A Paper

ON

NERVOUS AND MENTAL MANIFESTATIONS
OF THE CLIMACTERIC.*

BY

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THE climacteric or involutional period is that phase of life during which the reproductive functions diminish and become finally extinct. The most obvious manifestations of it in women are the disappearance of menstruation and power of conception; but associated with it, and, in fact, forming an essential part of it, are a series of bodily and mental changes, the appearance of which frequently precedes the onset of menstrual irregularity, and which often continue for a time after menstruation has stopped. Those of them which will form the basis of this discussion are more or less transient, but others are permanent, and are the hall-marks of middle age. Such are wrinkles, grey hair, and a calmer, if more conservative and less romantic, outlook on life.

The majority of women pass through the climacteric with its psycho-physiological adjustments without great discomforts, and in some, who are specially favoured perhaps with a balanced natural equipment and a happy environment, it hardly causes a ripple in their lives. Others, however, are less fortunate, and to the nervous and mental disorders which beset them special attention will be given.

Men, as well as women, are compelled by nature to experience this period of involution, but in them it begins about ten years later, and on the whole the reactions are less intense. It is an easier transition, unaccompanied by flushes and other discomforts of vasomotor origin, and although their waist line increases, and they lose their youthful vigour, middle age is apt to be accepted more philosophically, perhaps because their interests are more diffuse and absorbing, and the loss of the power of reproduction means less to them than to women. But, in general, the mental and physical changes at the climacteric are of the same order in men as in women, although, because of the later age at which it occurs, and the greater liability to arterial degeneration, complicating psychoses more often merge into the pre-senile degenerative mental states. I propose, therefore, to confine my contribution to the discussion to the nervous and mental phenomena in women at the natural climacteric, and to do no more than indicate, when occasion arises, features that distinguish the artificial menopause from ovariectomy in young women.

PHYSIOLOGY OF THE CLIMACTERIC.

Involution is essentially a physiological process, a general reaction to ovarian deprivation. It commences, as a rule, between the ages of 40 and 50, and lasts for two or three years. There is much that is yet unknown about the nature of the reaction, but it is clear that the primary response is due to other endocrine glands, more particularly those that are in most intimate functional relationship with the ovaries. Of these, the suprarenals, pituitary, and, in particular, the thyroid, play a leading part. Involved in the reaction is the nervous system, through the autonomic or vegetative portion of it, which is delicately influenced by, and in turn influences, the so-called ductless glands, especially the thyroid and suprarenals.

From the available experimental and clinical evidence, it would appear that the glandular reaction may be towards increased or diminished activity, which, however, is not uniform, but in general varies with each gland, and also

with the constitution of the individual. According to Maranon,¹ whose work ought to be studied by those who are interested in the subject, there are usually signs of overaction of the thyroid in the normal climacteric, to which, with lowered threshold of response of the sympathetic nervous system, may be attributed such symptoms as emotionalism, palpitations, tachycardia, sensations of discomfort in the chest, sweating, loss of weight, and occasionally goitre. Less often, manifestations of diminished thyroidal function appear, with signs of myxoedema, such as lethargy, sluggish mental reactions, dryness and inelasticity of the skin, slow pulse, loss of hair, and increased sensitiveness to cold. They are more common after castration than in the natural climacteric (Maranon). My personal observations agree with those of Maranon, and have led me to believe that the affective reactions at the change of life are, although other important factors come into play, the result of dysthyroidism. If the obesity of middle age can be attributed to the pituitary, this gland reacts to ovarian insufficiency more often by diminished than by excessive activity. Examples of acromegaly, however, do occur, and I have at present two patients under my care at the London Hospital.

In regard to the suprarenals, it has been shown by Hannan² and others that the flushings of the climacteric can be provoked by subcutaneous injections of small doses of adrenaline, and, in fact, in their symptoms, resemble the reactions to adrenaline in pre-climacteric people. It is possible also that the transient hypertension and glycosuria common at the change of life are due to hyperadrenalism, a view that is held by Culbertson.³

The functions of the cortex of the suprarenals are still imperfectly understood, but the development of masculine features in cases of adenoma of this portion of the gland may indicate that the occasional growth of coarse hair on the chin, legs, and trunk, a deep voice, aggressiveness, and other supposed male attributes may be due to excessive functional activity of this portion of these glands.

The physiological basis of climacteric symptomatology can therefore be said to consist of instability of certain endocrine glands, and through them, of the autonomic nervous system, the whole train of events being set going by ovarian insufficiency. This state of physiological unrest temporarily upsets the mental as well as the physical balance of the individual by giving rise to emotionalism, with a general tendency towards gloominess, apprehensiveness, and irritability. In all probability it is to dysthyroidism that the affective reaction is mainly to be attributed.

SYMPTOMS OF THE NORMAL CLIMACTERIC.

After ovariectomy at the pre-menopausal age, arrest of menstruation is the first of the train of events that follow abolition of ovarian function, but in the natural climacteric, occurring at the usual age, other symptoms and signs, notably emotionalism and flushes, commonly precede menstrual irregularities, and persist for a time after menstruation has ceased. It is for this reason that Maranon¹ has rightly insisted on the recognition of three stages in the clinical picture of the climacteric: (1) pre-menopausal, (2) menopausal, and (3) post-menopausal.

In briefly describing the phenomena of the normal climacteric I will mention only the more usual symptoms and signs which come within the field for discussion. Of these the most constant can be grouped under the headings of emotional instability, vasomotor reactions, and change in sex feelings. As an illustration let us take the case of a married woman who has had, on the whole, a healthy life, a small, well-doing family, a moderate share of difficulties, and has dealt with them courageously and successfully. At the onset of the climacteric, slight changes in temperament are noticed by the members of her family and her intimate friends. She becomes more easily worried and upset by trifles, is apt more than before to take a gloomy view of events, and to be obsessed with the difficulties that crop up in ordinary domestic and social life. Phases of depression distress her, and she surprises her friends by breaking into tears for insufficient reason. She becomes irritable and fault-finding, especially with her husband, children, and servants, and may at times be

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peevish and complaining, so that nothing seems to be right. She appears to live in a state of mild anxiety and apprehensiveness, and will say that she does not understand what has come over her. Her sleep is disturbed by flushes; dreams of domestic difficulties trouble her, and she is liable to wake early with her mind full of worries. As the day goes on she improves, and by the afternoon is almost herself again. In spite of it all, she manages to run her house, see her friends, and carry out her other duties in an apparently competent fashion, but she and her family feel the strain.

When her periods become irregular, and in time cease, she knows that she is going through the change of life, and bears it more or less philosophically. Gradually she regains her accustomed emotional balance; her flushes become less frequent, till at last, usually some time after the menopause is over, this rather disturbing crisis is passed, and peace is restored.

The flushes which form so common a feature of the climacteric and act as an irritant, compelling attention to the bodily state, warrant a separate, if brief, description. They occur in attacks, momentary or lasting for minutes, which vary in frequency and intensity, but are often worse in the night, probably because they are excited by warmth in bed. In the longer attacks they may be preceded by headache, palpitation, or a sense of oppression in the chest, symptoms which disappear with the onset of the flush. This consists of an erythema, which is distributed chiefly to the head and neck, and is accompanied by a general sensation of warmth, with or without waves of heat. These waves spread rapidly. In the night attacks there is often a sense of suffocation that compels the woman to sit up to breathe. Flushes are often spontaneous, but may be provoked by emotional disturbance, by increase in the external temperature, or by taking food. The slight attacks are much milder, and consist only of a sensation of warmth, followed by mild sweating, that gives rise to little distress.

Other nervous symptoms, such as headaches, pains in different parts of the body, giddiness, and itching, either general or in the external genitals, are common and distressing enough, but are less frequent than flushes, and may be mentioned here only in passing. With the flushes they are, however, important, not only on account of the physical discomfort to which they give rise, but even more because they aggravate the tendency to emotional instability, the development of a fear of mental and physical disease, and a gloomy outlook on life. At the same time I would stress that although the phenomena just described may be looked upon as being within the limits of the normal climacteric reaction, many women pass the transition to middle age so easily that their symptoms barely disturb "the even tenor of their way."

FACTORS DETERMINING MENTAL DISORDER.

Some women, however, are harder hit, and break down mentally at the change of life. Before entering upon a discussion of these complications, it would be profitable to consider the factors that appear to determine their development.

Constitution and Temperament.

In the first place, it will be generally agreed that a history of mental disorder in the family or in the previous life of the individual has an important bearing on the occurrence of psychoneuroses or psychoses at the climacteric. She may pass through it unscathed, but the dice are set against her. The odds are not easy to estimate, not only because of the difficulty, especially in the poorer classes, of getting correct information about relatives with whom they may be out of touch, but also on account of the varying standards of different investigators.

Emotional and Physical Background.

That causation is never simple is true of all diseases, and is all the more so in mental illnesses of the kind we are considering. They are reactions that are evoked by circumstances that may be mental or physical, or both, but the fact that such stimuli only occasionally precipitate

an abnormal response clearly indicates the importance of individual background.

The constitution as influenced by heredity is admittedly important, and from it temperament cannot be separated. The emotional nervous type of woman, who has imperfectly stood up to the ordinary wear and tear of life, will be more apt to be affected adversely by the upheaval of the climacteric than the woman of more phlegmatic temperament. So also educational equipment, in so far as it has led to cultivation of real interests outside herself, whether in regard to the welfare of her family or in intellectual pursuits, will help to prevent unhealthy introspection.

The severity of environmental difficulties has causal significance. Worry or poor health, especially preceding the menopausal period, is apt to lead to trouble. The healthy mother, happy in her family circle, or the single woman with suitable occupations and friends who satisfy her emotionally and intellectually, is likely, if of good stock, to have little trouble at the change of life.

Preconceived Notions of the Climacteric.

It is a popular belief that the change of life in women is associated with illness. The fear that this belief engenders may lead to much unhappiness by accentuating the emotional instability natural to the climacteric. Unfortunately, physicians in this respect are not entirely free from blame; for they are perhaps too inclined to forget, when discussing the climacteric, that, as a rule, it is associated with only slight disturbances. Thoughtlessly, they may also, as a ready means of getting out of a diagnostic difficulty, attribute symptoms which they cannot explain to the climacteric.

VARIETIES OF MENTAL DISORDER.

Mental complications may be divided into two groups: (1) psychoneuroses, (2) psychoses. While such a classification is justifiable, everyone with experience of abnormal mental states at the change of life will admit the difficulties in differential diagnosis, particularly between anxiety neuroses and the early phase of psychotic depression. In fact, the difficulties are not limited to this field, for, looked at from the point of view of psychological reaction, the main difference in the mental manifestations of the normal climacteric, the psychoneuroses, and involutional melancholia is in essence only one of degree. They are, so to speak, a continuity, differing in quantity but not in quality, with their symptomatological background of apprehension, depression, and emotional instability. Essentially affective reactions, they are slight or severe according to the woman's inheritance, mental toughness, and adaptability, the stresses to which she has been subjected, and perhaps also to the balance of her endocrine reactions at the climacteric. The presence of delusions and hallucinations may indicate no more than an emotional disturbance of unusual severity and duration.

Psychoneuroses.

Anxiety, gloominess of outlook, and physical discomfort are the basic psychoneurotic symptoms which, as has been said, differ only in degree from the disturbances that can be regarded as normal at this time of life. In consequence it is difficult to delimit normal reactions, but, for practical purposes, one might consider that the line has been crossed when emotionalism is persistent and severe enough to lead to more or less pronounced change in behaviour and to invalidism. She has full insight, but cannot, without help, overcome her difficulties.

Strictly speaking, the term "psychoneurosis" ought to be confined to those anxiety states which have been precipitated by domestic or other worries or by fear of the menopause and its consequences, and which, at the same time, do not present psychotic features. Such cases, of course, occur, and differ from the anxiety neuroses of an earlier age only in so far as they are coloured by the significance of the menopause and its physical discomforts.

All will, however, admit the difficulties of differentiating psychoneuroses from early depressive psychoses, and there can be little question but that many cases labelled as

neuroses are really examples of psychotic depression, either mild or at the prodromal stage.

The clinical picture of the psychoneuroses at the change of life need not be described, but attention might be drawn to the frequency, as in the psychoses, with which thoughts and obsessions have a sexual colouring. The suspicions, jealousies, and false accusations directed against the husband are, when without justification, due to faulty adjustment to the loss of reproductive power, and ideas of diminished physical attractiveness, fostered by the appearance of grey hair, wrinkles, and other signs of middle age. Women who are naturally suspicious, and whose marital relationships have not been felicitous, for imagined or real reasons, are especially liable to develop such symptoms. They thirst for attention, look for slights, demand concessions, become spiteful and unjust to younger women, and seem to get a vicarious satisfaction in causing trouble. At the same time, the desire for sexual intercourse may diminish even to frigidity, or it may increase or become perverted, although this is unusual.

Psychoses.

While the proportion of cases of serious mental disorder that can apparently have any connexion with the change of life is small in relation to the number of women who pass through the climacteric, yet this period is admittedly, like puberty and pregnancy, a crisis during which insanities are apt to appear in susceptible women. In men the so-called involuntional psychoses develop later, and are more prone, for that reason, to merge into the pre-senile and senile psychotic states.

Jones and Minague⁴ have plotted a curve of incidence of insanity in woman on the basis of age. They found that there is a progressive rise up to about the age of 40, after which there is a short descent, followed by a plateau, which is continued to the age of 65. There is then a rapid rise due to senility. From the statistics of the Lunacy Commissioners of England and Wales in the three years preceding 1912, Percy Smith⁵ considered that the change of life was a cause or associated factor in 8.2 per cent. of insanities in female patients admitted to public or private mental hospitals.

Melancholia.

Of the psychotic syndromes at the climacteric, melancholia is by far the most common. For example, in Percy Smith's series of 219 cases it formed 66 per cent. Large as this proportion is, it is, I believe, really greater, for asylum statistics do not include the majority of milder cases, nor can they be relied upon to indicate the duration of the disorder, except when it is severe. Admission to a mental hospital, especially under certificate, is delayed as long as possible—at all events in Great Britain—by relatives and family physician alike. The stigma attached to it is real, and cannot well be overcome until the law is altered. Even then, many patients requiring institutional care would be better placed in hospitals suitably equipped and staffed for dealing with those afflicted with mental illnesses in which the prognosis is good, but from which patients requiring certification are prohibited. Further, psychiatrists, like asylums, come under the ban, and, in consequence, many patients with mild psychotic depression, who recover relatively quickly without symptoms that might demand certification, come to the neurologist or general physician rather than to the psychiatrist.

Apart from the frequency and duration of psychotic depression at the change of life, there is the debatable question whether there is such a condition as melancholia peculiar to the climacteric, and apart from manic-depressive psychosis. The diagnostic difficulty lies largely in the fact that the evidence is clinical rather than pathological, and that the reactions of the individual with a varying background of life-history cannot be constant. Nevertheless, there is considerable reason for adopting the view that there is a syndrome of involuntional melancholia. First, there is the absence of previous history of mental disorder in a large proportion of cases. In Jones and Minague's⁴ series this amounted to between 70 and 80 per cent., and in Percy Smith's⁵ to 67 per cent. Secondly, mental and

physical retardation, in a considerable proportion of cases of depression, is relatively absent, restlessness being more common. Thirdly, attacks may appear to be precipitated more often by mental and physical disturbances, and so tend less to develop without apparent reason than clear manic-depressive attacks. Lastly, according to the evidence put forward by Hoch and MacCurdy,⁶ involuntional melancholia, if severe, may run a more chronic course, characterized by almost constant peevishness, hypochondria, ideas of death and poverty, and insufficiency of affect.

The differences in the reactions of involuntional melancholia and manic-depressive insanities may depend on constitution, heredity, and mental adaptability alone, or there may be the additional factor of emotional responsiveness in abnormal fashion to endocrine instability, such as occurs at the change of life. There is this to be said in favour of the latter view, although solely on clinical grounds—that depression and anxiety severe enough to be looked upon as psychotic, and appearing for the first time at the climacteric, differ only in degree from reactions which may be considered normal or neurotic at this time of life.

It would be out of place in a short paper to describe fully the clinical picture of involuntional melancholia, but attention might be drawn to certain important features of it.

In the first place, prodromal symptoms are commonly present, often in the pre-menopausal stage of the climacteric, which, from their character, may lead to wrong diagnoses. Anxiety, manifested either as vague apprehensiveness or special fears—for example, of cancer—with mild depression, irritability, sleeplessness, headache, and a sense of fatigue, are frequently looked upon as neurotic, until gradually the depression becomes more severe, and delusions develop. Not uncommonly the symptoms of which the patient complains most direct attention to the viscera, and she may only with reluctance admit of a morbid outlook, because of the suicidal ideas associated with it. Such symptoms as anorexia, indigestion, constipation, breathlessness, tachycardia, and pains in different parts of the body, lead the patient to the general physician rather than to the neurologist or psychiatrist. It illustrates the importance of patience and care in history-taking in diagnosis.

Again, as the clinical picture of depression evolves, certain features tend to be outstanding. It is essentially an affective reaction, and although the depression may be profound and continuous, there is little, if any, mental impairment, except when the illness becomes chronic. Hypochondriacal complaints referred to imperfect functioning of the intestinal tract, heart, or other organs, are almost constant, and delusions and hallucinations occur at some time or another in all but the milder cases. Delusions tend to be associated especially with ideas of unworthiness, death, and poverty, and are apt to have a strong sexual colouring. Hallucinations of any of the special senses occur. Phases of inactivity, which may amount to stupor, are broken into by periods of agitation, when the patient, the picture of extreme misery, wanders about aimlessly, wringing her hands and appealing to God in some stereotyped phrase. Impulses to strike, and to use abusive and filthy language, are not rare. The danger of suicide is ever present, and is probably greatest when the depression is less severe, as at the beginning and towards the end of the illness. For this reason the sufferers should never be left to themselves.

In considering melancholia at the change of life, it is usual to differentiate various clinical types, such as simple, anxiety, stuporose, and delusional. For prognostic reasons there is some justification for this plan, if it is not too rigidly applied, but, as Henderson and Gillespie⁷ assert, predominance of one group of symptoms over another is probably determined largely by the essential character of the individual. Thus, the naturally suspicious will develop ideas of reference, and so on.

Other Examples.

Brief mention only need be made of other varieties of mental illness met with at the climacteric, because of their relative infrequency compared with melancholia. It is

interesting that mania is comparatively rare, even in obvious cases of cyclothymia, and is suggestive of the bias towards gloominess at the climacteric. When present, it may be acute, with delusions of persecution and hallucinations. Chronic paranoid psychoses characterized by persistent ideas of reference, without much affective change, and sexual delusions of indecent suggestions and assault, occasionally occur. There is usually some degree of mental deterioration. Confusional insanities, with disorientation, hallucinations, and noisy episodes, may occasionally follow extreme exhaustion or septic infection, and mental disorder, with or without polyneuritis from alcoholism, has to be kept in mind. The climacteric age is also the usual period for dementia paralytica in women.

PROGNOSIS.

Vasomotor and nervous symptoms, including emotional instability, tend to disappear, and with the passing of the change of life women commonly enter a period of serenity, which has been happily termed "the autumnal peace of middle age."

The outlook in those suffering from psychoneuroses largely depends upon how far the environmental incompatibilities can be overcome, and the attitude of the woman adjusted to the disappearance of youth and reproductive functions. Domestic happiness, intellectual interests, and physical health are invaluable assets, and much can be done by wise psychotherapy.

The prospect of recovery from psychoses depends upon several factors, most perhaps on the reaction type of the illness, but also upon the physical health and general management and care of the patient.

In manic-depressive states recovery is to be expected as well as in those cases of melancholia appearing for the first time in which unfavourable reactions are not present. Henderson and Gillespie⁷ give six to nine months as the average duration of the illness, and Hoch and MacCurdy⁶ a little longer. It may be shorter, and is often longer. The prognosis is worse if agitation, delusions, and stupor are pronounced and persistent, and is largely due to the difficulty of keeping the patient sufficiently nourished.

Inadequate emotional reaction, constant peevishness, narrowing of the mental horizon, auto-erotic behaviour, aimless wandering with stereotyped complaints and ridiculous hypochondriacal delusions, may appear for short periods in benign cases, but according to Hoch and MacCurdy, if persistent, are of bad omen.

The prognosis in chronic paranoid states is grave, but in cases of alcoholic and confusional psychoses recovery will occur if the toxic cause can be eliminated.

With dementia paralytica and other neurosyphilitic disorders the outlook, with treatment, is the same as in non-involuntional periods of life.

Whatever the mental illness may be, if it is complicated by cerebral arterio-sclerosis, the prognosis is worse.

TREATMENT.

Prophylaxis.

Since poor health, either mental or physical, seems definitely to aggravate the psycho-physiological disturbance of the climacteric, women who are approaching this period of life should be protected as far as is possible from anxiety, and their general bodily hygiene kept at as high a level as possible. At the same time, the physician should be careful to dispel dreads of illness that are so often in their minds, and help them to realize that "the change" is a normal process, which is safely endured by the majority of women without much discomfort.

Glandular Therapy.

The climacteric is an endocrine reaction to deprivation of ovarian hormones. The rational treatment of those symptoms which are due to endocrinal insufficiency should therefore include active preparations of the glands which are functionally deficient. Up to the present, however, this ideal has been only partially fulfilled, because of the want of reliable standardized preparations, except in the case of thyroid. The drug market is flooded with sub-

stances which, on trial, give the most inconstant results, or none at all. Nevertheless, ovarian preparations, such as those of the corpus luteum, and the dry extract of the gland, are beneficial, especially for flushing and other vasomotor disorders. Maranon¹ considers that they are also of great help in reducing emotional instability, and uses them, along with other measures, in the treatment of psychoneuroses and involuntional melancholia.

The dose advised by manufacturers is often too small, and because of the variable efficacy of the different preparations the adequate dose in each case is a matter for experiment.

Ovarian grafts have proved to be unsatisfactory, chiefly, perhaps, because of their rapid absorption.

Thyroid is invaluable when there are signs of myxoedema, but it is often used indiscriminately with harmful results. The presence of even mild hyperthyroidal symptoms, such as excitability, tachycardia, flushing, and loss of weight, is a definite contraindication, and Maranon's rule that it should not be given if the basal metabolic rate is higher than +20, or the pulse rate is consistently over 100, is sound. There is no special treatment for hyperthyroidal states during the change of life, except in so far as ovarian preparations may be considered advisable. Rest, bromides, belladonna, quinine hydrobromide, and so on, are to be used as in medical treatment of hyperthyroidism in younger people.

Pituitary and suprarenal preparations are sometimes employed, apparently with benefit; but I have no personal knowledge of their effects in the climacteric.

Psychotherapy.

In dealing with the minor anxiety states that may complicate the climacteric, psychotherapy on common-sense lines is unquestionably beneficial, because it helps the patient to understand and overcome many of her fears, and so get rid of other attendant symptoms. At the same time, I am convinced that deep mental analysis, by which attempts are made to delve into unconscious processes, is not only unwarranted, but actually dangerous. Believing as I do that the essential mental changes, fear and depression, are the emotional counterpart of endocrine upset, especially overaction of the thyroid, I would assert that it is as unreasonable to hope to relieve these symptoms at the climacteric by psycho-analysis as it would be in a patient suffering from similar complaints with exophthalmic goitre. The danger is more acutely realized if the view is accepted that many of the apparent psychoneuroses of the climacteric are really mild states of involuntional melancholia. As can well be understood, psychotherapy yields most fruitful results in cases of neurosis brought on more by fear of the change of life than when it is an abnormal psychological counterpart of endocrinal imbalance.

Treatment of Psychoses.

What has just been said of psychological treatment applies all the more to the psychoses occurring at the climacteric. Depressed psychotic patients are often, but not always, helped by being allowed to talk freely about their anxieties and dreads, but the depth of the psychological disturbance prevents them from accepting reassurance. Apart from general care and attention to adequate nourishment, sleep, and regulation of the bowels, much cannot be done, unless, in involuntional melancholias, ovarian preparations are found to be beneficial. The danger of suicide in states of depression has always to be kept in mind, particularly in milder cases. Usually psychotics are better managed in special homes, away from their relatives—whether under certificate or not depends upon the circumstances in each case.

REFERENCES.

- ¹ Maranon: *The Climacteric* (Henry Kimpton, 1929).
- ² Hannan: *Flushings of the Menopause* (Baillière, Tindall and Cox, 1927).
- ³ Culbertson: *Surg., Gynecol. and Obstet.*, 1916.
- ⁴ Jones and Minague: Mental Disorders of the Climacteric in Women, *Med. Journ. of Australia*, 1927, ii, 282.
- ⁵ Smith, Percy: The Psychoses of the Climacteric, *British Medical Journal*, 1912, ii, 1378.
- ⁶ Hoch and MacCurdy: The Prognosis of Involuntional Melancholia, *Arch. of Neurol. and Psychiat.*, 1922, vii, 1.
- ⁷ Henderson and Gillespie: *A Textbook of Psychiatry* (Oxford Medical Publications, 1927).