or less deranged. The mania takes the place largely of the spasmodic seizures, which are rare during the mental excitement.

3. Hysterical Melancholia.—This melancholic state may precede, follow, or replace the hysterical attack. It is marked by anorexia, insomnia, constipation, depression of spirits, religious talk, restless anxiety, wringing of hands, pulling out of hair, picking skin sore in places, impulses to self-injury, cutting of wrists with bits of glass or a pin, weak attempts at suicide, which is seldom accomplished unless by accidental success of the effort, neglect of person and clothing, and

by constant demands of attention from nurses and physicians, fault finding with that which is done for them, and obstinacy and resistance to that which they are advised to do. Another type of hysterical melancholia is marked by constant recumbence, passive resistance to attempts to move or dress, complete mutism, flexed joints, closed eyes, and neglect of food and personal needs. Such patients have to be fed, which they come to enjoy, and to be waited upon like children, which is also pleasing to them. They have complete memory of all the events of the attack, which may last some weeks or months, and is often attended by some religious delusion or hallucination, or by a belief of inability to stand or walk. Joints may become permanently ankylosed in these cases if passive exercise is not carried out. There is usually gradual loss of weight.

4. Hysterical Somnolence.—This somnolent state may last days or weeks. The patient is easily aroused to partial consciousness, but relapses quickly into sleep, which is continuous, but not profound. The pulse and respiration are slightly slowed. A still more rare condition is hysterical trance, from which the patient cannot be aroused ordinarily, and respiration is superficial and retarded, and circulation feeble, and all the vital processes reduced to a minimum.

5. Hysterical Stupor.—This is an acute stuporous condition sequent ordinarily to the severe hysterical attacks and having a duration of days or weeks. It is due to exhaustion, and exceptionally to acute hallucinations and delusions.

6. Hysterical Automatism.—This state merits further study. It is not entirely automatic, but consciousness is largely in abeyance, or at least preoccupied exclusively with a certain class of ideas. It is not somnambulism and is a sort of a waking dream. There is only confused memory for that which occurs during this state, which rarely continues but a few hours, during which the patient may automatically perform curious actions with no apparent motive.

7. Hysterical Deterioration.—In the course of years there is a gradual but steadily progressive deterioration of mind and character in hysterical cases. This is specially marked in those strongly hereditary cases which begin early in life. In them this deterioration finally reaches a high degree of mental enfeeblement.

The above are the clinical outlines of the chief types of the psychic disorder in hysterical cases.

Causes.—Direct heredity is the most frequent cause, especially in youthful subjects. Transformed tendency is frequent from parents

in whom there had been Insanity, epilepsy, neurasthenia, or drunkenness.

The inherited tendency may be developed by a great variety of exciting causes, such as fear or other emotional shock, prolonged stress of domestic or business life, traumatic injuries of brain or spine, toxic and autotoxic states, the evolutional and involutional crises, infectious diseases, hemorrhages, chlorosis, parturition, sexual excesses, moral contagion, hypnotism, poverty and malnutrition, and bad education and associations.

Hysterical Insanity is three times more frequent among women than men, and it is most apt to appear at the age of puberty. It is more common among mixed races, and among the interbred aristocracy or the impoverished classes. Drug habits and alcoholic indulgence tend directly to develop the latent tendency to the disorder, and over-study in children is also a common exciting cause. In children also neglect, exposure, and cruelty are causative.

Stadia.—In marked hereditary cases beginning in childhood the Insanity must be viewed in reference to its entire course. It then has an initial stadium of perverted feelings and impulses, culminating ordinarily at puberty in the acute stadium, which continues for years with the various states depicted under clinical delineation. If recovery occur, which is the rare exception, there is a gradual convalescent stadium.

In most cases there is progressive deterioration, and following the acute stadium a terminal stadium of dementia, which is not as decided as in epilepsy, but still amounts to general mental enfeeblement, which completely unfits the patient for the duties of life. Hysterical Insanity from traumatic injuries has a long initial stadium of months on the average, and an acute stadium of one or more years often, followed by a terminale stadium of mental enfeeblement in most cases. The exceptional recoveries are gradual. Hysterical Insanity, in connection with hemorrhages, parturition, and the menopause, may have a convalescent stadium, but this also is exceptional.

The single acute attacks of hysterical mania, followed by no recurrence, and by prompt recovery, and having no prodromes, are mistakes in diagnosis.

Symptoms.—The stigmata of hysteria which are deemed specially diagnostic are limitation of the visual field, hemianæsthesia, and disturbance of the special senses on the hemianæsthetic side more especially. The hearing may be diminished for the lowest and highest notes, and, besides concentric narrowing of the visual field, there may

be loss of the color sense. Taste and smell may be affected. The anæsthesia to pain may be on one side only (usually the left), including the skin, mucous membranes, muscles, as well as the special senses. The analgesia may be confined to zones or to very limited areas. In the achromatopsia the disappearance and reappearance of colors was in regular order, and influenced by magneto-therapy in cases shown to the writer by Charcot many years ago.

In hysterical Insanity, with pronounced hysterical neurosis, symptoms can be created by suggestion, just as in hypochondriacal Insanity, and artificially educated patients are not safe material from which to draw general conclusions. This remark applies to traumatic hysterical Insanity, in which patients have sometimes undergone a sort of education in symptoms from medical examinations and interviews during years of traumatic hysteria before decided mental disorder. In the study of cases this possibility of symptoms from suggestibility will be constantly confirmed. The reality of the symptoms in hysterical Insanity, however, cannot, for a moment be doubted. There are hyperæsthetic and neuralgic zones, spinal tenderness, coxalgia, clavus, arthralgia, and visceralgias. Hysterogenic points are often mammary, epigastric, or ovarian, and among the hysterical insane the intercostal regions are most often hyperæsthetic and hyperalgesic. Megalopsia and micropsia are by no means rare, and the sensation of enlargement of the head or special parts of the body or of diminution of the same is very common.

The motor disturbances consist in tonic and clonic spasms, pareses, monoplegias, paraplegias, hemiplegias, contractures, atrophies, and tremors.

Vasomotor disorder is shown in one-sided or localized hyperæmias and ischæmias, in hyperidrosis lateralis, capillary stigmata, and variations in superficial temperature. Modifications of respiration, dyspnœa, barking cough, oscedo, sternutation, and tremulous voice from imperfect diaphragmatic innervation, and singultus are common symptoms.

Gastro-intestinal symptoms, anorexia, dysphagia, emesis, eructations, merycism, borborygmi, tympanites with delusions of false pregnancy, and emotional diarrhœas are frequent.

Anuria, polyuria, menstrual irregularity, nutritive disturbances, anomalies of sleep, trophic derangements, and disorder of pneumogastric functions, are also to be observed. Globus hystericus is due to spasm and paræsthesia.

In children and young persons, before the major hysterical symp-

toms are developed, there are chiefly such manifestations as perverted appetite, frightful dreams, enuresis, neuralgic pains, cephalalgia, and sexual irritation. The crises are more emotional than spasmodic, and consist in automatic laughing and crying, or in demonstrations of unaccountable fear or anger. Incubus and somnambulism are common.

The hysterical attacks in the fully developed cases are confined to violent emotional outbreaks, or they take the form of acute maniacal exacerbations, which may reach the extreme of hysterical furor. On other occasions these crises may be, in the main, spasmodic, consisting in violent movements of the extremities and of the whole musculature. These convulsions among the insane never have the hystero-epileptic type with such elaborate performances as are described under this title in writings on hystero-epilepsy. At least no such instance has ever occurred among the ten thousand insane cases which have been under the writer's charge.

In all completely developed cases of hysterical Insanity the condition between the paroxysms is one of decided hysterical perversion, and the complete lucidity which follows certain epileptic seizures is wanting.

The moral perversion is very pronounced, and mendacity, histrionic deception of all kinds, accusations against nurses and physicians, and malicious conduct toward husband or near relatives is characteristic.

The deterioration of the intellectual faculties is very gradual, but general enfeeblement of mind ultimately results.

Pathology.—All the evidence points to neurotic heritage in the pathogenesis of hysterical Insanity. The fundamental instability of the nervous centres is due to some nutritional anomaly of the emotional and intellectual cortical regions in the first instance, and later of the whole cerebro-spinal system, as manifested by the almost universal nature of the motor, sensory, trophic, and vasomotor symptoms. That the fundamental nutritional defect may be favored by chronic auto-intoxication is highly probable.

Differential Diagnosis.—The chronic course and highly characteristic group of symptoms of hysterical Insanity obviate difficulties of differential diagnosis. It is true that the hysterical stigmata and the sensory motor and visceral crises may be present in various degrees of completeness, but, taken in connection with the whole history of the case, they leave no room for doubt.

On the other hand, there may be, so far as individual symptoms

are concerned, serious difficulty in diagnosis between functional and organic affections. This is true of the paralyses, contractures, and arthritic affections, of the œsophagismus and organic stricture of the œsophagus, of hæmatemesis and gastric ulcer, and of the hysterical dyspnœa and true asthmatic attacks. The differentiation of these points pertains to surgical, medical, and neurological works and is beyond present limits.

The loss of consciousness in rare instances may be complete in the hysterical attacks, but other features of the attack differ so widely from epilepsy that no practical difficulty of differential diagnosis exists.

Prognosis.—The form of mental alienation which alone merits the designation, hysterical Insanity, is in the greatest number of cases progressive and decidedly unfavorable in prognosis as regards ultimate recovery of mental integrity. Individual attacks of mania or melancholia may pass away, but the perversion of character remains with the recurrent tendency, and the exacerbations become more frequent and intellectual deterioration finally results.

In rare instances of traumatic or climacteric origin there is a gradual and complete recovery from hysterical Insanity. The prognosis as to the chances of life are better than in epileptic Insanity, but the actual expectation of life at any given age is diminished decidedly by hysterical Insanity.

Treatment.—Isolation is the basis of treatment in acute maniacal or melancholic attacks, as well as in the confirmed neurosis with progressive deterioration beginning in early life. In the latter case prolonged disciplinary and educational methods carried out under medical supervision are alone of any avail. In the former instance the entire appointments of an institution for the insane are usually essential to meet all the emergencies of the case.

Psychotherapy is of first importance in the treatment of hysterical Insanity, and the influence of the physician is the supreme moral means of alleviation of the patient's sufferings. The rest-cure is applicable in many cases with massage, and forced alimentation, if need be.

Hydrotherapy judiciously and persistently carried out is of decided benefit in some cases.

Electrotherapy has very special applications as regards the muscular disorders, the paralyses and atrophies and contractures, for which static sparks and faradic applications are best adapted.

General hygienic measures are not to be neglected, and daily oc-

cupation of some kind in the open air is essential. Out-door games and the cultivation of a taste for some active pastime are useful. The patient should never be left absolutely idle.

Therapeutic remedies are only to be prescribed when positively indicated, and the less the patient's attention is directed to drugs and to his own symptoms, the better will be the final result. Bromides are not as successful as valerian, asafœtida, turpentine, monobromated camphor, and valerianate of zinc.

The hysterical attacks may be controlled sometimes by ovarian pressure, or by pressure of supra-orbital region, or by cold douche, or by emotional shock, severe reprimands, or other sudden impression. Such means are seldom of any permanent benefit.

The attacks may also be arrested by anæsthetics, chloral hydrate, or the administration of an emetic. For the latter purpose the hypodermatic use of apomorphine hydrochlorate (grain $\frac{1}{15}$) is the most prompt means.

The ordinary hypnotics and alcoholic stimulants are to be avoided in general, since a drug habit is quickly formed.

Iron and arsenic are of occasional use. The diet should be generous, and specially modified to suit the frequent idiosyncrasies of hysterical cases. Fats in some form are necessary. Gastric crises and emesis and œsophageal spasm render rectal alimentation an occasional necessity.

In the melancholic cases the frequent fasting with suicidal declarations is not to be allowed to lower the general standard of nutrition, but is to be promptly met by nasal feeding with predigested foods in cases with impaired digestion, and in other instances with full physiological quantities of mixed foods prepared as directed in the section on dietetics.

Section III.—Hypochondriacal Insanity.

In monomania the attention is often occupied with pain delusively interpreted, in alcoholism absurd tactile illusions may fill the mind of the patient to the exclusion of other ideas, in general paresis there are extravagant ideas of disease of various organs, in ordinary melancholia there may be dominant delusions of disease which does not exist, and all these symptoms may be termed hypochondriacal, but they are not true hypochondriasis, nor do such manifestations constitute true hypochondriacal Insanity.

Hypochondriasis vera is a distinct neurosis, and a form of neurotic degeneracy, which may manifest itself in a characteristic group

of symptoms from childhood to old age. This neurosis borders closely upon Insanity, into which it often passes at puberty or at the involutional epoch, and it has the numerical preponderance in men that hysteria has in women. Some writers merge hypochondriasis in hysteria or neurasthenia, but this serves to explain nothing, and only obliterates a positive clinical group of symptoms, which for two thousand years have been recognized as distinct facts, which cannot be doubted by medical men who have seen patients incapacitated for a life-time by hypochondriasis ending in Insanity of a pronounced type.

Definition.—Hypochondriacal Insanity is a form of aberration issuing from the hypochondriacal neurosis, with perversion of organic sensations, persistent introspection, changes in the cœnæsthesis and in conscious personality, and anxious and exaggerated delusions as to imaginary diseases.

Clinical Delineation.—The muscular, neural, circulatory, and respiratory sensations, which in sum total constitute the cœnæsthesis, are in health unconscious, but in the hypochondriacal neurosis they become painfully conscious.

This morbid change in the cœnæsthesis—this perversion of the sum total of organic sensations—is the essence of hypochondriacal Insanity. All the organic impressions, which are in health subconscious, arise with abnormal and painful force into consciousness, and determine a change in physiological personality. The organic processes and bodily functions become forced objects of attention on the part of the patient, and furnish the raw material of the hypochondriacal delusions.

The cœnæsthesis is a prime component of personality, and its alteration here leads to partial change of identity in patients who, through perverted organic sensations, come to regard part of themselves as dead, absent, or composed of foreign material. This anomaly of organic consciousness may eventuate in complete failure of self-recognition, and in entire change or loss of personality. These rare and extreme cases only serve to illustrate the importance of cœnæsthetic consciousness as an element of self-identity.

The first clinical features of the hypochondriacal neurosis are to be seen in early childhood in many instances. The child shows an unnatural interest in its own health, thinks and talks much about little aches and pains, exaggerates to a ridiculous degree petty ailments, and deserts play to be treated for its imaginary diseases. The introspective attention to the affairs of the body, the over-sensitive-

ness to slight physical impressions, the morbid love of sympathy for the imagined suffering, the sickly delight in drugs and treatment, and the extreme indulgence of self-pity are all to be witnessed in the child as unmistakable outlines of the hypochondriacal neurosis.

At the pubescent epoch all the symptoms are wont to be aggravated. The hypochondriacal patient, who is male in the majority of cases, concerns himself at this age with the latest function which has forced its way into organic consciousness. Every phase of sexual life is watched with the usual morbid interest by the patient. Slight preputial irritation or sensitiveness of the urethra becomes the cause of serious alarm, and a few seminal emissions result in consternation and the consultation of numerous physicians, until one is found charlatan enough to agree with the patient that his health of mind and body is in imminent danger and can only be saved by powerful and continuous medication.

If at this age the patient chances to be female there is constant worry about menstruation, careful study of the menstrual discharge, and a tendency to invalidism and bed-habit between the monthly epochs. Vaginal or ovarian hyperæsthesia are construed to mean serious local disease, for which treatment is sought persistently at the hands of specialists, who in vain assure the patient of the absence of organic trouble. These patients, filled with delusions of uterine disease, haunt the offices of gynæcologists for years, hoping for relief and yet fearing the worst, and refusing to believe that which they are told, because their mental disease embraces in itself the idea of bodily disease.

As the neurosis is with years fully developed, the ideas of disease extend to the whole organism, and the brain, the stomach, the intestines, and all the internal organs in turn may become objects of deep concern, and the source of perverted sensations and insane delusions.

The neurosis by this time has passed into evident Insanity, which unfits the patient for the duties of life. There is entire concentration in self, and in delusions of disease. Natural affection is lost, and all social and business interests are neglected. The whole life becomes a deluded study of imaginary diseases about which the patient will discourse for hours together, and from which the attention can only be diverted for a few moments by any conceivable means.

After years of this acute stage of perverted feelings and delusions, there may follow different degrees of enfeeblement of all the intellectual faculties, with changes in personal identity, or ridiculous fixed delusions as to the actual state of the body or internal organs, and

a complete retirement from the world to a solitary existence passed in a narrow circle of ideas of disease. This is the hopeless termination in the majority of confirmed cases, and the above are the general outlines of the clinical features of hypochondriacal Insanity. The special variation of symptoms within these outlines will be described directly.

Causes.—The prime cause is the degenerate neurosis, which is an inherited defect of nervous organization, shown often from the earliest years of life.

The secondary causes are physical or mental stress, or any of the ordinary excitants of inherent tendency to mental alienation.

The Insanity is the immediate outcome of the neurosis, just as in hysteria and epilepsy developing into mental disorder.

A broader etiological view may be to regard both the neuroses and their sequent mental disorders as only manifestations of the functional deficiencies of the entire nervous organism. The heredity is sometimes direct and at other times transformed. Thus hypochondriacal Insanity may be a heritage from parents suffering from any of the neuroses, alcoholism, imbecility, syphilis, or other forms of mental disease. Heredity, direct and homologous, has often been seen in sons or daughters repeating the identical hypochondriacal type of Insanity, and even the identical hypochondriacal delusions of their parents. In other families there is a continuous developmental origin, with a hereditary history of alcoholism and sexual excess in the grandparents, hypochondriacal neurosis well developed in the parents, and hypochondriacal Insanity in the children, who become patients in hospitals for the insane.

In exceptional cases the hypochondriacal neurosis and the resulting Insanity may be acquired by physical or mental traumatism. These traumatic cases are not very favorable, but they are less hopeless than the directly inherited types.

The exciting causes determine rather the special form of the hypochondriacal symptoms. Thus sexual excess develops the tendency to aberration in sexual hypochondriasis, trauma capitis in cerebral hypochondriasis, and any other real physical trouble may serve to develop allied hypochondriacal delusions. In one instance the direct exciting cause was the slight abrasion of the throat by a fish-bone immediately extracted. The patient dwelt upon the idea that part of the bone remained, continued to think and talk about it, and developed a delusion, which no surgical skill could remove, and despite all assurances to the contrary surrendered completely to the delusion,

which practically incapacitated the patient for several years, at the end of which time other hypochondriacal delusions appeared to confirm the Insanity, which became chronic, with a certain reasoning tendency, characteristic of hereditary types. In all similar cases the essential thing is the hereditary tendency and the latent neurosis, and the exciting cause and special direction of the first delusion are of accidental importance.

Stadia.—In the most degenerate cases there is an initial stadium beginning in childhood and culminating at puberty in a fully developed acute stadium of long years' duration, and ending after middle life in a final stadium of mental enfeeblement, which terminates only with life.

In instances of the acquired hypochondriacal neurosis there may be a brief initial stadium following severe mental shock or physical injury, and then an acute stadium of long years' duration followed by a terminal stadium of mental deterioration. In rare cases developing at the menopause there may be a convalescent stadium and complete recovery, and the same may occur after recuperation of the nervous system from traumatic accident, but such instances are very exceptional.

Symptoms.—The essential and fundamental symptoms are those of the hypochondriacal neurosis, and the innumerable sequential symptoms are, in a measure, casual and dependent on the age, sex, constitution, education, and social station of the patient.

The essential psychical symptoms are the appearance in the mind of organic impressions normally unperceived, the heightened consciousness to all visceral and peripheral stimuli, the morbid interest in bodily functions, the gross exaggeration of organic sensations, the absurd delusions of disease originating in explanatory efforts of the influx of strange organic feelings, the perversion of the cœnæsthesis, the changes in organic consciousness and in personal identity, and the final incessant preoccupation with delusive beliefs of imaginary physical evils of all kinds.

The changes in perception are marked. In the early stage there is hyperæsthesia acustica. The slightest sounds are magnified, and loud noises may be very painful, so that these patients often fill their ears with cotton to shut out sounds. Hyperæsthesia optica exists in rare cases. Photopsia, megalopsia, and micropsia are occasional symptoms. Cutaneous hyperæsthesia exists in the initial stadium, but later there may be hyperæsthesia or anæsthesia. Paræsthesias are constant symptoms.

There are perversions of taste and smell and occasional illusions and hallucinations of all the special senses.

The ordinary pleasurable physical sensations are exchanged for numerous painful impressions from internal and peripheral sources. The prevailing mood is depression. Social feelings are excluded by selfish ideas of bodily discomfort. Natural affection and interest in family is lost, and the higher altruistic sentiments disappear and are replaced by dominant delusions of disease. Memory fails because the attention is preoccupied with ideas of physical suffering, which excludes all else from the immediate field of consciousness. Consciousness is heightened for all organic sensations, but there is a limitation of objective consciousness. Thought-rate is slowed, and thought is inhibited largely by the painful state of organic consciousness.

Appetite is diminished, and not infrequently there is sitophobia. Sexual desire may be perverted and intercourse painful, and in women aversion is common, and psychical impotence often exists in men. Libido sexualis is exceptional. Abulia is universal, and impellent ideas and irresistible impulses are not very rare.

Among the somatic symptoms are to be noted vascular hyperæsthesia, and pulsation of temporal and carotid arteries and of the abdominal aorta, spasmodic twitching of muscles, cramps, spasms, pareses, and contractures from disuse, cutaneous paræsthesias, pruritus, formication, neuralgias, vasomotor anomalies, precordial panic, cephalalgia, cerebral hyperæmia, visceral paræsthesias, diminished peristalsis and coprostasis, cardiac dyspnœa, and disorder of pneumogastric innervation, which latter symptom is more prominent than any other physical phenomenon in hypochondriacal Insanity.

There are certain types of cases constantly encountered. One of the most common is the œsophageal type, in which the delusions relate to some imaginary disease of the œsophagus. The patient declares that the throat has grown together, that there is a foreign substance in it, that there is stricture, that it is impossible to swallow, or that there is a tumor in the throat. In some of these cases there may be anæsthesia of the pharynx and some spasmodic constriction of the œsophagus. No treatment or argument is of any use in the removal of the delusion.

Another type is gastric in origin, and the delusions centre in the digestive processes, of which an incessant study is made. A lengthy debate ensues before anything is eaten as to the effects which it will have, and as soon as it is swallowed the deluded exaggeration of the supposed dire consequences begins. There is thus one continuous

round of perverted gastric sensations and of resulting delusions, which drive the patient to despair, and lead to refusal of food in some instances and to suicidal tendencies in other cases.

The intestinal type is another persistent and common form of hypochondriacal Insanity. The idea often takes the form of obstruction of the intestines, and in spite of daily stools the patient will cling to the delusion that there is complete stoppage, and incessantly demand purgatives. Other patients have the delusion that their intestines have disappeared, that they have been passed at stool, or that they have all grown together, or that they are filled with disease or with accumulations of food. Others insist that there is a foreign body in the rectum, and are constantly using their fingers or various things to extract the offending object. Women have similar delusions about the vagina, and keep themselves sore by their manipulations to dislodge the foreign material.

The pulmonary type is also a common one. The delusion takes various forms—that the lungs are partly or completely destroyed by disease, that something has been swallowed the wrong way and has lodged in the lungs, that breathing is impossible, or that death is threatened by arrest of respiration. This is one of the forms of defective pneumogastric innervation. Attacks of dyspnœa are to be observed in these cases, and various modifications of respiration due to pneumogastric disorder. To the same cause is to be attributed the cardiac type of cases with delusions of heart disease or of cessation of the circulation.

The cerebral type of hypochondriacal delusions are frequent—that the brain is fluid, or that the skull is empty, or that there is something alive which is felt moving in the brain. Paræsthesia and neuralgia of the scalp are the real origin of most of the delusions as to the cranial contents.

Other types might be enumerated, but sufficient has been recorded to show the character of the clinical phenomena in hypochondriacal Insanity.

Pathology.—The pathogenesis is inherited defect of nervous organization. There may be morphological deficiencies of nervous structures, such as exist in imbecility, and in other instances demonstrable lesions are claimed to have been found. As yet no morbid anatomy has been established on sufficient grounds, and the more tenable theory is that there is a permanent nutritional defect of the higher cortical system.

It is also possible that microbic infection or auto-intoxications

may be pathological factors. The heredity in some cases is directly shown by the transmission in kind of this type of Insanity from parent to offspring.

Differential Diagnosis.—Hypochondriacal Insanity is to be differentiated from depressed delusions of disease intercurrent in general paresis, and ordinary melancholia. In the latter the patient is hopeless on all subjects and indifferent to drugs and results, while the hypochondriacal patient is eager to find remedies, and over-anxious about results, and depressed only about his special disease. The entire course and history of the hypochondriacal case is also different, and sufficiently diagnostic without regard to special symptoms.

Though accidental delusions of disease occur in various forms of Insanity, the diagnostic group of hypochondriacal symptoms heretofore given does not present itself, and the delusions in the former instance do not constitute so largely the Insanity as do the grouped symptoms in the latter instance. The most exact repetitions of the states of hypochondriacal Insanity are to be witnessed in hysteria and epilepsy, which are kindred neuroses, but in them other features are present to establish the differential diagnosis.

Prognosis.—The prognosis as to ultimate recovery is bad. Long remissions and some apparent recoveries occur, but a return of symptoms can be predicted with almost uniform certainty. The possibility of recovery exists in climacteric cases and in instances of mental disorder with the acquired hypochondriacal neurosis. The prognosis as to general usefulness is bad. Incapacity for self-support results in most cases.

The duration of life is somewhat shortened, on the average, but the extreme care given to the preservation of health in some cases tends to full tenure of life.

Treatment.—The psychiatric success in case of a natural-born hypochondriac depends upon vigorous and continued treatment from the earliest symptoms in childhood. Systematic education to some active open-air occupation is the main plan. In the meantime a judicious discipline, enforced with gentle firmness, the simple ignoring of the hypochondriacal ideas, the constant occupation of the attention by work or play, leaving no time for introspection, and the cultivation by personal example of a spirit of bravery to personal hardship and exposure are the surest psychotherapeutic means.

Hydrotherapy is of excellent service in these cases, to be begun with the most gentle forms and carried to the point of brief but severe cold douches. Hot rooms and all effeminate indulgences are

to be avoided, and sleeping apartments should be cool, and cold sponging, quickly done, should precede dressing. The diet should be varied and generous.

In fully developed cases of hypochondriacal Insanity the treatment can only be palliative and symptomatic. Attention is to be given to slight visceral disorders, which are sources of delusions. The paræsthesias in climacteric cases are best controlled by the bromides.

Constipation and absence of peristalsis call for massage of abdomen and laxatives. The possibility of organic disease of internal organs is never to be overlooked, but the patient is not to be indulged in unnecessary physical examinations.

In general, the less the patient's attention is directed to ideas of disease by local treatment or drugs, the better will be the result. There is no form of Insanity in which the treatment is more troublesome to the physician and less satisfactory in the end.

Section IV.—Choreic Insanity.

The only true chorea is that described so faithfully by Sydenham, and it is this chorea which develops into Insanity, which is here in question.

The same pathological conditions underlie both the neurosis and the psychosis, and, although the chorea is ordinarily first in order of appearance, this is not invariably the case.

Chorea is manifested by clonic spasms and inco-ordinate action of the voluntary muscles, more especially of the face and extremities. It has a maximum period of occurrence at the age from ten to fifteen years, being nearly three times as frequent in girls as in boys. It occurs rarely in adults and in senility. Huntington's chorea is an adult form of the disease, which is hereditary and is attended by chronic mental disorder. In adults generally both the spasmodic neurosis and the psychosis are apt to be chronic in form.

Definition.—Choreic Insanity is mental alienation, having the same pathological genesis as the choreic neurosis, to which it may be antecedent, vicarious, or sequent, and manifested by acute or chronic states of excitement, depression, or enfeeblement of mind.

Clinical Delineation.—The clinical outlines of the mental derangement are imparted largely by the spasmodic disorder itself. The chief forms which the Insanity assumes are as follows:

1. The maniacal state, which is the most frequent form, both in children and in adults. In children it appears as an exaggeration of

the spasmodic movements, with insomnia, automatic laughing and crying, fits of anger and violence, tendency to mischief and destruction, hallucinations of sight, soiling of self and of bed, stripping naked and reckless rolling about on the floor, and some speech disturbances in many instances, and marked loss of control of ideas and actions.

This mania in adults is of a more chronic form, with impulsive acts of violence or destruction of property, and changeful delusions and hallucinations of sight, and a gradual weakening of intelligence, with shifting delusions and gross improprieties of conduct.

2. The melancholic state is shown in children by lachrymose, irritable, and morose moods, by pavor nocturnus, frightful hallucinations, attacks of panic-fear, during which self-injury or violence to others may be inflicted. In adults the melancholic state is shown by ideas of persecution, by anti-social feelings, hatred and fear, and by occasional violent or suicidal outbreaks, with permanent delusions confirmed by visual hallucinations.

3. Stuporous states exist and are in most cases conditions of tension of mind, and of inhibition of mental activity from fearful delusions or hallucinations. These stuporous states are accompanied by vasomotor paresis, capillary stasis, torpor of respiratory and digestive functions, and they may alternate with the maniacal or the melancholic states.

4. Delirium acutum, with partial loss of consciousness and violent jactitation, hallucinations, and incoherent ravings, is an occasional state which leads to a fatal result in more than one-half the cases thus affected. This delirium acutum continues some days or a week, and it must not be confounded with the transient nocturnal delirium of choreic children.

Apart from these special acute states there is a continuous apathy, forgetfulness, stupidity, and irritability in choreic subjects, whose conduct may have the appearance of wilful wickedness while it is, in fact, the direct result of disease.

The above outlines give the main clinical features, which will be more minutely described under the head of symptoms.

Causes.—Sex is a predisposing cause in the ratio of about three to one in children. Among adults there is only a slight excess of women over men in numbers attacked.

Heredity is very decided in Huntington's chorea, but in most all other forms it is very slight and can only be considered a factor in a small percentage of cases.

Malnutrition, such as is found in the children of the poor, is undoubtedly a predisposing cause.

Emotional shock, and especially fright, is to be found in the history of a considerable percentage of all cases, and it may be that one-quarter of them are due to some psychical cause, such as overstudy, worry, and disappointment.

Rheumatism is very frequently associated with chorea, and it may be regarded as causative of choreic Insanity in possibly one-fifth of the cases.

Infectious diseases seem to be the exciting cause in some instances, and toxic agents and auto-intoxications are the etiological factors in a considerable number of cases.

The puerperium develops choreic Insanity in young women, and in these instances there may be a toxic condition, which underlies all the symptoms.

Imitation has been claimed as a cause, but it relates rather to choreiform habits, to spasmodic tics, and to hysteric epidemics of Insanity. Anæmia is associated often with choreic Insanity, and it is to be viewed, perhaps, in some cases, as a cause as well as a concomitant.

Stadia.—There is choreic Insanity as a prodrome, as an accompaniment, and as a sequel of chorea. As a prodrome of the chorea it is rare, and there is then an initial stadium of a few weeks of hebetude and irritability combined, with night terrors and hallucinations of sight, and spells of sudden causeless alarm in the day-time. There then follows an acute stadium of mental disorder, usually maniacal, during which the spasmodic neurosis declares itself, and there is then a final convalescent stadium of both the neurosis and psychosis.

As an accompaniment of chorea, which is most frequent, the initial stadium is of a few days' duration, and consists in exaggeration of the inco-ordinate movements, of a reckless and mischievous breaking of things, and tearing of clothing and overturning of furniture, and disregard of instructions. The acute stadium then follows during the third or fourth week of the chorea in the greatest number of cases, and is of maniacal character, and it ends in a brief convalescent stadium after a few weeks' duration, and subsequent to the disappearance of the spasmodic neurosis.

As a sequel of chorea the mental disorder has a brief initial stadium of depression and tension of mind, followed by an acute stadium of melancholia, with stupor and a short convalescent stadium. In a smaller number of cases the initial and the acute stadia are more of a maniacal character.

Whether preceding, attending, or following the chorea, the Insanity is wont to recur with the neurosis, which is known to have at least one relapse in a large percentage of cases.

In chorea in adults the initial stadium lasts for months, and the acute stadium, which may be depression or excitement, continues for years, or until a terminal stadium of dementia sets in with advancing years.

In Huntington's chorea the mental disorder would seem to form a later phase of the degenerative neurosis and to have a terminal stadium of mental enfeeblement.

Symptoms.—The principal symptoms in the maniacal forms are restless and irritable conduct, with violence or destructiveness, hallucinations of sight, disorder of speech and altered intonation of voice, inco-ordinate gesticulation, filthy habits, insomnia, loss of weight, the infliction of bruises and other personal injuries from violent jactitation, the stripping off of clothing, and a general incoherence of ideation and of action.

In the melancholic form there are frightful hallucinations, sudden exacerbations of panic or of violence to self and others, insomnia, disorders of respiration, circulation, and digestion, emaciation, cephalalgia, photophobia in some cases, and perversion of common sensation, as well as disturbances of the special senses. Vague dreads and constant suspicions of others and impulsive tendencies are common. Suicidal impulses are not rare, and cases of homicidal attempts have been reported.

The stuporous forms seem to be attended by inhibition from fearful hallucinations and delusions.

The sensorial disorder, as well as the spasmodic liberation of painful emotions in choreic Insanity, are due to active processes of disease in cortical regions.

Pathology.—There are very constant cerebral lesions in chorea, but no uniform morbid anatomy has yet been established. The pathology of the mental changes is the same as that of the spasmodic neurosis.

Meynert demonstrated intense hyperæmia of the caudatum in particular, as well as of the entire prosencephalon.

Rokitansky reported hyperplasia of connective tissues of the central nervous system, and Golgi encephalitic processes. Broadbent deemed capillary embolism of the corpora striata and optic thalami as the pathology of chorea. Various writers have reported lesions

in the cortex cerebri and in the central ganglia, in the spinal cord, and in the peripheral nervous system.

The conclusion to be admitted is that in chorea there are inflammatory lesions of cerebro-spinal centres, vascular changes, infiltration of perivascular spaces, meningeal adhesions, connective-tissue proliferation, changes in ganglionic cortical elements, and other morbid histological appearances.

All these pathological processes point to some toxic condition which gives rise alike to the choreic and rheumatic lesions. It is possible that there may be microbic infection in all these cases.

So far as the mental disorder is concerned, the morbid anatomy consists in the irritative lesions of the cortical motor and sensory centres.

Differential Diagnosis.—The group of features in chorea with which the Insanity is connected renders a mistake in diagnosis improbable.

The differentiation is to be made in intercurrent choreic movements in epileptic Insanity, in mental disease post-hemiplegic, in certain paretic cases, and in Insanity from arrests of organic development with choreic complications. The history of both the mental and motor disturbance serves the purpose for differential diagnosis in these cases.

Prognosis.—The prognosis as to recovery is good in youthful cases and usually takes place promptly with cessation of the spasmodic neurosis. The prognosis in adult cases of chorea is bad and mental deterioration is the ordinary result, a final stadium dementiæ being ultimately reached. This same unfavorable termination is the rule in hereditary chorea. The prospect of life is good in children, in whom death is recorded in only about one per cent. of the cases. In adult choreic Insanity the expectation of life is decidedly diminished on account of accidents, and the progressive general deterioration of mind and body.

Treatment.—The first indication in the acute forms of choreic mental disease is quietude and rest. The patient must be isolated in a room specially prepared ; the recumbent posture in the maniacal cases is the best, and the restraining sheet is the only practical means of keeping the patient in bed. Manual restraint is out of the question, as being a cause of irritation and resulting in abrasions and bruises on account of the constancy of the movements, which should not be forcibly restrained. The sheet allows a certain freedom of the involuntary motions while retaining the recumbent posture.

The next indication is abundant nourishment and stimulation at the right moments to sustain the circulation and avoid exhaustion in the acutely maniacal cases.

Bromides and chloral are the best sedatives, though in the melancholic forms opium is preferable.

Hydrobromate of hyoscin is an extreme resort in the violent jactitations of adult cases.

The most reliable remedy for the chorea itself is Fowler's solution of arsenic in increasing doses, beginning with ten minims daily. Cimicifuga is the next best remedy. Valerianate of zinc may be tried. The salicylates are indicated in rheumatic cases and iron in the anæmic states.

Warm baths at bed-time or the moist pack favor sleep. Cold spinal bags give some relief in certain cases. Darkened sleeping apartment in the day-time relieves from the visual hallucinations.

The avoidance of all causes of irritation and the indulgence of the patient's fancies are a part of the psychotherapeutic treatment. Attempts at discipline and severity of manner are worse than useless in these cases, which call for the utmost forbearance and kindness in keeping with the fact that they are doubly afflicted with motor and mental disorder.

Section V.—Neurasthenic Insanity.

There is a concensus of opinion among many alienists and neurologists that there is a neurosis which is to be termed neurasthenia. There certainly are conditions of instability and weakness of the nervous system, as shown by a variety of functional nervous symptoms, which are not grouped in a manner characteristic of any of the other distinct neuroses. Hence all these symptoms of debility and exhaustion of the nervous centres are classed under the generic term of neurasthenia. According to the special nervous centre exhausted, and to which the symptoms are more particularly referable, the cerebral, spinal, and sexual varieties of neurasthenia are recognized. Neurasthenics do not often become insane, but they enjoy no immunity from mental alienation, and their neurosis prepares the way for the psychosis, as does every other neurosis. Whether the neurasthenia precedes or develops simultaneously with the mental disorder there is a blending of the neurasthenic symptoms with the psychosis, which is then termed neurasthenic Insanity.

The recent American, French, and German literature of neurasthenia presents a vast and incongruous group of symptoms of ex-

haustion of cerebro-spinal and vasomotor centres, and there is conspicuous failure of consistent agreement among writers upon any particular neurasthenic type. Neurasthenia, therefore, like paranoia, is fast tending to include so much that it will soon cease to circumscribe any definite group of symptoms.

Definition.—Neurasthenic Insanity is a form of mental alienation attended by predominant symptoms of debility and exhaustion of nervous centres, by general irritable weakness of all the bodily functions, and by vasomotor anomalies, in addition to the psychical disturbances.

Clinical Delineation.—The earliest appearance of neurasthenia is in the numerous class of persons born with a highly nervous temperament, and it may in them appear soon after puberty. Most cases occur before the thirtieth year, and the proportion of neurasthenics diminishes steadily as life advances ; the gradual blunting of all the sensibilities is nature's way to euthanasia, and there are few neurasthenics after the age of fifty. In the adolescent period the clinical features are, feelings of general discomfort and of fatigue on slight exertion, disturbed sleep, headache and backache, paræsthetic sensations known popularly as "growing pains," nervous dyspepsia, gastralgia, disorders of menstruation and seminal weakness, despondency and loss of all natural interest in business or pleasure, inability to fix the attention, loss of memory, irritability, and impaired volition and depressing delusions. In some of the more neurotic cases there are to be depicted a host of vague doubts and fears, morbid fancies and suspicions, impulsive tendencies to excesses followed by intense remorse and self-reproach, religious intensity of feeling, delusions of imaginary diseases, and perversion of the appetites.

The clinical lines in cases more advanced in years are to be drawn more decidedly, and neurasthenic Insanity is then attended by decided vasomotor disorders, cerebral hyperæmia or anæmia, vertigo, cutaneous anomalies of circulation, cold hands and feet, cephalalgia, intercostal pains, neuralgias and visceral paræsthesiæ, spinal weakness and backache, gastro-intestinal disorders, migraine, hyperæsthesia of the special senses and occasional hallucinations of the same, despondency and loss of natural affection, and delusions as to business or domestic relations. A prominent feature is debility of vital functions, of respiration, circulation, and digestion, and fatigue of the muscular system on slight exertion. The same prompt nervous exhaustion follows slight mental efforts. The feeling of general demoralization on the part of the patient corresponds to an actual phys-

ical and mental incompetency, and is not, as in hypochondriasis, imaginary. More special delineation would only serve to accent, in certain cases, the cerebral, spinal, gastric, or sexual disorders of function. The insane delusions vary with the clinical nature of the physical symptoms somewhat, they are not systematized, and generally change from time to time, and are not very firmly rooted.

Causes.—The predisposing cause is the inheritance of a feeble constitution and nervous temperament. Women especially often resemble weak and nervous mothers in this regard, so that a neurasthenic family of daughters is often observed to be the direct punishment inflicted on the mother for violation of nature's laws. The neurasthenic state is also acquired by all the shocks to which flesh is heir. The wear and tear of life, worry, and work, the stress of business and the greed of gain, excitement, artificial living, selfish pursuit of pleasure, excesses of all kinds, and unhygienic surroundings, act as exciting causes of neurasthenia, which arises suddenly also from bodily injury, great exposure to hardship, or to sudden emotional shock.

Climatic influence seems to favor it, and high and dry localities have more than an average proportion of neurasthenics. Toxic, autotoxic, and diathetic states are causative of neurasthenia, which may proceed also from physiological crises and especially from the menopause. Ocular disorders and reflex irritations are occasional etiological factors. In this respect irritations of the primæ viæ and of the reproductive organs are important as causes.

Stadia.—There is ordinarily a long initial stadium of months, during which all the neurasthenic manifestations are heightened, and then an acute stadium of mental depression with delusions, and complete incapacity for the ordinary affairs of life. The acute stadium rarely takes the form of exaltation.

There is finally a gradual convalescent stadium.

All the stadia may have a more prompt and active course in a neurasthenic state acquired by some sudden and severe stress.

The writer has seen such cases following epidemic influenza, and probably moral shock might produce like results.

In congenital neurasthenics, who begin toward the crisis of puberty to pass into a psychopathic condition, it is more scientific to regard the whole age of puberty as the initial stadium, and the subsequent long years of fluctuations between Insanity and doubtful sanity as a long acute stadium with remissions, and the final years of relief, which age brings, as a convalescent stadium.

In several born neurasthenic cases the natural history of the whole constitutional exhaustion of mind and body and the vacillating mental aberrations seemed to justify this view.

It will not bear the test of clinical facts to circumscribe with a theoretical line of immunity from mental disorder the whole group of neurasthenics in order to be able to assure patients of safety when once within the neurasthenic circle. The fact is that real neurasthenics are near the border line between sanity and Insanity, and make excursions into the realm of actual aberration more often than is supposed.

Symptoms.—The psychical symptoms include a permanent sense of fatigue, absent-mindedness, partial amnesias, impaired will, impulsive tendencies, morbid fears, insomnia, frightful dreams, despondency, and delusions and perversions of the emotions.

The automatic repetition of ideas, which may become impellent, the loss of self-confidence and tendency to self-reproach, a reasoning, doubting, and panphobic character of the symptoms are present in some cases.

The somatic symptoms are sensory disorders, paræsthesias, anæsthesias, neuralgias, hyperæsthesias of the special senses, cranial and occipital pains, hyperæsthetic points of pressure, topalgia, visceralgias, vasomotor disturbances, dermography, hyperidrosis palmaris, pneumogastric disorder, cardiac irregularities, sexual debility and menstrual disturbances, hepatic torpor, nervous dyspepsia, nausea, anorexia, and defective metabolism.

The muscular disorders consist in the abnormal quickness of exhaustion from slight effort, the presence of clonic spasms of strands of muscular fibres or of single muscles, inco-ordination of the special muscular mechanisms, of gait, speech, or handwriting. The inco-ordination and indistinctness of speech has led to the diagnosis of general paresis in more than one case when taken together with the wavering gait. Tremor of the hands is present in some cases, and may be heightened on intentional effort. Muscular reflexes are exaggerated. General nutrition is impaired, and there is loss of weight in neurasthenic Insanity.

Pathology.—The most satisfactory hypothesis is that of malnutrition of the whole cerebro-spinal axis as manifested in the symptoms of irritable weakness of the functions of all parts of the nervous system. Possibly this dystrophy is more decided in cortical and vasomotor centres as judged by the prominence of the psychical and vasomotor abnormalities.

The clinical fact is that the neurasthenic is a bankrupt in nervous force, either from fault of nutritional manufacture, from defective storage in cerebro-spinal centres, or from a too facile discharge.

Hyperæmia of cerebro-spinal centres, and less commonly anæmia, exists in some severe cases, but no morbid anatomy can be said to have been established for this form of Insanity.

Differential Diagnosis.—Neurasthenic Insanity is to be differentiated from simple functional exhaustion of mind and body from any cause. It must be distinguished from mental disorder emerging from the other neuroses, such as hypochondriasis and hysteria. The whole history of the case suffices for this distinction, even if the symptoms do not sufficiently permit the differential diagnosis.

It must be differentiated from primary monomania. The physical symptoms afford the grounds of distinction in this case, taken in connection with the systematized delusions of monomania.

Neurasthenic Insanity is differentiated from melancholia by the etiology and course of the latter, which is seldom so chronic, and by the entire group of neurasthenic symptoms, and by the absence of some of the somatic signs of the acute melancholic state in most of the neurasthenic insane.

The differential diagnosis in other instances is not difficult, except in the early stage of general paresis. The clear cases of muscular inco-ordination of gait and speech among neurasthenics must be differentiated from like symptoms in paretics, and this implies a suspension of judgment for a reasonable period and warns against a "snap diagnosis" in any given case.

Prognosis.—Prognosis as to recovery from the immediate attack is good, but in the most confirmed neurasthenics there is nearly always a recurrence of mental disturbance.

In the acquired forms of the neurasthenic state and in the climacteric cases the recovery may be prompt and permanent.

The prognosis as to the chances of life is good, and the duration of life is not greatly affected by this form of Insanity.

Treatment.—Isolation is essential in many cases, either in private or in an institution. The rest-cure is to be tried if there is a history of over-work and there has been no interval of rest. The enforced idleness in other cases is bad, and a reasonable amount of occupation is attended by better results.

The excessive irritability is best controlled by the bromides, which are useful also for the insomnia. Opium is good in some cases, but a habit is at once formed. Hypnotics must be used sparingly, as

they disturb nutrition, which is always impaired in neurasthenic Insanity.

Strychnine, quinine, iron, and cod-liver oil are of service, in small doses, for tonic purposes. The alterative effect of arsenic is to be judiciously sought when other remedies fail.

Hydrotherapy is applicable, and a change of climate is of avail, in the more chronic cases, from inland to seaboard, or from the latter to mountainous regions.

The diet should be nitrogenous largely, and varied with fresh fruits in season. A visit to fruit regions and the abundant use of ripe fruit at the height of the fruit season is often beneficial.

A fresh milk diet is good in some cases, with fresh eggs and butter in considerable amounts. Fats are essential in most cases and favor sleep when taken as fresh cream.

Electricity and electro-massage are in order in connection with the rest-cure. Systematic exercise and out-door life are all important to harden the cure, and prophylaxis must be perseveringly enforced to avoid recurrences.

There are sometimes etiological indications for treatment, and all reflex irritations should be removed by surgical interference, if need be, in certain cases.

In all cases a searching physical examination is to be made that no organic disease may be overlooked.

Psychotherapy is of great avail in the treatment of the neurasthenic insane. A change of occupation and diversion adapted to each particular case, instead of cessation of all activity, is one of the chief means of cure.

After convalescence a change from sedentary to active life in the open air may be advisable. Marriage is often good for the convalescent patient, but cannot be advised on general grounds by the physician, whose first professional duty is to humanity in general rather than to his patient in particular.

If the neurasthenic state was acquired in the instance of the patient, and if the family history is good, marriage may be permitted.

Traumatic cases of neurasthenic Insanity require special treatment, according to the nature of the original injury. Such cases are apt to run a chronic and unfavorable course under any plan of treatment. In these cases, also, the result of properly adapted occupation is usually better than a surrender to idleness. In the main, the general plan of treatment does not differ from that described.

CHAPTER IV.

INSANITY WITH THE PHYSIOLOGICAL CRISES.

Group: Pubescent, Puerperal, Climacteric, and Senile Insanity.

Section I.—Pubescent Insanity.

Sexuality pertains to the entire system, and there is not a consummation of sexual differences in the human kind before the full development of the entire organism about the twenty-fifth year of life. At this age the individual is produced in full perfection, and is ripe for reproduction of the species, and at the height of sexual fecundity.

Ovarian maturation in the female and the orgasmic reflex and spermatopoietic function in the male occur, with climatic variations, from the twelfth to the sixteenth year, as confirmatory signs of the crisis of pubescence. This first nisus generativus arrives at a period of both physical and psychical immaturity, and with this prime sexual impetus the coming man and woman are launched upon full mental and bodily evolution, only completed at the end of a decade. This evolutionary era from pubescence to full sexual maturity, covering a period of about ten years, is the epoch during which pubescent Insanity declares itself, and it predominates in the latter rather than the first half of this decade, and it is then sometimes termed adolescent Insanity. The term "pubescent" is sufficient, especially as there is only one crisis, which occurs at variable points of this pubescent epoch, just as soon as nature runs short of formative material or nutritive force in the complete production of the entire physical system, and of the brain as the presidial organ of the human economy.

The same general *law of organic failure*, as demonstrated with a certain percental uniformity in immature and defective individual specimens throughout the whole vegetable and animal kingdom, here yields the pubescent Insanity order of human beings, whose imma-

turity and defect is in cortical functions as the most complex result of organic evolution, which is here stopped short of full perfection.

Definition.—Pubescent Insanity is mental alienation at the pubescent epoch from failure of complete evolution of mental faculties on a basis of stable equilibrium, and is characterized by sudden anomalies of ideation, by explosive emotions, by perversion of the instincts and appetites, and by maniacal, melancholic, and stuporous states.

Clinical Delineation.—The clinical features of pubescent Insanity are dependent in part on the turbulent evolution of new ideas and emotions in sympathetic relation with the reproductive function, and on remote and direct hereditary tendencies. Neurotic ancestral traits become pronounced, and there is a periodic exacerbation of symptoms corresponding with the monthly period in women, and there is also a larger cyclic tendency shown by recurrences of mental disorder in cases apparently recovered.

The mental disturbances may be mild or severe. In the mild cases there are simply gross exaggerations of youthful characteristics, egotism, boastfulness, impudence, a wild expansiveness of self-feeling and conduct, cruelty and pugnacity, sexual depravity, instinctive perversions, and occasionally violent tendencies.

In the more pronounced cases there are maniacal states, in which appear exalted feelings of self-importance, grandiose ideas, loud and constant talking, quarrelsome and destructive outbreaks, erotic and indecent conduct, masturbation, loss of sleep and flesh, and digestive disturbances.

Another type contrasting with the above is melancholic with ideas of persecution or of poisoning, suspicion of surroundings, hallucinations of hearing and of smell, loss of all energy or interest, gloomy depression and thoughts of suicide, insomnia and loss of appetite and of flesh, masturbatic indulgence, cold hands and feet, lowered temperature, and amenorrhœa and irregularities of menstruation in women.

The stuporous states often seen are mostly continuous of the melancholic conditions, with which they occasionally alternate, though they are sometimes sequels of the maniacal exacerbations. They are the obstinate and passively resistant states, during which the patient is conscious fully of all that occurs, and they are marked by cataleptoid and tetanoid phases.

These stuporous conditions may last, in rare cases, for several months, and they resemble dementia terminalis, except that the intelligent expression of the eye is not lost, and the facial lines are

not so completely obliterated, and close observation will show gleams of intelligence, which are not present in true terminal dementia.

The above are the chief outlines of the types of mental disturbance.

Causes.—The crisis of puberty is one which develops ancestral weakness of constitution transmitted to the offspring, and the neurotic tendency can be traced directly to parental sources in one-third of all cases of pubescent Insanity. The hereditary defect is numerically somewhat greater among women than men.

While heredity is the prime cause, there are numerous favoring circumstances to be considered.

Bad educational methods, immoral example on the part of the parents, vicious associations, the moral and physical degradation of extreme poverty, and the nutritional defects which it entails upon children, and all forms of unhygienic living and of personal excesses.

Masturbation, which has been so often regarded as the chief cause, is more often a symptom of the loss of inhibition, and of the morbid intensity of the sexual appetite, and of the general demoralization of the patient. The habit heightens the symptoms of vasomotor disorder, and tends to develop the stuporous and deluded states. The attack of pubescent Insanity would develop in most patients, even were there no masturbation, and the latter is a modifier of symptoms rather than a prime cause.

The menstrual disturbances in women are likewise symptoms of the general nutritional deficiency and of anæmic conditions rather than causes of the pubescent Insanity. When the patient is verging upon mania the menstrual disorder may immediately favor the outbreak.

The chief exciting cause is the crisis of puberty, with its sudden and universal changes in nutritive, vascular, and nervous functions, and with a vast influx of new feelings and ideas, and a readjustment of the whole mental mechanism. This profound organic evolution cannot take place in hereditarily unstable nervous systems without signs of brain disorder.

Stadia.—There is usually an initial stadium of some months' duration. This stadium is often overlooked, but it is seldom absent, and it consists in an expansive mood, flighty ideation and conduct, disobedient and impudent bearing, and persistent obstinacy and unreasonableness. There then follows an acute stadium of a maniacal or melancholic type, with intercurrent stupor, and then a prompt convalescent stadium.

In very many cases the acute stadium lasts for six or eight months, during which there are remissions of symptoms and then acute exacerbations and stuporous phases before the convalescent stadium.

The melancholic cases have a longer acute stadium than the maniacal, and a more prolonged convalescent stadium. In rare cases the acute stadium is stuporous and prolonged many months.

All the stadia are transient, in exceptional instances occupying only a week or so, but the average attack of pubescent Insanity is attended by recovery at the end of the fifth or sixth month.

The strongly hereditary cases present the greatest number of remissions and relapses, and they sometimes graduate into distinct periodical Insanity, which lasts the remainder of life.

Symptoms.—Periodicity and explosiveness characterize, in general, the symptoms of pubescent Insanity.

The psychical manifestations bear also a general stamp of childishness in the younger subjects, and in others border on the imbecile order of symptoms. In older patients there are fickle, turbulent, and changeful phenomena, in keeping with the revolutionary changes throughout the entire system at this epoch.

In males domineering egotism, bombastic speech, quarrelsome interference, the assuming of some religious or heroic rôle, impulsive violence to self and others, excess in alcohol, tobacco, or venery, antisocial acts and legal offences, loss of control of ideas and actions, and a reckless disregard of property and of personal safety. Delusions are exaggerated or depressed and confirmed by hallucinations of sight and hearing. In the masturbatic cases hallucinations of smell are common. In women, restlessness, talkativeness, impudence, obscenity, mischievousness, removal and tearing of clothing, religious or erotic delusions and hallucinations, and hysterical outbreaks are to be witnessed.

In both sexes suicidal tendencies exist in about one-third of the cases, but the attempts at self-destruction are not very decided and seldom successful.

In the melancholic state ideas of self-reproach and sinfulness, suspicions of danger to life, refusal of food, self-mutilations, and masturbation are common.

The hallucinations of vision in a few cases are ecstatic or phantasmagorial in character.

The stupor is sometimes attended by frightful visions. Amnesia is partial or complete. There is always perversion of feelings, loss

of natural affection, tedium vitæ, eroticism, and sometimes, among masturbatic males, gynephobia.

The somatic symptoms include automatic sighing, weeping, and laughing, cardiac irregularities and palpitations, cerebral hyperæmias, epistaxis, cephalalgia, neuralgia and paræthesiæ, vasomotor anomalies, cold extremities, osmidrosis, œdema in the stuporous states, tinnitus aurium, muscæ volitantes, spermatorrhœa, dysmenorrhœa, amenorrhœa, leucorrhœa, loss of weight, muscular rigidity, cataleptoid states, choreiform movements, convulsive tics, fibrillar spasms, hysterical joints, "growing pains," and loss of appetite and sleep.

In the stuporous states the vasomotor disorder is marked, the extremities are livid, there is capillary stasis, and the temperature is subnormal. The muscular sense and common sensation are involved to such an extent as to cause inco-ordination of gait. Speech is slowed in these cases, and in some there is mutism or articulation with scarcely audible phonation. Though vasoparetic states predominate, the sphygmographic tracing in these stuporous conditions shows high tension often from the obstruction created by the capillary stasis. Anæmia is frequent and the percental dininution of hæmoglobin is very considerable.

Trophic disturbances and nutritional anomalies are also very constant symptoms.

Pathology.—The immediate pathological conditions would seem to be vasomotor and nutritional disturbances of nervous centres. Looking beyond these abnormalities, it is possible to trace a vicious heritage and a neuro-psychopathic tendency in a little more than thirty-three per cent. of all the cases. There are strong exciting causes in some of the cases, but there is a large remainder having no definite pathogenesis.

For this large contingent it is necessary to seek a broader law than parental heritage, and this is found in the universal law of organic failure witnessed in the propagation of every species in all the domains of nature. Ample provision is made for the perfect propagation of the species, but there is a constant and large percental failure in the perfect reproduction of individuals. These pubescent patients, free from traceable heredity, are the imperfectly propagated individuals, the failures in the organic reproduction of the human species. There are causes more remote or more immediate than heredity, from innumerable and culminating influences beyond the grasp of biological science, which will possibly some day elucidate the facts of this law of organic failure, which can already be formulated according to percental chances in various animal species, irrespective of direct hered-

ity. As regards heredity, some writers fix it at a higher figure in this form of Insanity than that above given as representative of the writer's observations.

Differential Diagnosis.—Pubescent Insanity is to be differentiated from general paresis. The same exaggeration of ideas is present in the maniacal phase of both types of mental disorder, but the general failure of intelligence is less in pubescent Insanity, in which also the physical signs of general paresis are wanting.

The differential diagnosis must be made from Insanity with the principal neuroses. The intercurrent hypochondriacal, choreic, and hysterical symptoms in pubescent Insanity can only lead to temporary doubt as to whether one of the major neuroses is in process of development.

The differentiation from periodic Insanity on account of the remissions during the acute stadium of pubescent Insanity may give rise to some doubt, which time alone can with certainty dispel.

However complex the symptomatology of pubescent Insanity, there are characteristic groupings of symptoms which guide to diagnosis.

The menstrual irregularities, the stuporous states, the chloranæmia, the erotic and religious tinge of the delusions and hallucinations, and various psychical correspondences with the evolution of the reproductive functions, are highly symptomatic of the pubescent crisis in women. In males there are hardly to be found in any other form of Insanity the same commingling of boyish absurdities and manly pretensions, such extravagance of ideas and conduct, rank impudence and reckless disobedience of all law and order, sudden changes in mood and manner, alterations of consciousness and personal identity, maniacal and stuporous blending of symptoms with cataleptoid states and hallucinated and inhibited psychic conditions with muscular tetany, and such symptoms as the Germans designate hebephrenic.

Familiarity with the vagaries of these pubescent cases is soon acquired by clinical observation, but the diagnostic skill required in the differentiation of these cases from other types, though soon attained in practice, cannot be fully conveyed by didactic descriptions.

Prognosis.—The prognosis as to recovery is highly favorable as regards the immediate attack. Seventy-five per cent. of the cases make a recovery. Of those who recover a large percentage have subsequent attacks, and this is specially true of the cases with strong heredity.

The recovery is more prompt in the maniacal than in the melancholic patients, and more permanent in males than in females. The prognosis as to life is good. Less than ten per cent. of males and six per cent. of females die.

Chronicity finally results very frequently among males, of whom about forty-five per cent. eventually become chronic cases after several relapses.

The ultimate proportion of females who suffer relapses and become incurable is still greater, owing to the stronger influence of heredity.

The absolute recoverability is not so great, therefore, as would seem from immediate restoration from first attacks. The recuperative power of youth accounts for these apparently perfect first recoveries, but the inherited tendency reasserts itself at a later day under any accidental stress of mind or body.

The unfavorable cases terminate in dementia of the active form, chiefly with exacerbations of excitement. Some cases end in secondary monomania with delusions of exaltation. An occasional termination is chronic stuporous mental enfeeblement, with automatic masturbation as long as life lasts. Such patients, when aroused, show a degree of intelligence out of keeping with their facial and general physical degradation.

The prognosis as to life is often complicated with tuberculosis, or rheumatism and cardiac affections, to which due weight must be accorded.

Treatment.—The general plan of treatment must include isolation in the country or in an institution, in the majority of cases which last for several months. Underlying etiological or pathological conditions, anæmia, tuberculosis, reflex irritations are first to receive attention. Insomnia and maniacal excitement are best met with bromides, which abate the sexual ardor to some degree. The hygienic measures are of the utmost importance. The open-air treatment is to be pursued as far as possible, and a change of residence and climate to effect this purpose may be advisable.

In able-bodied patients active exercise in useful occupation or in out-of-door sports is commendable. The more invalid patients may sit or recline during full exposure to the air and sunlight.

The diet should be fatty and nitrogenous, and should be varied with fresh fruits in season. Milk, eggs, butter, fresh meats, fish, fruits and vegetables in season, and a plentiful supply of pure water are most essential. Hydrotherapy is of much value to promote cutaneous activity, to favor sleep, and for the local effects of heat and cold.

Electricity and massage are applicable in the stuporous cases. Anæmia and amenorrhœa call for iron, cod-liver oil, malt extract, and a little red wine, and in obstinate cases small doses of arsenic.

Blaud's pill is an eligible preparation, and should be supplemented with tonic doses of quinine. If there be any hereditary syphilitic history, bichloride of mercury in small (grain $\frac{1}{30}$) doses will do good service in the anæmic state. It is useless to treat the amenorrhœa until the general standard of nutrition has been restored and then tincture of aloes and myrrh, hot sitz-baths and local applications of electricity at the time of the regular return are efficient remedies.

Hypnotics are seldom essential when hygienic, hydrotherapeutic, and dietetic measures are faithfully enforced. Forced alimentation is often necessary in the stuporous states and in melancholia with delusions of poisoning. In such cases, when anæmic, bullock's blood, fresh or in solution from dried preparations, may be used to advantage per rectum.

The psychotherapy of each case demands a special study, and absolute neglect of moral agencies, even in stupor, is a mistake. Constant efforts to occupy and to divert patients are to be continued, and are to be redoubled at the critical turning point between the acute stadium and the convalescent stadium.

Section II.—Puerperal Insanity.

Ten per cent. of all mental diseases in women are developed in connection with the critical function of the reproduction of the species. All mental disorder appearing with this physiological crisis is termed puerperal Insanity, which in turn is best subdivided as follows:

1. The Insanity of gestation, which occurs at any time between conception and the parturient act, and constitutes about 1.5 per cent. of the entire numerical amount of alienation in women.

2. The Insanity of parturition and of the puerperium. The latter averages six weeks from the completion of labor through the chief part of uterine involution. The Insanity of this crisis forms six per cent. of the sum total of mental disease in women.

3. The Insanity of lactation, appearing any time from six weeks post partum to the end of nursing, and having a ratio of 2.5 per cent. in the total causation of mental disorders in the sex.

The percental figures here given are based on tabular statements of causation in American and British Reports of Hospitals for the

Insane, and they fall somewhat below those given by Continental writers.

The Insanity of gestation is a small fraction here of the whole amount of puerperal Insanity in hospitals for the insane, but, in fact, it has a larger statistical importance. Cases of alienation at this period are not fully diagnosed, on account of the frequent vagaries of pregnancy, and are often not taken to institutions for various reasons.

Definition.—Puerperal Insanity is mental disorder developed by the critical functions of gestation, parturition, or lactation, assuming maniacal, melancholic, or stuporous types in the main, and manifested by hallucinations of special and common sensation, by delusions of impulsive and dangerous character, by perversion of feelings, infanticidal, suicidal, or homicidal tendencies, and by a rapid sequence of psychic and somatic symptoms, which are characteristic not individually, but in their collective groupings.

Clinical Delineation.—During the reflex irritations and circulatory adjustment of the first half of gestation excitement of a pseudo-hysterical kind, with loud complaints and unrestrained emotional outbreaks, and impulsive and unreasonable conduct occurs. The mental disorder during this first four months of pregnancy may also take the form of depression with morbid fears, loss of conjugal affection, pica and depraved appetite, or anorexia, abstinence and emaciation, and tedium vitæ and suicidal impulses. During the latter half of gestation maniacal or melancholic phases also may appear and present much perversion of feeling, hatred of family or husband, suspicious delusions, ideas of poisoning, and homicidal impulses.

The mental disturbance of the first half of pregnancy sometimes disappears, when there is an end of morning sickness and quickening occurs, and the first adjustment of the system to the new order of things has been accomplished, just as the Insanity of the second half may cease upon delivery of the child.

The mental disorder of parturition springing from powerful and painful commotion of nervous centres or from direct toxic effects is usually sudden and violent, of maniacal type, with active hallucinations, incoherence, and turbulent activity. The severe aberrations thus provoked by the parturient act may be of hours' or days' duration only, or may pass into more prolonged states of alienation.

The Insanity of the puerperium occurs mainly within a fortnight after delivery, and more frequently within the first than the second week of the puerperal state, though it embraces many cases within

the first six weeks of the lying-in period. The bulk of all the cases are actively maniacal, but toward the close of the puerperal state and of uterine involution melancholic forms are more frequent.

The maniacal cases have a wild flight of ideas and speech, mistake persons and places, are hallucinated, emotionally agitated, gesticulate and rush about madly, are profane or obscene, remove or tear their clothes, can with difficulty be kept in bed or in the room unless restrained. There is often rise of temperature during the first few days after delivery, with frequent and wiry pulse and heavily coated tongue and deranged secretions, and the mania may approximate acute delirium and be due to toxic influences. Consciousness is much impaired in some of these maniacal conditions, and automatic destruction of life and property may occur, with complete amnesia of the events on recovery of the patient. This fact is important in juridical relations in instances of infanticide or homicide during the attacks.

The melancholic cases, toward the close of the puerperal state, appear anxious, restless, gloomy, and foreboding imaginary evils to the child, or danger of life from poison or from enemies. They may accuse themselves or others of crime, think they have committed the unpardonable sin, attempt suicide by starvation, or by more active means, and may kill the child to save it from some fancied terrible fate.

The Insanity of lactation may occur before or after the weaning of the child, and it is ordinarily associated with general debility, during which phthisical or other diathetic states may develop. The types of mental disorder are maniacal or melancholic chiefly, with stupor intercurrent in many instances. Delusions and hallucinations of sight and hearing of a painful character abound. Fear, anger, jealousy, and the depressive emotions predominate. The mental depression may reach the degree of stupor, with frightful hallucinations.

Perversion of maternal instincts and of that of self-preservation may lead to the destruction of children and of self.

Gay and happy forms of mania are rare, and the melancholic types are marked by explosive violence or painful states of stuporous inhibition.

In rare instances secondary monomania or general paresis is the outcome of the lactational state.

The unfavorable cases of puerperal Insanity graduate into terminal dementia, some at the end of a few months, and others only after a lapse of some years. The latter cases are apt to be tainted with he-

redity and to pass through a succession of remissions and exacerbations before reaching the stage of fatuity.

Causes.—Hereditary predisposition exists in a certain number of the cases, who during the lesser crisis of puberty may escape only to succumb at the critical epoch of parturition. Previous attacks are also powerful favoring circumstances, and some women develop mental disorder with each successive pregnancy.

In primiparæ, and especially in those who have passed the age of thirty-five years, the reflex irritation of the rapidly expanding uterus and the necessary systemic adjustment is a sufficient cause of derangement of unstable nervous centres. Hemorrhages may also precede labor, and abortions, miscarriages, and attempts upon the life of the child in utero may have causative relations. Albuminuria and uræmic states and auto-intoxications and hæmic deteriorations ante-partum may be exciting causes.

Severe and prolonged labor, instrumental delivery, the administration of anæsthetics, multiple birth, extensive hemorrhages, death or injury of the child, disappointment as to its sex, illegitimacy of the offspring, and eclampsia are influences operative at the parturient crisis. Following delivery there are frequent septic causes from reabsorption from uterine surfaces, from suppression of lochial discharges or of the secretion of milk, and there are also occasionally mastitis, endocarditis, perimetritis, and phlebitis, and undoubted states of auto-intoxication.

The etiological factors during lactation are general exhaustion from the hyperlactation, impoverished blood with diminished red blood-corpuscles and hæmoglobin, general malnutrition, which not infrequently develops latent phthisical tendency, uterine subinvolution, leucorrhœa, metrorrhagia, and local disease of reproductive organs.

In some cases all the untoward influences of gestation, parturition, and lactation are cumulative in the production of mental disorder at this critical period.

Stadia.—In all forms of puerperal Insanity there is an initial stadium, however brief it may be. During gestation this initial stadium is one of cœnæsthetic depression, with irritability and vague forebodings of evil, and general malaise, and then follows the stadium acutum, whether it be the maniacal or melancholic state, with hallucinations and delusions and other active symptoms. Sometimes this stadium acutum is constituted by alternations of excitement and de-

pression and by changeful manifestations of the two states, and this is more particularly so in cases tainted with heredity.

Following the stadium acutum is ordinarily a stadium debilitatis, a state of apathy and weakness, even though flesh may be gained during this stage, which has the appearance of mild stupor in some cases.

Then follows the convalescent stadium in regular order, and with steady advance or fluctuating advance, with slight recurrences for some weeks, but ending in recovery, which is ordinarily complete.

In exceptional cases the stadium acutum is one long continuation of melancholic stupor with active inhibition and hallucinations of a painful nature.

The sudden maniacal outbreaks at parturition are the stadium acutum of attacks, which it will nearly always be found were preceded by a distinct initial stadium before the parturient act. The convalescent stadium may be more brief even than the other stadia in these extreme cases, which still will be found to form no exception to the rule as regards the clinical progression of the mental disorder, however brief it may be.

There is no difficulty in tracing distinct stadia in the Insanity of the puerperium, and during lactation the initial stadium is often prolonged for weeks, and the acute melancholic stadium often lasts many months, and the convalescent stadium is also more gradual than in other forms of puerperal Insanity.

Even in the maniacal explosions of the act of parturition careful inquiry will often reveal an initial stadium previous to parturition—a state of heightened expectancy and dread of the approaching crisis, with insomnia and restless irritability, and other prodromes of the attack, which may follow with the apparent abruptness of mania transitoria.

In unfavorable cases a stadium dementiæ takes the place of the stadium convalescens.

Symptoms.—It is not necessary to repeat the symptoms of the ordinary maniacal, melancholic, and stuporous states of puerperal Insanity. It is important to note that they alternate and that the stuporous symptoms are almost invariable sequels of the acute maniacal or melancholic states.

That a latent general paresis may be developed or possibly originated by the prolonged toxic conditions of the latter part of gestation and the early puerperium is also noteworthy. The symptoms of puerperal Insanity are characteristic not singly, but collectively, considered at certain critical epochs.

Thus, in a case of puerperal mania a week after parturition may be witnessed such a collective grouping of symptoms as the following: The face is pale and haggard, with dark circles about the eyes, which have an unnatural brilliancy and wild expression, the skin is moist, the tongue coated, the breath offensive, the bowels constipated, the lochia may be suppressed, there may be high temperature, restless excitement, attempts to jump out of bed or out of the windows, violent resistance, exposure of person, obscenity, constant calling to imaginary persons, changing hallucinations and delusions, mistaking of persons, rapid repetition of single words or phrases, and an incoherent jumbling of present impressions and past memories in the incessant loud talking, and perversion of affection is manifested by violence toward children or husband. Incendiarism, self-mutilation, or general destructiveness may occur if the patient is not restrained.

In the Insanity of lactation there may be presented a somewhat different group of symptoms. There is emaciation, dilated pupils, subnormal temperature, anæmia, vertical headache, intercostal neuralgias, amenorrhœa, cough and phthisical tendency, despondency, religious gloom, vague fears, suicidal tendencies, delusions of poison or persecution, or of danger impending to children, who may be sacrificed to save them from some terrible fate. Violence is less impulsive and more delusional and premeditated than in the maniacal forms, and amnesia after recovery is rare as regards the events of the attack.

The apathetic states of the stadium debilitatis, following the acute stage, are due simply to exhaustion, and are not to be confounded with the stuporous states, which are hallucinatory and constitute often a part of the acute attack.

The local affections of the reproductive organs, the changes in the blood and urine, in the secretions and excretions, in circulation and general metabolism, give a varied somatic symptomatology, which, taken in connection with the psychic symptoms, furnish types familiar to those who have treated many cases of puerperal Insanity.

Pathology.—Puerperal Insanity beginning within a fortnight of delivery is probably, in the majority of cases, of septic origin. The sudden and violent symptoms, the changes in temperature, the inflammatory complications, the infarcted lungs, liver, and kidneys found in fatal cases all point to septic reabsorption from uterine surfaces.

Other toxic influences are found in the albuminuria and uræmia, and in kidney affections and deteriorated hæmic states. These latter states prevail before parturition. During lactation the impoverished blood-supply, dystrophies, uterine subinvolution, cachectic and

phthisical conditions, and a culmination of all the previous psychic and physical causes form the pathological basis of the mental disease.

Differential Diagnosis.—The occurrence of Insanity in connection with gestation, parturition, or lactation suffices for the diagnosis in most cases. The possibility of the crisis acting as an exciting cause of general paresis requires to be borne in mind.

Phthisical Insanity follows the pulmonary disease, but during lactation the mental disorder usually precedes the lung trouble. The history of the case, and the order of occurrence and grouping of the physical and mental symptoms are sufficient for the differential diagnosis, which seldom presents any difficulty.

Prognosis.—The prognosis as to recovery is good. About sixty per cent. of the cases perfectly recover. The favorable elements in the prognosis are, first, age from twenty to thirty years, since the ratio of recoveries in general diminishes steadily from thirty to forty years. Secondly, the acute cases occurring within ten days of parturition are more favorable than those appearing at a later period, and the Insanity of the puerperium is more curable than that of lactation. The maniacal forms are attended by a higher recovery-rate than the melancholic types at all periods of the reproductive crisis. The hope of recovery diminishes rapidly after the second attack of puerperal Insanity. Early treatment is essential to prompt recovery, and the prognosis is correspondingly bad in cases which have been neglected some weeks.

More than fifty per cent. of the cases recover within the first six months, and the prognosis may be considered bad after the first twelve months of the mental disease.

The mortality is considerable and increases rapidly with age, and is, on the average, probably not far from ten per cent. of all cases attacked.

Treatment.—The first indications are for the relief of insomnia and physical exhaustion. Chloral is the most efficient remedy for the former, and for the latter concentrated nourishment is the best stimulant, though in cardiac failure alcohol is to be given. Forced feeding without delay with predigested foods is often a necessity. The secretions and excretions next demand attention. The milk, lochia, urine, and intestinal discharges often present indications which are urgent. Obstipation and fecal impactions especially are to be at once removed. Measures are to be taken to relieve uterine disease or other local causes of reflex irritation.

Concentrated food in generous quantities is all that is required

in some cases of anæmia from post-partum hemorrhage, but iron may be given sometimes to advantage, and it is always useful in the anæmia of lactation. Tonics are to be used judiciously and stimulants sparingly in these cases. Hydrotherapy has its applications. Warm baths replace sedatives to a great extent. Massage and electricity are of some avail, and in amenorrhœa and subinvolution their local use may be effective along with general treatment.

Hygienic measures are of prime importance, and isolation from family surroundings is needful in the prolonged cases, though brief attacks of a few weeks may be treated at home. Out-door treatment is necessary in the lactation cases, and change of climate for this purpose and to combat phthisical tendencies may be in order. The almost universal defects of nutrition are best treated by small doses of arsenic, in addition to a varied and easily digested diet, and cod-liver oil, if well borne, along with malt extracts and peptonized foods.

In the stadium debilitatis following the acute stadium, counter-irritation to the back of the neck, the electric cautery, lively attempts at diversion, electricity, and other active measures are to be employed to prevent the patient from sinking into secondary dementia, which is then impending.

Section III.—Climacteric Insanity.

The involutional crisis of the menopause is a more severe constitutional trial than puberty or parturition, and a more active cause of mental disturbance. This influence is operative during the decade of the menopause, forty to fifty years in the sex, and still it accounts for four per cent. of all cases of mental disease in women. At the Willard State Hospital, out of a total of 1,317 women, the menopause was the sole cause assigned in 3.6 per cent. of the cases. The returns of other State hospitals give a somewhat larger percentage. Excluding the concurrent etiological factors of coarse brain disease, intemperance, and recurrences of mental disorder at the climacteric, the percentage given (four per cent.) approximates closely the actual proportion of Insanity due directly to the crisis of the menopause.

It must be admitted that the decline of sexual activity and general involutional changes during the decade fifty to sixty years in men may be regarded in the light of a grand climacteric, as in women, and that certain cases of Insanity in men at this epoch may be classed as climacteric. It is true that the sum total of physiological conditions is considerably different in the two sexes at this involutional

epoch, but the particular cause of melancholy—the sudden elimination from the mental life of the individual of the vast aggregate of instinctive feelings and ideas correlative of the sexual function—may be active in men through premature loss of sexual power and inclination at this period of life. The general systemic changes are alike in both sexes at this crisis, and must be assigned some share in the production of mental derangement, and the specific difference of causation in the sex lies alone in uterine and ovarian involution.

Definition.—Climacteric Insanity is mental disorder developed in connection with the general systemic changes of the climacteric involution, and attended by cœnæsthetic depression, gloomy emotions, painful perversions of sensation, marked vasomotor disturbances, alterations of the affective and intellectual faculties, and depressing delusions.

Clinical Delineation.—The psychic outlines of most cases are confined within the usual limits of states of mental depression. The melancholia may become so acute as to attain to maniacal exacerbations, or in very exceptional instances to pass into stupor. In the main, reasoning states of despondency, with a tendency to introspection and self-analysis, prevail. In men, self-pity and hypochondriacal exaggeration of symptoms and complete mental and physical anenergia are to be observed. In women the restless anxiety often assumes the form of melancholia agitata. There is considerable commotion in the ideal and emotional spheres representatively correspondent to the reproductive organs undergoing involution. There is usually enough self-control to inhibit the grosser salacity of thought and feeling, but the erotic tendencies are evident and provoke self-reproach and self-mutilation in some cases, and in other instances they lead to sensorial delusions and accusations of sexual outrages perpetrated at night by men, or by his Satanic Majesty. In one case the latter delusion persisted for nearly a year. There is a vicarious discharge of religious feeling and intensified observances of penitence and prayer. Self-accusations and the conviction of the unpardonable sin and of a soul eternally lost often lead to despair and suicidal attempts.

Fifty per cent. of the cases are suicidal in feeling, but lack the energy to consummate the act, but many weak and abortive overtures toward self-destruction are made, and the possibility of "felo de se" is always present. Homicidal impulses are rare. Sensorial perversions are common, and delusions arise in connection with the hallucinations of sight, hearing, and smell. One patient saw the blue light and smelled the sulphurous fume, which announced that she was

to be "burned everlastingly in hell-fire." Primordial delusions sometimes arise. Patients are engrossed with their hallucinations and delusions, and are indifferent to relatives and to all the interests of life, and it is almost impossible to divert them from their painful self-preoccupation. In occasional instances insane jealousy of the husband, or pseudo-cyesis, or perversion of the maternal instinct and infanticidal impulses may appear. Morbid impulses, impellent ideas, and a sense of relief after some explosive violence of action are not infrequently witnessed.

Causes.—It is necessary to eliminate certain etiological factors, which may be active at this period, such as alcoholic indulgence, previous attacks of Insanity, cerebral softening or tumors, and recurrences of mental disturbance in periodical melancholia, for such cases belong to alcoholic and periodical Insanity and organic dementia.

It is to be admitted that a predisposition to Insanity may have been inherited, though not previously developed, and that the constitutional stress of the menopause itself is adequate to provoke the latent tendency.

The peripheral impressions, feelings, and ideas from the reproductive organs fill a large place in the mental sphere, and when they disappear through the involution of these organs at the climacteric epoch there naturally results a disturbance of the mental equilibrium. This is a noticeable feature at this crisis in most persons, and in some the mental perturbation reaches the point of Insanity. Just as the balance of the mental faculties may be lost at the crises of puberty or parturition, so the perfect co-ordination of these faculties may be overthrown by the extensive changes of the climacteric.

It is not difficult to conceive that this obliteration of reproductive functions and of their representative sentiments and psychical equivalents should result in aberration in women. But it is less evident that alienation is favored so directly in men, in whom the organic involution of the generative system is much more gradual.

It is confirmed by clinical observation that there is from fifty to sixty years in some men, especially in those who have made sexual gratification a chief pleasure and aim in life, a practical loss of sexual competency and a functional ablation of all sexual pleasures and sentiments. When this loss of sexual power and interest is sudden, existence becomes apathetic and gloomy, and any latent tendency to hypochondriacal melancholia is developed.

Both in men and women some etiological weight is to be given to the involutional changes in the entire organism at this climacteric

epoch. Psychical influences are also to be considered. There is the fact of sterility or impotence, which is depressive, the fear in women that they will cease to be objects of attention or admiration, that other women may supplant them in their husband's affection.

One woman worried herself into Insanity over a slight growth of hair on her face, at this period of life, since she was sure it made her an object of aversion to her husband, and many women grieve over the loss of good looks or obesity at this age, for to some society women loss of admiration is like loss of life. The actual physical sufferings and organic diseases developed by the involutional epoch are also to be regarded as contributory causes.

Stadia.—Close inquiry will seldom fail to discover an initial stadium of some weeks' or months' duration. The patient is restless, anxious, and gloomy. The sum total of subconscious impressions is painful, and cœnæsthetic depression forms the chief feature of the initial stadium.

The stadium acutum is melancholic in three-fourths of the cases, and lasts from three months to a year or more, and there is then a stadium convalescens of weeks or months, ending in gradual and complete recovery. But in the unfavorable cases there follows a stadium dementiæ, or some secondary and chronic mental disorder of a maniacal type. In hereditary cases secondary monomania is not an infrequent termination.

The majority of all cases terminate in recovery within the first twelve months. If the psychopathic tendency is strong in the family the stadium acutum may have alternating phases of excitement and depression, or even intercurrent stuporous states.

Not only the stadia, but the entire clinical progression of the mental disease may be exact repetitions of hereditary types of alienation appearing only at the menopause. In these cases morbid expectancy may have causative influence, since the daughter feels that she is predestined to succumb at this critical age, like her mother and her grandmother before her. When the stadium acutum takes the form of agitated or resistive melancholia it is apt to be prolonged for a year or two before recovery, and a stadium dementiæ is not an infrequent termination in these cases, which are generally unfavorable.

The stadia, in the aggregate, are shorter in the maniacal than in the melancholic types.

Symptoms.—The most constant symptom is the painful cœnæsthesis due to the abnormal impressions from the organic periphery. The brain does not take cognizance of these peripherally initiated

impressions so long as they are customary and normal, but the involutional excitations from sexual sources force themselves into consciousness in a most painful manner. This painful cœnæsthesis forms the basis of the prevailing melancholic mood and accounts for the permanent irritability of temper.

Next in constancy and importance is the vasomotor disturbance, shown in the vertiginous attacks, muscæ volitantes and blurred vision, cerebral hyperæmia and anæmia, flushes of heat and cold, cutaneous ischæmias and inequalities of circulation, pulmonary and hepatic congestion, uterine engorgements, pseudo-dysenteries, persistent cephalalgias, and profuse discharges from sexual organs.

The cutaneous paræsthesiæ are marked sources of delusions. The sensorial anomalies are chiefly auditory, visual, and olfactory hallucinations. The delusions arise from sensorial perversions in part, and are also the outcome of the predominant mood of melancholy. Their erotic and religious tinge is physiologically based on the actual involutional changes in the sexual organs, and the cortical relations of sexual and religious emotions.

Amnesia arises from apathy and inattention, and upon recovery there is usually a connected memory of the main events of the attack.

The sudden gusts of emotion are the spasmodic liberations of feeling from cortical centres on account of the vasomotor and nutritional inequalities.

Alcoholic indulgence, common at the climacteric, greatly heightens the explosive nature of the symptoms.

The morbid appetite and craving for stimulants and artificial excitants is only an instinctive longing for relief from the cœnæsthetic depression. The violent actions are performed chiefly under the influence of distressing delusions, but occasionally from actual perversion of the instincts, of the love of life, and of offspring.

Trophic anomalies are not uncommon, pigmentations of the skin, hypertrichosis, progressive emaciation or abnormal deposits of fat, or reabsorption of the panniculus adiposus, the formation of new growths in the reproductive organs, and in women a change in the metabolism of the whole organism, and an occasional tendency to malignant formations in uterine or mammary tissues.

When the complete physical readjustment of the climacteric has been accomplished, there is a corresponding restoration of mental equilibrium, but both mental and physical life is then carried on at a lower level. Patients recover, but they have suffered physical and psychical eviration and defemination.

Pathology.—The connection between neuroses and disorders of the sexual system has long been recognized, and that the climacteric changes and morbid states of the reproductive organs may excite mental disturbance is not to be doubted.

Predisposition unquestionably exists in a considerable percentage of all the cases, but still the involutional crisis is the exciting cause.

Considerable influence is exerted by the vasomotor and trophic anomalies in the pathogenesis of climacteric Insanity.

The general involutional changes of the entire organism are also to be included among the pathological factors of the psychosis.

Differential Diagnosis.—Climacteric Insanity is to be differentiated from periodic melancholia by the history and mode of the development of previous attacks.

It is to be distinguished from organic dementia arising at the climacteric by the presence of coarse brain disease in the latter. When alcoholic indulgence provokes the psychosis, the latter is to be classed as toxic rather than climacteric.

Recurrent mania coincident with the menopause is not to be recognized as climacteric Insanity. Epilepsy first appearing at the change of life subsequent to the psychosis does not modify the diagnosis, which is climacteric rather than epileptic Insanity, but the reverse is true should the neurosis precede the psychosis.

Prognosis.—The general prognostic chances in climacteric Insanity may be stated in a few words. Fifty per cent. of all cases treated recover. The recovery takes place, in the majority of cases, within seven months, and nearly ninety per cent. of the recoveries occur within the first year of the attack. The earlier the treatment is begun the more favorable is the issue.

Climacteric Insanity developing after fifty years of age in women is unfavorable in prognosis.

The presence of hereditary predisposition renders the permanency of the recovery doubtful.

The prognosis as to life is in general favorable. The mortality among men is greater than among women patients, and it is among the latter about twelve per cent. and arises from intercurrent disease rather than from exhaustion due to the mental disorder.

Direct heredity predestines some women to recovery and others to chronicity.

The chronic cases often survive many years and may attain old age. Partial recovery results in about fifteen per cent. of the cases, and a certain usefulness and enjoyment of home life is possible in these instances.

Unfavorable elements of prognosis are chronic organic diseases, phthisis pulmonalis, cardiac affections, uterine or ovarian tumors, or the gouty or rheumatic diathesis, or a history in men of excess in "venere et baccho."

Treatment.—Home treatment is seldom successful, and isolation for a time from all home influences is desirable.

The object is to conduct the patient through the crisis of the change of life, and to assist nature in the readjustment in progress, and active or abortive attempts at the limitation of the psychoses are out of the question. Hydrotherapy suffices to procure sleep in conjunction with life in the open air and a nourishing diet.

Forced alimentation is to be systematically carried out, for anorexia and refusal of food or partial starvation is the rule in these cases. When the need of a hypnotic is imperative chloral and bromide of potassium, equal parts, give relief. The bromides diminish the paræsthesiæ and the general restlessness, but in the long run, if used in efficient doses, they influence the course of the mental disorder unfavorably and favor chronicity. Opium acts favorably in some cases, but soon becomes a habit and a positive hindrance, and the same is true of alcoholic stimulants, which are to be avoided.

Digitalis, to sustain cardiac action, is at times indicated, and arsenic, for its effect on general nutrition, and valerianate of ammonium, for the nervous agitation. Cannabis indica may be of service in the cephalalgias, which, if of the anæmic variety, are met with iron and small doses of camphor.

Climatic influences are important, and the state of the heart and lungs is to be considered in the choice of a climate. Out-door treatment is the most important hygienic measure.

Occupation and diversion and other psychotherapeutic means aid greatly in the cure. The mistake of a too early return to family responsibilities and household cares is to be avoided, for recovery after a relapse is the exception.

Section IV.—Senile Insanity.

The natural decay of the powers of mind and body begins at an earlier age than is usually admitted.

Muscular activity and endurance decline rapidly after the thirtieth year, and after the fortieth year there is no longer fitness for competition in feats of strength and agility. At forty-five years a gradual retrograde metabolism of the entire organism begins. Fat is substi-

tuted for higher forms of tissue, and fatty degenerations of the vascular system are already well under way at the fiftieth year, though perhaps not yet interfering with circulatory functions. The heart increases in size, but diminishes in inherent force, and there is lessened vigor of the organic muscular system. The fullest facility of memory and imagination, the readiness of acquisition of knowledge, the chief mental endurance, the originative power of mind are things of the past at the sixtieth year.

Premature senility (senium præcox) begins in some instances as early as the fiftieth year. Senile involution is generally admitted to date from the sixtieth year, and this is ordinarily the critical epoch at which the retrogressive changes of the muscular, vascular, and nervous tissues begin to result in evident failure of functions.

Normal senile involution is a gradual decline of all the powers of body and mind, ending in second childhood—a condition too familiar to require description. Instead of a gradual diminution of the mental powers there may be sudden failure of the faculties, or marked perturbations of thought and feeling, or turbulent commotions of the whole mental and moral being. This is senile Insanity from pathological senile involution, and it may appear at any time after the sixtieth year, or after the fiftieth year in senium præcox.

Definition.—Senile Insanity is mental aberration arising in connection with the cerebral atrophic changes and general systemic alterations of the involutional crisis of senility, and manifested not only by general failure of the mental powers, but also by sudden melancholic and maniacal reductions, by hallucinatory and delusional perversions, and by varied mental disorder, modified by the existing factors of the crisis.

Clinical Delineation.—Senile dementia presents the most typical transformation of physiological into pathological changes in old age. The natural diminution of appetite becomes sitophobia, the wakeful habit active insomnia, the forgetfulness amnesia, the hesitancy of speech aphasic trouble, the timidity morbid fear, the tardy recognition of persons the absurd mistaking of personal identity, the irritability violent passion, the indifference to personal appearance slovenliness, the talkativeness constant garrulity and reiteration, the egotism irrational boastfulness, and diminished faculty of adaptability to the environment complete helplessness.

The old man with waning powers of mind and body thus becomes gradually the typical senile dement. If this transformation is very gradual there is difficulty midway to mark the point at which the

Insanity may be said to begin. In many cases the symptoms of senile dementia are of sudden appearance, leaving no room for doubt as to the point of inception of the pathological mental change. Senile dementia is perhaps the most typical form of senile Insanity. It is distinguished from other kinds of dementia simply by the totality of the senile conditions under which it arises, and in the same way melancholia and mania at this senile epoch are modified by the total involutional changes in pathological circumstances of this particular crisis.

The loss of memory, disturbances of speech, muscular tremor, and childish extravagance of ideas in some senile cases suggest general paresis, and in still more exceptional instances there are reasoning and monomaniacal conditions.

The arterial degenerations favor hemorrhages and localized softenings of the brain, but all mental enfeeblement resulting from such coarse brain disease is to be classed as organic dementia, under which head it is described.

If there be well-marked heredity, alternating states of excitement and depression, and frequent remissions of symptoms become prominent features of the senile Insanity. Heredity is presumably less at this crisis than at earlier physiological epochs, and still it can be directly traced in about sixteen per cent. of the cases, which are wont to present the varied outlines found in all other hereditary insanities. Necessarily the complete phenomena of senile Insanity are complex, but still there is a constant group of mental and physical symptoms of the senile epoch itself, which impart a special character to the varieties of mental disturbance at this crisis.

Causes.—There is an inherited predisposition to Insanity in about sixteen per cent. of the cases. There is in other cases a predisposition acquired by alcoholic indulgence, or by syphilitic taint, or by cumulative stress of trying circumstances. In senility the power of recuperation from all the shocks to which flesh is heir is greatly diminished, and the youthful and vigorous resistance to the inimical forces with which life is environed is in a great measure lost. The exciting causes, therefore, of senile Insanity are both physical and mental and extremely numerous.

The essential causes unquestionably are the involutional changes in the vascular supply, and in the structural elements of the cerebral nervous centres. Circulatory and nutritional alterations in cortical regions exist previous to arterial and atrophic degenerations. Hence the senile psychoses may be clinically classed into those which are

functional and those which are organic, and the frequent recovery of the former and the invariable chronicity of the latter also sustain this clinical division.

The epilepsy appearing at this epoch is epiphenomenal rather than causative as regards the Insanity.

Stadia.—In typical senile dementia there is a long initial stadium of progressive deterioration of mind, followed by an acute stadium of unmistakable Insanity, during which violation of public decency, or the appropriation of the personal effects of others may get the patient into legal trouble. The stadium acutum is attended in these cases by remissions and exacerbations of excitement or depression, which become finally hardly perceptible, and there is then a final stadium dementiæ senilis, which terminates only with the life of the patient.

In other types of senile Insanity there is a shorter initial stadium, of a few weeks' duration, presenting anxious and restless states of mind, anorexia, insomnia, and morbid suspicions and fears, followed by a stadium acutum of decided maniacal or melancholic character, and with delusions and hallucinations and suicidal impulses. This acute stadium may continue for weeks or months and graduate into a final stadium dementiæ, or be followed by a genuine stadium convalescens. The convalescence in the functional senile psychoses is sometimes surprisingly sudden and complete. The restitution naturally is to the standard of mental health prior to the attack, and of course implies no regression of the previous involutional changes.

In the hereditary cases the stadium acutum often extends over one or two years, and is marked by alternations of maniacal and melancholic states, by semi-lucid intervals, by reasoning states of moral perversion and irrestible impulses and suicidal attempts. There are exceptional cases of homologous heredity at this crisis, in which there is an exact repetition of symptoms of mental disorder alike in successive generations, born to pass safely through other physiological crises, only to succumb to mental disease at this final critical epoch.

Symptoms.—Allusion has already been made to the progressive deterioration of mind in senile dementia. The amnesia is more especially for names, dates, and recent events, while past recollections may remain unimpaired until the final stadium dementiæ. General loss of impressionability and the blunting of all the special senses lead to inattention and lack of memory, so that gross errors of time, place, and identity occur. Finally, there only remain childish remin-

iscences, or a few personal facts permanently organized in memory by force of repetition in stories continually rehearsed.

The original and forcible use of language is early lost, but the automatic use of technical language by professional men may impose an idea of intelligence which does not exist. A senile lawyer dement, for long years incapable of self-care, by parrot-like repetition of legal phraseology imposed on visitors the idea that he should be released from confinement, but an examination into his mental state soon revealed the absurdity of the imposition. In the same way there may be an automatic appropriateness in replies to questions long after independent thought has ceased, and while marked senile aphasia exists.

Delusions of suspicion and persecution predominate in the early stages and are fortified by hallucinations of sight and hearing. Perversions of the special senses precede their pathological diminution in some cases. Thus parosmia and parageusia may precede anosmia and ageusia in senile Insanity. The anosmia is often due to atrophic processes of the olfactory bulb. The idea of poisoning may arise from these perversions of taste. The visual hallucinations are to be attributed to involutional changes and are often entoptical, and the same is true of the auditory perversions due to entotical senile conditions. Hypæsthesia and anæsthesia and analgia are common in the terminal stage. Paræsthesiæ of cutaneous surfaces lead to stripping off of clothes and to picking the skin sore in places.

The extreme restlessness, the "anxietas tibiarum" of the initial stadium, has its origin in heightened muscular sense, but the latter is impaired finally and favors the ataxic conditions of senile Insanity. The muscular tremor is a very constant symptom, and it is increased on intentional effort.

Facial hemiparesis and temporary monoplegias may appear. Muscular atrophy extends gradually to both voluntary and involuntary muscles, though there may be cardiac hypertrophy followed by dilatation. Syncope occurs from cardiac failure.

The atrophic processes involve all the tissues, though the epithelial and glandular structures are only affected at a late day.

The final stage of this general atrophy is senile marasmus. The emaciation is often extreme.

The vascular degenerations may be first evident in the carotid and basilar arteries, and in the cerebral vessels before the temporal and radial arteries betray atheromatous change. Cataract and arcus senilis are common precursory signs.

The rhythm of sleep is changed to somnolence in the daytime and insomnia at night. Bulimia is more frequent than anorexia. Intestinal anæsthesia enables lifelong dyspeptics to eat voraciously with impunity, and the wasting of tissues is perhaps the physiological explanation of the gluttony. The sexual desire is increased to a morbid degree, and with the presence of organic impotence there is libido or even satyriasis. As ethical degeneration is often complete, there result immoralities and legal offences in the sexual direction. Senile parapraxia are both impulsive and automatic. Indecent exposure of the person, sometimes leading to arrest, is automatic in many cases, and as thoughtless as the general filthiness of habits of senile dements.

Loss of natural affection, selfish concentration of feeling, impotent anger, suicidal impulses, insane acquisitiveness and miserliness, unfounded hatred and suspicion, and cruelty to children and animals are also symptoms often observed.

The fundamental emotional tone is melancholic, due to the painful alteration of the cœnæsthesis by the universal degenerative changes. Even the maniacal states emerge from cœnæsthetic depression. Hebetude exists, but full stuporous states are rare, except in connection with focal brain lesions.

The monomaniacal exaltations precede, ordinarily, the terminal mental enfeeblement in hereditary cases.

There is something exceptional to note in senile Insanity originating in senium præcox. In certain families senile decay begins at fifty years, and the Insanity in some instances bears a close resemblance to general paresis in symptoms and pathology.

The slowed speech of the senile dement arises from mixed causes, such as dulness of comprehension, retarded association of ideas and thought-rate, amnesic failure, and difficulty in the emissive sphere of speech.

The articulation has the same feeble deliberateness and occasional unsteadiness as the senile gait, and tremor of the voice from defective diaphragmatic innervation is not uncommon.

Modifications of respiration, dyspnœa, slowed breathing, superficial inspiration, modified respiratory rhythm are to be observed. All the vital functions are enfeebled.

Pathology.—It has already been stated that there is an inherited predisposition to mental disorder in a certain percentage of the cases. Still, the pathology must be admitted to be the involutional changes in the entire organism. The vascular degenerations and the cerebral atrophic lesions naturally are foremost in pathogenetic consideration.

Fatty and atheromatous changes in the cardiac and cerebral arteries may alone be found post-mortem, but in other cases the radial, temporal, and brachial arteries, and even the entire arterial system, may have undergone degeneration, and this is especially true in cases complicated with alcoholic excess.

The cortical atrophy is specially marked in frontal and motor regions, certain vascular areas suffer more than others, and both ganglionic elements and associative fibres are implicated.

In many cases not only the convolutions, but the medullary substance and the basal ganglia, are involved in the general atrophic and sclerotic processes. Chronic pachymeningitis, compensatory effusions, foci of softening, miliary aneurisms, ependymitis, and leptomeningitis have been reported in these cases. Cellular pigmentation, proliferation of protoplasmic glia-cells, and leucocytes in the perivascular spaces have also been recorded in these cases of senile Insanity. Prior to these extensive pathological changes in the organic senile psychoses there are decided vasomotor and nutritional derangements in cerebral centres to account for the functional senile psychoses previously mentioned.

Differential Diagnosis.—All the psychoses occurring during the physiological crisis of senility and modified by the sum total of the psychic and somatic conditions of the senile involution are to be regarded as senile Insanity. The differential diagnosis is to be made from general paresis in senile dementia, with impaired speech and memory and tremor with unsteady gait. The history and mode of development differ. The senile dementia has a longer and milder initial stadium, more painful moods and depressive ideas, suicidal tendencies, different delusions, lacks the paretic reflexes, has a depressed rather than exalted cœnæsthesis, has not the paretic gait, has a more gradual amnesic failure, lacks the spinal and ataxic symptoms, has tremulous but rarely hesitating paretic speech, and still it presents many points in common with general paresis. Senile Insanity with senium præcox has so nearly the same symptomatology as general paresis in certain cases that the diagnosis intra vitam is not possible, and even post-mortem the appearances in nervous centres may be much alike.

Prognosis.—The prognosis as to recovery in the functional senile psychoses is not unfavorable from the mere fact of senility. Thirty per cent. of such cases recover after maniacal or melancholic attacks. The general condition of the patient and of the internal organs is to be considered. In the absence of distinct organic disease, and in the

presence of a fair amount of physical vigor, recovery may be expected. If there be hereditary tendency a relapse will probably occur after a first attack, and a recovery from a second attack is doubtful.

The prognosis in the organic senile psychoses with degenerations in arterial and nervous tissues is bad. There may be remissions of many months, but complete recovery is not to be expected.

The prognosis of senile Insanity complicated with epilepsy developing at the involutional epoch is unfavorable.

Senile Insanity with senium præcox is practically incurable and often terminates fatally in from two to four years.

The prognosis as to life is good in the functional senile psychoses under proper care and treatment. In the organic senile psychoses the duration of life is shortened by the mental disease, on the average, though the patient may survive many years.

Treatment.—Isolation is necessary in most cases. Patients are dangerous to themselves, if not to others. They run about and knock against things, receive bruises, falls, and fractures. They are easily injured and get extensive ecchymoses and abrasions from restraint by the hands of attendants. The recumbent posture and the restraining sheet are most practical at night, and incessant attendance in the daytime is required. Warm baths and hot alcoholic drinks at bedtime sometimes procure sleep.

Sulphonal is less dangerous than chloral in these cases. Occasionally opium and digitalis relieve the anæmic insomnia. Forced alimentation is indicated in the majority of the cases with melancholia. A generous diet and predigested foods are all important. Massage relieves the restlessness in connection with hydrotherapy. Warmth, sunshine, care for clothing and personal cleanliness, the relief of obstipation and of a distended bladder, night-care, day-nursing, feeding and exposing to fresh air in appropriate weather are the main indications in the confirmed cases.

Frequent physical examinations, and the treatment of gastric, cardiac, renal, and pulmonary diseases constitute the routine of psychiatric proceedings in these cases.

CHAPTER V.

INSANITY WITH GENERAL SYSTEMIC MORBID STATES.

Group: Toxic Insanity and Diathetic Insanity.

Section I.—Toxic Insanity.

About ten years ago the writer drew attention, in his published writings, to the importance of toxic agents as etiological factors of mental disorders, and in June, 1892, read a paper before the American Neurological Association on "The Toxic Origin of Insanity," taking the view that a large percentage of mental disease is toxic. The opinions then expressed have been abundantly confirmed by subsequent writers on this subject, which has at the present day a voluminous literature.

The toxic agent may be vegetable, animal, or mineral, and it may be solid, liquid, or gaseous in form, and it may enter the system by the alimentary canal, the respiratory tracts, or the cutaneous surfaces. It may be the toxalbumins of infectious diseases, or the noxious products of catabolism in the organism, as in the auto-intoxications.

Whatever be the poison, the microbic infection, or the animal virus, the resulting toxæmic state is apt to be attended by mental disorder, which varies chiefly according to the individual mode of reaction to the toxic agent.

Definition.—Toxic Insanity is acute or chronic vesania, caused by the medium of toxic substances acting on the cerebro-spinal or sympathetic nervous system, and clinically manifested by motor, sensory, trophic, vasomotor, and psychic disorder, varying according to the individual idiosyncrasy of reaction to the toxic agencies, which have invaded or been generated in the organism.

Clinical Delineation.—Although the clinical manifestations in toxic Insanity are extremely diversified, the chief features of the toxic psychoses are readily outlined.

In the first place, there are acute intoxications from poisons, causing exaltation or depression of feeling, illusions, and hallucinations of the special senses, sensorial delusions, and disturbances of memory and consciousness. The mental disorder thus provoked may cease with the physiological action of the toxic agent, only to be renewed upon a second acute intoxication ; or a single exposure to the poisonous action may initiate prolonged mental disease, as witnessed in idiosyncrasy of reaction to alcohol, ether, or chloroform.

In the second place, there are chronic intoxications from poisons intentionally taken, as in the wide-spread drug habits, or unavoidably absorbed in certain occupations ; and these are attended by gradual physical and mental deteriorations, interpersed with exacerbations of acute mental disorder.

In other instances acute psychoses are promptly developed by the presence in the system of the virus of infectious diseases, and attacks having the form of acute mania or melancholia pursue a course to recovery or to terminal mental enfeeblement.

Again, in the numerous auto-intoxications there are maniacal, melancholic, or stuporous vesaniæ, passing through all the phases and stages to complete convalescence, or to terminal dementia.

The above are, in brief, the general outlines and the clinical progression of the toxic psychoses.

As to the particular features of the mental disorder, the maniacal types predominate over the melancholic, and the latter are more frequent than the stuporous forms. The melancholic states are more common in men than in women, and age has less influence than sex in this regard; but whenever heredity is a distinct factor alternation of excitement and depression becomes a feature.

Idiosyncrasy as to toxic influences is directly hereditary in some cases, as in the instance of alcoholic parentage, which confers excessive vulnerability upon the offspring. It is probable that the mode of reaction to toxic agents may also be influenced by heredity, and it would seem that psychoses from opium and haschish abuse do not present the same features among Turks and Anglo-Saxons, for instance. Whether derived from parental source or dependent on fortuitous conditions, the individual reaction to toxic agents causes the chief variation in the clinical aspects of the mental disturbance. Just as the physiological effect of alcohol is to cause expansive and agreeable feelings in one and morose and quarrelsome moods in another, so the pathological action of the same agent may result in happy types of mania or sullen forms of melancholia.

In their physiological effects there is a specific difference in poisons as to the prevailing emotional mood excited, but in their pathogenetic relations to Insanity they result in maniacal or melancholic states more in accordance with individual and constitutional peculiarity.

In some toxic cases motor anomalies, in others sensory perversions, and in others intellectual disorder may predominate, according to the vascular areas and nervous tracts involved in the pathological changes initiated by the poison. The cerebro-spinal lesions may give rise to a symptom complex like that of general paresis. These pseudo-pareses may be distinguished from general paresis only by the fact of their frequent recoverability, but, in most instances, the clinical features suffice for the differentiation, as will be later described.

Causes.—The etiological factor in all instances is the toxic agent, which acts in two distinct ways. In the first place, it operates, by its simple presence in the circulation, through immediate influence upon the ganglionic elements of the cerebral cortex. All acute infections, auto-intoxications, and most of the animal, vegetable, and mineral poisons may excite mental disorder at once in this way. In the second place, the toxic agent is causative through the permanent lesions which it occasions in vascular, nervous, and connective tissues. It is chiefly in this way that all the chronic poisonings lead to permanent organic psychoses and to pseudo-pareses.

Some of the more common toxic agents which cause Insanity are here named and classified:

I. Mineral Poisons and Drugs.—1, Lead; 2, mercury; 3, arsenic; 4, chloral; 5, bromide of potassium; 6, iodoform; 7, paraldehyde.

II. Vegetable Poisons.—1, Opium; 2, belladonna; 3, cannabis indica; 4, hyoscyamus; 5, stramonium; 6, tobacco; 7, cocaine; 8, conium; 9, erythroxylon coca; 10, astragalus hornii; 11, secale cornutum.

III. Intoxicants and Noxious Gases.—1, Alcohol; 2, ether; 3, chloroform ; 4, carbonic oxide ; 5, sulphurous-acid gas.

IV. Acute Infections and Diseases.—1, Typhoid fever; 2, small-pox ; 3, scarlet fever ; 4, typhus fever ; 5, diphtheria ; 6, cholera ; 7, puerperal sepsis ; 8, epidemic influenza ; 9, purpura ; 10, erysipelas ; 11, bubonic plague ; 12, lepra vera ; 13, lyssa humana.

V. Auto-intoxications.—1, Leucomains ; 2, ptomains.

Some of these toxic agents only act upon special tissues, but most of them deleteriously affect the entire organism, and their evil effects continue long after their elimination from the system. A single ex-

posure to chloroform, illuminating gas, and other toxic agents may result in a psychosis, but ordinarily mental disturbance only follows repeated exposures or chronic intoxications.

In order of numerical importance alcohol heads the list of toxic agents, and in its remote and direct effects is causative of a large percentage of all cases of Insanity.

In Eastern countries opium and haschish take the place of alcohol in this respect, and morphinism is wide-spread in all civilized countries. In South America the excessive chewing of the leaves of erythroxylon coca containing hygrin and cocaine sometimes results in mental disorder.

In Europe epidemics of ergotism have been attended with Insanity due to the use of rye-bread. The toxic agent in this instance is the sclerotium of claviceps purpurea which grows on secale cereale.

As regards ether and chloroform, the writer has seen acute psychoses resulting both from a single anæsthetic administration, and also from prolonged habit of the use of these poisons.

Sepsis in the puerperium, especially during the first ten days, is the cause of acute maniacal attacks. Ptomains are to be found in the urine. Scarlatinous and variolous poison may occasion acute psychoses, prior even to the eruption, though much of Insanity from acute infections is due to secondary lesions in nervous centres, complicated with parenchymatous changes in spleen, liver, and kidneys.

Epidemic influenza is a frequent cause of Insanity, and the writer has found extensive meningitic and cortical lesions in insane patients who succumbed to the disease.

Auto-intoxications are very common, and due to the putrefactive alkaloids, formed by the action of bacteria on organic matter, known as ptomains; or to nitrogenous basic substances resulting from metabolic changes in bodily tissues and called leucomains.

The presence of these autogenous poisons is the cause of a considerable percentage of the acute psychoses, as well as of chronic mental disorder.

Stadia.—Insanity from acute intoxications and single exposures to toxic gases has a brief initial stadium of physical distress and cœnæsthetic depression, followed by a stadium acutum of variable duration, and often prolonged for weeks, of maniacal or melancholic symptoms, ending in a convalescent stadium, ordinarily leading to gradual recovery. The preliminary intoxication is generally expansive or gay, but the reverse state of depression almost invariably is present in the initial stadium.

In chronic intoxications there is a long initial stadium of remittent depressions, following culminations of poisonous effects, with gradual change in character and the evolution of sensorial and intellectual disturbances. There then follows a prolonged acute stadium, which is virtually a stadium deteriorationis, a degeneration of the entire physical and mental being, reflecting the general organic lesions in progress in the vascular, glandular, and nervous tissues. Then follows a terminal stadium dementiæ, or a gradual stadium convalescens.

In the acute psychoses due to infections the usual clinical progression of the mental disease appears in an initial stadium, a stadium acutum, a stadium debilitatis, and a stadium convalescens.

The stadium debilitatis is one of great mental enfeeblement, and often passes directly into a stadium of terminal dementia.

Symptoms.—To illustrate the multiple symptomatology of toxic Insanity, the varied states of mental disorder generated by alcohol, as a typical toxic agent, may well receive attention.

First there is the acute intoxication with mental perturbation so brief as not to be deemed Insanity—the gay and boisterous, maudlin and lachrymose, sullen and violent moods, according to individual reaction.

Then there are very mild forms of mental disorder, states of cœnæsthetic depression or exaltation. The symptoms are confined to perversions of sensation, illusions and hallucinations, often recognized as such by the patient, loss of sleep and appetite, gastric disorder, cephalalgia, subsultus tendinum at night, incubus, cutaneous paræsthesiæ and changeful emotions, which escape the control of the will.

Again, there are attacks of fully developed mania or melancholia, with frightful hallucinations and delusions of suspicion and persecution, suicidal and homicidal impulses, perversions of special and common sensation, variations in pulse, respiration, and temperature, mistakes in identity of persons, great agitation and sleeplessness, tremor, and occasional convulsive seizures.

Still another form is acute delirious mania, with wild excitement and complete incoherence of ideas—a genuine delirium acutum—often ending fatally in a few days. There is incessant hallucination, automatic jactitation and violence, and spasmodic action of the entire musculature, ending in exhaustion with rapid rise of temperature, emaciation, and failure of the vital powers.

Contrasting strongly with the above types is the slow but deep and progressive degradation of the moral nature in the chronic drunkard.

Intellectual disorder may not exist, apparently, but the patient may be monstrously perverted, with loss of all natural affection for wife or children, with violent tendencies, homicidal or suicidal impulses, pyromaniac or kleptomaniac tendencies, and dangerous sexual and brutal instincts.

Then, again, there is the terminal type, resulting from physical, mental, and moral dissolution under the universal toxæmic influences, as witnessed in alcoholic dementia.

Finally, there are the alcoholic pseudo-pareses, which so nearly resemble general paresis, but differ from it in the frequent recoverability.

All the above types and symptoms of mental disorder caused by alcohol may be developed under the influence of other toxic agents, as shown in the psychoses from toxic occupations and drug habits.

In the acute infections the maniacal symptoms predominate in the incubatory and eruptive stage of the contagious disorder, and melancholic and stuporous states attend the subsidence of the acute infection. The maniacal state may attain the height of acute delirium, and the stuporous reductions often reach the grade of complete torpor.

In mental disease from typhoid fever the stadium acutum is frequently a post-febrile hebetude, with amnesia from loss of power to fix attention, confusion of time, place, and persons, and absence of initiative or will power. Several instances of Insanity seen during the fever took the form of melancholic delusions and hallucinations in the absence of all delirium. Maniacal states are said to arise during typhoid infection, but they have never been observed by the writer. Post-influenzal insanities are mostly of the melancholic form, with depressive hallucinations of hearing and suspicious delusions.

Hydrophobic Insanity is said to be of the maniacal order, and erysipelatous aberration is also of this type, though pseudo-paresis has also been reported from this source. The auto-intoxications are more frequently associated with the maniacal and melancholic states, but it is also claimed that general paresis develops upon a toxæmic basis, and this may well be granted as regards the luetic virus.

Ergotism eventuates in melancholic and stuporous states, delusions, amnesia, sensory disorders, cutaneous gangrene, convulsive seizures, cramps, contractures, circulatory and respiratory disturbances, ataxic shooting pains, trophic lesions of epithelial structures, loss of tendon reflexes, and general emaciation.

Plumbism gives rise to melancholic, maniacal, stuporous, and

demented states, and also to pseudo-paretic conditions. Nocturnal delirium is a symptom, and there are also hallucinations of sight, terrifying delusions, tremor, comatose and convulsive attacks, extensor paralysis, amaurosis from atrophy of optic nerve, wrinkling of the face (Tanquerel), and marasmus.

Absinthism is said to differ from alcoholism by a greater convulsive tendency and heightened reflexes, and to end more promptly in terminal dementia.

Astragalus hornii causes stuporous dementia, mydriasis, facial pareses, blank countenance, and fixed, staring look.

Bromism leads to stuporous states, which may end in complete fatuity.

Arsenicism, if severe, may end in dementia. In one case under the writer's care there was a stuporous state, anæsthesia due to spinal lesions, and paraplegia, from which there was a gradual recovery.

Morphinism results in amnesic states, affective perversion, irritable, suspicious, and fearful delusions, complete moral degeneracy, suicidal impulses lacking force of execution, and distressing hallucinations on cessation of the drug, with cramps and vasoparetic states.

Cocainism develops a reasoning form of mental alienation, with changeful hallucinations and corresponding delusions, anxious and excitable moods, attaining melancholic states of agitation on withdrawal of the drug, or even attacks of stuporous collapse.

Nicotinism in young subjects treated by the writer has given rise to both maniacal and melancholic states, and in one instance to an entire change in character resembling the moral degradation of chronic alcoholism.

Disulphide of carbon produces disorders of speech and memory, disturbed vision, tinnitus aurium, muscular spasms, depressed moods and delusions, and mental enfeeblement.

Pathology.—In acute intoxications there is the direct action of the toxic agent on cortical centres to account for the mental disturbance.

After repeated exposure to the poisonous influence, nutritional and vasomotor disorders become complicating factors in the mental disease. In the chronic intoxications organic lesions of vascular and nervous tissues account for the symptoms of the psychosis. There is an intermediate period, during which functional mental disorder and that due to structural changes blend in a variety of ways.

Taking alcohol as a type of toxic agents, the structural alterations are found to be atheromatous, and fatty degeneration of cerebral ves-

sels, proliferation of the protoplasmic glia-cells of the superficial cortical layer, fatty changes in the motor cells of the fifth layer and of the subjacent spindle cells, aneurismal dilatations of the minute cortical arteries, pigmentation of ganglionic elements and degeneration of apical processes, spinal lesions and sclerotic changes from without inward of posterior and lateral columns, and changes in the vascular supply of the cord.

Somewhat similar lesions are found in chronic intoxications from lead and some other poisons, but no toxic agents produce constant or uniform lesions, and individual peculiarity, and possibly inherited tendency, modify the result both as to the morbid anatomy and the mental phases of the psychosis.

Differential Diagnosis.—The history of exposure by special occupations or by drug habits to the deleterious effects of poisons often serves for diagnostic purposes. The whole train of sensory and motor symptoms, taken with the psychic manifestations, also aids greatly in the differential diagnosis. In uræmic, diabetic, and other toxic states the examination of the urine reveals the toxic origin of the Insanity.

In morphinism and other concealed drug habits the same test can be applied, for nearly all toxic agents are present in the urine soon after ingestion.

The differential diagnosis of the toxic pseudo-pareses from general paresis is the most difficult, but the history of the case, mode of development and progress of the mental symptoms, and the actual manner in which the entire manifestations are grouped usually suffice for the differentiation. It is seldom that the same physical and mental symptoms at once coincide in the two types, one of which is curable and the other practically incurable.

Prognosis.—The prognosis as to recovery is good in all the acute intoxications, judged by the general average of results. Advanced age, previous attacks, hereditary predisposition, and constitutional diseases are bad prognostic elements as to recovery. The prognosis in the chronic intoxications which have reached the stage of structural alterations is bad, and yet not unqualifiedly so, for occasional recoveries still occur.

In mentwal disease from drug habits the prognosis is good upon entire cessation of the drug, but a return to the habit is the rule, and a recurrence of the mental disorder can be predicted in the majority of cases. The same is true of the occupation psychoses, which

relapse if a change of occupation is not made to avoid exposure to the special toxic agent.

The permanency of recovery depends, therefore, largely on the degree of prophylaxis exercised in these toxic cases upon convalescence.

Treatment.—In all habitual and voluntary intoxications isolation at home or in an institution is required. The weak point of home treatment is that servants or relations procure the forbidden drug for the patient.

The gradual or sudden cessation of the drug is a question to be decided in each case, in accordance with the physical state of the sufferer.

In poisonous intoxications the antidotal and eliminative remedies are first in order, while the patient is sustained by supporting measures, concentrated nourishment in frequent and small quantities, and tonic treatment. Purgatives, diuretics, Turkish baths, iodide of potassium, and sulphate of magnesium are common means of elimination of the toxic substance. The motor paralyses are treated by massage and electricity, especially the galvanic current.

The acute maniacal and melancholic symptoms demand no different treatment from that fully described in the general chapter on therapeutic measures. The frequent violent and suicidal impulses call for close personal surveillance both night and day.

The auto-intoxications are met by gastric lavage and by intestinal antisepsis, in addition to general symptomatic treatment.

Predigested foods are here of much service, and artificial feeding should be undertaken at an early day. In the alcoholic cases capsicum and strychnine are of value, and the antidotal remedies vary greatly in the different toxic insanities. The general principle is the same in all—to support the patient by roborant treatment during elimination of the poison, and then to persevere with active measures during the tedious convalescence from the chronic intoxications. The mental recovery cannot be deemed complete until the general physical health has been re-established on a firm basis, and until all toxic sequelæ have disappeared.

Section II.—Diathetic Insanity.

Disorder of the mind often arises in connection with the general morbid state attendant upon such diseases as phthisis pulmonalis, gout, rheumatism, pellagra, malaria, anæmia, cancer, lepra and myxœdema, and the Insanity is then termed diathetic. The course and

symptoms of the mental disorder in this instance are often considerably modified by the diathetic state, which also, in some cases, occupies the relation of a direct exciting cause to the Insanity.

Definition.—Diathetic Insanity is mental alienation in connection with phthisical, podagrous, rheumatic, pellagrous, paludal, anæmic, post-febrile, cancerous, leprous, and myxœdematous systemic states, which impart special traits to the somatic symptoms, and also impress a particular character on the changeful phases of exaltation, depression, and enfeeblement, in which aberration of mind is revealed.

Clinical Delineation.—The clinical features of the mental disorder vary with the nature of the diathesis, and there are fluctuations in the physical and mental disease, and periodicity is not uncommon in both the vesanic and diathetic symptoms.

The Insanity may appear before the diathesis is fully developed, and this is often the case in phthisis pulmonalis; but the diathesis is ordinarily the primary affection. Alternations or vicariations also exist between the psychosis and the diathesis. Thus the phthisical symptoms may remain latent after the appearance of the mental disorder, and the latter may disappear when the former again become active. There is a vicarious heredity, also, by which Insanity and phthisis pulmonalis are interchangeably transmitted from parent to offspring, and this is also true of some of the other diatheses.

During the development of the diathesis the Insanity is manifested more frequently as melancholic perversion of ideas and feelings, with delusions of suspicion ; but, in advanced diathetic conditions, maniacal, stuporous, and demented states are to be encountered. It not uncommonly happens that there is a chronic melancholic stadium, interrupted by maniacal exacerbations, which correspond to the culminating phases of the diathetic disorder when it is malarious or myxœdematous, or to retrocessions of the same when it is podagrous or rheumatic.

In chronic paludal intoxication there may be stuporous states and maniacal periodic excitement, which is really a substitute for the malarial paroxysm. This larval mental access may be tertian or quartan, and it may reach the extreme of acute delirious mania.

In the gouty diathesis the prevailing mood is depression, but acute mania may supervene upon a sudden retrocession of the local disease, and the same is true in rheumatic metastasis. In fact, maniacal symptoms are the rule upon the subsidence of the arthritic affection.

The somatic conditions in most all of the diatheses are impaired nutrition, hæmic deterioration, congestion or anæmia of internal or-

gans, perverted metabolism, imperfect oxidation and retarded combustion of tissues, retention of waste products, vascular degenerations, gastro-intestinal, cardiac, renal, and hepatic disorder, and continuous vasomotor disturbances. Muscular disorders, modifications of respiration, derangement of digestion and sleep are also frequent.

The psychical symptoms, in the main, are restlessness, suspicion, morbid fears, delusions of a depressing character, hallucinations and illusions of a terrifying nature, suicidal, and more rarely homicidal or destructive, impulses, and a persistence of painful emotions. Even in the maniacal attacks the sensorial perversions are chiefly of a disagreeable and frightful kind. In rare instances there is an agreeable cœnæsthesis, and expansive feelings and delusions in phthisical cases. Occasionally fully systematized monomanias appear, and still more rarely general paresis originates in diathetic conditions. Hypochondriacal and hysterical features are very common in the early stage of the diathesis, and at a later period convulsive seizures and cataleptoid states are to be observed.

The final states of mental enfeeblement in the diatheses are usually conjoined with organic lesions of internal organs and a general condition of malnutrition, and progressive emaciation, which reaches its greatest extreme in phthisical Insanity. In the rheumatic diathesis choreic symptoms and cardiac affections are at times prominent complications.

These outlines of diathetic Insanity will be filled out under the head of symptoms.

Causes.—A certain hereditary predisposition is presumably present in diathetic mental disorder, but the general systemic morbid state is an adequate exciting cause of the Insanity. There are profound changes in nutrition and in the blood, and progressive emaciation in most of the diatheses. There are retentions of uric and lactic acids in the circulating medium, and reabsorptions of septic material in cancerous and tuberculous cases, and micro-organisms in the paludal diathesis to account for many of the symptoms.

It is no longer doubted that in the metastatic cases there may be a direct transference of inflammatory lesions from joints to cerebral regions, and that in phthisis pulmonalis there may be basilar meningitis, which generates depressive moods opposite to the euphoria prevailing in some other phthisical types of Insanity.

The disturbances of circulation, the active variations in temperature, and the bacillary auto-intoxications are further etiological fac-

tors. In almost all the diatheses there is also a profound anæmia to which a certain causative influence is to be attributed.

Stadia.—In some instances the stadia of the psychosis and of the diathesis have a simultaneous progression. There is then a gradual initial stadium of perverted thought and feeling during the development of the physical disease, and then a stadium acutum of melancholic or maniacal symptoms at the height of the diathetic affection, and a subsequent stadium dementiæ in the terminal stage of diabetic deterioration. This is the progression of diathetic Insanity in many phthisical, cancerous, leprous, pellagrous, and myxœdematous cases. In other instances there is a complete evolution of the phthisical, myxœdematous, podagrous, rheumatic, or paludal diathesis, and then a sudden initial, acute, and convalescent stadium of the mental disease; and it not infrequently happens that there is a recession of the diathetic symptoms during the height of the vesanic disorder. Thus, in phthisical mania there is often a complete arrest of the pulmonary disease, just as in gout and rheumatism the joint affection ceases when the mental disorder begins. There is a distinct alternation of the diathetic and vesanic symptoms in some cases, and in other instances the psychosis is vicarious of the diathesis. The stadium acutum is frequently interrupted by long remissions, as in phthisical and paludal Insanity. In rheumatic and gouty Insanity the initial, acute, and convalescent stadia may pursue a very brief and prompt course, and the entire attack may not occupy more than a few days or weeks. In the paludal diathesis the stadium acutum may be constituted by maniacal explosions coinciding with the plasmodial crisis and terminating with the malarial paroxysm. These recurrent maniacal outbreaks are not to be regarded as separate attacks, but, like similar manifestations occurring with miliary infiltrations of tubercle, are to be regarded as constituent features of an interrupted stadium acutum, which may be thus prolonged for months or years before a stadium convalescens or stadium dementiæ appears. Like remissions in the stadium acutum of the mental disorder are sometimes found in cancerous, leprous, pellagrous, and myxœdematous cases. The stadium dementiæ terminates only with the life of the patient.

Symptoms.—It may be said that mental depression prevails in the early part of the diathetic Insanity, that exaltation and excitement appear at a later period, and that dementia is most common in advanced stages of the diathesis, and that alternations of stupor and of the painful and expansive states mentioned are frequently to be observed in the stadium acutum. Pseudo-pareses also occur.

There are many exceptions to this general observation, and the symptoms are only characteristic of diathetic Insanity when grouped and considered collectively in different cases. In phthisical patients there may be the "spes phthisica," and a species of expansive and optimistic mood, alternating with the most decided depression and suspicion, and refusal of food through fear of poison. The objective signs of the lung disease—cough, pain, and expectoration—are often completely suppressed. The delusions are sometimes based on organic perversions of sensation in connection with tubercular deposits in internal organs.

General paresis arising with the phthisical diathesis has a hypochondriacal first stage, and usually assumes a melancholic form whenever there are active phthisical processes.

Hallucinations of hearing and smell often serve to fortify the delusions of persecution in phthisical cases. Tinnitus aurium and vertigo, rise of temperature and emaciation, anorexia and gastro-intestinal disorder are among the physical symptoms.

In the podagrous diathesis despondency and suicidal tendency are early symptoms, and wild excitement and maniacal conduct supervene on recession of the joint affection, and dementia is a late sequel. Aphasic and convulsive seizures also occur in this form of mental disorder, in which neuralgic affections and vasomotor disturbances are prominent symptoms, and the delusions are often connected with marked cutaneous paræsthesiæ. The stuporous states in gout are toxæmic in origin, and alternate with maniacal or melancholic exacerbations.

In acute rheumatism there are simple forms of delirium, but there are also attacks of acute delirious mania during the rheumatic fever. There is also the alternation of articular and psychic disorder of a maniacal type. Following acute rheumatism there may be stuporous states, or symptoms of perversion of the affective faculties and entire change of character. The resulting mental disease may be modified by the choreic and cardiac troubles sequent to the rheumatism, and melancholic phases with suicidal impulses are common. Hyperpyrexia and acutely maniacal states are almost invariably associated in this diathesis. Active sensorial disorder and frightful hallucinations and sudden violent tendencies are found in the maniacal states.

Pellagrous Insanity presents gastro-intestinal disorder, erythematous eruptions, emaciation, heightened tendon reflexes, cramps, atrophy of muscles, convulsive seizures, paraplegic attacks, impaired vision, angiospastic and angioparetic states, and marasmus.

The mental symptoms are panphobia, suicidal or violent impulses, delusions of poisoning, euphoria of toxic origin or painful emotions, and suspicion of relatives and hallucinatory states of stupor.

Limopsoitosic Insanity, during war, famine, shipwrecks, religious fasting, or any forced abstention from food, may assume mildly maniacal or melancholic forms. There are active sensorial disturbances, hallucinations of sight, ecstatic states, and, finally, flighty incoherence of ideas and changeful delusions.

In the paludal diathesis the mental disorder is attended by intermittent excitement or depression, with auditory and visual hallucinations, neuralgic and vasomotor affections, convulsive attacks, and paralyses or spasms of muscles, and depressing delusions and suicidal tendencies. Altered reflexes, amblyopia, and pseudo-paretic symptoms are not uncommon, and stupor may pass into terminal dementia in these malarial cases. Periodic exacerbations corresponding to the paludal crises are also to be observed, with complete intermissions of the mental symptoms.

The mental alienation with cancer may vary according to the cerebral lesions, if the brain be the seat of the malignant growth, but where the breast or uterus is attacked by the disease there is more apt to be melancholic states, with delusions and perverted sensations of local origin, and finally dementia as the fatal end is neared. Leprous Insanity is chiefly of the melancholic type, with apathetic and stuporous states. Delusions of persecution originating in perverted sensations or anæsthetic conditions attendant upon the local lesions may be present.

Myxœdematous Insanity is marked by retarded perception, sensorial deficiency, confusion of ideas, stuporous and apathetic states, aphasic and amnesic symptoms, doubt, fear, and suspicion, and delusions of a depressing kind. Dementia may be the final result, and congenital mental deficiency exists with cretinous myxœdema, and mental enfeeblement often supervenes in cachexia strumipriva.

Pathology.—In the pathogeny of phthisical Insanity the hereditary relationship of phthisis and the psychoses is to be accorded due weight. The actual pathological findings in phthisical patients who have died insane are venous stasis of meningeal membranes, an œdematous state of the cerebral tissues, which are markedly anæmic. Louis reports softening of the fornix, and this is confirmed by Clouston in tuberculous cases, and the latter also calls attention to the diminished specific gravity of the cortical matter as first observed by Skae.

In melancholia from basilar meningitis of tubercular origin the tubercles are to be detected in the course of the vessels.

Presumably, the direct infection by miliary tubercle and the immediate effects of bacillus tuberculosis and resulting ptomains on cortical centres suffice to account for the functional disorder of mental faculties.

In gouty Insanity the accumulation of uric acid and alkaline urates in the blood, and the action of podagrous toxins on ganglionic elements, is to be regarded as the pathogeny of the mental disorder. Doubtless the vasomotor centres are involved in the toxic influences, which are reflected in the abrupt metastatic changes in the joint and brain symptoms. Autopsical appearances of serous effusions, intense hyperæmias of cortical regions, and vascular degenerations have been recorded in these cases.

A similar set of pathological factors exist in rheumatic Insanity.

In pellagrous Insanity there is infection by micro-organisms, and the lesions present in cerebral centres are hyperæmic and anæmic or œdematous states, meningeal inflammations, and vascular degenerations. The most characteristic changes are in the lateral columns of the spinal cord, in dorsal regions, in which degeneration of fibres and sclerotic processes are found. Pigmentation and atrophy of nerve-cells in the anterior and posterior cornua occasionally occur with proliferation of connective-tissue elements.

In paludal Insanity the pathogenetic factors are the plasmodia malariæ in the blood, the excess of pigment and pigmentary emboli in cortical centres, the profound cerebral anæmia, and the general systemic morbid state.

The pathology of cancerous Insanity may be in the nature of focal brain disease, in those rare cases in which the malignant tumor is situated in cerebral tissues, but it is more generally to be sought in the hæmic deterioration, and, finally, septic reabsorptions. The latter considerations also apply to the pathogenesis of leprous mental disorder.

Myxœdematous Insanity is supposedly due to infiltration of connective tissues, disordered circulation, and auto-infection from failure of thyroid functions.

Differential Diagnosis.—The presence of a fully developed diathesis renders the diagnosis easy.

In phthisical cases in which the mental disorder precedes by many months the physical symptoms of tubercular infiltration, the history of phthisical heredity is the chief diagnostic point.

The diathetic pseudo-paresis, also, can only be differentiated by the actual fact of curability from the true general paresis, which occasionally emerges from the same general morbid state as the diathetic Insanity.

Acute delirious mania of diathetic origin is to be differentiated from the delirium of fever, fluctuating with the change in temperature, and having changeful hallucinations and incoherence of ideas and confusion of memory, and a wandering and muttering character. In rheumatic hyperpyrexia the use of means to reduce the temperature will be attended by a partial or complete disappearance of delirium, but not of delirious mania, and this same test may be applied in other forms of delirium with pyrexia.

In the pyretic state the mild wandering of the mind is not usually difficult to distinguish from Insanity, which has a prevailing mood of depression or exaltation, and ordinarily coherence in the delusions and hallucinations, and no pronounced impairment of attention and consciousness, and no confusion of past and present events, as in delirium.

Insanity is to be diagnosed in the phthisical diathesis when the irritability, moroseness, and suspicion which characterize it lead to irrational conduct, even in the absence of delusions. The melancholia of the preincubatory stage of the diathesis can only be differentiated from melancholia simplex by the subsequent appearance of diathetic symptoms, and the actual history of the case can alone distinguish diathetic from epileptic states of stupor.

Prognosis.—The recovery-rate in diathetic Insanity falls below the average. Practically, curability cannot be said to exist in cancerous and leprous cases, and in advanced phthisis pulmonalis the prognosis is also bad.

A change of residence in the malarious diathesis to a healthful region lends a hope of complete recovery from the mental disorder, just as a change of diet in the pellagrous diathesis may lead to mental recovery. Rheumatic and podagrous Insanity recovers frequently, but often relapses. Permanent valvular lesions of the heart in rheumatic Insanity are unfavorable elements in the prognosis.

The prognosis in myxœdematous Insanity is bad, though the use of the thyroid extracts has improved the chances in these cases. In the limopsoitosic and anæmic diatheses the prognosis is good.

With the exception of the phthisical, leprous, cancerous, and myxœdematous diatheses, the chances of life are good. In general, the expectation of life is considerably diminished by diathetic Insanity.

The termination of the mental disorder in incurable cases is secondary dementia and exceptionally paralytic dementia, or chronic mania.

Treatment.—The treatment of the Insanity is the treatment of the diathesis, in a great measure. Hygienic and dietetic means are of prime importance. Quinine and arsenic in the paludal cases, thyroid extracts, or fresh preparations of the gland, in myxœdematous cases, and iron to combat the anæmia in all the chronic diathetic conditions are plainly indicated. The symptomatic treatment of the mental disorder must proceed on general principles already fully discussed in the chapter on treatment.

Maniacal outbreaks on the sudden retrocession of joint affections may demand counter-irritants to recall the local disease. Hydrotherapeutics, Turkish baths, hot packs, and steam baths, for their eliminative effects, have a direct application in such cases, together with alkalines, salicylates, and diuretic and purgative remedies. Surgical procedures may be in order in the cancerous cases, and the earlier the operative interference, the greater, as a rule, is the hope of relief.

The previous excessive use of medicine by the patient for prolonged periods often complicates the case and renders a suspension of all drugs desirable in some instances, while dietetic, hygienic, climatic, hydrotherapeutic, and psychic treatment is administered with discrimination as to individual indications.

CHAPTER VI.

INSANITY WITH DEFINITE LESIONS OF THE CEREBRAL, SPINAL, VASOMOTOR, OR PERIPHERAL NERVOUS SYSTEM.

Group: General Paresis, Syphilitic Insanity, Organic Dementia, Typhomania, Traumatic and Sympathetic Insanity.

Section I.—General Paresis.

It is probable that general paresis has existed in the past as at the present time, but the conception of the disease as it now presents itself is of comparatively modern origin.

There are passages in the writings of Willis, the anatomist (1670), showing a knowledge of the association of paralysis and Insanity, and at the close of the last century Haslem and Perfect described paralytic forms of dementia. Esquirol noted as early as 1815 the fatal nature of paralysis and failure of speech, but had no clear idea of general paresis as a distinct type of Insanity. Georget (1820) recognized a distinct affection, with paralysis and mental disorder and fatal termination, and Boyle (1822) referred both muscular and psychic symptoms in these cases to chronic arachnitis, and pronounced the disease to be a distinct entity. He later (1825) described the changes in speech and the motor disorders.

Calmeil (1826) published a complete description of the physical symptoms and anatomical lesions in general paresis, which he considered as a complication of the Insanity.

Parchappe (1838) declared general paresis to be a distinct form of Insanity, with characteristic symptoms of motor and mental disorder.

Later writers—Baillarger, Requin, Lunier, Duhamel, and Prus—conceived the paralysis to constitute the essential disease, to which mental disorder might or might not be added as a secondary phenom-

enon, though a certain degree of dementia was admitted to be a customary sequel of the paralysis. This view led to inclusion of all kinds of dementia secondary to focal brain disease under the term of general paresis, or paralytic dementia, as it came to be called by some writers. Subsequent students of general paresis again declared its unity and independence as a type of mental disease, having characteristic motor disturbances and pathological lesions. Thus Delasiauve, and J. Falret, and Duchek, in their writings, sustained the original teaching of Boyle that general paresis was a distinct entity, with mental aberration determined by the same anatomical lesions which gave rise to the paretic symptoms. This view is generally accepted at the present day, though some authors, like Ball, of Paris, look upon general paresis as a generic term, embracing a variety of affections differing in etiology, course of symptoms, and final result.

Definition.—General paresis is a progressive disease of the nervous system, resulting in pathological changes in the encephalon, spinal cord, and sympathetic ganglia, and characterized by motor, vasomotor, and psychic disorders, ending, in the vast majority of cases, in rapid physical and mental deterioration, and death within three years from the inception of the malady.

Clinical Delineation.—The clinical outlines of general paresis include, in the order of importance, psychic, motor, vasomotor, and sensory disturbances, which, in very many patients, occur in the sequence here named. In the majority of cases the psychic precede the motor symptoms, but in other instances the progressive paresis is not only the first, but the most prominent phenomenon throughout the entire course of the disease. In rare exceptions the vasomotor disturbances initiate the malady, and every possible exceptional order of combination of the symptoms may occur. The entire average duration of the malady is about three years.

The psychic phenomena consist in an early decline of ethical and altruistic sentiments, in an alteration of character, in perversion of the affective faculties, and loss of the higher forms of self-control.

This initial phase in the dissolution of the mental being is followed by active maniacal or melancholic perturbations, with sequent stuporous states, and then remissions of all acute symptoms. It is evident, in these quiescent periods, that the patient is steadily sinking to lower planes of mental existence, and in the course of a year the terminal stadium of progressive dementia ordinarily begins, counting from the inception of acute psychic disorder. This final

process of deterioration is more or less rapid in different cases, but it usually ends in complete fatuity within a year.

The motor phenomena, in a word, are, first, a progressive ataxia, and, secondly, a constantly increasing paresis. The ataxia appears in the speech, gait, and other highly specialized movements acquired in manual occupations, of which the patients soon become incapable through loss of skilled co-ordination.

The paresis progresses at first "pari passu," with cortical lesions, but later it is also the manifestation of alterations in bulbar and spinal centres, and in syphilitic cases distinct paralyses are not uncommon. According as the posterior or lateral columns of the cord are involved, there is ataxic or spastic gait.

Following the seizures of general paresis there are not infrequently hemiplegias, or brachial or crural monoplegias, chiefly of transient duration.

Other motor anomalies are tremors, spasms, fibrillary twitchings, changes in the cutaneous and tendon reflexes, and deranged action of ocular and pupillary muscles.

The vasomotor symptoms are angiospastic or angioparetic, cerebral congestions or syncopal attacks from sudden cerebral anæmias, cephalalgias, vertigoes, capillary stasis, hyperidrosis, sometimes unilateral and cyanotic states in the final stage.

The sensory phenomena are, first, a change in the sum total of the organic sensations, giving a painful or hypochondrial cœnæsthetic consciousness, which later often assumes the peculiarly agreeable and expansive character which is so constantly reflected in the megalomaniacal delusions of the general paretic. Sensory disorder of the special senses is revealed as hallucinations and illusions in the majority of cases, and there is loss or perversion of common sensation in extreme degrees. Analgesia in the final stage is often complete.

The vital functions are always involved at some stage of the disease.

The modifications of respiration are very decided, consisting in altered rhythm, which may be of the Cheyne-Stokes variety during continued paretic seizures, in suffocative attacks, and in superficial or labored breathing for consecutive hours.

The disorder of circulation is most often seen in advanced cases, with heart failure, congested or livid skin, pulsations of large vessels, and permanent sphygmographic alterations.

The digestion is finally deranged and the entire metabolism disturbed, so that death often supervenes in marasmus.

This outline of the chief clinical features would be incomplete without a mention of the paretic seizures. These are syncopal, epileptic or epileptiform, apoplectic or apoplectiform, hysteroid or tetanoid, and serial in a paretic status, which may extend over hours or days of convulsive seizures and be followed by paralysis of upper or lower extremities.

The exceptional forms of general paresis are tabetic cases, or ascending cases, as they are termed, beginning as locomotor ataxia, to which the mental disorder is secondary. Other rare instances are stuporous throughout, with remissions, and still others display well-marked alternations of excitement and melancholy. This latter circular form may have long intervals of apparent freedom from symptoms, and is seen in cases with strong heredity. General paresis is less pronounced in type, and more chronic in course among women.

Hypochondrial and melancholic forms, with micromaniacal delusions and no trace of optimism or exaggeration of ideas, are also among the exceptional types.

There are also "galloping" cases, which may run their course to a fatal end in a few weeks, and present clinical features resembling delirium acutum. On the other hand are cases having a prolonged course of ten years, with lengthy remissions. The mental symptoms may precede the motor a year or two, and general paresis may then appear to emerge from some other type of mental disease, but this is questionable.

Causes.—Civilization favors general paresis through the demands which it makes on physical and mental powers, competition, reckless and feverish pursuit of wealth and social position, overstudy, overwork, unhygienic modes of life, the massing of people in large cities, the indulgence in tea, coffee, tobacco, stimulants, and social and sexual excess, and artificial modes of life. The disease is vastly more common in urban than in agricultural populations in all parts of the world, and more frequent among highly civilized than partially civilized peoples.

Sex has definite numerical relations, which may be stated, on the average, to be that there are three men to one woman attacked by general paresis. The proportion of women to men is much greater among the lower than among the higher classes, and it has constantly increased for the last twenty-five years, according to statistics of hospitals for the insane, both in Europe and America.

Age predisposes at the period of greatest functional strain from thirty to fifty years, though exceptional cases occur, according to some

writers, as early as fifteen years and as late in life as sixty-five years. The diagnosis in these extreme cases may be questioned, and, practically, the limits of occurrence of general paresis may be said to be from the twenty-fifth to the fifty-fifth year. The cases under twenty-five years are chiefly luetic in origin, and usually lack the typical traits, and those past fifty-five years are not easily distinguished from senium præcox.

The age of maximum frequency of the malady is earlier than formerly, and, whereas it was once reckoned to be forty-five years, it is now between thirty-five and forty years; and in European, British, and American cities it tends to fall at a still earlier period of age, especially among women.

Occupation is a predisposing circumstance, and military and learned professions furnish the largest percentage of cases. Politicians and artists, and those exposed by their calling to a high degree of heat, also supply a large contingent, as well as gamblers, prostitutes, and professional criminals, and speculative adventurers. The disease is said to be almost unknown among the Roman Catholic clergy.

Heredity exists in direct line in only about twelve per cent. of the cases. French authors incline to trace this heredity to epilepsy, apoplexy, and focal brain disease in progenitors, rather than to simple psychoses or to general paresis itself, which is said not to be directly transmitted.

In the writer's observation of cases, psychopathic tendency was common, but the major neuroses are rarely prodromes in the same case with general paresis; and this fact may constitute a numerically greater immunity in women than in men, since the sex is more frequently affected with these neuroses.

The exciting causes of general paresis are headed by syphilis, which all authors admit to be the most universal cause, figuring from twenty to eighty per cent. in the total causality, according to the widely divergent observation of writers.

Though inclined to accept the etiological importance of syphilis, the writer has only been able to positively establish the diagnosis of luetic infection in twenty per cent. of cases treated.

Specific disease is the cause of nearly all general paresis arising before the twentieth year.

Hereditary syphilis is also to be taken into account as favoring the vascular changes which underlie the subsequent pathological alterations.

Mechanical injuries of nervous centres are causative in a certain per cent. of the cases, and trauma capitis, concussion of brain or spine, insolation, and artificial heat-stroke are to be accorded due weight.

The toxic origin of general paresis is important. Alcohol is the chief toxic agent, but various metallic or vegetable poisons have given rise to the disease, though many of the cases thus caused are to be reckoned as pseudo-pareses. Probably not less than fifteen per cent. of the cases spring from alcoholic abuse.

Sexual excess, especially when combined with indulgence in "Baccho," is a competent cause, but masturbation is not followed by like results and leads to spinal rather than cortical disease. Infectious diseases have been etiological factors in occasional cases, and locomotor ataxia is intimately allied to general paresis, and is followed by it in numerous instances.

Mental strain, excessive work under trying circumstances, prolonged worry, and painful emotions are among the causes of the malady, which arises in most instances from a variety of cumulative influences prolonged through a series of years.

Stadia.—General paresis has been artificially divided into three, four, or five stages. The general rule is that there is a long prodromal period, during which a variety of causes are undermining the physical and mental constitution, and a gradual deterioration of the higher mental and moral powers takes place. There then follows a period of active mental disorder, maniacal, melancholic, or stuporous, with a great variety of somatic symptoms, and derangement of all the vital functions, and more or less marked remissions of all the phenomena of the disease. A third and final period of enfeeblement of mind and body and of complete dissolution of the personality of the patient then develops, and ends fatally within an average of twelve months.

There are exceptional modes of clinical progression, with rapid or tardy fatal ending, but nothing is gained by making more than three subdivisions in the general course of the malady, which is recognized as having three stadia, as follows:

1. *Stadium prodromale*, which has an average duration of one year. This stadium prodromale is marked by a steady decrease in higher forms of self-control, by amnesia as to recent events, and inability to discharge the more difficult duties of life, by careless and reckless demeanor, extravagance in purchases or business plans, a loosening of the moral inhibitions, shown in improprieties or grossly sensual conduct, or in acts of a criminal nature, such as petit larceny,

perverted sexual offences, incendiarism, or wanton cruelty to animals, or destruction of property, or dishonest business transactions. There are also morose and irritable moods, or boisterous and expansive turns unprovoked by adequate motive, or hypochondriacal and lachrymose spells. Loss of natural affection at this time may assume the more decided form of antipathy or suspicion of family, or there may be impulsive violence toward self or others. There is a lack of promptness and correctness in the use of spoken and written language at this period. There are omissions of words in written sentences, and hesitancy in the construction of phrases during ordinary conversation, and a certain incoherence of ideas from failure of attention. The motor disturbances usually appear also during this stadium. The higher forms of co-ordination of movements required by artists, musicians, and special mechanical workers are impaired. The mechanisms of speech and gait are early involved in the ataxic disorder.

The vasomotor symptoms—cerebral congestions, cephalalgia, vertigo, syncope, hyperidrosis, local cutaneous hyperæmias, cyanosis—appear along with anomalies of digestion, gastro-intestinal disorder, disturbances of circulation, and modifications of respiration, both in depth, frequency, and rhythm.

Trophic functions are deranged, as shown by changes in the skin, hair, nails, muscles, and bones, and in a gradual loss of weight. Changes in the composition of the blood, urine, saliva, and perspiration are occasionally to be observed during this stadium.

The deep reflexes are most often exaggerated at this stage, while the superficial reflexes may be diminished. There is contraction, inequality or irregularity of the pupils, or failure of response to light or accommodation in the majority of cases during the stadium prodromale.

Sensorial disorder, tinnitus aurium, deafness, diplopia, amblyopia, color-blindness, photopsia, anosmia, and parageusia are occasional phenomena of this stadium.

The change in the organic sensations is revealed in the depressed cœnæsthesis of this first stage, and later by a transformation into an exalted and agreeable cœnæsthesis, which is one of the most characteristic symptoms of general paresis. This cœnæsthetic exaltation, beginning ordinarily at the close of the prodromal stadium, often continues throughout the entire course of the disease, though in exceptional cases it is never present at any time.

The above are, in the main, the symptomatic developments of the stadium prodromale.

2. *Stadium acutum* is the period of full development of the physical and mental symptoms of the malady. It ordinarily lasts about a year, from the close of the stadium prodromale to the beginning of the terminal demented stadium, and it consists in maniacal, hypochondriacal or depressed, stuporous or convulsive symptoms, and also in general disturbances of motor, vasomotor, sensory, and trophic functions, and in minor and protean signs of the approaching dissolution of the physical and mental organism.

The stadium acutum is ordinarily ushered in by an acute maniacal outbreak, or by a paretic seizure, followed by depression or stupor. All the phenomena of this stadium correspond to progressive lesions of the encephalo-spinal nervous system. The maniacal excitement is often of a high grade, and may assume the form of delirium acutum and lead to a rapidly fatal termination. Exaggeration of ideas and megalo-maniacal delusions abound in these maniacal phases, while hypochondriacal and micro-maniacal concepts are common in the melancholic states.

The apoplectiform, epileptiform, and paralytic seizures are most frequent in this stadium, and they hasten the mental decadence.

The failure of the mental faculties is very rapid. Through defects of memory persons and places are confused, past and present events are hopelessly mixed, things imagined are mistaken for realities, and, with a childish play of fantasy, the most extravagant and impossible things are related by the patient as if they had been a part of his real experience. Attention and consciousness are impaired, so that there is no clear distinction of time and locality, and the relation of the patient to his environment ceases to exist, practically. Cortical and mental failure in the constructive and emissive sphere of speech are now complicated with ataxic and paretic defects of articulation. The gait is highly ataxic and spastic as the spinal lesions advance, and temporary hemiplegias or monoplegias may attend the paretic seizures.

Sometimes motor or amnesic aphasia arises at this period, with focal brain lesions. The facial lines of expression are obliterated, and tremor of facial muscles is observed on slight emotional provocation. Paramimic laughing and crying are to be observed. Monospasms, fibrillary twitching of muscles, Jacksonian epileptic seizures, syncopal attacks, contractures of nuchal muscles, masticatory spasm, and increasing paresis of all the muscles are now in order, and in keeping with the cortical and spinal disintegrations. Throughout the organism fatty degenerations occur, and adipose replaces higher forms of

tissue in vascular and nervous structures, and the panniculus adiposus may be greatly increased, and patients become plump, and all the more helpless on account of increased weight. Voracious appetite is common. Insomnia finally gives place to continued somnolence. The sexual excitement, often resulting in offences against public decency, is often followed by impotency and extinction of desire.

Dystrophies now appear in form of mollities ossium, muscular and cutaneous atrophies, changes in the nails, hair, and glandular organs. The deep reflexes are diminished, or lost in cases complicated with tabes. The evening temperature is increased, and this is also the case in the paretic seizures. The pulse becomes monocrotic, usually, toward the close of the stadium acutum.

Although the chief points of this stadium are a steadily progressive paresis and mental enfeeblement, there may still be remarkable remissions of these and of all the other symptoms. These remissions may continue for weeks, months, and, very exceptionally, for a year or more, before the stadium acutum and all its symptoms are again resumed. Whether the stadium acutum exceed the average duration of a year or fall short of it, there is the same termination in a final demented stadium.

3. *Stadium dementiæ* is the third and final period, of an average duration of one year. This stadium is reached when vesical and rectal sphincters are paralyzed, when hebetude and neglect of the daily wants of nature appear, or when the confusion and weakness of mind and body render the patient incapable of self-care. Remnants of former active delusions and hallucinations are still present, and an occasional brief attack of excitement may appear, but enfeeblement and progressive decay of the entire organism are the prominent symptoms.

The ataxia is followed by decided paresis. The patient becomes unable to dress himself, he has a wavering and feeble gait, falls often, and is clumsy, and in the course of a few months reaches the helpless and bedridden stage.

Speech is reduced to the formation of simple phrases, uttered with drawling intonation, hesitation, and tremor of voice in a guttural monotone. Tremors, spasms, atrophies, contractures, hemiplegic symptoms, and obliteration of facial lines are pronounced.

The patient eats voraciously and indifferently all substances set before him, is filthy and destructive in habits, has grinding of the teeth, hæmatoma auris, decubitus, paresis of pharynx and dysphagia,

and is subject to pneumonitis from passage of food into the trachea and to fractures from slight falls.

As the dementia becomes more abject, the patient no longer recognizes persons or places, has loss of special and common sensation, is without conscious personality, and has a mere vegetative existence. Through vasoparetic conditions, cyanotic skin, congestions of internal organs, and diarrhœa occur, and subnormal temperatures are observed. Owing to the descending bulbar lesions the circulatory and respiratory functions are affected, and dyspnœa and syncope from heart failure are frequent.

Dystrophic symptoms are marked, and finally a general wasting of tissues ends in marasmus.

Death terminates this final stadium by œdema of lungs, pneumonitis, intestinal, renal, or vesical inflammations, embolism or cerebral effusions, or by deep bed-sores, septic infection, and infarction of internal organs. The duration of a typical case of general paresis having the above stadia is, as stated, three years. Other cases have an exceptional stadial progression, and may manifest only a progressive dementia and paresis, with congestive seizures, ending early in fatal exhaustion. In cases with strong heredity the stadium acutum is characterized often by alternations of melancholic and maniacal states, and remissions may prolong the duration of the malady for many years.

In "galloping" cases all the stadia may elapse in a few months, and death ensue at the end of this brief period. In women the stadia are less clearly demarcated and have a longer average duration than in men.

In ascending cases of general paresis the course is exceptionally long, and the early locomotor ataxia is to be reckoned as a part of the stadium prodromale, like initial lesions and ocular anomalies in luetic cases.

In rare instances, also, the prodromal stadium is characterized by signs of some infectious disease, acting as the exciting cause of the general paresis, or by other symptoms, varying according to the immediate etiological factors of the mental malady.

Symptoms.—The entire evolution of symptoms in general paresis takes place in strict correspondence with vasomotor disorder, or pathological changes in the encephalo-spinal nervous system.

The mental, motor, vasomotor, trophic, and sensory symptoms, and the disorder of the vital functions, will be described in the above sequence, and in the order of their appearance during the progress

of the general paresis of ordinary type; and it has been already pointed out that, exceptionally, almost any conceivable priority of individual symptoms may exist, as the spinal lesions may precede the cerebral, and the latter vary in the manner of their development according to the immediate cortical regions involved in the diseased processes.

The mental symptoms are the outcome of the progressive atrophy of the frontal cortex. The supreme function of inhibition of this part of the brain cortex is lost as the first sign of the fatal malady. A certain abandon in speech and conduct first appears, and soon passes into open neglect of the conventions of society. All the higher and more complex concepts and feelings, such as the æsthetic and altruistic sentiments, are soon lost, and there results total disregard of social obligations, and often legal infraction of the rights of others. The propensities and desires are intensified and lead to overt acts for their gratification. The anti-social emotions, anger, hatred, and revenge, are sometimes active in the early part of the prodromal stage, and the fundamental emotional tone is that of irritable depression. This prevailing emotional mood is usually transformed into cœnæsthetic exaltation toward the beginning of the stadium acutum, but prior to this change suicidal or homicidal impulses may be manifested.

Failure of attention and memory, neglect of customary pursuits, inability to transact business, foolish investments and loss of financial judgment formerly possessed, inability to meet the new emergencies of life, and steadily increasing incapacity for management of self and of personal affairs, are psychic symptoms of the prodromal stage.

With the beginning of the stadium acutum active mental disease is in order. The turbulent feelings and animal passions are not restrained, as all higher forms of volitional control are lost. The cœnæsthetic exaltation is manifested in extravagant social demonstrations, in prodigal entertainment of friends, in bacchanalian or sensual indulgences, in vast business ventures, and in general extravagance of words and actions highly characteristic of general paresis. As judgment becomes more impaired, all insight into the absurdities of conduct is lost, and any attempt to check the extraordinary acts of the patient provokes violent resentment. The patient is restless, sleepless, full of a wild flight of plans for self-aggrandizement, and the amelioration of mankind in general. He can often not be induced to take time for his regular repasts, flies from one place to another, and

from one person to another, to enlist converts in his social and financial schemes.

Delusions of grandeur appear, and in his optimistic moods the patient promises in advance to his friends high offices and salaried positions. Hallucinations of sight and hearing confirm the delusions, and anomalies of common sensation and of the kinæsthetic sense favor the exaggerated ideas of personal strength and size. The liberation of energy from the motor cortex also swells the subjective impressions of muscular freedom and power. The patient feels giant-like, and boasts of his immense proportions and Herculean strength.

Maniacal outbreaks or melancholic or acute hypochondriacal symptoms may alternate with stuporous states, following the congestive seizures, which now complicate the case.

Amnesia steadily progresses, confusion of ideas and of time, place, and personal identity arises, limitations of personal consciousness are more decided, and a positive dissolution of personality is in progress.

Remissions at this period do not restore to the patient any conscious insight into his disease, which, with the convulsive attacks, usually resumes its course on lower and lower levels of mental life.

The stadium dementiæ inaugurates a vegetative existence and automatic mental states. The patient is now the mere simulacrum of an intelligent being, emotion and ideation are at an end, delusions and hallucinations no longer exist, and even the animal wants are no longer perceived. The patient has to be fed, clothed, and personally attended, like a child of the lowest form of congenital deficiency.

All these progressive manifestations of disintegration of the organ of mind are only a part of the group of symptoms essential to the diagnosis of general paresis. These psychic symptoms usually begin before the somatic signs are to be detected, but they may be late phenomena in ascending cases of general paresis, and in other instances they may be limited to a simple continuous failure of mental faculties without any active perturbation of intellect.

The motor symptoms correspond to the pathological changes in cortical, bulbar, or spinal centres, and they ordinarily attend or follow closely in order of time upon the mental disorder, but they may precede the latter in exceptional cases by many months.

The motor symptoms, especially the speech defects, are absolutely necessary diagnostic elements, without which general paresis cannot be claimed to exist. These motor symptoms consist in ataxia, and later in paresis, most observable in the more highly specialized

movements of speech, gait, handwriting, and skilled manual occupations.

The disorder of speech is pathognomonic, and is invariably present in some form. The earliest defect of speech is ataxic, and arises from cortical lesions, which prevent the delicate co-ordination of the combined movements essential to clear articulation. The resulting indistinctness of utterance does not include any formal defect of articulation of individual letters, syllables, or words, but only a general lack of clearness of enunciation, which is the first change in paretic speech.

Following this indistinctness of utterance of words and sentences is ataxic failure of pronunciation of labial or lingual consonants. This ataxia is at first cortical, but is finally due to disease of facial and hypoglossal nuclei, by which excessive or defective innervation of labial and lingual muscles results, or inco-ordination between the cortical volitional impulse and the bulbar impulse follows. Sudden over-innervation leads to spasmodic closure of lips, and a hesitancy interrupted by the explosive escape of the labial sound, and a like delay and forcible emission of lingual consonants is to be observed.

A third defect early in general paresis is the transposition of consonants or syllables in spoken words, and it is all the more diagnostic because rarely found in other brain diseases. It is especially evident in test words having a long sequence of recurring lingual or labial consonants, and it can be detected during reading aloud as well as in conversation.

These early ataxic defects of speech later are complicated by decided paretic conditions of the muscles of speech, so that both labial and lingual sounds are imperfectly formed, and, finally, pronunciation may be unintelligible.

Imperfect innervation, not alone of the muscles of the lips and tongue, but of the vocal cords and of the expiratory and inspiratory muscles, gives rise to a characteristic tremulousness of the voice. Hence tremor, hesitancy, and drawling from retarded thought-rate, and the spasmodic or reduplicated utterance of syllables come to be chief traits of paretic speech. The musical quality of the voice is early lost, and a hoarse monotone prevails; or, through failure of expiratory pressure, there is whispered or inaudible articulation.

The intellectual defects of speech are amnesic, and include loss of acoustic or kinæsthetic word-images, or complete inability in the syntactic construction of phrases.

Tremor is an early motor phenomenon, and is most evident in

face and extremities. It is fine and increased on intentional efforts, and during slight emotional excitement the whole physiognomy may be convulsively twitched or tremulously agitated, and the tongue shows the fibrillar tremor when projected. These fine and rapid tremors, having often ten vibrations per second, become coarser and involve the larger groups of muscles later in the disease.

The handwriting betrays ataxia and tremor and amnesic defects. Letters are omitted or doubled, and words are repeated, and syntactic and orthographic errors abound, and, finally, written language becomes an impossibility when the graphic signs are forgotten.

The fine co-ordination in all the skilled mechanical pursuits is soon lost, and the patient becomes incompetent in his special calling.

The gait is paretic, ataxic, or spastic, or mixed in character by a blending of these different types. The paretic gait springs from cortical disease, the spastic from degeneration of the lateral spinal columns, and the ataxic from lesions of the posterior spinal columns. Hemiplegic gait following the apoplectiform seizures is also to be observed temporarily. Contractures and spasms of single muscles or of groups of muscles are apt to occur, and also atrophies from peripheral neuritis.

The changes in the reflexes are important. The knee-jerk is exaggerated often early in the malady and then lessened or lost toward the close of the disease. It sometimes differs on the two sides, and it is rarely normal throughout the attack. Ataxic gait and absence of knee-jerk, and spastic gait and increased knee-jerk, are often associated. The superficial reflexes are usually lost in the advanced stages of paresis.

The pupillary reaction to light is partially or completely lost in the majority of all paretics at some time during the malady, and often it is an early symptom, and response to accommodation is also often absent.

Myosis is a common symptom in the prodromal stage, and is of the paralytic variety in ascending cases of paresis. Mydriasis is also common in the later stage of paresis, and is greater on the side of the grossest hemispherical lesions in some cases.

Inequality of pupils as a persistent symptom is most often found with mydriasis, and it exists in more than fifty per cent. of all cases.

Loss of pupillary dilatation upon painful peripheral stimuli is an early symptom, while cycloplegia appears in advanced stages of paresis. Paralytic mydriasis in general paresis is due, in some cases, to atrophy of the optic nerve.

Paralyses of external ocular muscles are not infrequent in paretic cases, and ophthalmoplegia externa has been recorded.

Unilateral paralysis of the external ocular muscles is not very rare, and is sometimes accompanied by diplopia, or by ptosis in paralysis of the third nerve.

These ocular paralyses are most common in luetic and tabetic cases.

Defects of facial innervation are usually present and account largely for the paretic stupor of countenance. Masticatory spasm is almost a constant symptom in the terminal stage. The bulbar disease is followed by dysphagia, anæsthesia of the pharynx favors the passage of food into the larynx and trachea, and pneumonitis and suffocation are sequels in some cases. Paresis of vesical and rectal sphincters occurs in the final stage, and there is involuntary escape of the contents of the bladder and rectum.

The vasomotor symptoms are, in the main, a progressive paresis, which favors congestive states of brain and internal organs, and is manifested by cyanotic and œdematous extremities. Local congestions, circumscribed or unilateral anæmias or hyperæmias, are to be seen, and also hyperidrosis or hæmidrosis. The pulse varies much in the early stage, but finally becomes a pulsus tardus, and is ordinarily monocrotic in the terminal stadium. The vasoparesis at last is so pronounced that hypostatic congestions and serous effusions take place in intestinal, pulmonary, and renal membranes. Hæmatoma auris is also, in certain cases, due to the same cause.

The trophic symptoms are, first, a decidedly impaired metabolism during the prodromal or acute stadia, with loss of bodily weight, which is only regained in the early demented stage, and emaciation supervenes toward the fatal end. Dystrophies of skin, muscles, bones, and internal organs are frequent symptoms. Eruptions and pigmentations, turning gray of the hair, cutaneous atrophy, decubitus, " mal perforant du pied," muscular atrophies, peripheral neuritis, and morbid changes in cartilages have all been known to occur.

The sensory symptoms are neuralgias and hemicrania, shooting pains and paralgesias in the early stage, and later anæsthesias of skin and mucous membranes and decided analgesias.

The special senses are functionally disordered at first, and then partially or completely impaired by atrophy of optic or acoustic nerves, or of the olfactory bulb.

The vital and organic functions are always disordered. Changes in the composition of the blood, urine, and other secretions and ex-

cretions are often present. Temperature is higher, on the average, in the evening, and increases in maniacal attacks and during the paretic seizures, and reaches the highest point in the paretic status after continued convulsions. Subnormal temperature is common, and very low degrees may be reached in the terminal stage. Modifications of respiration, dyspnœa, Cheyne-Stokes respiration, and cardiac failure and irregularity due to lesions of the pneumogastric are often found in the stadium terminale.

Pathology.—The seat of the pathological processes in general paresis may be the brain and the medulla oblongata, or the spinal cord. All these parts of the nervous system may be simultaneously attacked, or the cerebrum or spinal cord may be primarily affected. The morbid changes usually begin in the frontal brain cortex and extend downward, but in tabetic and ascending cases of general paresis the converse is observed.

The essential and terminal pathological process is atrophy of the brain. This atrophic process may be primary and degenerative, or secondary to various inflammatory conditions.

Membranes of brain and spine, and vessels, as well as cells, fibres, and connective tissues, are all involved in some progressive pathological changes, which also invade the entire sympathetic nervous system in certain cases. The posterior and lateral columns of the spinal cord suffer most uniformly, but the anterior and posterior cornua and nerve-roots, columns of Goll, and pyramidal tracts may be specially involved.

The very earliest anomalies are nutritive defects in ganglionic cortical elements, and then follow local hyperæmias of parietal, frontal, or temporal convolutions, dilatation and degeneration of the coats of vessels, lymphatic stasis and effusions into perivascular lymph spaces, swelling and then wasting of nerve-cells and fibres, proliferation of neuroglia and of protoplasmic glia-cells, cortical and meningeal adhesions and the formation of neo-membranes.

Macroscopically are to be found thickened calvaria, osteophytes in falx cerebri, adherent dura mater, pachymeningitis, hæmorrhagica interna, thickening and adhesion of pia and arachnoid, serous effusions, adhesions of membranes to cortex, which is torn and has a mouse-eaten appearance on removal of pial membrane. The gyral summits show these erosions. The cortical gray matter is thinned or softened and washes under a small stream of water, or may be readily scraped from the medullary substance, which is often firmer than normal. The entire brain is greatly reduced in volume, the

ventricles are enlarged and filled with serous effusions, and there is thickening and granulation of the ependyma. Atrophy of optic and olfactory nerves and of basal ganglia are exceptionally present, and the central tubular gray matter is often involved in the atrophic process. The facial hypoglossal and pneumogastric nuclei are sometimes implicated in the pathological processes.

The spinal membranes are opaque and thickened, and occasionally adherent, and cystic hæmatoma may be found in some cases. Valvular disease of the heart is common, and hyperæmia of lungs, liver, kidneys, and intestinal mucous membrane is often observed. Chronic cystitis is also frequent, and vesical ecchymosis and splenic enlargement and softening are among the post-mortem findings in a few cases.

The microscopical lesions are granular, fuscous, pigmentary, and fatty degeneration of ganglionic elements and of basal and apical processes. Vacuolation, atrophy, and complete disappearance of nerve-cells also occur in the final stage of cortical degeneration.

The nerve-fibres atrophy either primarily or secondarily from pressure, or as the direct sequel of cellular decay. In the cerebellum there may be sclerosis or atrophy of Purkinje's cells, and vascular degenerations.

The medulla oblongata is the seat of sclerotic or atrophic changes, and the nerve-nuclei are specially involved in the morbid processes in many cases.

The sympathetic ganglia show nuclear proliferation, sclerotic and pigmentary changes, and disease of vessels.

The earlier changes in the vessels are hypertrophy of the tunica muscularis, increase of the nuclei of the adventitia, and aneurismal dilatation. Later, sclerotic, fatty, and colloid degenerations occur.

The perivascular lymph spaces are dilated and filled with corpuscles, pigment, and crystals.

There is hypertrophy of connective tissue, and the protoplasmic glia-cells appear attached sometimes to the minute vessels. The proliferation of glia-cells is found both in the superficial and deep cortical layers, and also in the basal ganglia and tubercinereum. Sclerotic patches are found in the columns of the cord and there is granular degeneration of nerve-cells in posterior and anterior cornual regions. The posterior root-zones and the spinal nerves may become involved in the pathological processes. Sclerotic and atrophic lesions of internal organs may also be found in a certain percentage of cases.

Differential Diagnosis.—General paresis is to be differentiated

from organic dementia, from tumors, or other focal brain disease. The neurological diagnosis of the focal lesion is here of first importance, and the prominence of sensory and motor symptoms in the cases of brain tumor, for instance, is one point of difference. The hemiplegia of hemorrhagic effusion also is more permanent than that found in general paresis, and the dementia is secondary to the focal lesion and is marked by aphasic and amnesic disorder, and the physical symptoms are not the same as in general paresis as regards the ocular and deep reflexes.

The prodromal stadium of general paresis must not be mistaken for simple mania or melancholia. A careful research will usually reveal some of the physical symptoms of the progressive disease, but it is always well to bear in mind the possibility of the more hopeless affection in all mental aberration beginning with depression or excitement. A still more serious error is to mistake the simple psychoses for general paresis.

Neurasthenic Insanity, with its muscular exhaustion and incoordination of speech and gait, has repeatedly given rise to this mistake in diagnosis. The neurasthenic impairment of speech has even led to the diagnosis of general paresis in the absence of any real psychosis. The avoidance of undue haste in the formation of an opinion will serve to avoid such gross faults.

General paresis is to be distinguished from syphilitic Insanity with difficulty. In the latter the paralysis of cranial nerves, the distinct focal lesions, the persistent cephalalgia at night, the paralytic rather than ataxic nature of impaired motion, serve to differentiate the two complaints. There are cases which can only be distinguished by the course and curable nature of the syphilitic disease, and in still other cases the pathological lesions alone can decide post-mortem.

In alcoholic cases the tremors, sensory disorder, and suspicious delusions, and the nature of the hallucinations, may, in the absence of pupillary and speech defects, as in general paresis, serve to differentiate the two affections. There are cases, though, of alcoholic pseudo-paresis to be distinguished only by the final result, and the fact of curability may alone decide the nature of the disease in certain syphilitic pseudo-pareses.

Multiple cerebro-spinal sclerosis may resemble general paresis, since it may be attended by a gradual mental impairment. The speech defects, reflexes, and pupillary reactions, and other physical symptoms, are seldom grouped as in general paresis, and the expansive feelings and delusions are wanting.

Monomania, with delusions of grandeur, is a more systematized Insanity than general paresis, pursues a more chronic course, has a longer evolution, and lacks the general weakness of intellect of paresis, and also the physical symptoms.

Post-febrile Insanity may present stuporous states, and tremor and speech defects from exhaustion of nerve centres, but the history of the case and the favorable progress made within a few weeks will usually serve to differentiate the post-febrile from the paretic state.

Senile dementia, with epileptic attacks, may excite suspicion of general paresis. The age of the patient, and the lapse of some months without any progression of physical symptoms, suffice to decide the case, ordinarily.

General paresis in young persons, when attended by frequent epileptiform seizures, may be mistaken for epileptic Insanity, but the ocular and deep reflexes and speech defects usually correct the error in the course of a few months.

The history of the case, and special symptoms peculiar to the action of the different poisons, serve to diagnose toxic Insanity from general paresis. Plumbic cases, though, are difficult sometimes to distinguish from paresis, which bromic dementia may also closely resemble. The difference in the toxic insanities is chiefly in the fact that only a few symptoms are present and that pupillary and speech disorders are usually wanting in the order and constancy in which they appear in general paresis, and that the mental expansion and exaggerated delusions are rarely prominent at any time, and that the motor troubles are limited, and not general or progressive. Exceptionally, all differential signs fail, and time alone can decide, and whenever a cure results general paresis has not existed.

Prognosis.—The prognosis of general paresis as to recovery of mind is always bad. Recoveries have been reported, but most authors are inclined to doubt the diagnosis in these cases, and they hold to the incurability of the mental disorder.

The prognosis seems more favorable if long remissions of months, or even one or two years, are regarded as recoveries, which would seem to have been the case. Severe trauma and intercurrent infectious diseases have been known to cause a species of recovery from general paresis, but mental defect remains, even though the progressive deterioration be arrested in very rare instances.

The prognosis as to the chances of life is also bad, for general paresis ends fatally, on the average, within three years. The actual duration is less in men than in women, and it is greater in hereditary

cases and in cases with marked alternations of depression and excitement.

Excluding alcoholic and syphilitic cases of pseudo-paresis, it is safe to predict a fatal termination in a case of general paresis. The extreme possibility of a prolongation of life for many years under the best of care is to be stated.

Death may occur from marasmus, decubitus, suffocation from food, pneumonitis, œdema of lungs, cerebral or spinal hemorrhage, cardiac or renal disease, self-inflicted violence or injuries from accident, septic infection or bulbar sclerosis.

Treatment.—Prophylactic treatment is seldom employed, as the diagnosis can seldom be made in advance of the speech defects and other somatic signs. In suspected cases it is well to advise rest and favorable hygienic conditions, and the avoidance of worry and excitement. But, if this course causes loss of salaried positions and financial trouble, it would only increase the stress of mind, and a simple diminution of labor in customary occupation may be a wiser prophylactic measure in certain cases. Some paretics are easily managed by relatives, and do not endanger their property or the personal safety of themselves or others.

Ordinarily, it is necessary to place paretics in private or public hospitals for the insane to protect them against business extravagance or the violence which they may inflict upon self or others, as well as to secure the constant care demanded by paretics during the acute stage of the disease.

With the advent of the bedridden stage home care may again be resumed under competent and constant nursing. During remissions, also, liberty may be allowed the patient, under certain supervision, if safety require it.

Hygienic measures are of most avail in prolonging life and comfort of the patient.

Good food, specially prepared to avoid the danger of suffocation in advanced cases, and given semi-fluid or cut in small pieces, is of first importance. A full physiological ration of foodstuffs is best, and milk and eggs may be regarded as the two most reliable articles of diet. During the accumulation of flesh in the demented stage a diminution of the full ration may be permitted, and later, during decline, predigested foods are useful.

Fresh air, long hours of sleep at night and a siesta in the daytime, gentle exercise, and the sitting rather than recumbent posture

so long as patients are able to be about, is preferable in order to avoid decubitus.

Therapeutic measures correspond to the causes and symptoms.

When syphilis is diagnosed, or suspected from the nature of the symptoms, specific treatment by mercurial inunction and by internal administration of the protiodide of mercury is to be followed by the use of iodide of potassium in full doses. In case of syphilitic pseudo-paresis a cure may follow, but no decided improvement will otherwise result. Mercurial baths are of service in this connection.

Among the many remedies tried, with only occasional temporary benefit in general paresis, are calabar bean, digitalis, strychnine, tartar emetic, quinine, nitrate of silver, zinc, arsenic, bromide and iodide of potassium, veratrine, hyoscine, duboisine, and chloral. The latter, as a rule, is to be avoided, since it tends to increase the cerebral congestion, which is a prominent symptom of the disease.

In the terminal stadium tonics, iron, and cod-liver oil are employed.

Laxatives are of use, but purgatives as powerful derivatives have no permanent effect, and only tend to weaken the patient for the time being, except in the seizures.

Ergotine, for its vascular effect, is of some service and merits a careful trial in patients of full habit with sound heart and lungs.

Surgical procedures afford temporary relief in some cases. Counter-irritants to the head, neck, and spine have been repeatedly employed, more often without than with good results. Croton-oil, ung. antimon. tart., and other irritants, have been used to produce blisters and suppuration of the scalp, and benefit has been claimed even when necrosis of bone has resulted.

Setons, vesicants, the electric cautery and the red-hot iron have been used on the back of the neck; spinal vesicants have been tried, and leeching, bleeding, and blisters to the legs and feet.

Trephining of the skull has been performed in America and England, without such results as justify the recommendation of the remedy to the general practitioner.

Vertebral puncture affords a simpler means of relief from cerebral pressure, but is without curative effect, though justifiable as a palliative procedure. The operation has been described in the chapter on treatment in the first part of the work.

Spinal suspension and stretching of the cord have been tried, as is claimed, with some benefit, but too much doubt attaches to such procedures as yet to permit their indorsement.

Galvanization of the head and spine may afford some relief, if practised with expert knowledge and caution. General faradization, combined with massage, is tonic and sedative if thoroughly done, and relieves the vasoparetic stasis of cutaneous capillaries for the time being.

Frequent catheterization is to be avoided so long as the patient can, by voluntary effort, empty the bladder. Pressure with hands may assist the complete evacuation of the viscus, which it is well to effect to avoid retention and decomposition of urine.

Massage is employed to favor alvine passages, and enemata are also useful.

Special symptoms to be met are as follows: Insomnia is to be met with warm baths, with cold to the head after a stimulant enema. If the feet are cool, hot mustard foot-baths are advisable, and cold foot-baths followed by active friction of feet and legs may answer. The bromides, sulphonal, paraldehyde, and other drugs, such as morphine or hyoscin, may become necessary when motor excitement is combined with the agrypnia. Cerebral galvanization may be of use.

Extreme excitement may be subdued by prolonged baths, with cold to the head, but veratrum viride, bromides, duboisine, or morphine may be lesser evils than the exhaustion from the unrestrained excitement. Sensorial excitement, especially when visual, is sometimes relieved by seclusion in a dark room and blisters behind the ears.

The subcutaneous use of ergotine may also relieve cerebral congestion, which often underlies the excitement. Digitalis is of some use in equalizing cerebral circulation in this connection, and a saline cathartic is sometimes of service.

The epileptiform seizures call for evacuation of bladder and rectum, and the use of chloral hydrate by mouth or enema. In the status epilepticus chloroform inhalation may be justified, and a drop of croton-oil on the tongue may, by purgation, tend to relieve the cerebral congestion.

The apoplectiform attacks demand cold to the head by the ice-cap, ergotine and bromides, heat to extremities, and active derivation through the intestinal tract. For the latter purpose oleum tiglii (℥ ij.) is well adapted. Stimulant enemata of turpentine or camphor, venesection or leeches behind the ears, and local blood-letting may be employed in extreme cases.

During the bedridden stage frequent change of position and constant attention to cleanliness are necessary to avoid bed-sores. The cleansing is best done by warm antiseptic solution, and friction is

to be avoided in drying the parts, pressure alone being used. An ointment of benzoated lard and a little white wax prevents subsequent contact of urine with the skin in exposed parts.

Artificial feeding may become necessary from the paralysis of pharynx and œsophagus.

Water-beds and air-cushions are useful in this stage, and prolonged hot-water applications favor the healing of deep sloughs, which are to be treated on antiseptic principles in general. Cystitis is common in this final stage, and rupture of the bladder may occur from over-distention, if care is not exercised in personal examinations of the patient. Hope of life is never to be abandoned, as most unaccountable remissions may occur in the terminal stadium.

Section II.—Syphilitic Insanity.

A certain psychological change takes place in a large percentage of those attacked by syphilis, but positive mental disorder results chiefly in the following class of cases: 1. In cases with heredity in which the specific disease acts as a moral exciting cause in advance of the physical lesions. 2. Mental disorder initiated by the syphilitic fever and early toxic influence of the virus on unstable cerebral centres. 3. Insanity provoked by the secondary symptoms, and by general nutritional and constitutional disturbances. 4. Mental disease from tertiary changes of cerebral syphilis, resulting in a variety of focal lesions, or diffuse cortical deteriorations, or vascular degenerations. 5. Psychoses in children from hereditary syphilis. 6. Pseudo-paresis from cerebro-spinal syphilitic lesions.

While the term syphilitic Insanity is as appropriate as any other etiological designation, it is more consistently applied to cases in which definite cerebral or spinal lesions are the direct outcome of the syphilitic infection, and the immediate factor of the alienation.

Definition.—Syphilitic Insanity is mental disorder arising from the immediate or remote effects of the luetic virus on nervous, vascular, and glandular tissues, and manifested by melancholic, maniacal, stuporous or demented states, accompanied by paralysis of cranial nerves, impairment of the special senses, nocturnal cephalalgia, and other clinical features of the specific disease.

Clinical Delineation.—Syphilis, acting on those predisposed to mental disease, may soon after infection excite an attack of melancholia, through dread of the future results, through fear of loss of business or social standing, inability to meet marriage engagement,

or liability of infection of family if married, or anxiety as to the probability of mental disease to which hereditary tendency is known to exist. In this way syphilis may become a powerful exciting cause prior to distinct physical lesions, and the syphilophobic melancholia which results is usually attended by active suicidal tendencies, insomnia, refusal of food, self-accusation or religious despondency, and delusions of persecution.

A more genuine syphilitic Insanity is an acute maniacal outbreak, sometimes witnessed during luetic pyrexia and the primary action of the virus on the entire organism. Doubtless a native instability of nervous centres is a predisposing cause in these sudden maniacal attacks, which resemble other toxic manias in clinical features.

With the secondary specific symptoms—the sore throat, cutaneous eruptions, mucous patches, general enlargement of lymphatic glands, and nutritional disturbances—forms of melancholia rather than mania arise, but states of excitement or of weakness of mind may result from the primary depression, which is not infrequently intensely hypochondriacal in the first instance. The psychosis is attributable to the syphilitic dyscrasia, as well as to lesions of ganglionic elements in cerebral centres. There is considerable sensorial disorder, and hallucinations of sight and hearing are frequent sources of the depressing delusions. This sensorial disorder only foreshadows the subsequent inflammatory and atrophic processes which occur in the organs of special sense, and also specially in optic and acoustic nerves.

The mental disease most deserving the designation syphilitic Insanity results from tertiary lesions of cerebral centres, from vascular degenerations, focal brain disease, diffuse sclerotic or atrophic processes, and gross structural changes in internal organs.

The maniacal and melancholic attacks are characterized by remissions, but a continuous impairment, in the long run, of all the mental faculties; so that mental weakness is the resultant state, which, under specific treatment, may still disappear in a most surprising manner. In some of these cases syphilitic epilepsy leads to early stuporous states; in others the mental obtuseness would seem to result from syphilitic impairment of the special senses, and the hallucinatory disorder has a like pathogenesis; in others still, the irritability, emotional weakness, and amnesic aphasia is associated with unilateral loss of motion of extremities.

There is sometimes a symptom-complex of syphilitic sensorial disorder, paralysis of cranial nerves, and progressive moral deteriora-

tion, which may resemble the ethical obliteration of general paresis without active expansion or depression of feeling. The cœnæsthetic exaltation of general paresis is very rarely found in syphilitic Insanity, in which a depressed and painful cœnæsthesis is the rule.

Insanity in children from hereditary syphilis most often takes the form of mental deficiency, or of alienation from deprivation of the special senses. Infantile psychoses arise, however, from the fifth to the twelfth year as the outcome of the specific inheritance. They have a depressive emotional ground-tone, and fear and suspicion are heightened by hallucinations of the special senses.

Among tainted children there will also be seen a progressive mental and moral deterioration, beginning after a bright early childhood, and ending in terminal dementia, or modified forms of idiocy or imbecility.

Finally, there are syphilitic pseudo-pareses, which have a different grouping of sensory and motor symptoms from general paresis, in the main, but occasionally resemble it so closely that a symptomatic differentiation between the two affections becomes impossible, and recovery under specific treatment alone serves to clear up the diagnosis. The chief differences in neurological and psychic features are that in syphilitic pseudo-paresis there are paralytic rather than ataxic muscular affections—paralysis of cranial nerves, monoplegic and hemiplegic disorders—and the motor troubles appear relatively earlier than the psychic symptoms, hypochondriacal rather than expansive ideas abound, tremor of facial muscles is less marked, cachexia is a more prominent and earlier symptom, the sequence of all the symptoms is more capricious and changeful, and the remissions are more sudden and prolonged on the average. These symptomatic differences correspond to actual differences in the site and nature of the anatomical lesions with two affections.

Causes.—The syphilitic virus, like the alcoholic poison, produces Insanity in some and not in others. The individual vulnerability, as regards the psychic result, is perhaps hereditary and possibly acquired instability of nervous centres. Occasionally the syphilis is only the last of a long list of untoward influences, both physical and mental, and it is seldom that it is the sole known factor.

Making due allowance for these facts, there still remains sufficient proof that the mental disorder follows the luetic infection, varies with its lesions, remits and recurs with its fluctuations, and deepens into dementia when tertiary disease invades the cerebrum extensively.

It has ceased to be a matter of doubt that hereditary syphilis may,

like the primarily acquired disease, cause extensive degeneration of nervous centres and physical arrest or deterioration.

It is well known that some persons are invulnerable as regards the luetic virus, in the first instance, and hence may have immunity from syphilitic Insanity. It is not impossible that psychopathic persons are more often attacked by cerebral syphilis, and this would seem to be the case among brain-workers, as compared with those engaged in manual occupations, when suffering from specific inoculation.

Severe mental labor and stress of mind in syphilitic patients are undoubtedly favorable to the development of syphilitic Insanity, even if they do not directly determine the site of organic cerebral lesions.

Stadia.—In the early attacks of mania or melancholia there is a brief initial stadium of dread and forebodings of evil, and then a stadium acutum, which, with judicious specific treatment, usually ends in a stadium convalescens at the end of a few weeks.

The maniacal and melancholic attacks, which tend to pass into mental weakness during the tertiary lesions, often have a long initial stadium of increasing moroseness, insomnia, suspicion, and tedium vitæ, and then a stadium acutum of active mental disorder, with delusions, hallucinations, suicidal or violent impulses, and remissions and progressive impairment of intellect; and this stadium, if not cut short by specific treatment, may continue for months, or one or two years, and then end in a stadium convalescens, or, more commonly, in a stadium dementiæ. From this latter stadium there is still a surprising possibility of recovery of mind, though with some defect.

In children with hereditary syphilis at the age of four or five years, an initial stadium of restless malaise, nocturnal visions, and fright passes, in a few months, into a stadium acutum of complete change of disposition, hallucinations, insomnia, and convulsive seizures, or spasmodic muscular affections, disorder of the vital functions and of nutrition, and a general reduction of intelligence. A terminal stadium dementiæ or a fully developed idiotic state follows and seldom admits of amelioration.

The pseudo-pareses have a prodromal stadium of some weeks or months, a stadium acutum of months or years, with a great variety of mental, motor, and sensory anomalies, similar to those of general paresis, and a stadium dementiæ, from which recovery may take place under the influence of specific remedies, or possibly as the result of self-limitation of the disease.

Remissions may also form a prominent feature of any of the stadia above mentioned. In rare instances embolism, hemorrhage, or other

focal cerebral lesion may give rise to sudden mental disorder, and the initial stadium drops out of the clinical course ordinarily pursued, at least so far as objective symptoms are concerned.

Symptoms.—It is a general impression that irritability, moroseness, hypochondriacal ideas and feelings, and melancholic delusions and states abound in syphilitic Insanity. It has been the writer's observation that maniacal excitement is almost equally frequent, though the symptoms are limited to rapid flight and noisy expression of ideas, boisterous conduct, destructiveness and angry demonstrations, and seldom include the extreme exaggeration and expansion of feeling seen in paretics. It cannot be claimed that there is anything specific in the psychic symptoms, but the fact that they are usually preceded and accompanied by the motor and sensory anomalies of syphilis serves to present characteristic groups of clinical phenomena. Thus, nocturnal headache, paralysis of cranial nerves, optic neuritis, vertigo, somnolence and convulsive seizures, progressive intellectual impairment mingled with hallucinations, delusions, and active emotional excitement or depression, and sudden remissions of these manifestations, can hardly be said to exist in any other type of mental disease.

It was long ago pointed out by Meynert that tubercular basilar meningitis gave rise to melancholic conditions, and it is probable that the states of depression so common in syphilis are due to gummatous basilar meningitis, and that maniacal symptoms spring from meningeal inflammations of the convexity of the brain, involving motor and sensory cortical areas. Diabetes and polydipsia are more often symptoms of the melancholic forms, while monospasms and convulsive seizures are most frequent in the maniacal types.

The syphilitic lesions of the nerves of special sense are accountable largely for the sensorial illusions and resulting delusions. Optic and acoustic perversions are the most constant, but hallucinations of taste and smell also occur. In the excited states visual and auditory disturbances chiefly abound, and the latter seem to persist in the depressed forms, while the former are observed in stuporous conditions. The endarteritis of basal arteries, deprivation of cerebral blood-supply, embolisms and local softenings account for motor paralyses, usually taking the hemiplegic form, but from spinal meningitis and myelitis paraplegia is also encountered. In spinal syphilis the posterior nerve-roots are apt to be involved, and painful symptoms thus arising are the source of delusions of persecutions on the part of the patient.

The somnolent and semi-comatose states pertain to syphilis, and are not to be mistaken for the stupor of an ordinary psychosis. The sudden variations and remittences in all the symptoms are also characteristic of the specific disease. In no other form of dementia does an actual recovery take place, as happens among syphilitic patients, who may have been for long months in profound hebetude, apparently of a terminal nature.

All types of psychic disorder of specific origin tend to a gradual impairment of all the mental faculties, and some form of mental weakness is the final result of the melancholic and maniacal attacks in the majority of cases. The peculiarity of these demented conditions is their recoverability under treatment.

Pathology.—The mental disorder is the result of the syphilitic lesions, chiefly in nervous centres, though there is reason to believe that the general invasion of the internal organs by the virus and the luetic dyscrasia are adequate causes of mental alienation, independently of cerebral changes of inflammatory nature.

Definite pathological lesions exist, however, in the majority of the cases of syphilitic Insanity, and they are, in brief, as follows: Syphilitic meningitis, with specific exudation and infiltration and proliferation of round cells. The cortex cerebri may be sclerosed or atrophied in areas of arterial distribution, or in disseminated patches, and in rare instances softening occurs. Gummata may be present, exerting pressure and interfering with nutrition in basal regions or on the convexity of the brain.

Periarteritis and endarteritis, with obstruction or complete obliteration of arteries, may be found, and the former affection may precede the latter. The small arteries, as well as the basal arteries, are thus affected when situated in the vicinity of inflammatory exudation, in which instance the periarteritis is the initial lesion of the vessel.

Gummata of cerebral nerves are not infrequent. Embolism, hemorrhage, and local softening of brain tissue are also found in occasional instances. The sclerotic processes may extend into the medullary substance, though ordinarily confined to the cortex cerebri. In all instances the arteries and meninges are primarily infiltrated by the specific exudate. Finally, there are paretic and tabetic degenerations.

Differential Diagnosis.—The symptom-complex of paralysis of cerebral nerves, optic neuritis, special sensorial disorder, mental depression or excitement, with somnolence, nocturnal headache, vertigo,

convulsive seizures or hemiplegia, and progressive mental weakness, is sufficient to establish the diagnosis of syphilitic Insanity.

The dementia of epilepsy is without these differential symptoms, which are to be traced in the history of syphilitic dements with epileptiform seizures. Organic dementia following apoplectic attacks most nearly resembles syphilitic Insanity with hemiplegic symptoms, but here, too, the history of the case and the absence of all the specific symptoms facilitates the diagnosis. In case of paretic dementia there may be no means of differentiation from syphilitic pseudo-paresis except the final fact of recovery in the latter. The symptomatic differences which exist in such cases have been pointed out at the close of the clinical delineation.

When syphilitic Insanity arises in the absence of decisive neurological symptoms, or cerebral affections pointing to focal lesions, or other characteristic implication of the nervous system, specific treatment leading to rapid improvement may still render the differential diagnosis possible.

Prognosis.—Syphilis, which is a microbic infection, has a natural history of self-limitation at the end of a term varying from three to ten years, on the average. Cerebral syphilis giving rise to Insanity may, without treatment, pursue this natural course, and there may then be complete recovery from both the specific and the mental disease. The mental disorder is only one symptom of cerebral syphilis, and has a shorter average duration than the specific affection. Unfortunately, the mental disease may become fixed, while the luetic affection disappears, and incurable dementia or chronic mania are the usual terminations.

Partial recovery, with permanent defect, is not infrequent in tertiary syphilis, but complete mental recovery is to be expected chiefly in the acute mental disorder of the earlier cerebral lesions.

The young recover better than the old, women suffer less severely than men, and syphilitic Insanity in senile cases is most unfavorable.

The earlier specific mixed treatment is undertaken judiciously, the better is the prognosis.

Excessive mercurialization and insufficient attention to hygienic measures renders the prognosis much more hopeless than neglect of all treatment.

The prognosis is bad in cases of Insanity from hereditary syphilis.

The duration of life is greatly shortened by syphilitic Insanity,

which so often passes into terminal states of mental weakness, having an average duration of life of not more than six years.

Severe forms of mental disease may follow mild forms of syphilitic infection, and the converse is equally true. The cerebropathy is most severe in those originally psychopathic.

Syphilis combined with alcoholic excess renders the prognosis of mental recovery very bad. An equally bad combination of causes in prognosis is prolonged worry and excessive brain-work, and syphilis.

Treatment.—Specific treatment is to be administered so soon as the diagnosis of syphilitic Insanity has been made, provided the patient has not already been subjected to the same. The constitutional effect of mercury is to be first obtained by protiodide of mercury, grain one-fourth, *ter in die*, and increased rapidly, if need be. In urgent cases inunction, or mercurial baths, give a more prompt effect.

Iodide of potassium, five grains, *ter in die*, with rapid increase of the dose to one ounce, is to be continued, according to the effects produced, or suspended temporarily, if not borne as expected. Very large doses seem to be favored especially by American neurologists in the treatment of syphilis of the nervous system. It is customary to continue the protiodide for a year or two, and the iodides of potassium or sodium for twice that length of time, with occasional intermissions in the treatment. A generous diet, exercise, and all other hygienic measures, including baths, are of much importance.

In cases with hereditary syphilis specific treatment is also to be recommended.

This may be considered the heroic plan of treatment, but it gives better results than the expectant plan of non-specific treatment by tonics and baths and hygienic means alone.

During the specific treatment other drugs are to be avoided, so far as possible.

It is well to continue the iodides so long as there are any symptoms of cerebral syphilis. The third year after infection is one of special danger, and it is well to treat cases occurring at this time, even in the absence of specific symptoms referable to the nervous system.

It is well to state that some physicians rely on tonics and hygienic measures, and never employ specific treatment in syphilitic Insanity.

Statistics show that cerebral syphilis is more common in those luetic cases which have not been subjected to specific treatment, and

that the latter exerts a decided prophylactic effect in this regard in those infected.

All the more recent literature of the subject sustains the idea of the value of specific treatment.

Alcohol, sexual excess, mental strain, and business worry must be avoided. Long hours of sleep, and open-air life and plentiful nourishment are essential.

Surgical interference may be justified for the removal of a large syphilitic gumma of the convexity of the brain when specific treatment is without effect and pressure symptoms are urgent. As often as there are recurrences of symptoms of brain syphilis, or of mental disorder, specific treatment should be renewed. Atrophic, sclerotic, and other specific degenerations of cerebral and spinal tissues in chronic cases of syphilitic Insanity will not be relieved by specific remedies, but roborant treatment may avert, for a time, the fatal termination.

Section III.—Organic Dementia.

There are certain coarse brain diseases which give rise to disorder and impairment of the mental faculties. The mental disease may have an acute phase of maniacal, melancholic, or stuporous aberration, but there usually results a form of dementia which is termed "organic," from the nature of the brain lesions which underlie it. The gross organic brain diseases which are causative of this type of Insanity are hemorrhages, embolism, thrombosis, tumors, ramollissement, hydatids, such as ecchinococci and cysticerci, and other coarse cerebral affections. The mental alienation thus resulting naturally falls in the present group of insanities with definite lesions of cerebral structures.

Definition.—Organic dementia is a form of mental aberration from coarse brain disease, manifested in excited, depressed, or stuporous phases, but eventuating in more or less permanent demented states, characterized by amnesic and aphasic symptoms, emotional weakness, confusion of ideas, sensorial perversions, and often progressive failure of mental faculties, in addition to motor and sensory anomalies caused by the cerebral lesions.

Clinical Delineation.—The features of mental aberration vary in time and order of appearance with the nature of the coarse brain disease. Taking cerebral hemorrhage as one of the most common factors of organic dementia, maniacal excitement may appear within

a few days of the effusion and disappear within a fortnight; or, the focal irritation may result in melancholia of some weeks' duration, with morose and irritable moods, and suspicions of poisoning; or, confused and forgetful, with sensory aphasic symptoms, the patient may in a few months sink into a demented state, in which he is as silly, weak, and childish as a general paretic. In this typical state of organic dementia there is no fundamental mood of excitement or depression, but great emotional weakness, shown in uncontrolled laughing or crying on slight provocation. Memory is specially impaired for recent events, and for names, dates, places, and persons; various forms of aphasia may exist; the sensory and motor phenomena vary with the site of the effusion; exacerbation of brief excitement or suicidal depression may occur, but the state is mental feebleness.

In cases with insane heredity there may be alternations of melancholic and maniacal moods, and intervals of continuous mental enfeeblement for a series of years, but the termination is ordinarily dementia, just as in those not originally psychopathic.

If tumor of the fore-brain be the source of trouble, headache, vertigo, spasmodic affections, impaired special senses, and disordered speech may be observed; also loss of attention and memory, irascible or lachrymose moods, progressive hebetude and mental incapacity, with intercurrent maniacal or melancholic symptoms. Brief delirious attacks, with pyrexia, are to be distinguished from the other aberrations of mind. In the bedridden stage stupor and semi-comatose conditions also appear, and convulsive seizures are common. The fatal end is attained more rapidly than even in general paresis, except in the case of gummatous tumors or those of traumatic origin.

Embolism sometimes causes brief mental disorder of the maniacal type, followed by prompt recovery, but thrombosis is apt to give rise to more permanent psychic disturbance, and this is also the case in all vascular obstruction ending in wide ramollissement of cerebral substances.

Thrombosis is associated often with obliterating endarteritis and fatty heart, and the advent of dementia is favored by decubitus, hypostatic congestion of internal organs, and other physical complications which arise in the bedridden state, as well as by the existing cerebral vascular degenerations. In ill-nourished senile cases and in post-febrile exhausted patients there is also marantic thrombosis, which causes stupor, and usually ends fatally in a brief period. Malignant embolism, causing septic encephalitis, is too suddenly fatal to admit

of any intervening mental disorder, as a rule, but embolism from pulmonary abscesses in phthisical cases may cause maniacal excitement.

There is no doubt that embolism from endocarditis occasionally causes softening of the brain and organic dementia, though thrombosis and hemorrhage are the chief sources, in those advanced in years beyond middle age, of this form of mental disease.

The aphasic symptoms are important in these cases, having medico-legal relations, and the paraphasia may be mistaken for incoherence, and word-deafness and word-blindness for a degree of dementia which does not exist.

Cases of sensory aphasia are often sent to hospitals for the insane, but they may still possess reasoning power and right understanding of the affairs of life, and are not necessarily demented, as can readily be demonstrated by appropriate tests. A very careful study of all the features of hemiplegic and aphasic cases is necessary before they can be regarded as instances of organic dementia, even when alexia, apraxia, and paraphasia are present in connection with some emotional weakness.

Causes.—Periarteritis, endarteritis, and miliary aneurisms, and other vascular degenerations from alcoholism and senility, are the prime causes of hemorrhages, favored also by increased blood-pressure from renal disease and cardiac hypertrophy. Cerebral congestions, also, from whatever source, are favoring conditions of intracranial hemorrhage.

Organic dementia from embolic processes may be traced, in the first instance, to ulcerative endocarditis, aneurisms, microbic or pyæmic foci in internal organs, or malignant growths; while thrombotic occlusion springs often from arterial degeneration and the cardiac enfeeblement of old age or of infectious disease. The cerebral tumors which cause dementia may proceed from tubercle, syphilis, or trauma capitis, which is a very important factor in the history of many cases. Parasitic tumors are rare but authenticated causes of organic dementia. Glioma and sarcoma and cancer are much less common than tubercle and specific tumors.

Brain abscess of the chronic form may cause mental weakness, and active recurrences of disorder of intellect. The cause of brain abscess is microbic infection from otitis media or from suppuration in more distant organs, from which pyogenic micro-organisms are conveyed by the circulation to the brain. Ordinarily the mental dis-

turbance created by suppurative encephalitis is too brief to be reckoned as Insanity.

Pachymeningitis hemorrhagica and traumatic cranial injuries, followed by extensive inflammatory changes of meninges and cortex, are to be enumerated among the occasional causes of organic dementia.

Stadia.—The initial stadium is very brief after apoplectic seizures before the acute stadium of maniacal excitement in some cases. Thus, after cerebral hemorrhage there may be a few days of confusion of ideas or stupor, followed by a maniacal stadium acutum of two or three weeks, and then by a stadium convalescens of the mental disorder, as there may be then compensatory adjustment of cerebral circulation, and the clot may cease to be an active source of irritative disturbance.

In other instances there is an initial stadium of some months, following a hemiplegic attack. The irritability and painful feelings pass into an acute stadium of melancholia, which may continue for a year and end in a terminal demented stadium. The stadium acutum is sometimes interrupted by remissions of some weeks, or there may be alternations of depression and excitement. The exacerbations sometimes correspond to new hemorrhages from miliary aneurisms.

In case of tumors the initial stadium is sometimes protracted for a year or more, with depression of feeling, occasional sensorial perversions, as the special senses become involved by the anatomical changes and by pressure, and the stadium acutum is of a few months' duration and is marked by hallucinations, delusions, stuporous or maniacal attacks, convulsive seizures, loss of sensation or motion, and other physical symptoms due to the tumor, and then may follow coma or stupor in the fatal stage; for such cases, on the average, perish more promptly than paretics. Brief stadia and recurrent attacks are to be observed in embolic processes, while in senile cases thrombosis often has a lengthy stadium acutum, and ends in a demented stadium, which terminates life, in most instances, within two or three years, and the same may be said of chronic brain abscess.

Symptoms.—In the group of insanities with definite lesions of the encephalo-spinal nervous system, the mental disorder is characteristic only through the grouping of the physical and mental symptoms, and not from any specific traits of the aberration of mind. The maniacal, melancholic, and stuporous symptoms are blended in organic dementia with vertigo, nausea, headache, convulsions, amaurosis, optic neuritis, hemianopsia, palsies of cranial nerves, paræsthesiæ, anæsthesiæ, aphasia, protospasms, hemiplegia and paraplegia,

and other somatic sequelæ of various modes of invasion of nervous centres by focal lesions.

Climacteric, post-febrile, and senile, alcoholic, or diathetic states also modify the semeiology of organic dementia in some cases.

The two most characteristic psychic symptoms are the emotional weakness, shown in childish, or even automatic, laughing and crying, and the general enfeeblement of all the mental faculties.

Complete sensory aphasia is not very rare, but ordinarily there are mixed forms of motor and partial sensory aphasia. When memory for the auditory and graphic signs of language is lost, as well as for the nascent motor impulses essential to speech, dementia is inevitable, and reasoning is no longer possible. Great improvement often takes place gradually in these aphasic conditions. The stupor of organic dementia is not, as in the functional psychoses, due to powerful inhibition or to hallucinations, but to actual failure of association of connected memories and to loss of power of attention. The dementia itself is due not to functional but to organic impairment of the cerebral mechanism. It is even possible, from the profound nature of the stupor alone, to predict focal brain disease before the physical signs of the latter appear. The fluctuations and recurrences of the mental symptoms are also characteristic, and point to extension of the pathological processes, and the mental disorder throughout its entire course may be regarded as subordinate to the organic brain disease. The irritation of sudden cerebral hemorrhage may cause mania, and, as the clot becomes encysted, melancholia may supervene, and rupture of the cyst and more effusion may again be attended by a maniacal outbreak, and dementia may be the sequel of this second phase of the focal disease.

Almost any imaginable sequence of the psychic symptoms may thus originate. Hallucinations of the special senses, perversions of common sensation, disorders of the muscular system and of the vital functions of respiration, digestion, and circulation, and delusions of a painful nature, chiefly, are among the prominent symptoms of organic dementia.

Pathology.—Coarse brain disease produces Insanity in some persons and not in others. Bilateral lesions and diffused processes cause more extensive damage of mind than unilateral or circumscribed lesions, and this is true of cortical as compared with subcortical lesions. It would seem that very slight disease of cerebral tissues excites mental disorder in some persons, already predisposed, but that there are persons in whom the most extensive focal disease causes

simply diminution of intelligence in proportion to the cerebral structures actually destroyed, and never active aberration.

In organic dementia brain abscesses may be in the temporal lobes from otitis media, or in the frontal, parietal, or occipital lobes. The brain-cells and fibres are destroyed, proliferation and then disintegration of glia-cells takes place, and a fibrous envelope encloses the abscess in chronic cases. Multiple abscesses of microbic origin may exist, but such pyæmic abscesses are small.

Cerebral hemorrhages causing organic dementia arise from degenerations of arteries, and are favored by renal disease, cardiac hypertrophy, and whatever increases unduly intra-arterial blood-pressure.

Diseased states of the blood itself may lead to hemorrhage. The rupture is most often in the branches of the middle cerebral artery into the caudate or lenticular nuclei or optic thalamus, or secondarily into the ventricles, and the effusion is in a few weeks encysted; but previously there may be irritative disturbance of brain functions and maniacal symptoms. On account of pressure, large hemorrhages are more decided causes of mental disorder than smaller ones. Repeated hemorrhages are specially apt to result in organic dementia, though death often terminates a third apoplectic seizure. Cases of slight attacks recurring every few months for a year or two are exceptionally seen, and are due to miliary aneurisms, perhaps.

Thrombosis from atheroma of arteries which supply the corpora striata, is common, and it may be followed in turn by embolism, hemorrhage, and softening of brain structures.

Embolism of the middle cerebral may affect cortical areas and gives rise to active mental disturbance in some cases. Tumors of the brain in the frontal and occipital lobes are specially wont to disorder mental functions, and when large they almost always cause enfeeblement, as well as active disturbance of intellect by irritation, pressure, and by secondary rupture of vessels and hemorrhages. Apart from tubercle and luetic tumors, glioma and sarcoma are most common in cerebral tissues, as causes of organic dementia. Cases from ecchinococci, cysticerci, and the micro-parasitic affection, termed actinomycosis, have also been reported.

Differential Diagnosis.—This form of Insanity is to be differentiated from epileptic dementia from the fact that epileptiform seizures are never the only symptom of focal brain disease causing organic dementia, and the history of the two diseases is different, and epilepsy pursues a more chronic course before giving rise to a de-

mentia, which itself has a longer duration, and a much less promptly fatal termination in the majority of cases.

The neurological symptoms also serve to differentiate organic dementia from senile dementia, with syncopal attacks due to cardiac feebleness, or with epileptic seizures. Headache, vertigo, vomiting, optic neuritis, palsy of cranial nerves, protospasms, hemiplegia, the history of causes of focal brain disease, and any or all the signs of its actual presence, serve to make the differential diagnosis.

Should a simple melancholia or mania suddenly pass into a profound stupor of long continuance, focal brain disease may be suspected, and a probable diagnosis of organic dementia may be made in advance of the physical signs of the focal lesions.

It is sometimes difficult to differentiate this type from alcoholic dementia, in which there may be apoplectiform seizures, but rarely any permanent loss of power of limbs. It is only by the history of the case and a careful study of the complete group of symptoms in the order of their occurrence that a correct opinion can be formed in intemperate patients mentally enfeebled. If there is a history of focal brain lesions prior to the dementia, it is to be assumed that the latter is organic.

In the terminal stage, and upon appearances alone, it might be difficult to distinguish certain paretics from organic dements, but the early history of the cases and the entire course of both the psychic and somatic symptoms seldom fail to furnish sufficient points of difference for a diagnosis. It requires neurological skill of high order to always make a correct diagnosis of organic dementia, since it implies the faculty of interdifferential diagnosis of focal brain diseases among themselves.

Prognosis.—The hope of mental recovery is very slight, and the chances of death within a few years, at the furthest, are very great. This general opinion admits of some exceptions.

The prognosis in any particular case depends directly on the nature of the brain lesion. Tumors having attained the size necessary to cause dementia are of bad prognosis, and will generally end fatally within two years. Syphilitic tumors, and those admitting surgical removal, are exceptions to this statement.

The prognosis in apoplectic effusions is bad, though there may be recovery, with mental defect, from a first attack. Life itself is endangered greatly by a second hemorrhage, and a third apoplexy is rarely survived. The existence of organic dementia testifies to the severity of the hemorrhages, as a rule.

Cerebral emboli and thrombosis are but little more favorable than hemorrhages. Brain abscesses are always of bad prognosis, both for mental recovery and for life.

Senility, cardiac and renal disease, alcoholism, atheromatous and sclerotic degenerations of vessels, and diathetic states are bad elements of prognosis, and some of them appear in the history of most cases of organic dementia.

Treatment.—The only hope of radical cure lies in precarious surgical procedure. Antiseptic brain surgery renders the evacuation of brain abscess or the removal of tumors of the convexity less desperate than formerly.

Symptomatic treatment, carefully conducted, may in course of time be followed by recovery, with mental defect, in cases of cerebral hemorrhage with sensory aphasia.

Sustaining treatment, tonics, and all hygienic measures are in order, and arsenic, the iodides of potassium and sodium, and the bromides in developing epilepsy are to be employed.

Massage and electricity have some application in the paralyses and other muscular disorders. Strychnine, in tonic doses, is of value, and digitalis to sustain cardiac action, and hydrotherapy is of some avail. Cold to the head, counter-irritation, local blood-letting, and remedies for the relief of pain, especially cephalalgia, will be required in the course of the symptomatic treatment.

Specific remedies should be employed whenever there is a history of previous syphilis.

In most cases it will finally become a mere question of good nursing of a bedridden patient. The chief constant danger to be averted is decubitus. An antiseptic wash of bichloride of mercury, frequent change of position, air-cushions, and a water-bed are often to be used. As the rectal and vesical sphincters become paralyzed, antiseptic catheterization and enemata at timely intervals are practical aids to cleanliness which must be carefully enforced at all times.

Refusal of food is common and calls for artificial feeding, as does also impaired deglutition from various focal brain diseases.

Life will be sustained largely by careful alimentation, of which predigested foods will form a part.

In all stages of organic dementia, renal, intestinal, and cardiac activity are to be sustained by appropriate remedies.

Intercurrent affections of heart and lungs are common, and death most often results from pulmonary complications.

Section IV.—Typhomania.

This severe form of mental disease was first described by Dr. Luther Bell, in 1844, as typhomania, but it has also of late been termed delirium acutum, or acute delirious mania.

Some writers regard it as a mode of termination of acute mania, but the prompt onset, violent and brief course, and fatal termination in most instances, justify the opinion that it is a distinct type of mental disorder of toxic or infectious origin.

Definition.—Typhomania is a form of intense mental disorder, probably of infectious origin, of sudden access, turbulent course, marked by hallucinatory and motor excitement, and rapid exhaustion of vital powers, ending in death in the majority of cases within a fortnight of the outbreak of the maniacal symptoms.

Clinical Delineation.—Typhomania is not often a complication or termination of other forms of mental disease, which sometimes pass into a state of typhoid exhaustion. The term is to be limited to those independent acute delirious manias which present the typical symptoms and run the hyperacute course about to be described.

After prolonged mental strain, excessive labor, or sexual and alcoholic excess for a week or two, may be observed incubatory symptoms of restless anxiety, despondency, and forebodings of evil, general malaise, and disorder of sleep. Then follows abruptly a maniacal explosion of great violence of motion, incoherent flight of ideas, wild gesticulation, boisterous and destructive acts, loud screaming, laughing and crying, and vivid hallucinations of the special senses. The excitement continues unabated by ordinary sedative measures, and great physical exhaustion supervenes within a day or two. The motor activity becomes general, excessive, and automatic, wild delirious ideation appears, consciousness is rapidly obscured, and speech is reduced to incoherent muttering.

The temperature now rises to 102° F., or even as high as 106° F., the pulse becomes rapid and feeble, the breath is offensive, sordes form upon the lips, semi-comatose and convulsive states develop, there is involuntary evacuation of bladder and rectum, rapid emaciation ensues, and, on the average, death follows within fourteen days from the first appearance of the maniacal symptoms. The fatal end may be reached within the first thirty-six hours, or delayed, very exceptionally, beyond the third week.

Causes.—Psychopathic predisposition appears in the history of some cases, and in others there is an acquired neurotic state from

business or domestic worry, severe mental shock, or prolonged stress of mind from whatever source.

Other etiological factors are insolation, trauma capitis, acute infectious diseases, puerperal sepsis, suppurative inflammations of internal organs, specially of the lungs and kidneys, surgical operations with prolonged anæsthesia, and alcoholic excesses. The age of the vast majority of patients is between thirty and fifty years.

In the writer's experience, men are more often attacked than women, but an opposite observation has been made by most writers.

The sudden invasion, violent symptoms, rapid exhaustion of vital energy, and extensive pathological lesions, all favor the view that the entire process is of a toxic or infectious nature. In puerperal cases and in suppurative inflammations of internal organs a source of sepsis may be readily surmised, as well as in all acute infectious diseases; but in other instances a perverted metabolism and the auto-formation of toxins is a presumable source of the disease.

Stadia.—There is a brief initial stadium in all cases, but, as its duration is only for a few days, it may escape observation. It begins with a depressed cœnæsthesis, a general painful feeling. Sometimes there is referred to the head a distressing sense of weight and tension, and at other times a boring pain is felt in the back of the neck. Profound lassiture, depression of spirits and feelings of vague dread, and restless insomnia are also a part of the initial stadium, which may have extreme temporal limits of a few hours or ten days, and is abruptly terminated by the outbreak of maniacal symptoms.

The stadium acutum declares itself suddenly; even within the space of a half hour the patient may pass from apparent lucidity to the full height of hallucinatory aberration and delusional violence of conduct. In exceptional cases the patient wakes from troubled sleep into the maniacal state, or the latter follows alcoholic stimulation, or some emotional shock. The full intensity of the symptoms is rapidly attained, and generally the clinical progression is marked by a vast expenditure of physical force and incessant psycho-motor excitement.

By way of exception, remissions of a few hours occur in the turbulence of mental and motor symptoms. There is no arrest in the pathological processes, however, and resting spells are followed by still more violent explosions of nervous force, and vital exhaustion becomes evident in a few days, at the furthest.

Incoherent and automatic speech and movements continue, jactitation is incessant, subsultus tendinum is continuous, even in drugged

sleep, and convulsive spasms may become general. Sleep no longer exists, but sopor or comatose conditions appear, and the downward course is rapid, and death from cardiac failure is a common termination.

If recovery is to follow, the comatose stage is not reached, but remissions of a few hours arise, and the violence of all the symptoms abates, and the patient is left prostrate and completely exhausted in body and mind. A convalescent stadium of some weeks restores the immediate balance of the mind, but a much longer period is necessary to a complete restitution of mental and bodily powers, which in some are never fully regained.

Symptoms.—The painful cœnæsthesis is the earliest expression of the incipient pathological changes in the entire organism, and of these the organic senses take cognizance, which is reflected in intellectual centres as vague presentiments of coming evil, dire forebodings, and melancholy fears. The acute hallucinations and illusions of all the senses are attended by sensorial delusions, swiftly changing like the sensory perversions, but in the meantime prompting to a great variety of absurd, destructive, or violent actions. This stage of psychomotor activity is soon passed and is followed by involuntary and forced sensory and motor phenomena, due to the intense irritation of cortical regions and spasmodic discharge of nervous energy from the same. Multiple hallucinations and illusory sensations and massive emotions overwhelm the patient, while the whole muscular system displays a tetanic convulsibility. The limbs are jerked about in the most purposeless manner, and the whole body seems to be rent by the disjointed actions of the extremities. These violent ataxic movements may give place, for a brief period, to tetanoid contractions of body and limbs. In the meantime, all clear conceptions and conscious mental processes disappear. The shouting, singing, and incoherent talking give place to hoarse and whispered mutterings. The patient may continue to spit a frothy, viscid saliva; the face is twitched convulsively; the pulse is rapid and feeble; the temperature ranges from four to eight degrees above the norm; respiration is frequent and superficial, and sometimes altered in rhythm; the secretions and excretions are offensive; the tongue, teeth, and lips are coated with sordes; the face, at first flushed with suffused conjunctivæ, now is pinched and haggard, with dark circles under the eyes, and the whole aspect is that of profound nervous exhaustion.

There is a general wasting of muscular tissues, and a rapid loss of total weight, which may be diminished twenty-five per cent. in

the course of a week. The uncontrollable and incessant movements prevent the patient from taking food, which cannot be recognized when presented, and artificial feeding is always necessary. Perspiration is often profuse; urine is scant, high-colored, charged with urates and sometimes albumen, and also blood-corpuscles; constipation exists at first, and colliquative diarrhœa finally. Pemphigus, decubitus, cellulitis, and abscesses are common. The superficial and deep reflexes are first exaggerated and then lost. Ocular and masticatory spasms are frequent.

The temperature may fall to the norm a few days before death, and there may then be an antelethal pyrexia of twenty-four hours.

In rare instances hyperpyrexia does not exist at any time. In convalescent patients sequels like those of infectious fevers are observed, such as renewal of cutaneous epithelium, splenic enlargement, hepatic congestion, and nephritic affections.

In recoverable cases remissions of all the symptoms appear before the comatose stage appears. Recovery may be prompt, but ordinarily is a slow process like that from a severe fever. One mode of termination is dementia. No case under the writer's observation has ever terminated in general paresis or in any other type of Insanity than that just named.

Pathology.—The pathological processes resemble those in toxic or septic conditions. There is at first intense congestion of cerebral regions, and following the hyperæmia, venous stasis and œdema of the brain.

The blood in the sinuses is dark and fluid, there are effusions of blood-corpuscles and leucocytes in the perivascular spaces, the ganglionic elements are swollen or in process of degeneration, and there are sometimes punctate extravasations of blood in the brain substance. There is lymphatic engorgement and the pial vessels present an opaque appearance, and there is injection and adhesion of membranes of the brain. The lungs are the seat of hypostatic congestion or œdema, and the heart is lax and contains dark fluid blood. There is engorgement of internal organs—of the liver, spleen, and kidneys, and the muscles are atrophied.

The presence of micro-organisms in the blood and urine has been reported.

There is no doubt that the intense nature of the pathological processes in the whole system stands in etiological relation to the acute nature of the general symptoms.

Differential Diagnosis.—The simple exhaustion of acute mania

never appears with the sudden or severe symptoms of typhomania. The rapid reduction of consciousness, the high temperature, and the general wasting are all wanting in acute mania, which rarely leads to fatal exhaustion, if treated by the same means which prove of no avail in typhomania.

The delirium of fevers is not of such an intense character, and there is a difference in the temperature curve, and a rash, and a sequence in the symptoms in point of time unlike that of typhomania.

Acute meningitis may resemble typhomania in confusion of ideas and delirious excitement, but the motor agitation is not so great and the reduction of vital forces is not so sudden. Still, there is a near resemblance in the symptomatology, which not infrequently leads to mistake in diagnosis.

In pneumonitis the delirium lacks the motor violence and is relieved by antipyretics, which are without effect in typhomania.

Typhomania is differentiated from delirium tremens by a general comparison of the whole group of symptoms characteristic of the two diseases. Single symptoms are alike in many cases of the two affections. The temperature is higher in typhomania, and the reduction of consciousness more complete, and the alcoholic tremor is wanting, and a coarser tremor exists only in exceptional cases. The difficulty of diagnosis is greatest when alcoholic excess has been an exciting cause of typhomania.

Prognosis.—The prognosis is bad. The majority of the cases die within the first fortnight. Of those who survive, one-half pass into terminal dementia.

Apparent lucidity of intellect may be restored within three or four weeks, but complete recovery of the forces of mind and body is gradual and only completed after a considerable lapse of time.

Of the prognosis of typhomania as a prodrome or sequel of other forms of mental disorder, the writer cannot speak, having never observed such a case.

Treatment.—The only hope lies in prompt treatment. A large, well-ventilated room, kept at a cool temperature, preferably not above 60° F., and darkened, is supplied with a wide, stationary, single bed, accessible to nurses from both sides. The patient is to be treated in the recumbent position, and is not to be held, but kept in bed by the restraining sheet, which does not arrest, but prevents self-injury and bruises from the violent jactitations.

The combat for life is against death from exhaustion of vital powers.

Alcoholic stimulants are to be reserved until the first intense hyperæmia of cerebral centres is passed and heart failure appears. Active derivation and relief of customary constipation is to be effected by one or two drops of oleum tiglii. Subsequently, stimulating enemata are to be employed. The temperature is to be reduced by sponging with evaporating lotions and by cold packs, which encourage the activity of the skin and assist in toxic elimination. For the same reason plentiful cool drinks, mildly acidulated with mineral acids, are to be given to favor diaphoresis and diuresis.

Cold milk, if the patient will take it, may be plentifully administered.

Whenever the temperature rises above 104° F., friction of the entire surface with ice, or a bath rapidly graduated from tepid to cold, with the ice cap, is to be employed, under direct medical supervision.

Second only in urgency to reduction of temperature is alimentation throughout the whole attack.

Forced feeding is to be begun as soon as the patient fails to take the necessary supply of food.

The waste of tissues is enormous, and must be made good by a full physiological ration of concentrated nourishment, predigested, if need be. Eggs, milk, beef essence, meat pulp, and fresh juices of fruits are to be given at regular intervals. Fresh cream, one pint daily, obviates partly the early constipation and favors sleep.

Generous alimentation is the best stimulant and the best soporific in the early part of the attack.

Chloral hydrate increases the hyperæmia, and hyoscin hastens the exhaustion.

Ergotine is the best drug at first, and full doses of morphine may be justified occasionally to relieve the violent excitement. Bromides are of no avail, and all the hypnotics fail to give satisfactory results.

Warm baths, with cold to the head, are of some service, and, if the patient is kept nourished and the heart's action is sustained by digitalis, sleep will result at brief intervals, and will be of a refreshing nature.

Bleeding and counter-irritants are not to be recommended. Calomel may be of some service and serve to correct foul intestinal conditions.

Antiseptic catheterization becomes necessary in some cases in the soporous states. The mouth is to be cleansed with an antiseptic wash, and constant personal attention is required to prevent decubitus.

Alcoholic stimulants become of value when cardiac weakness appears.

Should the patient survive, tonics are to be employed, and a long period of rest and favorable hygienic conditions are essential to complete restoration of health. Second attacks of typhomania are extremely rare.

Section V.—Traumatic Insanity.

It has long been known that very obstinate mental disorder results from injuries to the head, which give rise directly or indirectly to definite lesions of cerebral tissues. It is to this form of mental disorder that the term "traumatic Insanity" is more appropriately applied, though some writers give a wider use to this designation.

Definition.—Traumatic Insanity is mental alienation from damage to the organ of mind by mechanical violence to the cranium, membranes, or cerebral tissues, and it is attended by active aberration or chronic deterioration of mental functions.

Clinical Delineation.—Following a severe fall or blow upon the head, there may result within a few hours confusion of ideas, loss of memory for recent events, and a complete incapacity for the affairs of life. The patient sometimes has a silly, helpless manner, an astonished sort of look, gives incoherent replies to questions, and confounds places and recent events, is emotional, and in a few days grows restless, sleepless, and is mildly maniacal. In other cases there is an interval of weeks or months between the cranial injury, which may have caused slight depression of the skull, and the attack of melancholia or mania, which may manifest a recurrent tendency and end in secondary dementia at the end of a few years. Or, again, the trauma capitis may be followed by a gradual change in character, and at the end of a year or two a development of systematized delusions and a fully developed monomania.

In other instances, secondary lesions extend from the seat of the injury and involve the brain cortex, and give rise to epilepsy, which in turn is followed by mania or dementia. The extent of the brain injury does not bear a constant relation to the severity of the mental disease, which may take on a hopeless form after slight trauma capitis. The little injury may be a point of departure for wide pathological changes of the meninges and of the cortical cells. Periodicity of maniacal symptoms is a prominent feature in some of the cases. That general paresis results in traumatic cases has already been noticed.

Some of the cases in young persons undergo a moral deterioration, and resemble, in their general outlines, moral Insanity.

Causes.—The trauma capitis and its resulting lesions are the exciting causes of the mental disease.

Predisposing causes consist in direct heredity, or existing neuroses, intemperate habits, or exhausting mental or physical labor, and insufficient nourishment and loss of sleep, or a previous psychosis.

It may even be that the head injury only develops a latent psychosis at some of the evolutional or involutional epochs or physiological crises. Doubtless a variety of causes act together in some cases, but in others, free from heredity and in good general health, the trauma capitis, apparently by its sole influence, leads to a psychosis, which may prove incurable and end in dementia.

Stadia.—The initial stadium is very brief in cases of mania following within some days of the injury, and it consists in loss of power of attention, slight confusion of ideas, and impaired memory, and a painful sense of physical being and sleeplessness. Then follows the stadium acutum, of melancholic or maniacal form, for a few weeks, and then a stadium convalescens or stadium dementiæ in unfavorable cases, which are much the more numerous.

In mental disorder distant a year or more from the injury, the initial stadium may consist in gradual changes in disposition and in incubatory delusions, becoming systematized at the end of many months, and then follows the stadium acutum of monomaniacal order, lasting for years, until there supervenes a terminal stadium of dementia.

In still another class of cases the initial stadium embraces the mental changes of early epileptic states, caused by the traumatic lesions and the stadium acutum, the epileptic manias, and active deterioration of mind, and then follows the stadium dementiæ.

Symptoms.—In some of these traumatic cases there is, in connection with general failure of bodily health, a hypochondriacal or hysterical array of symptoms, spasmodic twitchings of muscles, neuralgic pains, anorexia, insomnia, loss of self-control, outbreaks of anger, and general incapacity for social or business relations of life.

In other cases, delusions or illusions may arise, only to disappear and be replaced by still more disagreeable ideas or feelings, which culminate in some absurd act, destructive effort, direct violence, or suicidal attempt.

The monomaniacal patients, especially, develop most dangerous delusions and homicidal impulses.

Still another class, probably of latent epileptic character, have automatic states, of which there is no subsequent memory, and during which they commit theft, arson, or petit offences against the law.

In the epileptic cases hebetude or somnolence is common, and sudden violence is to be feared, and is a prominent symptom in traumatic Insanity, and often takes a shockingly ferocious and treacherous form.

Cephalalgia, hallucinations of sight and hearing, perverted appetites, paræsthesiæ, suicidal impulses, animal propensities, vertigo, spasms, paralyses of special nerves, convulsive seizures, syncopal attacks, and epileptic automatism are among the symptoms of traumatic Insanity.

In occasional cases there may be spinal symptoms due to descending degeneration. The moral and æsthetic deterioration is not unlike that in alcoholic patients, and may constitute an important part of the psychic change in perfectly temperate persons, who may develop delusions of conjugal infidelity, and become brutal, selfish, and insanely cruel to wife and children.

Religious delusions and sexual perversions are not uncommon, and in the early stage pious and sexual emotion influences the conduct largely in many patients. Self-mutilation of sexual organs under religious delusions sometimes occurs.

Pathology.—The lesions found upon autopsical examination are adhesion of dura mater to calvaria, thickening and opacity of membranes and cortical adhesions, exostoses, inflammatory and atrophic processes extending from the original site of injury, and, if the latter has been a severe blow, lesions of membranes or cortex in the opposite hemisphere as the result of contrecoup. The nature of the trauma determines in some degree the resulting pathological changes. Depressed fractures may have circumscribed lesions, or may give rise to epilepsy, and in course of time be followed by extensive degeneration of cortical cells, as in idiopathic cases of the convulsive affection. Falls and blows, and the effects of contrecoup from spinal concussions, may result in diffused cortical atrophy.

Even slight and circumscribed injuries may, in predisposed patients, serve as a point of departure for wide structural alterations of cortical elements.

Differential Diagnosis.—The history of trauma capitis, with a gradual development of such clinical manifestations as have been mentioned under "Symptoms," serves to establish the diagnosis in

most cases. If the Insanity follow epilepsy developed by the trauma, it is still to be regarded as traumatic.

Traumatic Insanity is to be differentiated from general paresis initiated by traumatic accident. Some writers do not differentiate between traumatic Insanity and mental disease caused by insolation, which may give rise to similar forms of aberration, but the pathological lesions are not alike in the two affections.

Mental disorder as the direct sequel of brain-surgery is to be regarded as traumatic. If, though, the operation be very slight and the anæsthesia somewhat prolonged, it may be more consistent to consider the mental disturbance as toxic in origin. Considerable care is necessary to learn the history of cases and the sequence of injuries and insane symptoms as related in patients having both cranial damage and epilepsy, in order to differentiate between mental disorder due to the convulsive neurosis and that due primarily to the traumatic factor.

Prognosis.—A few cases, following promptly upon cranial injury, have an acute attack of mental disorder and recover completely.

Traumatic cases, with a long prodromal stadium and gradual changes in character, are uniformly unfavorable in prognosis.

The prognosis is bad whenever epilepsy develops from the trauma capitis along with the mental disease.

There is a bad prognosis whenever the monomaniacal type is a sequel of the cerebral injury.

Intemperate patients often become insane from slight blows or cerebral concussions, which are not followed by secondary lesions. These cases recover often, but they are not genuine instances of traumatic Insanity.

The immediate danger to life is not much greater in traumatic Insanity than in other types, since the majority of the cases pursue a chronic course.

Treatment.—The radical cure may be effected by surgical treatment. Operation for depressed bone acting as a source of cortical irritation is directly indicated, unless the general condition of the patient is unfavorable.

When diffused lesions have ensued, the local interference will prove of no permanent service.

In all the varied cranial injuries and modes of mechanical violence to cerebral tissues it is a question for modern brain surgery to decide as to the surgical procedure justified. Antiseptic operations now succeed which would formerly have been condemned, and the

last and only hope of mental recovery often lies in this direction.

On account of dangerous tendencies, many traumatic cases require treatment in institutions.

The traumatic epilepsy calls for the usual anti-epileptic treatment.

Apart from the surgical bearings, the psychiatric indications are such as have already been fully discussed in the chapter on "Treatment." The important point is that the surgical procedures and all other active measures should be undertaken at the earliest possible moment, as delay is fatal to hopes of recovery.

Section VI.—Sympathetic Insanity.

The possibility of mental disease from some morbid condition of other organs than the brain, and from injuries of distant structures, has long been explained on the ground of "sympathy" of the cerebrum with other parts of the system. The modern view is that such mental disease springs from lesions of the peripheral nervous system in a reflex manner, and through vasomotor disorder. Just as intestinal worms may cause convulsions, and a foreign substance in the sole of the foot may cause tetanus, so may similar irritations, acting through the peripheral and vasomotor nervous system, derange the action of the higher cortical regions concerned in mental manifestations.

Definition.—Sympathetic Insanity is disordered action of the mental mechanism through reflex channels, and through disturbances of the peripheral and vasomotor nervous system occasioned by extra-cerebral irritations and lesions of distant parts or organs.

Clinical Delineation.—Sympathetic Insanity, like some other types, is treated as a special form, not from any specific psychic symptoms, but from the special pathogeny and mode of termination of the disease. Thus a painful cicatrix of a peripheral nerve excites mental disorder of a maniacal type, and the removal of the cicatrix relieves the mental disorder, or the repeated presence of intestinal parasites may be attended by mental aberration, which is promptly terminated by the successful use of anthelmintic remedies. The prevailing character of the alienation may be melancholic or maniacal, and the hallucinations and delusions may relate to the local irritation, or the complexion of the mental malady may in no wise reflect the topical origin of the psychic trouble.

Persecutory delusions and suicidal tendencies have been reported

in connection with middle-ear disease, and prompt relief from the same followed the cure of the aural affection.

A form of hypochondriacal melancholia sometimes results, especially when, in early adult life, the reproductive organs are the seat of the local irritation.

Melancholia from abscess of the liver is reported to have been promptly relieved by aspiration.

Sometimes intense circumscribed neuralgic pains form a prominent feature of the psychosis, for which they may constitute a sort of direct exciting cause in other cases. In a few instances there is an etiological sequence in neuralgia, herpes, and mental aberration. J. Pons regards these patients with herpetic eruptions as forming a distinct type of sympathetic Insanity, with delusions based on the cutaneous irritations, and reports a characteristic change of personality as chronicity appears in these cases.

When helminthiasis is the local source of the mental trouble, perversions of taste and smell, pica and coprophagy, and libido are among the clinical features to be noted.

Maniacal excitement followed in one case of a worm in the stomach. Mania may be the form resulting from larvæ in the frontal sinuses.

Profound melancholia and emaciation from tape-worm, Maudsley records cured promptly by the oil of male-fern, leading to complete expulsion of the worm, and he quotes Jördens for an instance of violent Insanity from a splinter of glass in the sole of the foot, and the immediate relief of the mental disorder on extraction of the foreign body from the foot.

In fact, literature abounds in instances of active mental disorder provoked by local irritations.

Causes.—Due weight must be accorded to hereditary predisposition to mental disorder, since the exciting cause is such as does not ordinarily result in aberration of mind.

A convulsive neurosis, like epilepsy, in the patient or in the immediate progenitors, doubtless favors this form of mental disease. The innate tendency may reveal itself merely in a convulsive tendency to muscular disorders, or sensory anomalies, or neuralgic affections. A history of some such convulsibility or instability will be found in most cases of sympathetic Insanity.

Alcoholic excess and all unhygienic modes of life tending to lower the general tone of the nervous system may be regarded as predisposing circumstances.

As persons are born with a tendency to disease of some particular organ, so others have an innate psychic vulnerability through certain peripheral nervous channels, and it is this idiosyncrasy which is the real etiological factor in this form of alienation.

Stadia.—The initial stadium may be brief and consist mainly in sensory disturbance, neuralgic pains, and mental depression, and there may then ensue a sudden acute stadium of maniacal symptoms, and a prompt convalescent stadium on removal of the local irritation.

In other cases there may be a long initial stadium corresponding to the gradual development of a peripheral disease; a stadium acutum of a melancholic nature, with illusions of the special senses, and depressing delusions and suicidal impulses; and a convalescent stadium ending in recovery of both the mental and local affection. Should the latter prove incurable, the terminal stadium of the mental disease will probably be secondary dementia.

Symptoms.—When the relation between the disease of special organs and of the mind, and reactions of a sensory and motor kind, shall have been more thoroughly studied, it will be possible to define more closely the symptoms in the reflex psychoses. It would seem that subacute and prolonged irritations of gastro-intestinal and hepatic tissues tend to develop hypochondriacal and melancholic vesaniæ; that deep-seated ocular and aural irritations serve to excite maniacal disturbance, and that parasites of frontal sinuses and nasal disease have a like tendency; that extensive peripheral neuritis is often followed by stuporous or demented conditions; that chronic uterine irritations are frequently associated with restless melancholia; that diseased centres of irritation in pulmonary tissues favor euphoria and excited mental states; and even that certain cardiac lesions result in depression and other valvular affections in excitement. All these apparent clinical relations demand further research.

In general, sympathetic Insanity presents hallucinations of all the senses, and corresponding delusions, expansive or depressed moods, convulsive seizures, muscular disorders, neuralgic and trophic disturbances, and some special sensory symptoms referable to the local disease.

Pathology.—It is necessary to invoke the aid of the nervous connections of the brain with all parts of the organism to understand the effects of local irritations on the higher nervous mechanism. It is only thus, through reflex nervous channels, that a local affection can give rise to general convulsions or to a convulsive and inco-

ordinate action of the higher cortical regions involved in mental disorder.

There is another pathogenesis possible in these cases, and that is through the intervention of the vasomotor system. In this way it is possible to account for the pathological anæmias and hyperæmias arising from reflex irritations, and favoring mental derangement.

Bearing these two modes of origin in mind, sympathetic Insanity has been classed among the vesaniæ, with lesions of the peripheral and vasomotor nervous system.

Differential Diagnosis.—Although the local disease of some internal organ or external part may impress a special character upon the delusions and hallucinations, still the differential diagnosis cannot be made by the psychic symptoms, but must be based on the recognition of the local irritation, and of its causative relation to the Insanity.

Thus, in a case related by Griesinger of a splinter in the eye causing mental disorder, or of neuralgic herpes, as already mentioned, or of middle-ear disease, the causative connection might be more patent than in hepatic abscess or other local affection of internal organs.

In many instances the differential diagnosis between sympathetic Insanity and other forms of mental disorder can only be made with approximate certainty upon the actual cure effected by the removal of the local irritation. If the expulsion of a tape-worm or the surgical removal of a uterine tumor or diseased adnexa results in prompt mental recovery, it is safe to pronounce the diagnosis of sympathetic Insanity.

Prognosis.—The prognosis is good, provided the local affection is not of a serious and incurable nature, and that the cure of the same is effected before chronicity of the mental disorder is established.

When the local irritation springs from functional disease of the special sense-organs, of the gastro-intestinal mucous membranes, or of the reproductive organs, the chance of relief from prompt treatment is good. Malignant local disease or organic affections of internal organs are of bad prognosis. Helminthiasis and foreign bodies admitting ready removal furnish instances of astonishingly prompt recovery.

Treatment.—The treatment must be directly based on the diagnosis of the local source of the disease, and efforts to remove the

same, either by therapeutic or surgical means. A thorough physical examination, including the organs of special sense, can alone furnish the etiological grounds of treatment, since there may be more than one source of local irritation in the same case. In the meantime, the symptomatic treatment of the psychosis can only proceed on such general principles as have already been described fully in the chapter on Treatment. The most brilliant success may follow surgical intervention, including otological, ophthalmological, or gynæcological operations, but the general condition of the patient must never fail to receive due treatment.

CHAPTER VII.

PSYCHO-TRAUMATIC INSANITY.

As a final type of Insanity to which definite etiological relations can be assigned is to be recognized mental aberration as the immediate result of mental shock. There are well-authenticated instances of persons who have been stricken dead by sudden emotion, while others have been suddenly deprived of their reason by a similar mental blow. Such an event is in the nature of a direct psychical trauma, and hence the term psycho-traumatic Insanity is employed to designate such cases.

Definition.—Psycho-traumatic Insanity is mental alienation from cerebral commotion, resulting from single and sudden mental shocks, or from repeated psychical traumata, and manifested by abrupt and stuporous termination of mental activities, by profound melancholic states, or by acute maniacal excitement.

Clinical Delineation.—The psychical effects of frightful railway accidents to those not physically injured may be hysterical seizures, neurotic sequels, or prolonged hypochondriacal states, and permanent traumatic neurasthenia may result, in a like manner, from the mental shock alone. These well-known facts illustrate in kind, though not in full degree, the damage done by sudden mental shocks. A mother sees her child killed in some horrid accident and passes directly into a state like melancholia attonita. There is a complete suspension of higher mental processes, and a painful limitation of consciousness, and a single terrifying conception pervades the mental sphere. Not only the psychic, but also the physical, functions are in partial abeyance. Respiration is superficial, circulation feeble, and general nutrition impaired. A still more common example is that of a child subjected to some severe fright, which develops a stuporous state. The child is literally frightened out of its senses, stands helpless and motionless, stares vacantly and gives no reply to questions, and there is inhibition of both motion and ideation.

This condition, resembling partially or fully primary dementia, may continue for weeks and may be attended by terrifying hallucinations or delusions and all the disturbances of vital functions found in ordinary psychoses. Sometimes there is an interval of some days between the mental shock and the distinct appearance of mental disorder. In still other cases the news of some great calamity results in acute melancholia. A still more exceptional cerebral commotion, ending in maniacal excitement, is caused by joyful emotion. This is illustrated by the case already mentioned of the man who drew a small fortune in a lottery, and, although previously healthy and temperate, became hilarious and then maniacal, simply from excess of emotion, which soon reached the uncontrollable stage.

Instances are not wanting of repeated psychical traumata, such as befall some persons who meet with a rapid series of tragic misfortunes in life. The types of mental disorder which result from such psychical shocks are not always in keeping with the nature of the emotional event. Maniacal attacks may follow sorrowful events or melancholic states excess of joy. The predominant mood of the emotions peculiar to the individual in health is more apt to influence the nature of the Insanity than the determining cause in this one regard.

Causes.—Those wide-spread causes which create calamity on a large scale and carry consternation to the hearts of men, are most apt to develop occasional cases of this type of Insanity. Thus, war, pestilence, famine, floods, conflagrations, shipwrecks, business crises, and other disasters are among the possible etiological factors.

The cause may be trivial and out of all proportion to the result effected. In children, especially, a simple reprimand may provoke suicidal Insanity, and disappointment in love may suddenly develop homicidal mania. The supposition is that in normally constituted persons no emotional shock is adequate to provoke mental disorder, and a certain predisposition is to be assumed, therefore, in cases of this kind. Most persons are vulnerable in some particular thing upon which their interest is strongly centred, and they may well bear emotional shocks in all other directions than that of their long-cherished desires. Most men are vulnerable in financial directions, and the severest blow is loss of property. In one instance treachery of a trusted friend, and in another failure in competition for collegiate honors, was the cause. Psychical trauma, then, may be as various in kind as the special susceptibilities of vulnerable individuals.

Stadia.—The initial stadium may be extremely brief, and it is

then essentially a stadium of vasomotor disturbance, as shown by pallor, or cerebral congestion, or profuse perspiration, and then may follow the stadium acutum of confusion and inhibition of ideas, or of stupor, or of profound melancholia. In other cases there may be an initial stadium of painful tension of mind, and insomnia for several days before the acute outbreak of maniacal symptoms.

Sometimes, by a supreme effort of will, the symptoms of the initial stadium are suppressed during some great emergency demanding action on the part of the sufferer, who then sinks into complete collapse when the immediate demand for action is at an end. In one instance the fright was imminent danger of life from fire, and the initial stadium of some weeks resembled the symptoms of a traumatic neurosis, and was followed by an acute maniacal stadium of some weeks, and then by a gradual stadium convalescens. In cases with hereditary taint, the stadium acutum may consist of alternations of excitement and depression. In psychical trauma from fright in young persons the stadium acutum is most often a state of stupor, with cataleptoid phases.

Symptoms.—When violent emotion is pent up, it may expend its deleterious force on nutrition or vital processes, and its escape through motor channels is a safeguard. The blanching of the hair is only one instance of changes produced by fright, and dystrophies of muscular or osseous tissues, even, may likewise result.

The sudden alteration of vital functions in stuporous mental disorder from fright is remarkable. The temperature is subnormal, the pulse is slowed, there is angioparesis and capillary stasis, the skin is cool, moist, and often has a bluish-gray tint, there is diminished peristalsis, feeble digestion, and superficial respiration.

The stupor may spring from inhibition of mental processes or intense preoccupation from a few frightful hallucinations. The delusions are apt to be of a terrifying nature, also, in such cases.

There is nothing special to note in the maniacal excitement, which may approach to acute delirious mania.

The melancholic symptoms are also apt to be acute, and may resemble in general the thunderstruck (attonita) variety.

In unfavorable cases the transition from stupor to terminal dementia may be direct. There is only a partial recollection, on recovery, of the stuporous stage, but memory may be good for the events of the melancholic stage. The cause of emotional shock and of the malady usually appears in distant retrospect after recovery, however prompt the latter may be.

Pathology.—The effects of profound emotion on circulation and nutrition are undeniable, and yet their pathogenesis is obscure. The deferred shock of purely mental origin, in which days elapse before the immediate results are manifest in collapse, is specially remarkable. The psychic trauma produces an interruption of the presidial influences of cerebral centres over circulatory and trophic functions. This severance of the relation of the higher level of the nervous system to the vital functions is one of the chief pathological features in psycho-traumatic Insanity; but there are other causative elements, probably involving the whole cerebro-spinal axis in erethismic conditions, as judged by the nervous manifestations. The vasomotor nervous system is evidently implicated largely in the pathological state in some cases, while in others the trophic functions suffer most, and the higher intellectual operations are more or less deranged in all instances. The pathogeny would seem to be exhaustive liberation of nervous energy from cortical emotional regions in certain instances, and in other cases the damage is such as is effected by violent pent-up emotion reacting banefully on organic functions.

Differential Diagnosis.—The history of fright serves to differentiate the stupor from that which follows epilepsy or other neuroses. The melancholia attonita from psychical shock can only be distinguished by the actual fact of emotional trauma from that due to other causes.

Occasionally the clinical symptoms of psycho-traumatic Insanity reflect the nature of the etiological factor throughout the entire course of the mental disorder, but this guide to diagnosis is usually wanting.

Relatively, more importance is to be attributed to a history of fright in the case of women and youthful persons than in that of men.

Sequential stupor is differentiated from psycho-traumatic stupor by the fact of the existence of a previous psychosis.

Prognosis.—The chance of mental recovery in youthful subjects are good, so far as the immediate attack is concerned, but the probability of relapse is also great.

Adults, who succumb to ordinary emotional shocks, have some hope of a good recovery, but they have given evidence of an innate vulnerability which will doubtless display itself on subsequent occasions. If the Insanity was only developed under very severe and unusual psychical trauma, the prognosis as to permanent recovery

is more hopeful. If epilepsy, as well as mental disorder, is simultaneously caused by the emotional shock, the prognosis is bad.

Treatment.—The treatment of psycho-traumatic Insanity is best conducted in the recumbent posture, and in isolation and in perfect quietude.

The vital functions are to be sustained by artificial warmth to cutaneous surfaces and to extremities, by gentle friction and hot baths, and by cardiac stimulants, and artificial alimentation with concentrated and predigested foods must be early undertaken.

The obstinate agrypnia is to be overcome by full hypodermatic doses of morphine. Should the original emotional shock still persist as a cause of psychalgia, opium in continued doses, which do not interfere with nutrition, is a justifiable remedy, and more efficient than any other in the alleviation of mental pain.

When the stadium acutum is over, whether it may have been stuporous or simply melancholic, there is need of active stimulation, tonics, electricity, and attempts at diversion and lively forms of activity to prevent secondary dementia.

Following convalescence, prophylactic measures to prevent subsequent exposure to mental shocks are of prime importance, and will determine often the difference between permanent recovery and a prompt recurrence of the malady, which is always to be feared in these cases. After mental convalescence a course of physical training and abstinence from responsible work is desirable for some months, and a judicious plan of travel or change of scene is often a wise means of prophylaxis against recurrence.

CHAPTER VIII.

STATES OF DEPRESSION.

Group: Cœnæsthetic Depression, Melancholia Simplex, Chronic Melancholia, Secondary Monomania with Depression.

Mental suffering, when commensurate with the exciting cause, is normal, but when it is disproportionate to the same it constitutes a pathological condition termed a state of mental depression.

These states of mental depression display certain clinical varieties, which it is necessary to now describe.

Section I.—Cœnæsthetic Depression.

There is a state of depression less pronounced than that of simple melancholia, for which some designation is needed. This depression is always dependent on alteration of the cœnæsthesis, and hence arises the propriety of the term cœnæsthetic depression.

Definition.—Cœnæsthetic depression is the mildest form of mental alienation, and consists in a painful resultant of the sum-total of the organic sensations, with a correlative gloom of mind, incapacitating the patient for the ordinary affairs of life.

Clinical Delineation.—The clinical features are not unlike the depression of the incubatory stage of infectious diseases. There is a general sense of malaise, and a restless anxiety, for which no cause can be assigned. So great is the misery that there is no longer desire or full capacity for social or business purposes, though, by a great effort of will, some of the duties of life may still be performed. Thought is laborious, but there is no formal disturbance of mental operations, and no delusions. The patient is alienated from his normal manner of being, and feels the estrangement, and instinctively seeks seclusion and rest.

Causes.—The essential cause is the change in the cœnæsthesis,

the perversion of the organic sympathies. This painful resultant of all the peripheral stimuli from every part of the organism is the basis of the general sense of distress, referable to no one point, and definable only as a general sense of misery, which is reflected as a persistent emotional gloom.

Stadia.—Cœnæsthetic depression has a pre-incubatory stadium, but the symptoms are so mild as to escape observation, and are merged in the ordinary slight departures from physical health, to which no special attention is directed. The stadium acutum is that which is recognized as cœnæsthetic depression, and may last for weeks or months. There is then a stadium convalescens which is often a prompt return to perfect health, and in many instances the patient is not recognized as having been insane.

Very frequently there is a termination in acute mania or melancholia, of which, in this event, the initial stadium is constituted by the cœnæsthetic depression.

Symptoms.—The symptoms may be briefly summarized as unaccountable emotional gloom, difficult and painful mental efforts, general indisposition and incapacity for customary occupations, and a desire for solitude and social aversion.

There is also anorexia, insomnia, and disturbances of nutrition and of circulation. Delusions do not appear, though suspicions and apprehensions may arise. There is often a certain insight on the part of the patient into the pathological nature of his sufferings, of which a clear self-description may be given.

Pathology.—This affection is not in itself fatal, and the fact of cerebral lesions correlative of symptoms cannot be claimed to exist. The only available hypothesis is that of circulatory or nutritive lesions of a functional nature. This type is admittedly among those for which no definite etiological or pathological condition can be ascribed.

Differential Diagnosis.—The difficulty is not that of confusion of this type of alienation with other forms of mental disorder, but of failure to differentiate cœnæsthetic depression from simple forms of physical illness. The mental indisposition of physical disease is justified by present circumstances, which may be detected by physical examination. When no such cause of depression of mind can be found, and the despondency still persists, the diagnosis can be made, and is of importance, since prompt treatment may avert a more serious psychosis.

Prognosis.—This is the most curable of all types of alienation.

The vast majority of all cases recover, and many are not diagnosed until subsequent Insanity recalls the fact of previous despondency on one or two occasions.

The unfavorable prognosis is in cases in which the cœnæsthetic depression forms the initial stadium of some other form of Insanity.

Treatment.—All that is necessary is isolation, rest from active and responsible labor, hygienic and dietetic treatment, and occasionally an after-cure of travel or climatic change for a few weeks. Prophylaxis may demand a change of laborious or sedentary occupation, or some change in personal environment, should the latter contain permanent deleterious influences.

Section II.—Melancholia Simplex.

This is the classical melancholia of all ancient and modern writers, and presents in itself some minor symptomatological differences, according to the age, sex, and temperament of the patient, but the type will remain unchanged to the end of time.

It is not well to divide melancholia in accordance with simple degrees of depression involving delusional or sensorial perversions, but when the painful inhibition becomes so great that there is an actual arrest of psychical processes, the advent of melancholic stupor is to be recognized as a clinical division.

Definition.—Melancholia is a state of mental depression characterized by permanent gloom, impaired attention, retarded thought-rate, self-limitation of consciousness, sensorial perversions, suspicions and delusions, vascular hypertony, diminished secretions, impaired nutrition, general loss of weight, and agrypnia.

Clinical Delineation.—The clinical features of melancholia vary not alone with the degree of mental depression. The actual disorder of intellect and the modes of its manifestations afford the chief lines of clinical variety. Such is ordinarily the self-concentration and reticence of patients that it is difficult to know that delusions do not exist in many patients, who manifest profound depression alone. This pervading distress and weight of sorrow shown in looks, words, and actions or suicidal attempts, is the core of the malady in some cases, but there are few instances in which loss of self-confidence, vague dreads, and active fears of coming evils do not also exist, and lead to suspicions and delusions, which are not expressed, though secretly entertained.

A great variety of names have been applied to the clinical phases

of the disease. If the suicidal impulses are persistent, the term *suicidal* melancholia is used. If the delusions relate to religion, the unpardonable sin, and the need of self-crucifixion, *religious* melancholia is mentioned. Should exaggerated self-introspection and false conceptions of the state of internal organs abound and influence the conduct of the patient, *hypochondriacal* melancholia is recognized. Demoniacal possession and the belief of change into some animal form, known as *lycanthropic* melancholia, was formerly very frequent.

A common feature is passive or even obstinate resistance to everything done for the patient, and this has been called *resistive* melancholia.

Nostalgia almost merits a place as a separate type, having occurred in epidemic form in armies in foreign countries. The homesick patient emaciates and pines away, has visions of home, becomes desperate, commits suicide, incendiarism, or homicide, or simply dies in a depressed and marasmic state.

Melancholia agitata is a type initiated by active delusions expressed through motor channels, but when the first force of the painful false beliefs is spent, the motions have become automatic and remain for years. This type is often encountered at the climacteric involution. The patient moves about in a restless and purposeless manner, bites her nails, pulls her hair out, rubs herself sore in spots, moans and groans, and automatically repeats bits of delusions a thousand times a day.

Melancholic frenzy is the counterpart of maniacal furor. It arises at the full height of the melancholic distress, and has an explosive violence of uncontrolled actions, which may be destructive or homicidal.

Chronic melancholia is a distinct type, secondary to acute melancholia. After a year or more of the acute state the patient passes into the chronic state of melancholia, which may last for years, or indefinitely, without the appearance of dementia. The acuteness of the mental suffering no longer exists, but the delusions and hallucination persist, and the fundamental emotional tone is that of depression. The inhibition of thought and action is, in a measure, removed, and the patient undergoes a partial readjustment to the environment, and engages, to some limited degree, in light occupation. This type is well known to those familiar with hospital inmates.

Melancholia attonita is a type marked by extreme concentration

of attention upon a few painful hallucinations or delusions, with greatly impaired attention and consciousness for surrounding objects. The association of ideas is so inhibited, and the paucity of impressions is such that a positive stupor is sometimes present, and the attack is then termed "melancholia cum stupore." Amnesia for the attack is only partial in most cases, showing that the stupor is often more apparent than real.

Secondary monomania with depression is ordinarily a sequel of acute melancholia. The patient retains a certain prevailing mood of melancholy and some narrow range of delusions of a depressing nature, but talks connectedly and reasonably on most subjects.

The delusions are systematized and defended with a certain show of reason, and in some measure control the conduct of the patient. Patients remain in secondary monomania a decade or a score of years before passing into terminal dementia. These monomaniacs are interesting types, retaining often considerable mental vigor, but are absolutely without insight into their own mental derangement.

Causes.—The forms of depression for which etiological and pathological conditions could be definitely assigned have been already considered. There are many cases for which no definite agencies, but rather a concatenation of unfavorable circumstances, can be deemed causative. Heredity, as the cause of causes, is always to be thought of in the absence of other ascribable sources of melancholia.

States of depression increase with age, and the greatest number of chronic cases are found from forty-five to fifty-five years. Sex has numerical relations in favor of men. The average ratio of cases of acute melancholia is, by the last census, 25.1 per 1,000 of all cases of Insanity, but for females it is 26.4. For chronic melancholia the average ratio is 130.2 per 1,000 of all cases of Insanity, but for females it is 137.8.

Stadia.—Cœnæsthetic depression has a single stadium, which can be distinctly recognized and then passes into acute mania or melancholia, or into a stadium convalescens, as before mentioned.

Melancholia has an initial stadium of weeks or months of failure of vital energy, disturbed sleep and digestion, lack of interest in customary calling, and then an acute stadium of some months of symptoms already mentioned, and a stadium convalescens of some weeks, or a termination in one of the secondary states of depression above named, or in terminal dementia.

Chronic melancholia is to be regarded as a terminal stadium of

acute melancholia, and the same may be said of secondary monomania with depression.

In severe cases of acute melancholia there is a stadium debilitatis between the stadium acutum and the stadium dementiæ. In melancholia attonita the stadium acutum may be essentially a stadium stuporosum.

Symptoms.—The ground-tone of emotional gloom, the arrest of the free flow of ideas, the persistence of a few painful thoughts, the loss of interest in everything, doubts, fears, and suspicions, desperate or suicidal feelings, and frightful delusions are common mental symptoms. The somatic phenomena are disordered digestion, obstipation from diminished peristalsis, general loss of weight, dry skin, increased intra-arterial blood-pressure, slowed circulation, subnormal temperature, lessened secretions and excretions, changes in blood and urine, relaxed musculature and flexure of body and extremities, agrypnia, superficial respiration, and altered metabolism.

The suicidal impulses may spring from delusions or from despondency alone. Exaggerated hypochondriacal ideas may dominate the conduct for years. Religious delusions may prompt to self-mutilation or suicide.

Changes in personal identity are rare, but occasionally appear in the final stage.

The resistive tendency springs chiefly from vague fears of the environment, which seems to encroach upon the patient, who struggles to repel the apparent invasion of inimical forces from all sides.

The nostalgic patient has hallucinations of home and kindred, sees his native hills rise before him, and is engrossed with the one idea of home, and may be violent to those restraining his return to his native land.

The motor expressions of intense mental agony may take violent and destructive forms, as in melancholic frenzy, or a more automatic restlessness, as in melancholia agitata, which soon ceases to be accompanied by much mental suffering In chronic melancholia a morbid delight may come to be taken in delusions primarily painful.

There is often a wild, staring look in melancholia attonita, with terrifying hallucinations, but, as stupor becomes more decided, the face may be perfectly blank. Cataleptoid and tetanoid states are occasionally present, with abeyance of all the vital functions, neglect of the wants of nature, and absolute lack of spontaneity of movement.

Pathology.—Hypotheses to account for the entire symptom-complex of melancholia are lowered nerve-tension, vasomotor anomalies,

nutritional defect in cortical centres, and toxæmic influences. The whole economy is involved, and the cause must be universal in effects, and local lesions would not account for the symptoms. No theories thus far advanced offer a satisfactory pathogeny of all the clinical manifestations.

Differential Diagnosis.—Melancholia is to be differentiated from the normal depression of mind from adequate causes of grief. It must be distinguished from all forms of sequential stupor and from terminal types of mental enfeeblement. The physiognomy, the history of prevailing despondency, and the clinical course of the melancholia, as well as the nature of the delusions, usually suffice; but stuporous melancholia and dementia cannot always be differentiated without a knowledge of the antecedent events in the case. Hypochondriacal melancholia in the beginning is to be differentiated from the hypochondriacal stage of certain cases of general paresis, in which there is nearly always an element of mental weakness, which is diagnostic, even in the absence of physical symptoms. The history alone serves to diagnosticate melancholia from the melancholic phase of circular Insanity, and in the primary cycle of the latter there is no means of distinction, and this possibility is to be borne in mind in prognosis. Melancholia attonita is to be diagnosed from primary dementia, in which there is no painful emotional mood previous to the attack, and melancholia agitata must be distinguished from mania with anxious delusions.

Melancholic frenzy and maniacal furor are only to be distinguished by the type of mental disorder from which they spring.

Prognosis.—Melancholia in young persons usually recovers. It is a more serious disease in those past middle life, and as the expression of senile involution it has an unfavorable prognosis. The prognosis is bad when treatment has been delayed for many months.

Melancholia agitata points to a chronic tendency and probable incurability.

Melancholia attonita often recovers, while hypochondriacal melancholia is usually chronic in course, and most often terminates in terminal dementia. A large number of cases pass into chronic melancholia or secondary monomania, with depression, and these are incurable types. Other cases terminate in terminal dementia. Not a few of the recoveries are defective, with ethical deterioration or general diminution of intellectual force.

Death results from suicide, general exhaustion of vital forces,

from trophic defects and emaciation, or from phthisis pulmonalis, or chronic gastro-intestinal disorder.

Treatment.—Isolation from sources of annoyance and danger in an institution or in private quarters, under the constant care of trained nurses, is essential in fully developed cases of melancholia. Rest, watchful supervision to prevent self-injury, forced alimentation and artificial aids to digestion, hypnotics when food, fresh air, and baths fail to procure sleep, are the chief indications. It is often well to relieve the bowels by laxatives and enemas when dietetic means fail, and to stimulate the skin by Turkish baths and massage. Gentle exercise in the open air is necessary after the more acute exhaustion has been overcome. Roborant treatment and general electrization, and stimulants and tonics must be employed at the close of the acute stadium to prevent transition to dementia. Occupation and diversions are also of service at this critical stage, and sometimes a temporary removal to new surroundings is of service at this time.

Forced exercises and long hours of sleep are necessary. A generous diet, gastric lavage, intestinal antisepsis, predigested foods, and forced feeding are often a part of the treatment in patients with foul secretions and refusal of food. Opium relieves mental suffering better than any other known drug. Chloral is the surest drug to procure sleep, but must be used sparingly in melancholiacs. Motor agitation, if extreme, is met with hyoscin subcutaneously administered. The whole life is to be carefully regulated by medical advice for some months after convalescence.

CHAPTER IX.

STATES OF MENTAL EXALTATION.

Group: Cœnæsthetic Exaltation, Mania, Mania Transitoria, Mania Chronica, Secondary Monomania with Exaltation.

Section I.—Cœnæsthetic Exaltation.

When the resultant of all the impressions from the peripheral distribution of the nervous system is pleasurable, there is developed an expansive cœnæsthesis, which may exceed physiological limits, and the mildest pathological state of exaltation then arises and is here termed cœnæsthetic exaltation. It is of much importance to name and recognize this mildest maniacal state, which may run an independent course to recovery or constitute the initial stadium of a more serious psychosis.

Definition.—Cœnæsthetic exaltation is the mildest maniacal type of alienation, arising from a pathologically exalted cœnæsthesis, and clinically manifested in expansive ideas and emotions, hyperæsthesia of the special senses, heightened association of ideas and thought-rate, hypermnesia, quickened vital functions, and motor excitement of a perfectly co-ordinated kind shown in restless activity of conduct.

Clinical Delineation.—The clinical features are often not recognized as those of mental disease, though the change in conduct does not escape observation. The patient is unusually social and may attract attention by extravagant entertainment of friends; is full of new business schemes, or, if a woman, of plans for the conversion of mankind; runs about and talks to acquaintances, as well as to friends, of the new projects; finds no time for actual work and brings nothing to pass; changes from one plan to another; is not incoherent in thought or conduct, but ill-directed in immature efforts of all kinds. The patient is a source of amusing surprise to friends, showing unusual quickness of thought and action, witty in speech,

full of reasonable explanations for unusual conduct, laughing, joking, and bustling about, hardly taking time for meals, and sleeping less than usual; sometimes meeting good fortune in rash business ventures, but more often failure; often exhibiting erotic tendencies and indiscriminate gallantry, and tending to social dissipation and alcoholic excess.

The circulation is active, the countenance has unusual color, there is increased muscular tone and heightened co-ordination, the appetite is good, but sleep is diminished, the secretions and excretions are abundant, general nutrition is not disturbed, but the great activity leads to a slight loss of weight.

Causes.—The expansive cœnæsthesis, the exaltation of organic consciousness, is the necessary accompaniment, if not the prime cause, of the full sympathetic flow of cerebral energy, which manifests itself in pleasurable emotions, lively ideas, and increased sense of mental force and freedom, and the other symptoms of cœnæsthetic exaltation.

The absolute or final causes of states of pain or of pleasure are as yet unknown, either for physiological or pathological degrees of enjoyment or suffering.

Stadia.—The pre-incubatory signs are so slight as to escape observation, and there is only an acute stadium of weeks' or months' duration, ordinarily recognized by friends and readily diagnosed by an expert in mental diseases. There then follows a stadium convalescens, ending, in a few weeks, in full recovery.

In some cases there is a transition into acute mania, or some other acute psychosis. A termination in dementia does not occur.

Symptoms.—The emotional expansion proceeds from organic sources and reflex cerebral sympathy, and not from spontaneous liberation of cortical energy, as in some other forms of mental disorder. The increased flow of ideas never escapes the rate of possible attention, and there is a due association of ideas and no incoherence of speech.

Delusions and hallucinations do not arise. The loss of inhibition is evident in the rapid succession of new ideas and motives of conduct, and the inability to persistently follow out any one course of action. There is, therefore, a distinct impairment of professional or business capacity, and some excuses are found for a neglect of regular occupation. Consciousness is not seriously involved, but there is no self-consciousness of the real mental trouble. Remonstrance with the patient often provokes great emotional reaction,

and the loss of self-control is again shown in sudden displays of violent anger, or uncontrolled laughter, or crying in women.

The eroticism may be decided and lead to violation of conventional restraints of conduct, both in women and men. Loss of sleep is sometimes great, but the effects are seldom shown in the physical appearance of the patient, and the loss of flesh is due to excess of activity rather than to defect of nutrition.

The social feelings predominate, but anti-social emotions also appear, and the optimistic mood then gives way to vicious conduct toward opponents. It is possible that the patient may be dangerous to himself or others through intensity of feeling and loss of self-control.

Pathology.—It is admitted that the brain is in nervous connection and in intimate sympathy with all parts of the organism, but it is not known how changes in cœnæsthetic consciousness and in organic sympathies directly derange the higher co-ordination of intellectual processes. The clinical fact is undeniable, but the pathological explanation cannot be made satisfactorily.

Differential Diagnosis.—The diagnosis is to be made from temporary states of expansive feelings due to adequate emotional causes. The question of individual temperament must also be borne in mind. The natural buoyancy of spirits of a sanguine temperament might be positively abnormal if appearing in a person of an opposite temperament.

The differential diagnosis must be made from the expansion of feeling which marks the initial stadium of toxic Insanity, and also from the exaltation of the first stage of general paresis. The etiology of the case, and the motor symptoms, including superficial and deep reflexes, usually suffice in these instances for the differentiation.

Prognosis.—Recovery follows in most cases, if the diagnosis is made in time to institute treatment and exercise prophylaxis against a more severe psychosis. If neglected, the result is apt to be acute mania, since the incessant activity is itself a cause of exhaustion. Generally speaking, the prognosis is more favorable in those under middle age, as in those advanced in life this type is often the precursor of more serious forms of mental disorder.

Treatment.—Isolation in an institution becomes necessary if the patient is not amenable to advice and persists in exhausting activity of body and mind.

Regularity in habits, long hours of sleep, removal of heavy responsibility, either of a social or business nature, a generous and specially

adapted diet, hydrotherapy judiciously employed, daily exercise short of fatigue, and some occupation rather than idleness, are among the curative measures.

The bowels are to be regulated by dietetic means, and sleep is to be procured every other night by a full hypnotic, if baths and other expedients fail to relieve the insomnia, which is always a dangerous symptom.

The greatest skill is required in the psychotherapeutic measures employed to divert the patient from injudicious social or financial plans. If the patient is not properly managed, unsuitable marriage, disastrous investment of money, and unfortunate business alliances may be made. Travel with a judicious companion is sometimes advisable when both friends and patient oppose institutional treatment.

Separation from customary surroundings and influences is often necessary.

The whole life should be carefully regulated for some months following convalescence.

Section II.—Mania.

The term mania has been vaguely applied by some writers to all active forms of Insanity; but it now signifies a distinct type of mental disorder, the opposite of melancholia, running an acute and definite course, and having well-defined symptoms. It occurs most frequently in the spring and early summer, and is more common among colored than white persons, and among females than males. Acute mania has an average ratio of 192.1 per 1,000 of all cases of Insanity in institutions for the insane in the United States. Among women this ratio is 199.1 for white and 246.2 for colored persons, and for colored males it is 273.0. The average ratio of cases of chronic mania is 236.3 per 1,000 of all cases of Insanity, and in females it is 248.5. Mania is therefore the most common form of Insanity in institutions for the insane, and this is also undoubtedly true in the community at large. The maximum number of cases occurs in the quinquennium thirty to thirty-five years for acute mania, and for chronic mania thirty-five to forty years in males and forty to forty-five years in females.

Definition.—Mania is an active type of mental disorder, attended by loss of the higher forms of inhibition of thought and action, by increased flow of ideas, quickened rate of mental processes, a tumultuous influx of sensorial impressions, expansive and pleasurable emo-

tions, motor excitement, boisterous actions, insomnia, increased secretions and excretions, and a general loss of bodily weight.

Clinical Delineation.—The clinical picture varies somewhat according to the age, sex, and temperament of the patient, but certain features are always prominent. The sense of well-being, the exaltation of feeling, the rapid flight of ideas, and heightened muscular activity are seldom absent. The general expansion of feeling arises from the agreeable change in cœnæsthetic consciousness, and the succession of ideas, though in accordance with association by similarity, may be more swift than utterance, and hence the discourse is at times disjointed. All the senses are in a hyperæsthetic state, and the crowds of new impressions are provocative of changeful ideation, and the lesion of attention is due to this forced displacement in consciousness of one idea by another.

The muscular activity is at first psychomotor, but at the height of the maniacal access it becomes reflex and automatic, and absolutely beyond the control of the patient.

The mimetic muscles in reflex response to swiftly changing emotions give a surprising play of facial expressions, as the patient by turns engages in laughter, weeping, prayer, or vituperation. The agreeable moods predominate, but explosive anger is almost always present.

The motor excitement is irrepressible, and under manual control by nurses the muscles still continue to contract, as if for purposive movements, which may be repressed but not prevented, so far as the correlative discharge of nerve-force is concerned.

The patient first acts in accordance with illusive perceptions and hallucinatory concepts, but at the height of the sensorial perversion and confusion of ideas, action becomes incoherent as well as speech. The patient then cannot even dress himself, mistakes objects and their uses, attempts to put his legs into the arms of his coat, and takes his trousers for a jacket, overturns and misplaces things, not alone out of mischief, but from misconception of their real nature. These mistakes in identity extend to persons as well as things. Strangers are greeted as members of the family, or near relatives are denounced as enemies.

In occasional instances the patient ceases to recognize himself, but permanent changes in personal identity pertain rather to chronic mania.

The delusive concepts are too fleeting ordinarily to take the form of permanent false beliefs, but the repetition of the same illusions

sometimes gives rise to certain sensorial delusions persisting for some time. The play of phantasy is extraordinary, and finally all distinction between the real and the imaginary world is broken down, and the patient reacts extravagantly to the fantastic environment of his own creation. In the milder moods the patient appears as if in a waking dream, or like a child at play, to whom the fancies of the moment are the only realities.

The appetites and instincts are active, sexual passion is exaggerated, and destructive or violent impulses are common. This is a delineation of ordinary acute mania, but there are other types of mental exaltation to be here described in brief outline.

Mania transitoria is an ephemeral aberration of mind of the exalted type, and of extremely sudden evolution.

After brief symptoms of rush of blood to the head, suffused countenance, and vertigo or headache, there is an outbreak of violent maniacal excitement, intense hallucinations, turbulent and destructive actions, and often incendiary, suicidal, or homicidal deeds. There is great confusion of ideas and partial eclipse of consciousness during the transitory mania, for which there is ordinarily no recollection on recovery, though a vague memory of parts of the access may exist.

The whole attack varies in duration from a quarter of an hour to forty-eight hours, and it terminates by long and profound sleep. It is of great juridical interest, since responsibility cannot exist when consciousness is in abeyance, and of its nature something more will be said under other headings in this chapter.

Chronic mania is another state of exaltation, ordinarily a sequel of acute mania, and lasting for years, and constituting an average ratio of 236.3 per 1,000 of all hospital cases of Insanity in the United States. It is not to be confused with demented or secondary monomaniacal terminations of the psychoses, but it is distinctly maniacal throughout, though it may, in the course of years, end in terminal dementia. The general disturbance of vital functions, of respiration, circulation, and digestion, in a measure ceases, but the psychic symptoms of mania remain. The patient is noisy, destructive, and has expansive feelings, and retains hallucinations and delusions, is difficult of control, and sleeps at irregular intervals, diurnal rather than nocturnal, is cunning and mischievous, and easily provoked to acute exacerbations of excitement, and is usually a source of much boisterous disturbance in the wards of hospitals for the insane.

Secondary monomania with exaltation is another terminal type to be sketched, and to be differentiated from dementia and chronic

mania. After an acute psychosis, usually of the maniacal order, the patient is left with a few expansive delusions, which become systematized, with such show of logic as enfeebled reasoning powers permit, and on other subjects there is coherence of conversation. There is exaltation of feeling, and the delusions show the exaggeration of self-importance. There is no longer the intensity of emotions of acute cases, but resistance to the special delusions provokes anger. In some cases there has been a change of identity, but this implies a degree of mental enfeeblement which does not exist in the majority of cases.

Patients may believe that they are heirs to large estates, that they are great inventors, that they have wide political influence, that they have a divine mission on earth, that they are married to titled persons, or that they are to become the benefactors and social reformers of mankind. The mental enfeeblement is not of such a degree as to prevent reasoning on ordinary topics, and conformity to the ordinary ways of life, and a certain rational adjustment of conduct to the personal environment.

Patients do not belong to this type of mental disorder, but to a lower grade of mental enfeeblement, when they have lost their identity completely, and decorate themselves with bits of paper or rags, and automatically repeat that they are kings or queens, and have no conception of their environment. These are terminal dements, with automatic remnants of delusions, and they may previously have been cases of the type under consideration. It is desirable to distinguish more definitely these consecutive forms of mental alienation, which have been so promiscuously grouped under chronic mania and dementia, and the writer first began this task about ten years ago in an article written for Wood's "Reference Handbook of the Medical Sciences."

Causes.—Hereditary predisposition can alone be mentioned in a causative relation to manias other than those for which definite etiological and pathological factors have already been given. That there is such a type as idiopathic mania arising without definite assignable causes other than predisposition is undoubtedly true. The possible contributing causes in some cases are very numerous, while in other instances absolutely no unusual or trying circumstances can be ascertained.

Stadia.—Ordinary acute mania has an initial stadium of some weeks, with headache, insomnia, a general sense of ill-being, and irritable and depressed moods. This stadium may be, on the other

hand, one of cœnæsthetic exaltation and expansive feelings. Then follows directly the stadium acutum, with emotional and intellectual disturbance, motor excitement, illusions and delusions, and the whole train of acute maniacal symptoms. Then succeeds, ordinarily, a stadium debilitatis, which is one of complete exhaustion of mind and body, often approaching a stuporous nature, and, finally, there is a stadium convalescens, or a stadium dementiæ in incurable cases. The stadium acutum has an average duration of from three to six months, the stadium debilitatis lasts from two to six weeks, and the stadium convalescens extends over several months to complete recovery, and the stadium dementiæ continues to the end of life.

Mania transitoria has a single acute stadium. There are incubatory symptoms, doubtless, but they are not sufficiently well-recognized to constitute an initial stadium. The acute stadium lasts from fifteen minutes to forty-eight hours, and then follow many hours of deep sleep, which is the equivalent of a stadium debilitatis, and directly there ensues a stadium convalescens of some weeks, or even months, before perfect restitution of health.

Chronic mania itself constitutes a terminal stadium of acute mania, and it may last for an indefinite period of years. Secondary monomania, with exaltation, is also a terminal stadium of the acute psychoses, more especially of mania, and its duration may be for years or for the remainder of life. The absolute termination, however, of all consecutive types of mental disorder is dementia, provided life is not abbreviated by intercurrent disease.

Symptoms.—The expansive emotions, heightened thought-rate, exaggeration of ideas, loss of control of thoughts and actions, increased muscular activity, illusions of special senses, sensorial delusions, erotic excitement, and sleeplessness, are the most prominent symptoms of acute mania. The motor excitement is shown in constant walking, talking, and gesticulating. When the flight of ideas is too rapid for utterance, there exists incoherence of speech. There ceases to be any parallel between ideation and feeling, when, through intense cortical irritation, there arise emotional outbursts of pathological force. The impulsive tendencies are irresistible and lead to destruction of property or personal violence. The sense of fatigue does not exist, and the patient puts forth astonishing exertions. Superficial and deep reflexes are usually increased. The pupils are wider than normal in most cases, the turgor vitalis is well-marked, the skin moist, the appetite often excessive, and still there is loss of weight. Salivation is often present, the temperature rises during

violent exertions and sinks to a subnormal degree subsequently, obstipation or diarrhœa is frequent, and vasoparetic states are common.

Hallucinations are not prominent symptoms, but exceptionally they abound to such an extent that the attack is termed mania hallucinatoria.

In mania transitoria there are the most turbulent symptoms, shouting, singing, incoherent talking, violent and destructive actions, furious emotions, ungovernable rage, and obscured consciousness. The patient then sinks exhausted into profound sleep, and awakens into a clear state of consciousness.

Chronic mania differs in symptomatology from acute mania in that the active bodily disorder largely disappears, and the patient eats well and may have the outward appearance of fair physical condition. Most of the psychic symptoms remain, and the illusions and delusions are more constant, and motor excitement continues to manifest itself in violent or destructive acts. Secondary monomania with exaltation has a narrow circle of false beliefs, and exaggeration of personal importance, with occasionally a few fixed sensorial perversions.

The somatic condition approximates that of ordinary health again, and sleep, appetite, and circulation seem to be about normal. All the mental faculties are, in fact, impaired, but the loss of balance of mind is not very apparent, except in the direction of the special delusions. Upon provocation, the weakened control is revealed by temporary outbreaks of wild vituperation, or delusional anger, directed against imaginary foes, and the enormous conceit of the patient appears on such occasions as he asserts his supposed rights. There is a species of physical accommodation to the new order of things, and the patients may have active vegetative functions and the semblance of fair health. The powers of resistance are always reduced in these chronic types of Insanity, as shown by the readiness with which they succumb to acute intercurrent diseases. There is not infrequently an increase of weight and fatty degenerations of internal organs. Permanent angioparetic states are also common.

Pathology.—The maniacal types with definite pathological lesions have already been described. It must be admitted that, for the remaining forms here in question, there is no assignable pathology other than vasomotor or nutritional disturbances of cerebral tissues.

It has been surmised that high tension of nerve-force is the functional correlative of the maniacal manifestations, and this is

as plausible as any other theory to be offered in pathological explanation.

Certainly, no claim of a definite morbid anatomy in these cases of mania can be sustained in the present state of knowledge.

Mania transitoria is presumably of epileptic origin in the majority of the cases. The whole symptom-complex is in the nature of a violent cortical discharge of force.

That pathological conditions arising in puerperio and from alcoholic excess are to be considered in this connection admits of no doubt.

In the history of some cases none of the above agencies are to be traced, and the pathogenesis is very obscure. Meynert advocated the vasomotor origin of mania transitoria, and, of late, microbic infection has been suggested.

Chronic mania and secondary monomania with exaltation, being consecutive forms, can only be said to have the pathology of the primary psychoses from which they spring in the first instance. It is questionable to what extent any correlation exists in these types between the mental symptoms and such chronic and gradual changes in cerebral tissues or meningeal membranes as are known to occur in the course of a series of years.

Differential Diagnosis.—Mania is to be differentiated from the early stage of general paresis. In the latter the physical symptoms, and the display of beginning mental weakness, and the extravagant feelings and delusions, are the chief points of distinction; but they may also, in a less characteristic way, be present in mania. The inter-differential diagnosis can in certain cases only be made after a lapse of some weeks, or even months. Simple mania is to be distinguished from the maniacal phase of periodical Insanity by the history of the case. When mania forms the first part of the first cycle of periodical Insanity, it cannot be differentiated from simple mania.

Mania is to be distinguished from the intoxication of drugs or alcohol, and from the delirium of inflammatory diseases, and of all forms of hyperpyrexia.

Mania transitoria is not to be easily mistaken for any other type of Insanity, but it may be confused with the delirium of fevers. In the latter the motor agitation and hallucinatory excitement are never so severe as in mania transitoria.

Chronic mania is to be distinguished from terminal dementia with automatic motions and occasional exacerbations of excitement.

The mental impairment is not so great in chronic mania, and there is a much wider range of symptoms of a noisy and destructive kind, with expansive ideas correspondent to actual emotions, which are wanting in terminal dementia. Secondary monomania with exaltation is to be distinguished from terminal dementia with meaningless repetition of set phrases, which may suggest fixed ideas of grandeur. The secondary monomaniac feels and believes in his own greatness, and can assign reasons for his false beliefs, while the dement has no feeling about the matter, and no belief and no understanding of the full meaning of his claims.

Prognosis.—Mania is one of the most curable of all forms of Insanity. If treated within the first six weeks, seventy-five per cent. of cases will recover; after six months, fifty per cent. of recoveries may be expected, and then there is a rapid fall in the ratio of cures to the end of the first year, when ten per cent. of recoveries may result from treatment. The young recover better than the old, and in women the chances are a little more favorable than in men.

Mania transitoria has a good prognosis, and recovery may be expected if no fatal accident be met with during the attack, which per se does not lead to death by exhaustion. Mental recovery, in very rare instances, may be defective, but there is ordinarily apparent restoration to reason within twenty-four hours.

Chronic mania is practically an incurable type of mental disorder. The patient may go twenty years without passing into terminal dementia, which is the termination, if life be sufficiently prolonged.

Secondary monomania with exaltation is also a hopeless form of alienation, and also ends in dementia in the course of time. The expectation of life is considerably shortened by these and all other terminal forms of Insanity.

As to the ordinary type of mania, there is a mortality of about fourteen per cent. of cases attacked. The chances of life are very much better in the young than in those past fifty years of age. After this age the mortality-rate in mania increases very rapidly. It is somewhat less in women than in men.

The causes of death are nervous exhaustion, gastro-intestinal disorders, suicides and accidents, heart-failure, pulmonary diseases, renal and intercurrent disorders.

Treatment.—Institutional care is necessary in acute mania for the safety of the patient and of others.

If exhaustion is imminent, the recumbent posture is to be retained. In vigorous cases out-door exercise and light occupation is

desirable. The patient puts forth fewer efforts in the freedom of a walk than when secluded. The motor excitement may be quieted in extreme cases by hyoscin or duboisine, or the bromides may quiet the general agitation. Warm baths and chloral are the most efficient means of procuring sleep.

Graduated baths, with cold to the head in hyperacute cases, are specially effective.

Generous alimentation is of the utmost importance throughout the entire attack. Anorexia is no contra-indication to forced feeding if there is loss of weight, and neglect of food from over-excitement.

Stimulants are only to be used to sustain cardiac action.

Tonics, massage, and electricity are useful after the stadium acutum in the stadium debilitatis.

Psychotherapy is in order in the convalescent stage, and change of climate and travel are then of occasional use. Gardening and light farm-work, and prolonged exercise in the open air daily for some months, is one of the surest means of hardening the cure. An after-cure is necessary to avoid a relapse in recoveries from a second attack. This is of special importance, since recovery from a third attack is rare.

Mania transitoria is so brief that only symptomatic treatment is possible. Probably a full dose of hyoscin and morphine, if given at the very onset, might be of service.

Hyperpyrexia is to be met with the cold pack, or with a cool bath, with cold to the head.

The patient is to be protected from injury by constant restraint by others or by the restraining sheet.

Chronic mania presents only indications for the feeding, clothing, safe-keeping, occupying, and diverting of the patient. In prolonged excitement counter-irritations to the back of the neck are of some avail. In cases constantly destructive and violent, a seton in the back of the neck is sometimes followed by good results. Secondary monomania with exaltation can be cared for out of an institution, provided there are no dangerous impulses, and the teaching of some manual occupation is most desirable. The object is to divert the patient, to establish regular habits of life, and, if possible, of usefulness, and to provide comfortable quarters, regular sleep, and proper clothing. If carefully managed, this class of patients may be rendered productive, and, in part, self-supporting. In all these chronic cases frequent physical examinations are necessary to detect the insidious course of pulmonary, renal, and cardiac affections.

The possibility of cure is shown by an occasional recovery in these consecutive forms at the end of ten or fifteen years. The continuous use of sedatives and hypnotics in these chronic cases is to be condemned. Bathing and occupation, or diversion in the open air to the point of fatigue, most always suffice, together with a generous diet, to procure sleep and reasonable quietude.

CHAPTER X.

STATES OF MENTAL WEAKNESS.

Group: Primary Mental Enfeeblement, Terminal Dementia.

Section I.—Primary Mental Enfeeblement.

There is a primary state of mental weakness involving the whole intellect and in some cases progressing to dementia, independent of the deficiencies of early life or of the senile decay of mind. This primary mental enfeeblement has neither the cerebral lesions of paretic or alcoholic cases, nor the somatic symptoms of those forms, and it differs decidedly from acute primary dementia, and it is therefore recognized as a special type, though it is admittedly a rare mode of alienation.

Definition.—Primary mental enfeeblement is a progressive state of weakness of intellect shown in loss of memory, impaired attention, confusion of ideas, inability to pursue customary avocations, and a general deterioration of mind.

Clinical Delineation.—After prolonged stress of mind or body, there is first absent-mindedness, a disinclination to usual labors, forgetfulness of certain duties, or mistakes in the performance of the same, a desire for quietude and repose, and a loss of interest in the affairs of life. There is no active disorder of physical functions, but sleep is not refreshing, and there is indifference to food and sexual indulgence, and some gradual impairment of nutrition.

There is no decided tone of feeling, either of expansion or depression, but there is often a consciousness of a certain general indisposition. If warning is taken and treatment instituted at this stage, there may be restoration to health; otherwise, there is further progression of the mental malady. The errors in business are more glaring, and the amnesia is so great that mercantile or professional occupations can no longer be pursued. Confusion of dates, of events,

and of identity appears, and the weakness of intellect becomes apparent to all. The patient finally is totally incapacitated for any intellectual pursuit, is simply capable of self-care, and of some simple mechanical duty. This stage is reached at the end of six or eight months. Recovery is still possible, but an occasional ending is a continuous decline into complete dementia, which is terminal.

Causes.—This type of enfeeblement may appear in the young as well as in adults after exhausting infectious diseases, or prolonged physical or mental strain from any cause. It is most apt to occur about middle-age in men who have been through great vicissitudes in life. Predisposition to mental disease probably exists, but has not appeared as an etiological factor in the history of cases.

Stadia.—The initial stadium, as shown by early loss of memory and accustomed accuracy in duties, and absence of mind, may last several months and give place to the acute stadium of confusion of ideas, forgetfulness of the most common affairs of life, and inability for any occupation. This acute stadium continues for several months and passes into a stadium convalescens or a terminal stadium dementiæ. The convalescence is gradual, and full health is only regained at the expiration of some months. The terminal dementia is the same as that of other types of aberration, and is of the passive variety.

Symptoms.—The chief characteristic is the absence of active perturbation and the steadily advancing enfeeblement of all the mental faculties.

Another peculiarity is failure of any depression, exaltation, or sensorial perversions. The delusions arise from inattention and confusion of places and persons at the height of the alienation. Consciousness is clearly impaired, but there is no loss of it and no change in identity. The amnesia is marked in all cases, and is progressive, and, in the end, total in the incurable cases. The somatic symptoms are at first negative, but gradually there is loss of appetite, sleep, and of total weight. The progressive enfeeblement may be arrested at any point, and the actual degree of mental weakness reached varies much in different cases, especially in adolescent cases, in which recovery may follow high grades of impairment of mind. The symptoms resemble slightly those of general paresis, so far as progressive deterioration is concerned, but the active disorder and the physical signs are wanting, and the recovery shows the radical distinction between the two maladies.

Pathology.—The mental weakness is connected in some way with

functional brain exhaustion, and the curability would imply that there are not organic lesions, as in paresis and other forms of progressive mental enfeeblement.

It is not impossible, in young persons, that certain changes in ganglionic cortical elements may be recovered from in this form of mental weakness, but it is not probable that the disorder is other than functional. In other words, the pathology is obscure.

Differential Diagnosis.—In the absence of active symptoms, and of motor disturbances in the early part of general paresis, there may be mental weakness of a progressive nature, like that of primary mental enfeeblement, but the subsequent course of the paresis serves to differentiate the one from the other.

Acute primary dementia presents mental and physical symptoms of a decided nature, and fluctuations of stupor, which suffice for the differentiation.

Senium præcox has some points in common, but does not recover, and has organic lesions; and the mental enfeeblement in epileptics is not to be easily confused with the type in question when the diagnosis of nocturnal or larvated attacks has once been made. Senile dementia presents also a more active group of symptoms.

Prognosis.—The prognosis is not bad, and fifty per cent. of the cases may be expected to recover if taken in the initial stadium, but when treatment is delayed to the end of the acute stadium, the chances are that terminal dementia will ensue.

The prognosis is better in the young than in the middle-aged, and in women than in men.

Caution must be exercised in prognosis not to mistake the mental weakness of the acute stage for terminal dementia.

Treatment.—Institutional treatment is not essential in these cases, which are seldom dangerous to themselves or to others. Rest and freedom from all responsibility and worry are necessary, and then the enforcement of hygienic measures. Idleness is to be avoided, but gentle exercise and some light out-of-door occupation, like gardening, is desirable. Diversions and social means of arousing the patient from apathy must be continued perseveringly. Long hours of sleep, nourishing food, and the Scotch douche, and other active hydrotherapeutic measures, are useful in the more robust male patients. The alterative effect of arsenic may be tried, and tonics and alcoholic beverages, in moderation, in cases with impaired cardiac action, may be used.

Hypnotics must be employed sparingly, and still sleep must be

procured, if other expedients fail. The recovery is apt to be gradual, and a renewal of therapeutic means may be necessary to complete the cure. If there is danger of passage into terminal dementia, the blistering of the neck, or Paquelin's cautery, may be a *dernier ressort.*

Section II.—Terminal Dementia.

All the acute psychoses, and all the mixed and consecutive types of mental disorder, which prove incurable, end in terminal dementia, if life be sufficiently prolonged. More cases are classed under this form of Insanity than under any other, and terminal dementia, out of 74,028 cases of Insanity in hospitals for the insane in the United States, was the form in 19,889 instances, of which the largest number fell in the quinquennium forty to forty-five years.

Definition.—Terminal dementia is a consecutive state of mental weakness, and consists in various degrees of loss of all the higher mental activities, of memory, reason, attention, and consciousness, and it is also attended by physical deterioration and structural alterations of various parts of the organism.

Clinical Delineation.—As indicated by the above definition, various degrees of mental weakness of a permanent kind are grouped in the demented category. Some dements do not know their names, their friends, their locality, or their own existence. They do not exist mentally, but physically, and have lost all conception of their own identity. There has not been a transformation, but an abolition, of personality in these cases. Some of these patients have to be fed, clothed, bathed, and cared for like babes, and they would perish of hunger with food within their reach, having lost the prime instinct of self-preservation and of the need of food. They sit or stand in one position for hours, or move about automatically, with a shuffling gait. Their countenance is a blank, with expressionless eyes, effaced facial lines, open mouth, which may drool much saliva, and there is entire neglect of the calls of nature.

This is the *passive type* of terminal dementia. The *active type* has somewhat different features. The active dement has automatic movements, walks in a circle, or sways to and fro, rubs his head with his hands, grimaces, may tear or break things or pick his clothes to pieces, mutters to himself or talks incoherently, and may have remnants of maniacal expression or habits, or traces of melancholic looks and demeanor without any corresponding emotion. Types of consecutive mental enfeeblement, grouped often under the general

term dementia, have already been described as chronic mania, chronic melancholia, and secondary monomania with exaltation or depression. In addition to these, and to the active and passive forms of dementia, still others might be delineated, but enough has been said to show the variety of the mental ruins wrought by the acute storms of mental disease.

Whatever be the diversity of symptoms, in the course of time the passive type of dementia is attained as the final termination of mental existence.

Causes.—No independent etiology can be claimed for dementia which is the result of the acute psychoses. Neglect of treatment of the acute mental disorder, or ill-advised management of the same, as a matter of fact, may be regarded as a cause.

Undoubtedly, certain cases are predestined, by evil inheritance, to pass into dementia, and in some families this occurs at a definite period of life. The causes of congenital or acquired imbecility are not to be enumerated in this connection, though it is a common error to class acquired mental deficiency under the term of dementia.

Stadia.—Terminal dementia constitutes a final stadium of the acute psychoses. This stadium is prolonged for the whole period of life, and ends in death. That there are some changes in the psychical symptoms during this stadium has already been noted, and that the more active manifestations finally give place to passive and purely vegetative forms of existence. Exacerbations of excitement sometimes occur, but remissions do not exist, and in the course of time complete fatuity is the termination of this stadium dementiæ.

Symptoms.—The lack of all initiative is due to the emotional indifference and to the diminution of sensorial perceptions, and the absence of motives of conduct. The active type of dementia retains some emotional ideas and sensorial perversions following acute mania, and for a time there is some show of spontaneity, until hebetude follows. The loss of the association of ideas, and the obliteration of memories, as well as the inability to fix the attention upon any one object, is the explanation of the fatuous state observed. The repetition of words or phrases (verbigeration) indicates no ideation, and is as automatic as the motions of the patient. Even the grimaces and gestures and attitudes are largely reflex and automatic, and in some cases they are inherited peculiarities of manner or movement, remaining after all voluntary action has disappeared. Obscure promptings of animal instincts and brutal appetites may still move the pa-

tient to masturbation, coprophagy, or other beastly acts, of which there is no intelligent conception.

The nutritive functions may seem to be good by the large gain of flesh, but fat is the lowest form of tissue, and its rapid accumulation only announces the degradation of the general physical being. The circulation is impaired, there is vasoparesis, and enfeebled cardiac action. The skin is bluish and cool, and there is often a subnormal temperature. There is anæsthesia and analgesia, and the superficial and deep reflexes are diminished. Mydriasis is ordinarily present, and a sluggish reaction to light and to peripheral stimuli is found. Finally, the trophic functions are greatly impaired, and there is then a general loss of weight, and death often results in a state of marasmus.

Pathology.—The pathological changes in the cerebral tissues are chiefly of an atrophic nature. The nerve-cells undergo degeneration, and their processes disappear, and association nerve-fibres also disintegrate, and this interstitial atrophy is most general in the cortical regions of the frontal lobes.

Still, no definite lesions can be cited as correspondent to the psychic symptoms during life. Atheromatous degenerations of the vascular system and sclerotic changes of internal organs are not infrequent, tuberculosis appears in a large percentage of cases, and œdema or other pulmonary disease is a common cause of death.

Differential Diagnosis.—Terminal dementia is to be differentiated from acute dementia, in which there is active inhibition of thought and action by fearful hallucinations or delusions. It is also to be distinguished from sequential stupor, epileptic hebetude, and acute melancholiacum stupore. The history of a previous psychosis and the general impairment of mind renders the diagnosis easy in most cases.

Prognosis.—The prognosis is always bad. Cures have been recognized in a few cases, but there was a mistake in diagnosis, in all probability. The duration of life is shortened, on the average, but existence may be prolonged almost indefinitely, or to extreme old age in rare cases.

Treatment.—Curative treatment is out of the question, and the object is custodial care. Much may be done to establish automatic habits of cleanliness. Patients are to be taught to attend to the calls of nature and to avoid destructive or filthy tendencies.

Often some simple mechanical occupation in the way of farm

labor may be taught, and the patient may thus be made in some measure useful.

Regular meals, long hours of sleep, and warm clothing are necessary hygienic means.

The active dements may be treated with occasional sedatives, if very noisy at night, but exercise in the open air to the point of fatigue is a better expedient.

It is better for the patient to be dressed and sitting up, so long as the strength will permit, but many dements become bedridden, and decubitus is then a constant danger to be avoided only by constant attention to cleanliness.

Intercurrent diseases of internal organs are frequent, and often escape notice if physical examinations are not frequently made.

CHAPTER XI.

STATES OF STUPOR.

Group: Acute Primary Dementia, Sequential Stupor.

Section I.—Acute Primary Dementia.

There is a state of stupor, which does not follow acute mental disorder, and is of a very decided character, and hence is termed acute primary dementia. It is most common between the ages of fifteen and thirty-five, and is very rarely seen after middle age.

Definition.—Acute primary dementia is a state of stupor attended by inhibition of thought and actions, absence of association of ideas and of the power of recollection, and occasionally by the domination of a few sensorial delusions, and by exhaustion of vital functions.

Clinical Delineation.—The degree of stupor varies considerably, and with it the general features of the case. It would not be true to clinical facts to picture all cases as suffering from profound apathy, which certainly is present in the most typical instances. In the cases of deep stupor, which will first be delineated, there is absence of all facial expression and a vacant, staring look; the jaw is relaxed, and saliva often drools from the partially open mouth; the whole musculature is lax, and the extremities, when raised, drop heavily of their own weight; circulation is slow and feeble, and the extremities are blue and cool; perception is dull, sharp peripheral stimulations are not heeded, and the prick of a pin will excite no response. Ideation is in abeyance, and sensorial stimuli excite no psychic reflexes. The sense-impressions call up no associated images and arouse no memorial residua. There are no emotions and no motives for immediate action, and no intentional movements. The patient sits or lies for hours in one position, and has to be fed, dressed and undressed, and led from one place to another. When

seated, the body flexes of its own weight, and when the head is raised it again falls forward. No words are spoken, and the bladder and rectum are involuntarily emptied, and the patient is simply a surviving, but totally inert, human being.

In the less pronounced cases of stupor, the patient appears absorbed completely, but can be aroused to a momentary appearance of recognition of surroundings by some active appeal, and may reply briefly to some question, and then sinks again into hebetude. At intervals the patient shows some signs of mental activity, laughs or cries, and may have corresponding muscular display of a brief change in innervation, shown in emotional shades of expression, or in active movements of the extremities. In exceptional instances there is, from time to time, a brief period of excitement, and then a sudden relapse into the stuporous state. There may be cataleptoid rigidity of muscles in these cases, and automatic motions oft repeated, but these are unusual manifestations, and it is still more rare that there is an actual maniacal exacerbation of short duration.

Whenever mental activity appears, it may be demonstrated repeatedly in the direction of a few hallucinations or delusions, remaining the same throughout the attack. This state is like that of melancholia cum stupore, but in the latter the hallucinations and delusions are of a frightful and painful character, while in the cases mentioned the sensorial perversions during the excitement may be lively, and dancing or singing may occur before the relapse into stupor. It will generally be found that these cases with excited intervals have hereditary taint, and the more neuropathic the patient, the greater variety will there be in the entire course of the symptoms.

In unfavorable cases the stupor passes at the end, ordinarily, of six months into dementia of a terminal kind; but, otherwise, intervals of clear consciousness begin to appear and gradually lengthen into a convalescent state, which may end in complete or incomplete recovery of mind.

Causes.—Stuporous states develop in pubescent and adolescent cases of a psychopathic disposition without any assignable cause. Probably, whatever lowers vitality and nervous tone favors the stupor. Thus the puerperium, severe mental effort, masturbation, large losses of blood, fevers, and other exhausting affections, and great physical fatigue, serve to develop any inherent tendency to acute primary dementia. Sudden fright also acts in this way.

Stadia.—There is an initial stadium of general malaise, gloomy feelings, and indisposition to occupation. Often there is constipa-

tion, headache, and disordered digestion during this stadium, which lasts some weeks, on the average. Then follows the stadium acutum, which, in this instance, is a stadium stuporosum, which lasts some months ordinarily, though it may terminate in ten days or extend through an entire year. This acute stadium may be interrupted by semi-lucid intervals of a few days, or by mild maniacal turns of a week or so, or by hysterical symptoms in psychopathic women.

There then follows a stadium convalescens of some weeks' duration, according somewhat with the relative length of the acute stadium. In unfavorable cases a stadium dementiæ terminates the attack.

Symptoms.—The symptoms in cases from sudden fright may appear at once, but ordinarily a week or more elapses before complete stupor is developed. In the most profound cases there is complete absence of ideation, of attention and perception, of voluntary movement, and of ordinary reflex actions. The eyes do not close when objects suddenly approach, tickling the neck with a feather provokes no attention, superficial reflexes are abolished, muscular reactions to electricity are diminished, there is anæsthesia and analgesia, the pulse is slowed and feeble, respiration is superficial, cutaneous surfaces are livid, there is capillary stasis, temperature is subnormal, and general nutrition is impaired. There is complete muscular relaxation in profound stupor, but in other instances there is muscular fixity and a passive resistance to all enforced movements. This inhibition of actions is like the inhibition of ideas in the same cases, which show no movements, but still belong to active rather than passive stupor, and it is in such cases that certain sensorial delusions persist, to the exclusion of all other ideas. There is, in these instances, a limitation of consciousness, while in the passive cases there is an obscuration of consciousness, or a total eclipse of the same. Some speak of these states as anergic stupor (passive stupor) and delusional stupor (active stupor). There is no memory of the state of passive stupor on recovery, but a partial recollection may exist for the events of active stupor. In the passive type the saliva drips from the mouth, but in the active form it is often retained until the mouth is filled, and, as swallowing is inhibited, there is a change in the saliva which becomes offensive. The sphygmograph shows a high-tension pulse from capillary obstruction.

Vasoparesis, autographic skin, and digiti mortui may appear in some of the cases. The organic needs are not felt and hunger is unknown. The patient has to be fed and food must be carried back

in the pharynx to excite swallowing, and liquid nourishment is hence required. The patient may be unconscious of the action of the bowels or bladder, and is inattentive, at any rate, to nature's calls. The blood is changed and the red blood-corpuscles are greatly diminished. Trophic functions are impaired, and there is a general loss of weight.

Pathology.—The fact that recovery from the stupor may be sudden points not to organic lesions, but to functional disturbance of cortical regions, either from circulatory or nutritive disorder. The pathology which best accords with the clinical manifestations is vasomotor disorder. The same capillary stasis evident in the general surfaces of the body probably exists in cerebral tissues, which have been found œdematous post-mortem in some cases. The pathogenesis cannot be definitely assigned, however, and it may differ somewhat in the active and passive types and in the different degrees of stupor.

Differential Diagnosis.—It has been customary to differentiate acute primary dementia from melancholia cum stupore. In the latter the inhibition of thought and action is dependent on frightful hallucinations and delusions, and there is painful tension of mind. This tension may be broken suddenly, and violent acts to self or others may follow, and then, after the explosion, the stuporous depression may be resumed.

The tension and inhibition are not so great, even in acute primary dementia from fright, which most nearly resembles melancholia with stupor. Whenever the reduction of consciousness is so profound that mental tension and pain cease to exist, the state is one of acute dementia rather than of melancholia with stupor. The only real distinction between the two states seems to be that in one there is concentrated and painful action of mind, and in the other absence of such mental activity. Clinically these states may approach one another so that in some cases it is an arbitrary distinction to say which designation is the more appropriate.

Acute primary dementia is to be differentiated from epileptic, paretic, alcoholic, and all other forms of stupor intercurrent in the acute psychoses. The history of the case serves for this purpose, and in the absence of all previous knowledge of a case the differential diagnosis is often impossible.

The differential diagnosis is also to be made from the temporary hebetude and confusion of ideas following the shock of severe emotions. Necessary time for a reaction must be accorded before a diag-

nosis is made. Some delicately organized persons require some days to recover from severe emotional trauma.

Prognosis.—The prognosis is that fifty per cent. of those attacked may be expected to recover, if promptly and continuously treated. Terminal dementia follows in a considerable proportion of the cases, and imperfect recovery is also common. Death results from pulmonary or cerebral œdema or cardiac failure in not a few instances.

Relapses are also to be anticipated, especially in those with strong heredity. The prognosis is unfavorable in those past the thirtieth year, and in those predisposed to phthisis pulmonalis, which is wont to develop in these stuporous states.

Treatment.—Prolonged and constant nursing renders institutional care necessary when two nurses cannot be provided for night and day attendance in private treatment.

The three immediate provisions to be made are warmth, rest in bed, and continuous alimentation of the patient. Warm baths equalize the circulation, and Turkish baths, followed by massage, are efficient. Sleep is favored by artificial heat to the extremities, and digitalis, for its cardiac effect and the relief of passive cerebral congestion, is indicated. Galvanism of the sympathetic and of the brain may be cautiously used. General electrization and electro-massage assist the circulation and nutrition.

Artificial alimentation is to be persistently carried out, and a full physiological ration of nitrogenous food is to be given. Meat, eggs, and milk are the main reliance, and cod-liver oil, if well borne, may be added. Stimulants are to be used chiefly as cardiac failure demands. Anæmia calls for ferruginous preparations, and quinine and arsenic, for tonic and alterative effects, are sometimes useful.

Obstipation is to be relieved by stimulating enemata and by massage.

Insomnia is sometimes an obstinate symptom. Heat to the head may induce sleep, and digitalis and opium act better than the usual hypnotics in these cases. Hot milk, one pint, with two ounces of whiskey, and hot-water bags to feet and spine, will often procure sleep. In the convalescent stadium systematic but gentle exercise in the open air, diversions, and a change of climate and travel are often useful.

Prophylaxis as regards relapses is necessary. No serious occupation should be undertaken for several months following recovery, which cannot be deemed complete in women until the menstrual

function has been re-established with regularity. In general, the return to normal weight, appetite, and sleep announce the physical restoration without which recovery cannot be recognized as fully accomplished.

Section II.—Sequential Stupor.

In contradistinction to the state of stupor just described as primary dementia, there is another state of stupor which is secondary to some other form of Insanity, and hence termed sequential stupor. This type is therefore, strictly speaking, not an independent form of Insanity, though it may constitute an apparently distinct mode of alienation, and is so frequent as to merit separate consideration. It presents a variety of clinical forms, and is so important as to deserve the most careful study, and is a key to the understanding of the true course of certain types of mental disease.

Definition.—Sequential stupor is a mode of alienation intercurrent in other types of mental disorder, and characterized by various degrees of loss of memory, arrest of flow of ideas, impaired special and general sensation, absence of emotions and of volitional impulses, and inhibition or abolition, more or less complete, of all psychic activities.

Clinical Delineation.—Following acute melancholia or acute mania, sequential stupor is mild or severe, and may last for weeks or months. In the mild cases of stupor the patient ceases to perform voluntary acts, except as prompted by hallucinations or a few delusions, or by momentary impulsive tendencies. Questions are not answered, though the patient may utter a few phrases or repeat the same reply to every question asked. One position is long retained, and there may be resistance of a passive kind to all attempts to move, feed, dress, or undress the patient, who is entirely neglectful and dirty in habits. Every few hours there may be some automatic display of activity or some impulsive act, such as striking or throwing something suddenly seized, and then there is immediate relapse into apathy again. Occasionally cataleptoid symptoms appear, or there may be automatic swaying to and fro, or some stereotyped motion continued for shorter or longer periods. There may be repetition of words or of short phrases, or of certain inarticulate sounds; all of which shows the paucity of ideas and the escape of nervous force through some particular channel, which, for the time being, chances to be pervious. Or there may be monotonous reaction to

some hallucination or persistent sensorial delusion, but this is relatively rare. In the severe cases of stupor sequent to melancholia or mania there is complete exhaustion of psychic and physical forces. All mental operations are suspended, and the vital functions are notably implicated. Respiration is superficial and feeble, circulation is slow, temperature is reduced, digestion is impaired, and general innervation is very imperfect. The countenance is vacant, and voluntary movements are not executed; reflexes are absent, sensation is wanting, sensorial perception does not exist, consciousness is practically abolished, and there is no ideation.

Between these extremes of mild and severe stupor every conceivable degree of intermediate lethargy may exist, and the variations in the symptoms correspond to the fluctuations in the actual amount of apathy present. It would require a vast amount of description to depict all the clinical phases of these varying degrees of stupor familiar to those having had large opportunities for the observation of the insane. It is important to know that these types of stupor may follow or even interrupt the course of mania or melancholia, or they may constitute one phase of a cycle of periodical Insanity.

It is appropriate to discuss, in this connection, a manner of mental reduction termed catatonia.

Catatonia is a group of symptoms conceived by Kahlbaum (1874) to be a separate type of Insanity. He represented this type as beginning with melancholia, passing into mania and then into catatonic stupor, and ending in dementia. The only characteristic features appeared in the catatonic stupor, and were, in the main, fixation and resistance of muscles, repetition of movements termed *stereotyped*, cataleptoid conditions, mutism, or continued utterance of the same words (verbigeration), and, in fact, such symptoms as are well known to alienists to occur in the various forms of stupor intercurrent in epileptic, hysterical, pubescent, and hereditary cases of mania and melancholia.

Kahlbaum deserves credit for a most truthful study of the symptoms of stuporous states, which naturally follow the exhaustion of mania or melancholia, and then pass into dementia or recovery.

The order of his stadia in catatonia is simply the universal natural order of all psychoses, which have first depression, then excitement, then exhaustion, which may reach the grade of stupor, and then dementia. Neurotic and hereditarily tainted patients, during the clinical progression of an attack of Insanity, after the melancholic and maniacal stage, have a stuporous stage, with symptoms like those

described by Kahlbaum, and seen also, in epileptic, hysterical, neurasthenic, and all psychopathic patients, when in sequential stupor, developed at any point of an attack of Insanity.

The special phases of melancholic, maniacal, or stuporous stadia can never become a stable basis upon which to erect separate types of Insanity. Such attempts only create confusion, but Kahlbaum's delineation of stuporous symptoms was so excellent as to be at once recognized as real by physicians who have passed many years in the clinical study of large numbers of insane cases. In any form of stupor, not profound, there may be a persistence of certain ideas and an automatic repetition of words and of movements. But, just as habit chorea, convulsive tics, repetitive impulses to set movements are most common in neurotic individuals in comparative health, so in them also, in mental disease and in stupor, which reveals inherent nervous tendencies deprived of volitional control, are to be witnessed the same repetitive tendencies in set movements called stereotyped, and in words or phrases oft repeated, termed verbigeration. The resistance of enforced movements by stuporous patients is the simple result of inhibition, and cataleptoid rigidity is common in sequential stupor.

Stupor in epileptic cases following severe cortical discharges may be very profound. Intercurrences of stupor are also seen in paretic and alcoholic and syphilitic Insanity. This sort of sequential stupor is often very severe, but not of long duration, ordinarily. A mild type of sequential stupor in a simple psychosis follows the stadium acutum and takes the place of the stadium debilitatis in some instances, and ends in convalescence or in a stadium dementiæ.

Causes.—The stuporous state is the outcome of the psychosis in which it occurs, and can hardly be said to have an independent etiology. Still, it is possible, during an attack of Insanity, for accidental losses of blood, or masturbation, or great muscular exertion, to develop the stupor.

Stadia.—Sequential stupor is itself a stadium following the stadium acutum, whether melancholic or maniacal, in some psychoses. In other instances it is only an intercurrent state in the stadium acutum of a psychosis, or in general paresis.

As a separate stadium, taking the place of the stadium debilitatis, it may last for many weeks, and it ends in a stadium convalescens, or in a stadium dementiæ in incurable cases. As an intercurrent state, it may last for hours, days, or weeks, and then gives place to the mania or melancholia which it interrupted. In periodic

Insanity it may form one stadium of a cycle, which has also a maniacal stadium, the alternation being, 1, stadium maniacale; 2, stadium stuporosum.

Symptoms.—Sequential stupor, hypothetically, is the same from whatever source derived, being dependent on suppression of mental activities, such as association of ideas, attention, memory, and sensorial perception; but, practically, it retains clinical evidences of its special origin. Thus, following an acute melancholia, there will be traces of emotional distress, or facial lines of depression, or glimpses of frightful hallucinations. When secondary to acute mania, there will be still occasional laughter, crying, or sudden exclamations or passing shades of expansive expression of countenance. Sequent to epileptic mania there may be expected sudden impulsive acts of destruction or violence, and, consecutive to hysterical mania, there may be also fixed attitudes for effect, peculiar grimaces, unrestrained laughing or shedding of tears, erotic gestures, and cataleptoid states. The prevailing state, in the meantime, is mute stupor. All special features, from whatever source derived, are obliterated when the stupor becomes profound. The somatic symptoms are dependent on the degree in which the cerebro-spinal sympathetic and trophic centres are involved. Circulation, respiration, digestion, and general metabolism are impaired in all fully developed stuporous states. Along with the livid skin and cyanotic extremities there goes an actual reduction in bodily warmth, and, if the stupor is prolonged, there is a loss of weight in spite of the most active alimentation.

Pathology.—Angiospastic and angioparetic cerebral states are, in all probability, the most constant pathological factors in sequential stupor. Even theories of nutritional disturbances of cortical elements cannot serve to explain the sudden appearance and disappearance of stupor, and the theory of inhibition due to a few intense or frightful delusions, is also inadequate. Both cerebral and spinal vasomotor centres would seem to be involved, and the trophic functions of anterior cornual cells is evidently implicated in prolonged and severe stuporous states in which there is muscular atrophy.

Differential Diagnosis.—If the history of the case is known and the stupor is the sequel of some regular type of Insanity, the diagnosis of sequential stupor can always be made. Without any previous knowledge of a case, it would not, from the symptoms alone, be possible to differentiate always between sequential stupor and acute primary dementia.

Exhausting diseases, acute fevers, severe cerebro-spinal concussions, and a series of epileptic seizures in those not insane, may give rise to extreme hebetude and lethargic states, which are to be differentiated from the mode of alienation now under consideration.

Prognosis.—The prognosis is good in the majority of instances, but occasionally there is a termination in dementia. Relapses are very frequent during the pubescent and adolescent periods of life, but stuporous states are less common in advanced years, when dementia takes the place of stupor.

The danger to life is considerable, but can be averted by attentive treatment.

Treatment.—Sequential stupor is best treated in bed, to preserve vital warmth and to equalize the circulation. The most urgent indication is to sustain nutrition. Not only artificial feeding, but predigestion of food may be necessary, owing to entire neglect or refusal of meals by the patient, and to impaired gastric functions. Diminished peristalsis may cause constipation, which is to be relieved; while, in the most severe stupor, vasoparetic states in intestinal mucous membranes give rise to diarrhœa, which must be promptly treated. Iron, camphor, and arsenic, for their hæmatinic, cerebral stimulant, and alterative effects, are of service. Galvanization of cervical sympathetic, practised with caution, and general electrization, with massage, and hot baths of brief duration, are useful measures. Cardiac and general stimulants are to be employed at emergent points of the stuporous attack. Relapses may sometimes be prevented by a prompt use of digitalis and alcoholic stimulants at the right moment.

CHAPTER XII.

STATES OF IMPAIRED OR SUSPENDED VOLITION.

Group: Abulic Insanity, Somnambulistic Insanity.

Section I.—Abulic Insanity.

There is a type of mental disease manifested chiefly in loss of control of thoughts and actions, and of the higher forms of inhibition ascribed, ordinarily, to the exercise of volition, as the supreme faculty of the mind. It is useless to discuss the question of will in this connection, and it suffices to assume the axiomatic fact that normally voluntary control over ideas and actions is exerted, and that when this faculty of control is lost a pathological state exists, which is here termed abulic Insanity. A mistaken conception is that there may be increased volitional power in Insanity, and the term hyperbulia has been used to denote it. The highest function of will is to inhibit, and the violent actions of the insane, supposed to display increase of volitional force, would have been inhibited had there not been an actual loss of volitional control. All such violent outbreaks are abulic rather than hyperbulic.

Definition.—Abulic Insanity is a pathological state of mind, characterized by loss of higher forms of inhibition, by absence of control of ideas and of actions, and by the presence of impellent ideas, morbid impulses, irresistible tendencies to violent or illegal deeds, and the inability to execute desired acts or to refrain from performing others which are dreaded.

Clinical Delineation.—There are two chief modes of impairment of volition among abulic patients; one is the inability to execute desired acts, and the other is the inability to refrain from performing deeds which are dreaded.

Emotional or intellectual disorder, such as is common in other types of Insanity, is not often found in abulic alienation. Abulic

patients are to be ranked as neurasthenic or degenerate, but there are some independent of both these neurotic classes, and having neither degenerate stigmata nor the physical signs of neurasthenia, nor the history of transmitted taint.

First, then, as to inability to execute desired acts, it will be found that certain patients have a struggle to do simple things of every-day life, and finally become impotent to execute their own wishes in certain regards. They cannot rise in the morning or retire at night when they desire, cannot put on or take off certain articles of dress, cannot sign their names when needful, cannot follow the service in church, cannot rise up or sit down, or get in or out of a carriage, or swallow certain necessary articles of food, or perform other simple acts. Others, having perfect freedom of thought and speech, are unable to say anything when special occasion requires it, and some cannot write a letter when they wish, and, when they specially desire it, cannot fix their attention on any subject (aprosexia). There is no limit to the variety of manifestations of this mode of volitional impairment in which desire is present, but impulsion to action is wanting. This form of abulia is connected with certain permanent *deterrent ideas,* which are practically what the French term obsessions. These deterrent ideas take possession of the mind and dominate it like a delusion. The patient may struggle painfully to overcome the deterrent idea, but the effort is in vain, and there is impotence to perform the desired act.

In the other mode of impaired volition there is inability to inhibit certain actions which are not desired, but dreaded. The patient struggles to avoid the actions which he is impelled to perform. There are various clinical phenomena relative to and in part explanatory of this mode of impaired volition. In the first place, there are *impellent ideas,* which persist in consciousness until the undesirable act is performed. There is a painful state of tension of mind, which disappears for the moment upon the performance of the act, but the same impellent idea returns, and with it the anxiety to shun the inevitable recurrence of the same act.

There are also irresistible impulses of either an emotional or instinctive nature, which result in absurd or even criminal acts, which the patient cannot avoid. Thus there may be an impulse to steal, to set fire to buildings, to drink, to use profane or obscene language, to make indecent exposure of the person, to commit suicide or homicide.

There are also emotional ideas of a persistent and absurd nature,

which the will cannot banish, and which influence the conduct. Most of these ideas take the form of doubts or fears, which are clearly pathological in nature. Thus there is fear of open or closed places, fear of high places, fear of men or women, fear of crowds and of solitude, fear of animals, fear of insects, fear of defilement, fear of darkness, fear of accidents, fear of fire, fear of travel, and, in fine, fear of everything. There is no end to the absurdity of acts which may be occasioned by these persistent fearful ideas, which escape all volitional control.

The persistent ideas of doubt are equally common and ridiculous. Patients having these ideas of doubt question whether they should do a thing, whether they have done it right, whether they should not do it over again. They seek to be reassured that the simplest acts are correctly done, that they are not mistaken in what they have heard or seen or done. They doubt themselves and doubt others, and live in a world of doubts, and nothing reassures them permanently, not even the evidence of their own senses. There is an inability to form conclusions or to perform the necessary acts of life calling for prompt decision and action. The patient may be thus incapacitated for the ordinary affairs of business. Thus, patients may converse rationally on most subjects and may be, in a measure, conscious of their disease; but they are still impelled or deterred in their actions by persistent ideas and impulses or morbid doubts and fears, and they exhibit an Insanity of actions due to volitional impairment.

Causes.—The etiology of this affection is hereditary taint in the vast majority of cases, which are enumerated as degenerate or neurasthenic, though some display none of the physical traits of the latter class. It is very probable that, in exceptional instances, the abulic state may be acquired, like the neurasthenic state. Satisfactory etiological research has still to be made in regard to this type of mental disease, which has not been clearly recognized until of recent years.

Stadia.—There is a long initial stadium of months or years, of fixed notions and eccentric ideas as to doing or not doing certain things, and by friends the patient is recognized as odd or cranky in these regards. Then follows the stadium acutum of inability to perform the essential acts of daily life, or the period of doubts, fears, impulses, and irresistible tendencies, ending, perhaps, in suicide or crime. This stadium may endure a lifetime, but a certain mental enfeeblement is apt to develop as a terminal stadium, but not as an actual stadium dementiæ.

A genuine stadium convalescens is not to be expected, but remissions of all the symptoms, and paroxysmal returns, are the rule in abulic Insanity.

Symptoms.—The persistent escape of nervous energy through the same psychic or motor channels is peculiar to degenerate or neurasthenic patients. Thus the repetition of purposeless motions, fixed attitudes, fingering the face or hair, restless action of hands or fingers, peculiar movements of the head, odd action of the features, the persistence of certain musical airs, the counting of numbers before doing anything, the desire to touch certain things repeatedly without motive, the placing of things in a certain relation to each other with no assignable reason, and a thousand like actions, felt to be needful to the comfort of the patient, though inexplicable in the patient's own mind, are among the psychic and motor tics to be witnessed in these abulic cases. The idea of an action revives the motor images for its performance, and arouses nascent motor impulses. In the abulic state these nascent motor impulses attaching to the idea are not inhibited, but pass at once into action. Such ideas are *impellent*, and cannot be resisted, and after an anxious effort the patient is forced to yield to them.

The irresistible impulses are chiefly from organic sources, and spring from the animal appetites or instincts, or from their perversions.

In abulic Insanity the patient is fully conscious of the nature of the impellent ideas, morbid impulses, doubts and fears, besetments and obsessions, as they are sometimes called, and the mental suffering is extreme, until the culmination in action brings temporary relief from the painful tension of mind.

Nothing cumbers science like words, and the terminology of the symptoms of abulic Insanity has reached an unreasonable extension. Thus the simple fact of morbid fears among these patients has given rise to such terms as agoraphobia (fear of places), acrophobia (fear of heights), anthropophobia (fear of men), nosophobia (fear of diseases), monophobia (fear of solitude), zoöphobia (fear of animals), misophobia (fear of defilement), aichmophobia (fear of sharp things), crystallophobia (fear of glass), metallophobia (fear of metals), and a host of other technical labels.

To illustrate the irresistible impulses are designations as follows: Kleptomania, dipsomania, pyromania, dromomania (impulse to travel), oniomania (impulse to buy), coprolalia, cubomania, onomatomania, arithmomania, erotomania, and others too numerous to

mention. A few writers have not been satisfied to label simple symptoms, but have confused students of mental diseases with the impression that these designations stood for distinct varieties of mental alienation.

The morbid association of ideas in abulic patients is illustrated by phonisms, which are auditory impressions vividly derived by the action of some of the other senses. Thus certain odors or tastes may be associated morbidly, so as to recall certain sounds, or the sight of objects or persons may invariably revive certain aural hallucinations. In like manner, photisms, which are sensations of light or color secondary to the action of the other senses, may occur and take the hallucinatory form.

Phonisms and photisms, and other secondary sensations, except in their hallucinatory relations, are not necessarily pathological, though they are more apt to occur in psychopathic individuals.

The somatic symptoms in abulic Insanity are not prominent, and are mostly of the neurasthenic order. There is no active disorder of vital functions. The habit-chorea, convulsive tics, and automatic motions of neurotic patients remain, in addition to the motor anomalies due to the morbid impulses and impellent ideas.

Pathology.—Apart from hereditary susceptibility and instability of cerebral centres, no definite pathology can be assigned. Abulic symptoms may be intercurrent in various types of Insanity, and certain pathological factors may then be suggested in causative relation to the volitional impairment; but for the abulia as a continuous mode of alienation, such as here described, there is no assignable pathogenesis other than the transmitted taint.

Differential Diagnosis.—Abulic Insanity is to be differentiated from the higher forms of imbecility with feeble will-power. There is rarely any native deficiency of intellect among cases of abulia.

Monomania, with certain peculiar and persistent actions or inhibitions of conduct, may resemble abulic Insanity. The monomaniac acts, however, in obedience to fixed and systematized delusions, which is never the case with abulic patients. Impellent ideas and irresistible impulses may occur in any form of Insanity, but they do not constitute the gravamen of the mental disease, as in abulic cases. Some patients, classed under neurasthenic Insanity, are, more properly speaking, cases of abulic Insanity.

Prognosis.—The prognosis for complete recovery is uniformly bad. Long intermissions may occur, but relapses are almost inevitable.

Usefulness is seriously impaired, but patients may continue for many years to be self-supporting.

The prognosis as to life is good, exclusive of the chances of suicide. The average duration of life is not specially shortened. The prognosis is best in youthful subjects treated by systematic education for a series of years. No amelioration is to be anticipated in chronic adult cases.

Treatment.—Isolation in institutions seldom accomplishes any improvement. Change of occupation, of climate, and of surroundings, is sometimes of decided benefit.

Attention to the general health and to hygienic surroundings is first to be enforced, and, when regularity of habits has been established, the special treatment is to be undertaken.

Psychotherapy is all-important. The influence of a cheerful and strong-minded person, and, by preference, a physician, if he will undertake the case, is the main reliance. Discussion or opposition of the patient's weaknesses are of no avail. The patient is to be kept steadily occupied or diverted, so that absolutely no time for introspection is allowed. As a crisis approaches, most active efforts are to be made in horseback or bicycle exercise, or some lively diversion, and, if this fails, large doses of hypnotics are to be tried at critical periods, so as to break the habit and the spell by which the patient is bound.

Hypnotism, if ever of decided use, may be judiciously employed in certain cases, but counter-suggestion may be of service in many instances. When the volitional impairment is in the performance of certain acts, the patient may be systematically trained to do similar acts, until the prime difficulty is overcome.

Only prolonged psychotherapeutic treatment and systematic education extending over a series of years can be expected to accomplish permanent improvement, and then a prophylaxis is required to prevent relapses.

Section II.—Somnambulistic Insanity.

It is not possible to consider the many disorders of sleep in this connection, although all perversions of sleep have indirect relations to the present subject.

Somnambulism, in certain persons, may be as persistently recurrent and as pathological in nature as epileptic disorders of consciousness. If a patient in epileptic automatism commit crime or take

human life, he is recognized as insane; and if, as has occurred, a sufferer from somnambulistic automatism commit crime or murder, it is consistent to recognize the Insanity and the irresponsibility of the patient. All epileptics are not insane, and all somnambulists are not insane, but there are special epileptic states and special somnambulistic states of active mental disorder of a most dangerous character. Such states are brief attacks of Insanity, having most important medico-legal bearings, and as such they are given a nosological position and are termed somnambulistic Insanity.

Definition.—Somnambulistic Insanity is a state of aberration in which hypnagogic impressions are mistaken for realities, and in which the senses may be active while volition is suspended and memorial consciousness is in abeyance.

Clinical Delineation.—The state of somnambulism varies greatly in different persons, and on different occasions in the same person. Some or all of the special senses may be active in this state, or hearing or touch may alone remain. Sight may be specially active, and the sense of touch very acute, and the muscular sense and co-ordination are sometimes heightened to an extraordinary degree. The acts performed in this state may be very simple or very complicated, involving the most skilful forms of muscular adaptations and intricate psychic operations. The patient is often guided by hypnagogic impressions, and simply reacts accordingly, just as insane patients react to waking illusions. Volition as the supreme controlling power is suspended, and hence arises the danger of violent reaction to the disordered fancies of the somnambulistic brain.

Thus the somnambulist Fraser, in hypnagogic violence, murdered his boy, whom he dearly loved (*Journal of Mental Science*, 1878, p. 454).

Some patients speak aloud or converse in reply to questions in the somnambulistic state, or even address imaginary audiences, or play upon instruments, or sing. They also, in this state, acquire knowledge, solve problems, or compose and write coherently on subjects familiar to them. The somnambulistic state may occur in the daytime as well as at night, and Prichard relates cases in his work on Insanity, and similar instances have since been reported by other writers.

Patients sometimes have their eyes wide open and reply to questions and seem to be acting a part, and this is literally the case, since they are acting out the impressions and fancies which have escaped volitional control. When these hypnagogic phantasms are of a nat-

ure to provoke violence, the resulting aberration may be most dangerous. Thus patients may shoot their friends while under the impression that they are burglars, or jump out of the window to escape fancied danger, or perform various destructive or criminal acts. It is also known that in coming out of the somnambulistic state there may occur a sort of panic, with dangerous emotional confusion and sudden violent tendencies. This resembles sleep-drunkenness, as it is termed, and which, properly speaking, is a phase of somnambulistic disorder of mind, during which crimes and violent acts have been known to have been perpetrated. When such patients are placed upon trial for their illegal acts, there should be no hesitation in recognizing the fact of mental disorder, and of irresponsibility for deeds of which there is no recollection.

As to the amnesia, it would seem that patients appear to remember in the somnambulistic state some things which occurred in a previous like state, and they have been known to tell where they had secreted things while previously sleep-walking, and of which they could give no information in the waking state. They also resume in somnambulism conversations of which they have no knowledge, except in subsequent somniloquent states.

All these states of disordered mental action in partial sleep are of extreme interest and juridical importance, and merit more scientific attention and close study.

Causes.—Somnambulism is sometimes hereditary. It is most frequent in pubescence, but may occur at any time of life, or, in hereditary cases, throughout life. Like epilepsy, it is confirmed by repetition, and has as an ultimate cause some unstable condition of cortical centres. It is provoked by gastro-intestinal disorders, by mental over-strain, by emotions, or great physical fatigue. Sympathy or wonder entertained and expressed for youthful patients tends to foster the disorder. The extreme pathological form of somnambulism to be reckoned as Insanity is probably attained only under peculiar vasomotor conditions, and possibly autotoxic influences.

Stadia.—An explosion of destructive actions or of homicidal violence in the somnambulistic state may be compared to brief epileptic mania. The attack may be considered as consisting of a single acute stadium, like that of mania transitoria.

Symptoms.—Memory fails because voluntary attention does not exist. The heightened muscular sense renders the patient capable of unusual acts of co-ordination, such as walking on roofs, and the unconsciousness of danger favors such performances. The pupils

are dilated, and the eyes open as often as closed. Objects are avoided by an increased tactile sense or by sight. Talking is as common as walking. Hypnagogic impressions are faint or extremely vivid, and they may or may not provoke corresponding motor reactions. When most vivid, they are few and persistent, and eventuate in explosive actions. The amnesia following the attack is precisely similar to that after epileptic automatism. In the transition from the somnambulistic state to the waking state, hypnagogic hallucinations and delusions may arise. The culmination of somnambulistic phantasms in motor explosions may or may not terminate the sleep-walking state. Patients have broken furniture, set fire to things, secreted stolen articles, taken horses out of barns and driven them a distance while in the somnambulistic state.

Pathology.—Vasoparetic states and congestion of limited areas of the sensory cortex, or the presence in cortical cells of those detritional products which, in excess, may exert a toxic effect, are likely theories, but a definite pathogenesis is not known to science. The explosive violence in the somnambulistic state suggests actual discharges from cortical centres as the pathology of the mental disturbance. The hereditary tendency in certain cases has already been noted.

Differential Diagnosis.—Somnambulistic Insanity is to be differentiated from brief epileptic mania. When epilepsy and somnambulism coincide, violent outbreaks resulting are always to be regarded as epileptic in nature.

A patient may wake out of sleep and frightful dreams directly into a maniacal state, but the duration of the latter would differentiate it from somnambulistic Insanity, which is always brief and terminates ordinarily within the hour of the performance of some violent act.

Prognosis.—The prognosis is that there will be a relapse, since the somnambulistic habit is like the epileptic habit when once established in adult life. In youthful subjects the prospect of cure of the habit and of the danger of explosive violence is much better than in epilepsy. The attack itself passes off with the same promptness as an outbreak of transitory mania, and brings no danger of physical exhaustion, but may expose the patient to fatal accidents during the height of the somnambulistic excitement.

Treatment.—The treatment is prophylactic, and consists in the prevention or relief of the somnambulistic habit. In hereditary somnambulism there is little hope of prophylaxis, for the disorder will

declare itself with the same certainty as other hereditary neuroses. The hygienic and dietetic treatment is important. Regular hours of eating, sleeping, and exercising must be enforced. A hard, smooth bed, light covering, elevated position of the head, the relief of the bladder and rectum before retiring, a cool sleeping apartment, and the exclusion of artificial light from the room, are needful measures. A cardiac stimulant, given at bed-time, is sometimes of service in adults. General tonic treatment and hydrotherapy, especially a cold sponge-bath before retiring, are useful means. The bromides diminish reflex irritability and favor continued sleep better than any other drugs in these cases, and are useful in the breaking of a somnambulistic habit. Counter-suggestion and a certain severity in youthful subjects act as deterrents, and are not out of place as psychotherapeutic agencies. In pubescent cases, severe mental application is to be forbidden, and all unfavorable emotional influences are to be carefully avoided. In confirmed cases, when other remedies have failed, hypnotism might become an experimental and justifiable measure. Cerebral galvanization may also be tried as a *dernier ressort*, and general electrization at the bed hour may also be employed.

Cold affusions, roughly practised, have long been a popular remedy to break the somnambulistic habit, and in youths castigation has not been without curative effect, though this means cannot be commended.

All such prophylactic measures may succeed in the prevention of the habitual return of somnambulism; and still the explosive violence of that special phase of the disease known as sleep-drunkenness may appear.

When an attack of this kind has once declared itself, the patient should ever afterward, as a safeguard, occupy a single bed and room, and sedulously avoid alcoholic stimulants, tea, coffee, tobacco, sexual excess, and exciting habits of life and night-hours of brain-work, and pursue some healthful out-of-door occupation. Marriage of such a patient is to be avoided for various reasons, and specially in consideration of the heredity of somnambulism.

Indications for treatment may sometimes be based on organic sources of the neurotic affection to be found in gastric or sexual disorders. All such reflex sources of cerebral irritation are to be removed by appropriate treatment. Nervines and general roborant treatment are always indicated.

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