A

PSYCHOLOGICAL STUDY

OF

CERTAIN PHASES OF INSANITY

WITH

SPECIAL REFERENCE TO MELANCHOLIA.

BY

MATHEW A. REASONER.

THESIS.

FOR THE DEGREE OF BACHELOR OF SCIENCE.

UNIVERSITY OF ILLINOIS.

1896.
B I B L I O G R A P H Y.

Sanity and Insanity, Mercier.
Dictionary of Physiological Medicine, Tuke.
Dictionary of Practical Medicine, Fowler.
Body and Mind, Maudsley.
Journal of Nervous and Mental Diseases, '92 to '96.

Reports from:
Kankakee Hospital, Anna, Bryce, Ala., Pontiac, Mich.,
Norristown, Penn., Connecticut Hospital, and Central Indiana Hospital.

Hospitals and Asylums of the World, Burdette.
Handbook of Mental Diseases, Regis.
Reports of Cases, Personal Histories etc., obtained at Kankakee.
Suicide, Morselli.
Dictionary of Statistics, Mulhall.
Century Magazine, June 1896.
Nervous Diseases, Hammond.
THESIS.

A STUDY OF CERTAIN PATHOLOGICAL MENTAL CONDITIONS.

Throughout the history of education and of medicine, no question has so engaged the attention of the scientists and physician as the influences exerted upon the human organism by environment and hereditary. These influences upon our physical being repeated through successive generations resolve themselves finally into law, a law as unalterable as those of the Medes and Persians, a law founded upon fundamental truths and verified in the experiments of physiological science.

The aim of education and medical science is one, so that the physiologist joins hands with the psychologist in the endeavor to restore health to the mind and to prevent degeneration, and acknowledging the bodily transmission of the sins of the father to the third and fourth generation; would fain seek in the springs of life itself the secret and cause of insanity, and this will be discovered if ever it is discovered only through a more thorough investigation of insanity itself, as manifested in all its forms and phases.

In the broadest sense we speak of mental alienation as including all the disorders of the mind; defining it we may say "Mental alienation is the total of the pathological conditions essentially characterized by disorders of the intelligence", or as implied in the disorders of the adjustment of the individual to his
surroundings or of the organism to its environment in cases due to no fault of the peripheral organism.

According to the international nomenclature adopted at Paris in 1889 the mental alienation is classified in the following manner, (I) Mania, (2) Melancholia, (3) Periodical Insanity, (Circular Insanity), (4) Progressive Systematized Insanity, (5) Vesanic Dementia, (6) Organic Dementia, (7) Paralytic Insanity, (8) Neurotic Insanity (Hypochondria, Hysteria, Epilepsy), (9) Toxic Insanity, (10) Moral and Impulsive Insanity, (11) Idiocy. The classifications are either (I) Physiological, according to the nature of the disorder, (2) Symptomatic, or (3) Depending upon the Anatomical character of the lesions. The classification evolved by Regis, which is one of the most practical and suggestive yet presented is here given.

I. Functional Alienations, (Insanities, Vesanias, Psychoses)

I. Generalized or Symptomatic Insanities

I. Mania

Sub acute (Maniacal excitation)

Acute, Hyperacute, Chronic, Remittent or Intermittent.

2. Melancholia or Lypemania

Subacute (depression), Acute (typical), Hyperacute (with stupor), Chronic, Remittent or Intermittent.

3. Insanity of double form

Continuous insanity of double form and Intermittent insanity of double form.
2. Partial or Essential Insanities.

I Systematized progressive insanity

First stage (Hyperchondriacle Insanity)

Second stage (Persecutory, religious, erotic)

Third stage (Ambitious insanity)

II. Constitutional Alienation (Degeneracies, Mental Infirmities)

I Degeneracies of evolution (vices of organization)

Disharmonies,

Defect of equilibrium, eccentricity.

2 Neurasthenias,

Fixed ideas, impulses,

3 Phrenasthenias

Delusional (multiple delusions)

Reasoning (reasoning insanity, moral insanity)

Instinctive Insanity.

4 Monstrosities

Imbecility

Idiocy

Cretinism, myxoedema.

2 Degeneracies of involution (disorganizations)

I Dementia

The number of classifications vary about the same as the number of writers upon the subject, yet they all contain substantially the same thing arranged in various ways.
Of these divisions the subject chosen for special study, is a functional generalized derangement, one of the most interesting of the series, that of melancholia. It is defined as a disorder, characterized by feelings of depression and misery which is in excess of what is justified by the circumstances under which the individual is placed. There is frequently a tendency to brood over a single subject and occasionally paroxysms of insanity.

The subject will now be considered under three heads, I A general view of Melancholia including a careful presentation of the symptoms, causes and cure, 2 Reports of cases including reaction times obtained and experimental work performed upon melancholiacs, 3 Legal responsibility of melancholiacs.

In slight cases the melancholia amounts only to a feeling of dissatisfaction, of distrust in their own powers and a general vague unhappiness, but in acute cases it is one of the most dreadful diseases which can afflict a human being. In such cases the patient by his attitude and gesture fully evidences his ailment. Question him and he does not answer, urge him and he groans in his distress, still urge him and he cries and says in a feeble monotone that he is the most miserable and wicked of men, that he is accursed of God and man, that he has committed the unpardonable sin and is no longer fit to live. A universal gloom pervades his mind and a distaste for all previous avocations and interests manifests itself, he shows a feeling of indifference toward all exercises and recreations, and indeed the entire external world. Nature presents
him with no delight, and whatever there be of beauty or gaiety or happiness around but serves to emphasize his gloom as he feels their want of kinship to his nature. But in comparing the relation of the expression to the amount of misery felt, another point should be taken into consideration. The training of man is so much directed toward the suppression of the play of emotions, that in the early stages of Melancholia where control is but little impaired the actual amount of emotion can only be faultily estimated by means of the expression. On the other hand when misery has long been severly felt and freely expressed, a habit, of complaining has grown up, which continues after all real intensity of feeling has passed away and thus in the latter stages of the malady, the expression may not be a true index of the emotions felt, but nevertheless is an important factor in the diagnosis of the disease.

The cardinal symptom of Melancholia is indicated by the definition; it is the expression of misery for which there is no justifiable foundation, the two other groups of symptoms are, defects of nutrition and of other bodily processes, and defects of conduct with occasionally the expression of delusion. The feeling of misery is expressed in several different ways, (1) by the face, (2) by the attitude, (3) by gesture, (4) by verbal expression. The expression of the face is especially characteristic, the jaws are not firmly closed although the lips remain together, giving the face an elongated appearance. The forhead exhibits several transverse rinkles, extending upward in the center are several vertical rinkles
The inner edges of the eyebrows are drawn upward and together caus­
ing the opening of the eyes to assume a triangular appearance, the
corners of the mouth point downward and the lower lip protrudes.
The attitude of Melancholia is one of general flexion, the figure
is never erect, and the head is generally bowed, one of the minor
symptoms is a tendency of the thumb to lie parallel with the finge­
ers. The most prominent gesture is that of weeping, not loud but
low sobbing, accompanied with ringing of the hands, nodding, of the
head, sighing and groaning, or rocking of the body back and forth.
The verbal expressions of misery are few and may be considered main­
lly as verbal gestures whose peculiarity is their frequent repeti­
tion and in this form of usage are no more to be considered than as
groans. In one case recorded by Dr. Savage, the patient never
opened his lips but to repeat the words, "dead and damned". He spoke
only that one phrase as if in it he did his soul outpour.

So far we have spoken only of the general external mani­
festations of Melancholia. There are other and important factors
which may be used in a diagnosis but are essentially pathological
conditions upon which the abnormal mental states depend; We will
consider them as taken up in the following classification, under
Causes of Insanity. The first division from which results by far
the largest proportion of insanity is that of I. Direct Physical
Causes. They affect mental processes by direct action on the brain,
- through violence, from increase or diminution in the blood supply
through deleterious substances carried in the blood, or through
altered nervous sensations, (a) diseases of the nervous system as epilepsy, chorea, syphilis, apoplexy, tumors, or other disease affecting brain and spine tissue. (b) Prolonged draft on vitality, over-exertion, over-study, rapid child-birth, prolonged lactation. (c) Ill health - tuberculosis, cancer, Bright's disease etc. (d) Causes incident to pregnancy and parturition - abortion, pregnancy, puerperal. (e) Traumatic causes - bodily injury and injuries to the head, sun-stroke etc.

2. Indirect physical and emotional causes which produce their effect by an indirect action upon the brain. For convenience they may be divided as follows: (a) Grief, care and anxiety, abuse, cruelty and neglect. (b) Want and privation. (c) Business reverses and perplexities (d) Feigning insanity. (e) Religious excitement.

3. The third division includes vicious habits of all kinds - Intemperance, opium, chloral, cocaine habits, sexual excess, self-abuse, and all habits of life which directly undermine the physical constitution and thus affect the brain. They are indeed direct causes, since they act through a direct poisoning of the brain or by a sapping vitality and producing a constitutional breakdown. The real proportion of insanity produced by vicious habits is somewhat smaller than a first glance would seem to show, since the natural constitution of the individual has much to do with the practice of such habits and the preservation of mental integrity. Those who through heredity are constitutionally disposed toward
vicious habits, are generally of a weak nervous constitution and are affected much more seriously by such habits than the normal individual, so that in cases of resulting insanity the vicious habits are to be considered as the strain which prematurely shattered the already weakened and hereditarily predisposed nervous system.

4. Under Constitutional and Evolutional Causes are considered three causes which point to an innate defect in the constitution or development of the individual. To a greater extent than any other one cause does heredity either directly or indirectly affect the mind. The individual may be endowed with a nervous, a susceptible or weak constitution, which at some crisis in development needs but a trifling cause to produce a breakdown. Under this head the causes may be grouped as follows, (a) Congenital and Infantile-, ante-natal influences and those producing an arrest in development, (b) evolutional and developmental—excluding those pertaining to the pubescent, adolescent, climacteric and senile periods.

In a more exhaustive review of the causes above stated, epilepsy will first be mentioned. It is a disease especially dependent upon congenital causes for its existence, and of its real nature scarcely anything is known. Frequently it is found alternating with Melancholia and other forms of insanity in successive generations, but is not so important as others in producing Melancholia. Another very prolific cause is Syphilis. It may produce mental disorder by causing loss or destruction of nerve tissues; such as organic dementia; it may cause sensory troubles leading to
mental disorder, or it may cause disorder of nutrition and function which may lead to ordinary insanity such as Melancholia or epilepsy. The way in which syphilis affects the individual, depends much upon personal idiocyncracies. It more generally affect the nervous system of those who by age, habit or inheritance are nervously weak, and in many such cases it seems to avoid the tissues more affected in others, such as the skin and mucus membrane. It is hard to make a true estimate of the number of insane to whom syphilis has been either an exciting or predisposing cause, but of the melancholiacs the number in whom syphilis is either acquired or hereditary is large. Melancholis may arise from syphilis indirectly; as in gastric ulceration, where owing to the close relationship existing between the nervous centers and the digestive tract, from disorder in one a disturbance is generally induced in the other. In regard to the condition of the blood much of importance has been obtained. The blood is generally much deteriorated in Melancholia. In forty two cases (sixteen males, twenty six females) deficiency in the red blood corpuscles was observed in fifty per cent. In women the subnormal corpuscular percentages were absolutely ten per cent lower than in men. The richness of the blood in the haemoglobin was a little lower than normal in the majority of cases and the average percentages were 93 for men, and 85 for women. In several instances the blood was deficient in haemoglobin but contained a normal number of haemacytes.
No special mention needs be made of the effect induced by prolonged draft upon the vitality from over exertion, over-study and prolonged lactation, save as to the general symptoms. The conditions induced resemble anaemia, there is a lack of initiative, a loss of self-confidence, and an exhausted condition of the nerve centers and in an organism in any way unstable, the mental processes may be affected.

Under general ill health, Tuberculosis is by far the most active in producing Melancholia. From another standpoint we may say that the concurrence and co-existence of phthisis and insanity, indicates an imperfectly developed or unstable organism with a materially lessened power of resistance; and this hereditary or acquired instability or vulnerability would manifest itself in the lungs of one individual making him under proper environment liable to the development of phthisis, while in another the instability being in the nervous system, the tendency would be to develop insanity, especially Melancholia. "Phthisis and insanity are equally potent factors in the hereditary production of brain instability," says Tomlinson, one of the most noted American Alienists. Out of 695 admissions to the St. Peter's Hospital, St. Peter, Minn., 70 had a history of phthisis in the family, and of the general insane 22% are affected with consumption, which is about three times the percent of the normal population affected. Of 104 cases of Melancholics upon whom autopsies were held by Blackburn in the Government Hospital at Washington, 37 or 35%, were found to be suffering from
tuberculosis, which was the direct or indirect cause of death. In a tabulated list of the causes of mortality in 98 American asylums, 62 of them had a death rate of from 15 to 65%, and these figures are liable to be underestimated owing to the lack of thoroughness in post mortem examinations. The hereditary relationship between insanity and phthisis was observed by Van der Kolk, who says, "It is remarkable that in the same family some of the children suffer from mania or Melancholia, and the brothers and sisters who remain free from this disease die of phthisis". The key to the solution of this question is undoubtedly in the close relationship existing between the brain and the bodily nutrition. Recent investigations point to the fact that every severe disturbance of brain function of whatever kind, is accompanied by lowering or disturbance of its trophic energising, and that such trophic lowering means sooner or later, structural or functional change in the peripheral organs and tissues (especially connective tissues) of the body.

Cancer has not produced a very large proportion of insanities and then mainly in uterine or cerebral cancerous affections in females.

Among females, disorders of the reproductive organs frequently produces insanities of different types, Melancholia predominating. We may state these causes as follows; pregnancy, parturition, abortion, amenorrhoea, etc. The insanities of pregnancy may be induced by hereditary tendencies, through neuroses, advanced stage at first pregnancy, (especially in those who are nervously degenerate),
previous nervous illness, the sex of the child, blood poisoning, or moral influences. Esquirol has said that the derangements of menstruation form one sixth of the physical causes of insanity, and Morel agrees with him. The following general conclusions are obtained from the study of five hundred lunatics. 1. That in idiocy and cretinism, puberty is usually delayed or absent. 2. That melancholiacs in great number suffer from amenorrhoea. 3. That very rarely catamenia reappears in aged insane women after a prolonged cessation. 4. That manicle exacerbations usually occur at the menstrual flow.

In Melancholia the general conditions of anaemia may produce amenorrhoea and hence asthenic Melancholia, but amenorrhoea is also sometimes the result of a plethoric condition of the system.

The growth and development of the brain in marked by many dangers. Since it is the hereditary impulses that have produced these activities, it is easy to see how any hereditary taint or misdirected impulse will abnormally influence them, but the development into insanity only occurs after the adolescent period is well on. And then may not ensue without an adequate exciting cause, possibly delaying until the senile period for its appearance.

Under the term Traumatic factor may rightly be included all injuries produced by external violence affecting the nervous system so as to become factors in the production of mental disorder or defect. A blow on the head may produce a jar, a shake, or a
violent vibration of the brain or spinal chord, the practical result of which is the suspension to a greater or less degree of fewer or more of the functions of the brain or chord. Next there may follow the molecular alterations and the perversions of functions, exhibited as psycho-neuroses or neurasthenias, and finally there may be sub-acute or chronic organic diseases of the brain and sometimes of other parts of the system. The age of the patient has some influence on the type of traumatic insanity resulting. It shows a tendency to assume the form most common at that time of life. This tendency to the production of insanity by injury is greatly increased in neurotic subjects. External violence may affect the embryo or foetus in utero. Frequently when severe shocks have been sustained by the pregnant mother, and partially conveyed to the womb, they have wrought vital disaster to the nervous and mental development to the coming child. The injuries sometimes sustained during birth may establish a neurosis or degenerative diathesis which frequently ends in Melancholia. Mental alienation when induced by bodily injury apart from the head is more an indirect than a direct result.

An important cause of the relatively large amount of Melancholia existing is the effect produced on the brain by indirect physical and emotional causes. These causes have already been stated. When the means of subsistence falls so low as to verge on starvation the nerve centers become very poorly nourished, and the
signs of alienation resulting from the direct stress of imperfect nutrition, unlike business reverses, which affect the unstable mind through the suddenness and unexpectedness of the shock, begin to show themselves. Quite commonly certain symptoms which the patient displays in the period of emotional disturbances which goes before the complete loss of self control are wrongly understood as exciting causes when they are only incident to the insanity. This is notably true of religious excitement. In the depressed periods of Melancholia the subject is restless and low spirited, introspective and dissatisfied with himself. In this state of mind his thoughts are apt to turn upon his spiritual nature, and he attends church attentively in the hope that through spiritual exaltation, he may obtain relief from his overwhelming depression. His thoughts become centered upon religious subjects, his restlessness increases, he becomes sleepless and loses his appetite and later becomes deranged. The religious excitement had to do with the production of insanity, but back of that lay ill health, business worries, overexertion, excesses of some kind, or possibly an hereditary defective nervous organization.

The causes given under the third division, which were somewhat fully treated, are either directly or indirectly responsible for about 25% of insanity.

Of the fourth division heredity is by far the most important cause. By heredity we mean a reproduction in progeny or offspring, by transmission or descent, of the salient mental and phy-
sical characteristics of the ancestral type. Race after race, individual after individual, have endowed their progeny with a synopsis of the sum total of their objective and subjective experiences, plus the similar experiences of their predecessor whether man or animal. In a more or less varying line there has been transmitted down the ages an impetus, a gemule, a germ plasm, or whatever this potentiality may be termed, which has passed from being to being added unto and strengthened in one generation, depending upon environmental resistance. Thus it is seen that the potentiality which insures that "like will produce like", when it reaches the individual may be increased or decreased in various ways, depending upon the conditions under which the organism is placed. As a rule the characteristics of the immediately preceding generation of ancestors, are impressed most strongly. "In terse terms an individual may start a neurosis or degenerative diathesis in his own life's history, or add to one originated by his parent, or modify an ancestral atavistic vice of development." Also the prepotence of one or the other parent may determine whether the offspring acquire the finally appointed armamentarium of the genus or the coarse armature of the criminal. When the degenerative element approaches a great degree of morbidity, it soon reaches a stage in the family history when the line becomes extinct, thus explaining the frequent sterility and barrenness of the defective and delinquent classes, or the degenerative developmental impulse may be so misspent or dissipated, as to render a proper development.
impossible, or the individual reaches maturity with a damaged and over susceptible organism. The other causes have been treated rather fully and will not be taken up further.

Melancholia is classified as acute, hyperacute, subacute, chronic, remittent and intermittent. These forms will now be considered. In the prognosis of Melancholia the more acute and recent attack is, the more favorable are the prospects, and following from this the longer the period of incubation and the more lingering the progress, finally the existences of hallucinations are all indices of threatening incurability. In regard to corresponding mental lesions, there is some dispute as yet. When narrowed down to the functional alienations or true insanities, the question becomes yet harder to answer. It appears that in the great majority of cases no traces are left by the acute insanities. We may suppose that maniacal conditions or those of excitement correspond to a hyperaemia and Melancholia or depressed state, to an ischaemia of certain regions of the brain and indeed with some reason, yet these purely functional disorders usually disappear at the autopsy, so, they cannot always be verified. It has been proposed to make cerebral oedema the characteristic of one particular form of mental disease, "Melancholia with stupor." The outward manifestations of these conditions are very plentiful. Hallucinations of hearing sight and the other senses are frequently noticable. Every subject of such auditory hallucinations is a dangerous patient. What was at first to them confused and inarticulate hallucinations, becomes
later organized, and to use an expression of the patient "becomes a voice". What it will say and impel them to do, depends especially on the character of the insanity and the former life of the patient. Hallucinations of the other senses are not so frequently met with in the acute form. The humility, contrition, apprehension, cares and anxieties, are merely previsions of the egoistic feeling which is evidenced in the refusal of food and the constant tendency to suicide peculiar to Melancholia. Winslow records a statement of a patient as follows:—"For six months I have never had the idea of suicide night or day from my mind. Whereever I go an unseen demon pursues me, impelling me to self destruction. My wife, friends, and children, observe my listlessness and perceive my despondency but they know nothing of the worm that is gnawing within! Among the physical disorders, one of the most prominent is the insomnia induced in acute attacks. Tactile which will be considered later is much impaired, explaining the indifference to pain which so many of the alienated show. There is frequently a loss or diminishment of the muscular sense, which possibly explains the prolonged attitude and catileptiform immobility of some among them, who at times seem to have changed to vertebral statues.

In K. K. the above symptoms were especially evident. Female sex, aged 24, not married, height five feet three, weight 130 pounds, pulse slow, distinctive melancholiac attitudes, says very little, will not always answer questions, sometimes repeats the last few words of the question asked, has no special delusions or at
least says nothing of them. Was observed going along the hall with the arms outstretched, apparently in a catapleptiform condition. She was requested to play on the piano, and there the same thing was evidenced only in a different way. She only desisted when taken away and during the playing through several changes, kept up the same monotonous performance.

Of respiration and circulation in Melancholia no definite and conclusive statement can be made, since they may vary either way between extreme ranges. The nutrition until the chronic stage is reached is very poor indeed, as a result the subject is generally in a much emaciated condition. The secretions are altered, indeed it is partly owing to the respiration (anidrosis) that the skin and hair assume their special characteristics. The temperature is lowered in all depressed or apathetic forms. From the good effects frequently obtained by washing out the stomachs of Melancholiacs, it seems logical to assume that the result produced may come through auto-intoxication.

The first period of Melancholia is that of invasion which may begin with gastro-intestinal disorders, insomnia, depression, ennui; but outside of these there seems to be no special symptoms. This stage does not last for any great length of time and sooner or later gives way to the fuller development of the disease. In culmination the principal symptoms is a painful concentration of the mind upon some characteristic delusion or hallucination. The ideas are variable between rather narrow limits. They are ordinar-
ily ideas of ruin, impotence, damnation, persecution, disgrace, and especially of culpability and imaginary crimes. Mr. H. was a good example of the latter, 50 years old, rather short stature, fair nutrition, occupation book-keeper, not very temperate, duration of insanity four years, doubtful hereditary, had attempted suicide, and since that time has been mentally unbalanced, believes that he has robbed his employer of a large amount of money, nothing can change his delusion, he believes that he is the meanest man on the face of the earth, is going to be damned, he thinks he ought to be shot, and would not make the slightest resistance in such event, he does not know what he did with the money, (his employers obtained an expert accountant to go over the book and all was discovered straight) but still he knew that he had taken the money and was consequently the worst sinner outside of Hell. His is a case of chronic Melancholia with delusions of crime and again we are reminded of the perverted egoistic impulse so frequently seen and the constant tendency to refer all evil to self. Corresponding with these delusions are special symptoms of speech. They talk very little, and then in a slow doleful tone as if the words were forced out. In acute Melancholia hallucinations are nearly constant. Several senses may be involved, but hearing is most frequently affected. They hear voices threatening and reproaching them and see all manner of disagreeable sights. In Mrs. M., aged 44, white, five feet two inches high, weight 98 pounds, Teutonic, very anaemic, hair sandy, harsh and scanty, skin dry, heredity bad, and nutrition very poor. Hallucin
ations that voices come to her in the night and tell her she is not fit to live, that she is in the road, and is eating what belongs to others. She would eat only when fed but made no very determined effort to commit suicide, again exhibiting two of the typical phases of Melancholia. The tendency to commit suicide is nearly constant but under characteristic conditions is never carried out, since the patient lacks a sufficient amount of initiative as well as the consequent will power necessary to carry out any very determined effort at self destruction and the only endeavors made are ridiculous in their futility. In Melancholia the patient frequently declares that he feels no hunger or for some other assigned cause refuses to take any nourishment whatever. But has not a sufficient amount of will power to prevent himself receiving food, when he only needs to be the passive agent. The causes for such perversions are found frequently in abnormal conditions, of the intestines as cancer, ulcers, gastric dilation, dyspepsia, gastritis, dysentery, enteritis, cystitis etc. The functional systems not less important and numerous are subural conditions, fetor of the breath, regurgitation, with pyrosis, vomiting, gastrorrhagia, and enterorrhagia, intestinal colic, meteorism, tympanitis, constipation particularly diarrhoea and incontinence of urine and faeces. These symptoms may be seen in all forms of insanity but are more especial to Melancholia, many of whose symptoms are directly traceable to such pathological conditions. Acute Melancholia does not ordinarily have as a basis, advanced stages of the above mentioned conditions. And for this
reason presents more possibilities for cure under proper hygienic treatment.

Sub-acute Melancholia, the melancholia of depression, is very common in the female, it may be either delusional or non-delusional. A rather full personal history of J. B. was obtained. His ailment had originally been acute Melancholia and a history of its progress through sub-acute Melancholia is herewith presented.

J. B. male, admitted July 13 '89, married, white, born in Germany, age at time of admittance 39, Teutonic, business livery keeper, common school education, temperate, Roman Catholic, used tobacco, duration of insanity short, not sexual, first attack, paternal hereditary none, maternal heredity—father suicided, two brothers unbalanced, cause unknown. No bruises, much headache, good nutrition, five feet seven and one half inches tall, mouth and tongue clear, appetite fair, bowels irregular, sleep poor. Special senses—sight and pupils normal, hearing good. Skin dry, slight general insensibility on right side, reflexes slightly diminished on right side, apparently chronic bronchitis. Heart normal, respiration 16 and regular, pulse 84 weak regular, genito-urinary system normal. Delusions of persecution, suicidal tendencies but no homicidal, inhibition poor. Patient suspicious, fears that he is going to receive some bodily injury, he is rather depressed but talks freely and answers questions, has no peculiarities of speech. His parents were born in Germany, no relationship existed between them. His father was
aged 37, his mother 39 at his birth. His mother died of consumption
and rheumatism. J. B. was an industrious worker, temperate, uniform
disposition, rather successful in business, chewed tobacco and out
side of this had no vicious habits. The assigned causes are hard
work, business complications, and the worry consequent to the care of
a sick child with whom he staid up nightly during the previous May.
In June he became nervous and excitable, he said some one was going
to take his property from him and was going to jump into the canal.
He was treated by sedatives which induced some constipation. He
seemed to get better until July 4th, when he jumped from the upper
story window, sustaining a rupture of the inguinal regions but which
was however readily reduced. He was now very weak physically
and made only one attempt at suicide afterward when he again jumped
from a window. It was only necessary to restrain him during the
last two or three days before taking him to the County jail. During
this time he was watched and held down by neighbors. July 13th, '89
present condition feeble, emaciated. Pulse normal, pupils equally
dilated, voice unnatural, stammering and hesitating, hands sweaty,
appetite poor, sleep induced only by means of narcotics, digestion
bad. There were no signs of paralysis until after his fall when
symptoms of concussion of his brain and spine appeared in the par-
alysis of the lower extremities which lasted about eight hours.
This was removed by means of counter irritants. He talks about his
debts and family, but is occasionally observed talking to himself.
Sept. 22nd, he has no delusions, he wants to work, and appeared cheer-
ful when informed that he was to be sent home soon. He was sent home but was returned in a few days as he had become violent. Feb. 19th, his wife died and it was thought advisable to take him to the funeral. On arriving that morning on which he was to leave he said that it seemed to him as if something awful had happened. Upon his return he seemed to feel the death of his wife very much and appeared more quiet. He continued in the same state for some time verging toward chronicity. Oct. 6th, '90, Appetite fair, bodily health good, sleep very disturbed, habits very cleanly, he is still willing to work, takes care of the supervisor's office, seems always depressed and cries for the least cause. Nov. 11th, becomes very much grief stricken, he talks much of his family and of his desire to see them. June 16th, begins to talk of himself, he remains stationary until July 15th when he seems to improve some since he does not cry so much. Aug. 2nd, he still continues neat and tidy but is constantly depressed and talks of home. Aug. 22nd, appetite fair, bodily health good, sleeps well, talks much. Sept. 22nd, he seems to have no realization of his condition but cries continually, wants to go home to his children. Stationary until Dec. 22nd, talks of home and children and cries. Stationary until March 23rd, health good, wants to go home, still worse. May 20th, he said today that he thought he was well enough to go home. June 20th, it is difficult for him to comprehend, he worries a great deal, works very faithfully. July 22nd, worries constantly and cries, writes home once or twice a week. Sept. 12th, his health and appetite are both good, he talks much of the
time when he shall go home. Jan. 12th, '91, he is afraid of some harm which may befall him and cries constantly, assigning for a reason his desire to go home and see his children. Stationary. April 27th, nervous at times. March 23rd, His appetite poor, sleeps well, talks much of his brother George and sister Lucy. Stationary. Appetite good, becomes delusional at times and may be disturbed or quiet. The rest of his history has been the regular progress into chronic Melancholia, he now works very little and talks less, although most of his bodily functions are in very good order. He sits and sobs, rocking back and forth and at times no amount of questioning will induce him to reply. At this stage of the disease the patient avoids all labor, all activities and social life, he isolates himself and incapable of making any effort or wish, remains for months at a time in a position of absolute passiveness. A designation for this phase of insanity sometimes used, is Melancholia with reasoning. The subject feels and comprehends his condition and is sometimes capable of resisting his pathologically homicidal or suicidal impulses. Subacute Melancholia generally manifests itself in more or less sudden attacks, liable to termination at any time, so ordinarily recovery takes place with the possibility of relapse. The prognosis is more grave than that of acute Melancholia.

The third division of Melancholia to be considered is the Hyperacute or Melancholia with stupor. From a psychic we may differentiate between cases where there is simple stupor without delusions i.e. passive, and those wherein the stupor is only peripheral
and the mental activities are exceedingly active. In the latter the patient may become the subject of the most frightful delusions and hallucinations and indeed when Melancholia is invested with these characteristics, it is a fearful disease. Frequently they remain in one position for whole months, as lying in bed, sitting down, or doubled upon themselves with the immobility of a statue. Occasionally under the influence of a sudden impulse they drop all at once their torpor, have a period of agitation or commit some act of violence, then relapse into their former impassibility. For instance Mrs. G., who had long been in a Melancholiac stupor, suddenly arose herself to say, "Cut my throat and let me die". The attendant questioned her upon the reason for this request. She answered, "Because I am so shocked", then relapsed into her former condition, from which she recovered at the end of some months. Hyperacute Melancholia is susceptible of cure, but when prolonged results in physical degeneration. It is considered as a phenomenon of arrest. The anatomical alterations may be either oedematous conditions of the brain, which is not constant or an atrophy of the convolutions.

Chronic Melancholia is merely one of the modes of termination of the other forms. The physical symptoms may improve but the psychical symptoms become somewhat attenuated, gaining in intensity as they lose in quantity. Ideas of persecution or of religious delusions predominate, frequently accompanied with multiple hallucinations and differing from the progressive systematized delusions by the etiology and the existence of a degree of depression
with Melancholic paroxysms and a tendency towards suicide. In chronic Melancholia consequent to the anxious forms, the most absurd hypochondriacal conceptions are frequently present. Mrs. Y., upon being questioned as to her name, responded, "I have no name, I am no one, I have no body, no head, no limbs, I am a voice, I am an echo," or the man who so frequently called attention to the resonant qualities and the beautiful polish of the hollow steel ball which he possessed in place of a head. Many of these delusions lead to the formation of a double personality. Chronic Melancholia is incurable. It may continue indefinitely and finally merge into Melancholia dementia. The last form to be considered is that of Remittent and Intermittent Melancholia. Remittent Melancholia is a continuous form in which between the regularly returning crises or paroxysms, there are periods of attenuations or remissions. Intermittent Melancholia differs from remittent in that the attacks are not separated by simple periods of ameliorations or remissions, but by intervals of complete returns to the normal conditions. When in its heightened form, the insanity is generally acute or sub-acute. Intermittent and Remittent Melancholia are in no ways varieties from a symptomological point of view, but are distinguished by the following points. (I) The attacks are reproduced in a more or less regular fashion. (2) That they are usually identical with each other, (3) That they begin and end as a rule suddenly, (4) That they are always separated by remissions or intermissions, (5) That the duration of the alternation is indefinite and ceases only when chron-
ticity has appeared. These forms as well as the insanities of dou-
ble form are more special to the degenerated and congenitally dis-
posed. The general treatment used in Melancholia consists in a
special oversight of the patient, Russian and Turkish baths, fric-
tional electricity, in acute forms nervous sedatives, purgation and
douches and different forms of tonics. The following table is con-
densed from a large amount of statistics.

<table>
<thead>
<tr>
<th></th>
<th>Recovered</th>
<th>Died</th>
<th>Relieved</th>
<th>Chronic</th>
</tr>
</thead>
<tbody>
<tr>
<td>M. Simple</td>
<td>61.7</td>
<td>14.5</td>
<td>13.4</td>
<td>10.6</td>
</tr>
<tr>
<td>M. Acute</td>
<td>54.9</td>
<td>23.5</td>
<td>5.8</td>
<td>15.6</td>
</tr>
<tr>
<td>M. Delusional</td>
<td>55.5</td>
<td>14.5</td>
<td>14.3</td>
<td>16.0</td>
</tr>
<tr>
<td>M. Recurrent</td>
<td>50.0</td>
<td>12.5</td>
<td>12.5</td>
<td>25.0</td>
</tr>
<tr>
<td>M. Hyperacute</td>
<td>63.6</td>
<td>9.0</td>
<td></td>
<td>27.2</td>
</tr>
</tbody>
</table>

From this it is seen that Melancholia is susceptible to
cure in a much greater degree than most of the other forms.

The following are some of the results obtained from the
autopsies of 104 melancholiacs at the Government Hospital at Wash-
ington. In almost every case where the disease had existed some
time, decided atrophic changes were found in the convolutions and
nearly always most noticable over the fronto—parietal convexity and
the anterior portions of the median surfaces. The dura mater was
adherent to the skull in many cases especially to elderly subjects.
Shrinkage or atrophy of the convolutions was observed in the major-
ity of cases. The average weight of 83 male brains was 44.005 oz.
Of the female brains seven in number, the average weight was 43.62 oz. The facts can be appreciated when it is known that the normal brain is from 45 to 50 oz. in weight. The average weight of the brain in 75 males in whom the disease had existed over a year was 46.64 oz. General reduction of consistence, oedema, and enlargement of the perivascular spaces were found in various degrees in nearly all the chronic cases and frequently in a minor degree in the acute forms. Lesions of the cerebellum, pons and medulla, were not common and the spinal chords were generally found to be normal. The microscopic examinations added but little to the knowledge already obtained. Generally in the acute cases no structural alteration could be discovered, though some showed decided degeneration in the nerve cells and vessels, these were no doubt closely connected with the mental symptoms. Of the diseases of the other organs, tuberculosi s of the lungs was found in thirty five cases. The disease was found accompanied by tuberculous affections of other organs and was in many cases the direct or indirect cause of death. The heart showed valvular disease accompanied by hypertrophy and dilation in at least eight cases and chronic disease of the valves as well as six cases of atrophy of the heart were found, usually in connection with phthisis. The diseases of the kidneys were usually chronic in character. In thirty five cases they showed a degree of contraction deemed of pathological importance, shown by adhesion of capsules, by the granular surfaces, the cortical atrophy and the reduction in weight. There were sixteen cases of lesser contraction and eight
of other affections. The urine which must necessarily be affected will be considered later. Five malignant tumors were found, all of which were carcinomata, in one case the prostrate gland was the seat of the tumor.

Two regular autopsy reports are here given,

Acute Melancholia

No. 36. (Head not examined). Heart, weight 7 3/4 oz, calcareous deposits at the base of aortic valves. Lungs, right adherent at apex and upper lobe, left free. On section both hypostatic at bases posteriorly, most marked at right. Areas of pneumatic consolidation in right lung lobular in character, one focus only in left lung. Kidneys, Weight of left 4 1/2 oz., right 3 3/4 oz. Capsules adherent, surfaces granular. On section chronic interstitial nephritis. Uterus, Fibroids of Fundus uteri, small cyst of left broad ligament. Mesentric Glands enlarged.

Chronic Melancholia.

(Head not examined) Heart, weight 8 3/4 oz. Pericardial walls very thick; the sack contains a few drams of clear yellow fluid. The epicardium markedly fatty. Mitralis slightly thickened; orifice admits of three fingers. Slight thickening along the attached borders of the aortic valves. Muscle pale, flabby, on section fatty degeneration exhibited. Lungs, left very adherent throughout; on section well filled with large and small tubercular deposits, a large cavity occupies the apex and a number of smaller ones scattered through the lungs contain purulent fluid and caseous material.
Right also firmly adherent through out, one small cavity at the apex containing purulent fluid and caseous material, lung filled with hard nodular masses composed of aggregations of tubercular deposits. Lung.

Liver, weight 29 1/4 oz. Peripheries of acini fatty. Superficial blood vessels very distinct. Gall Bladder, chololithaisis (19 dark stones each the size of a pea, also a quantity of dark fluid bile).

Spleen, weight 3 1/4 oz, very dark and friable. Kidneys, weight of left 3 1/2 oz, right 3 1/4 oz. Capsules strip readily, leaving the surfaces irregular and granular, covered with a number of cysts from the size of a pea to that of an almond, containing clear yellow fluid. On section, fatty degeneration and chronic interstitial changes exhibited.

Intestines, in ileum and ileo-caecal valve, numerous small ulcers averaging a pea in size, chiefly situated opposite mesentric attachment. Uterus, very much atrophied, some erosion of cervix.

Since so many of these conditions are peculiar to Melancholia as compared with other forms of insanity, it must be admitted that a very close relation exists between physical and psychical health. And that frequently they may be used interchangeably the one as an index of the other.

That insanity may as one of its effects render a person not responsible for his actions, is recognized by the statute law as well as by the common law of most countries. The guilt or innocence of the accused is determined and secondly in the event of the verdict being against the accused, the question of his sanity...
if brought up is determined and if he is deemed not responsible for his actions, he is treated as are other insane. Thus in the case of the defendant who is found by a jury at his trial to have been guilty of the offense charged against and yet to have been insane, every care is taken to protect the public from any possible depredations by him in the future, whilst the prisoner himself receives at once such care and treatment as his insane condition may require. Regarded from this point of view the question becomes somewhat more simple as well as more practical. It is a less complicated problem to determine in a given case whether a prisoner shall be treated as a criminal lunatic or as an ordinary prisoner, than it is to define in the abstract the exact degree of mental defect or derangement which renders a person insane, so as not to be according to the law responsible for his actions. The question of insanity is always one of degree and the degree of aberration varies in the same person at different times. The point that determines the degree of aberration, that is pronounced insanity, is usually such a state of character and conduct that the person has reached or is liable to reach, that renders him or will render him highly objectionable, troublesome or dangerous to others. The peace, safety, and welfare of others and of the person himself usually determine the question, whether he shall be called insane or not. In delusional forms of insanity and manic forms, there is little difficulty in determining whether the individual is or is not responsible for actions committed by him. But in such forms as Melancholia whereas as
been said and excessive amount of grief or misery exists compared to the exciting causes it is different. This feeling may have existed for a long time and the individual being sufficiently adaptable to restrain himself so that differences, if any, noticed in his behavior were only slight. Suddenly without the slightest warning we find that he has committed suicide or has murdered his family. He possibly knows that he has done wrong, but thinks that he has taken the only step out of the dilemma. From the fact brought out before, it is therefore evident that in many cases the melancholic is responsible for his actions.

Hale, who wrote in 1670, says there is a total insanity and a partial form. "The person affected with the total insanity is not responsible for any of acts and the responsibility of the partially insane must be determined by the circumstances of the case." Blackstone considers that if a man be insane, he should not be tried and if he becomes insane afterward, sentence should neither be pronounced nor judgment executed. In response to the statement that a man to be irresponsible Erskine says, no such madman ever existed in the world, (This does not include some cases of imbecility or senile insanity). The other important point upon which Lord Erskine insisted and the most important was contained in the following passage of his speech:— "When a man is laboring under a delusion, if you are satisfied that the delusion existed at the time of the committal of the offense, and that the act was done under its influence, then the accused cannot be considered as guilty of any
crime. The summing up by the judge was as follows: "To be sure if
a man is in a deranged state at the time, he is not criminally re-
ponsible for his acts but the material part of the case is whether
at the very time the act was committed the man's mind was sane,"
farther he stated that it was necessary for the prosecution to show
the sanity of the defendant. This was during the trial of James
Hadfield for the attempted murder of the King, which occurred in 1800.
In the case of Edward Oxford charged with firing a loaded pistol
at the Queen in 1840, the attorney General said in the course of
his speech that to make the defense of insanity effective, counsel
for the defense must show that at other times the party in whose
behalf the plea was set up had exhibited marks of insanity and also
that at the time the act was committed he was in an insane condi-
tion and that he was unable to distinguish between right and wrong.
At another time Lord Lyndhurst in a speech before the House of
Lords said as follows: "The question to be determined is whether
at the time the act in question was committed the prisoner had or
had not the use of his understanding so as to know that he was
doing a wrong or wicked act. If the jurors shall be of opinion that
the prisoner was not sensible at the time he committed the act,
that he was violating the law, then he would be entitled to a verdict
in his favor, but if they are of the opinion that when he committed,
the act, he was in a sound state of mind, then their verdict must be
against him." In this case also the defendant was acquitted. A set
of five questions was submitted by the House of Lords by the Eng-
lish judges and in reply, the answers following were received.

1. What is the law respecting alleged crimes committed by persons afflicted with insane delusions or partial insanity, when the accused knew he was acting in violation to law but did the act under an insane delusion with the intention of redressing or revenging some supposed grievance or injury or of producing some supposed public benefit?

Ans. If the person knew he was acting in violation to the law of the land whatever his intention, he shall not be exempt from punishment.

2. What are the proper questions to be submitted to the jury when a person with insane delusions is charged with some crime?

3. In what terms ought the questions be left to the jury as to the prisoner's state of mind at the time when the offense was committed?

Ans. To acquit the accused, it is necessary that the defense establish the fact clearly that at the time the offense was committed the accused was laboring under such a defect of reason as not to know the nature of the act he was doing. The usual course is to leave the question with the jury, as to whether the defendant had a sufficient degree of reason to know that he was doing an act that was wrong.

4. If a person under an insane delusion as to existing facts commits an offense in consequence thereof, is he thereby excused?

Ans. Here it would depend upon the character of the delusion.
as to the defendant's responsibility? For instance if he killed a
man under the delusion that that man was attempting to take his
life, then will he not be held responsible. If on the other hand he
kills him in order to gratify some supposed spite that he has con­
ceived against that person, then is he to be held responsible and
liable to punishment.

5. Can a medical man merely from facts gained at the trial,
be relied upon to give a true statement of the degree of insanity
of the accused and the condition of the defendant's mind at the
time of the commission of the crime?

Ans.- The latter is especially more a matter for the jury to
decide but for a correct decision the physician's opinion is re­
quired.

At present there is nothing more difficult than the appli­
cation of the law in insane subjects. The knowledge of right and
wrong in its broadest sense involves a capacity to reason and draw
conclusions from facts, this of course implies a sound mind. In a
general sense a person may be said to be insane so as not to be
liable to legal punishment: 1. when his mental condition is such as
to render him unfit for penal discipline. 2- When in the words of
Lord Blackstone "disease of the mind was the cause of the crime" or
when in the words of Mr Justice Stephen," The accused was deprived
by disease affecting the mind, of the power of passing a rational
judgment on the moral character of the act which he meant to do." But
it may be said that the law of the present day is about a hundred
years behind the times since no recognition is made of the fact that disease may affect the will power and render a person unable to restrain their criminal propensities even though knowing that such acts are in direct violation to the law. In such cases it seems hardly right to hold the individual directly responsible for his acts.

Mental Alienation and Especially Melancholia as Examined by Experimental Psychological Methods.

The relations existing between the mental conditions and the nervous activities are very intimate, in fact they are one and the same thing in so far as their relations to health and disease are concerned. In normal man we may speak of the amount of intellectual capacity, but this can never be stated accurately since it cannot be measured or obtained concretely, however an index may be found in the various results obtained as time reactions and from the temperature and heart pulsations of the subject. The simple reaction time which is the basis of all other measurements of psycho-physical operations has been the subject of inquiry at the hands of numerous observers with respect to the normal reaction time to acoustic, visual, tactual or gustatory stimuli as well as the variations observed under diverse physiological and pathological conditions and alterations in the intensity or nature of the stimulus applied.

Simple as the mechanism is (which will be described later)
it is absolutely necessary in dealing with normal and much more so with insane subjects, to observe certain precautions: First as regards the patient, he should be told beforehand exactly what is expected of him and what he may expect and should be given a few preliminary trials. Instruct him to keep his finger on the contact breaker at slight tension so that no time will be lost in breaking circuit. In certain subjects it is necessary to insist upon keeping the attention upon the bell and responding as quickly as possible. The room where the experiments are carried on, should be as quiet as possible and nothing allowed in the room which may distract the subject's attention. So vagrant becomes the attention of many from visual impressions, that it is often necessary to blindfold the eyes when testing the reaction to acoustic stimuli and in testing the reaction to visual stimuli the most absolute silence should be maintained. Each case must be treated on its own merits and care must be taken not to arrouse by any stray remark the slightest emotional disturbance. Even with a normal subject such interruptions are very distracting but are much more so with the insane. After a series of preliminary trials when it is obvious our subject has accustomed himself to respond properly a series of test trials should be taken. We never exceed twenty trials with these subjects, since beyond this number a large proportion of cases betray some exhaustion from the sustained attention requisite; an average is struck from their total and the maximum and minimum delay also recorded.
The simplest reaction may be defined as a signaling by a predesignated movement that an expected stimulus has been received. We are informed that a bell is about to strike and that as soon as the sound is heard we are to press a key, the time intervening between the striking of the bell and the pressure of the key is a simple reaction time. In this process we distinguish as physiological factors, (a) the impression of the sense organ, (b) the passage of the impulse along different nerves (and it may be the spinal cord together with delays whenever the impulse enters cells) to the brain, (c) the passage of the return efferent impulse from the brain to the spinal chord and the nerves and muscles and (d) the contraction of the muscles. The factor thus unaccounted for, the transformation of the sensory into the motor impulse, is a center or psychological factor of which we have regretfully knowledge. It is however the variations of this factor and the influences by which its time relations are favorably or unfavorably affected that interests us more especially. That sense organs have a certain inertia, is shown by the fusion of rapidly succeeding images or stimulations and by experiment, may be easily eliminated by further research. The rate of the nervous impulse may be considered as a result of many experiments to be about 110 feet per second for both sensory and motor nerve. The latent time of the muscle and time of its contraction have been determined and form a slight and constant factor. With these facts in view, it has been estimated that in a reaction from eye to hand involving 150...
process and the remaining processes occupy about equal times. So in tests of abnormal subjects, it is necessary to take into consideration the pathological conditions both physical and mental, which exist in the patient. Other conditions affecting reaction times in both normal and abnormal subjects are (1) the number of distinctions and choices, (2) specific nature of the impression and the reaction, (3) the foreknowledge of the subject, (4) the association of stimulus with motion, (5) a frequent overlapping of mental processes.

The greater number of observers give .19 sec. or even less as the normal reaction time to visual stimuli and from .14 to .15 sec. to auditory stimuli. Taking .19 as the standard in health we find notable delay in those cases of paralysis and stuporous Melancholia in whom the visual reaction times were tested. No efforts were made to discover the relations existing between the various senses as regards their liability to diminution in sensitiveness in the various mental affections.

The tests made were as follows, (1) Auditory reaction time, (2) Visual reaction time, (3) Sphygmographic tracings, (4) Pressure sense, (5) Temperature. Following are the details of the processes with further on a tabulated list of results.

I. As shown in photograph number 1, the apparatus used was an improved chronometer measuring to .01 seconds accurately with the necessary electrical connections and an electric bell. It was so arranged that upon the operator closing the electric circuit, the
bell would ring and the chronometer would start the subject was instructed that as quickly as possible upon hearing the bell he should break the circuit with his circuit breaker, which was obtained with slight pressure. Simultaneously with this the chronometer ceased running and the reaction time was noted down, the averages of a number of experiments are given below in conjunction with those of visual stimuli.

2. The reaction time to visual stimuli was obtained by means of the apparatus and electrical connections as exhibited in photograph number 2. The apparatus used was a shutter behind which was concealed an object, the shutter was so arranged that it could be dropped and at the time the object came into view, the shutter struck a circuit closer, establishing the circuit and setting the chronometer into operation, the subject then broke the circuit at the moment when he was able to speak the name of the object. A series of tests were made upon different persons and are presented farther on in connection with the other reports.

3. In the various conditions of insanity the influence of the nervous system upon the heart and circulation is such that in nearly every case the sphygmographic character of the pulse is altered in some way from the normal, and for purposes of diagnosis as well as prognosis the instrument is frequently of valuable service. From the nature of the apparatus obtainable it was impossible to take any tracings except from the carotid artery. Further on will be found tracings sufficient to exhibit the special characteristics.
of first the normal pulse, second the Melancholic pulsation, third
the epileptic circulation, and fourth exhibits characteristics of chr
onic Melancholia. Number I is a good sample of normal tracing, the
descent is marked by several undulations, the point is sharp and
the ascent abrupt, the pulse is about seventy five per minute and
the heart's action strong and the arteries well filled. Number 2
exhibits the characteristics of Melancholia, the pulse excepting in
acute cases is slower than usual and from the tracings and imperf
ect filling of the vessels and an imperfect cardiac systole is indi
cated. The upstroke is short and slanting and the down stroke
prolonged and undulating. The tension is very low so that if much
pressure is used the pulsations are entirely lost. Number 4 exhib
its the phases of chronic Melancholia especially well. The heart's
action as evidenced by the tracing, is much stronger than that of
No, 2 and in short is what we might expect in the return of bodily
health which ensues in chronic Melancholia. The manner of using
the apparatus is shown in the accompanying photographs, but possibly
its construction is well enough known not to need farther descrip
tion.

4. Testing for sensibility to pressure is performed as fol-
lows: any portion of the body selected is denuded of hairs and rub-
bed with oil. A series of cork weights from .01 milligram up to
several milligrams are obtained and beginning, a very light one is
gently placed upon the skin, if possible so as not to be felt, if suc
cessful, weights are added until felt. At some of the more sensative
portions of the body mere contact of any perceptable weight suffices to produce a sensation and in such cases the skin sensibility is tested either by the variation in weight which the subject is able to distinguish or by obtaining the least distance at which the subject is able to distinguish between two points of contact upon the skin. The sensibility of the skin varies greatly on different portions of the body.

The following are some of the reaction times obtained in normal subjects and Melancholiacs. The first five are normal.

<table>
<thead>
<tr>
<th></th>
<th>Auditory</th>
<th>Visual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self</td>
<td></td>
<td>.13</td>
</tr>
<tr>
<td>R. H.</td>
<td></td>
<td>.15</td>
</tr>
<tr>
<td>I. H.</td>
<td></td>
<td>.16</td>
</tr>
<tr>
<td>R. L.</td>
<td></td>
<td>.13</td>
</tr>
<tr>
<td>D. A.</td>
<td></td>
<td>.16</td>
</tr>
<tr>
<td>R. W. Simple Melancholia</td>
<td>.29</td>
<td>.30</td>
</tr>
<tr>
<td>M. L. Simple Melancholia</td>
<td>.22</td>
<td>.25</td>
</tr>
<tr>
<td>S. W. Climacteric Melancholia</td>
<td>.29</td>
<td>.24</td>
</tr>
<tr>
<td>J. W. Hypochondriac Melancholia</td>
<td>.23</td>
<td>.26</td>
</tr>
<tr>
<td>G. A. Delusional Melancholia</td>
<td>.20</td>
<td>.24</td>
</tr>
<tr>
<td>J. W. Depressed Melancholia</td>
<td>.23</td>
<td></td>
</tr>
</tbody>
</table>

(reaction times for comparison)

The average reaction times for a few forms of insanity are as follows:

<table>
<thead>
<tr>
<th></th>
<th>Auditory</th>
<th>Visual</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Paralysis</td>
<td>.19</td>
<td>.23</td>
</tr>
</tbody>
</table>
None of the patients examined suffered from any very serious degree of Melancholia such as would have prevented them from entering fully into the interest of the trial. And from another observation on normal subjects the limit of variability for auditory stimuli has been found to be from .12 to .18 of a second and for visual stimuli from .15 to .22 of a second. In the insane the former is only exceptionally below .20 and the latter rises from .24 to .30. The prolongation of the reaction times in Melancholia arises from the general defect in nutrition throughout the whole body and this defect is always of the nature of a slackening, weakening diminution of the activity in the process of nutrition. In all the parts of the body that are open to observation, nutritive defect shows itself conspicuously in the pathological conditions:

In the normal subject, weights of .02 gr. can be distinguished on the forehead and of .03 gr. on the abdomen. In melancholics the sensibility is never so acute as normal, frequently a gram weight cannot be distinguished on these portions. On the palm or digits normally .02 gr. can be distinguished. The figures following show the susceptibility for variation as shown by normal subjects.

<table>
<thead>
<tr>
<th></th>
<th>Auditory</th>
<th>Visual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alcohol Insanity</td>
<td>- - - - - - -</td>
<td>.21</td>
</tr>
<tr>
<td>Epileptic Insanity</td>
<td>- - - - - - -</td>
<td>.23</td>
</tr>
<tr>
<td>Chronia Mania</td>
<td>- - - - - - -</td>
<td>.25</td>
</tr>
</tbody>
</table>

For 1 gr., .32 gr. can be distinguished as a variation
For 5 gr., .96 gr. can be distinguished as a variation
For 10 gr., 1.4 gr. variation can be distinguished
For 20 gr., 2.4 gr. variation can be distinguished
For 100 gr., 7.4 gr. variation can be distinguished.
In these there is shown a constantly decreasing ratio. Frequently in Melancholiacs the pressure spots are deadened and no variation in pressure can be distinguished. The method for testing "local sign" gives in many abnormal cases very exaggerated results. A very peculiar and unexpected fact in the study of the temperature is, that it is generally about a half degree above the normal average, frequently it rises to 101 degrees.

Concluding we may say that advanced research upon the lines suggested here has given much that is of value to science and especially to medicine and in the future will be the means by which much more of importance both to the physician and the unfortunate sufferer will be gained.
Auditory reaction time.

Pressure sense.
Sphygmographic tracings

Visual reaction time.