that education of the public must precede reform, and so thorough have been its methods of instruction that practically every forward step has been made with the concurrence and good will of the county councils, who are responsible, and of the people generally.

Ireland has still far to go, but it is advancing resolutely. Before long it will be in the very forefront of civilized races so far as the care of its people is concerned. In its future struggle this meeting of the British Medical Association will prove a stimulus and an aid. It comes at the beginning of an epoch in our development. Perfection is not attainable, for as the goal is approached new problems ever arise; but Ireland is travelling hopefully, and to do that is better than to arrive. Its desire is not merely for the physical needs of its people, but for their spiritual development.

"I looked: aside the dust cloud rolled,
The Warrior seemed the Builder too,
Upspringing from the ruined Old,
I saw the New!"

THE FAMILY PHYSICIAN'S ROLE IN THE PREVENTION OF MENTAL DISORDER AND DEFECT*

BY

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The shock incidental to a mental attack in a member of a family is indeed a big one, and especially so if it happens to be the first of its kind that has occurred. As a result the physician has to deal with a difficult situation in the family, apart from the anxiety and worry associated with the treatment and care of the patient suffering from the psychosis. I should like here to record my admiration for the skill and tact with which the family physician, who in many cases has little experience of mental disorder, will almost invariably meet the situation, with credit to his profession and with benefit to his patient.

For the partial or complete prevention of any disorder it is not essential that the exact cause of such disorder should be definitely known; which is fortunate in this case, inasmuch as little could be accomplished towards the object in view. In searching, however, through the causes, either principal or contributory, usually considered to be the precursors of mental disease, one cannot help being struck by the frequency with which certain factors predominate, factors which should often be preventable, and it is in this direction that I hope the discussion may be of benefit to all of us.

NEUROPATHIC INHERITANCE

One first has to consider the neuropathic inheritance—a feature that can be ascertained in about 75 per cent. of one's cases. This fact has a very evil effect, because there would appear to be a fixed idea among the public that anything of a hereditary nature is almost always incurable. I would suggest, however, that too much fear has been felt with regard to the neuropathic inheritance, and that it should be regarded in much the same light as that inheritance which was so long considered to be the cause of tuberculosis, a disease which in many respects resembles mental trouble and one with which it is often associated. But although the neuropathic inheritance may not now hold its one-time importance, yet it cannot be ignored. Its frequent presence demands attention and investigation if progress towards the prevention of mental disorder is to take place.

* Read in opening a discussion in the Section of Neurology and Psychological Medicine at the Annual Meeting of the British Medical Association, Dublin, 1933.

The late Sir Frederick Mott gave much attention and thought to this subject, and has recorded his opinion on many occasions. The amount and the nature of the work he accomplished must command one's admiration. In short, he endeavoured to prove that a mental illness in a parent was liable to be followed by a more serious mental illness in the next generation, and that it would be apt to occur at an earlier age. In other words, a periodic psychosis is liable to be followed in the succeeding generation by dementia praecox, and by mental defect in the next one. He noticed a tendency for insanity not to proceed beyond three generations, as there was either a regression to the normal type or else the stock died out, and that the latter frequently occurred by the malady manifesting itself as imbecility or adolescent insanity. He considered this to be one of Nature's methods for ending or mending a degenerate stock.

These conclusions have been criticized by Paterson, who has gone over some 4,000 cases. He finds that the existence of the law of anticipation in mental diseases is not proven, and that Mott's results were obtained by the manner in which the material was collected. There was always the difficulty when working under Mott's hypothesis of explaining those cases of dementia praecox which have occurred without a neuropathic inheritance. Mott himself considered them to be examples of a "throwback" in heredity; but this never appeared to be wholly satisfying, and, further, the frequency with which these examples occur helps to negative the supposition.

SIGNIFICANCE OF A SUBTHYROIDAL STATE

Some years ago I suggested that the nature of the psychopathic inheritance might mainly be one of a deficiency in the thyroidal secretion, and that this deficiency might also be concerned in the cause of certain other diseases which appear to have a hereditary tendency, including tuberculosis and malignant disease. I have come to regard the presence of either of these diseases in a family history as being of at least equal significance as a mental illness. There would seem to be some grounds for believing that the initial trouble in each of them is a subthyroidal state, and that a second and exciting cause determines which disease is to develop. Granted that this were true, there would be at once explained the 25 per cent. of cases in which, no matter how one searches throughout the family history, it is not possible to get a definite example of mental illness. It would also account for the not infrequent development of an example of dementia praecox in a family in which no previous mental attacks have been experienced, on other grounds than that of a "throwback." The presence of a low thyroidal secretion, with all its ill effects upon the rest of the endocrine system, would in the course of a couple of generations be just the type of condition necessary for the production of a disease characterized by a marked tendency to an early degeneration of the cortical cells. Myxoedema, of course, is known to be capable of transmission in a hereditary manner, especially through the maternal side of the family.

There can be no question about the exceeding frequency with which subthyroidal symptoms are met with in a mental hospital. The number of these symptoms is large, and they are widely known, so I do not propose to dwell upon them here. One has, however, to mention with gratitude the name of McCarrison, whose work upon the thyroid gland is of an inspiring nature.

It is a matter for regret that the valuable eyebrow sign first described by Hertoghe is no longer available in many of the younger women of to-day, owing to the development of the habit of eyebrow-plucking and its replacement by a thin black line. I have sometimes thought that the idea of this must have originated in the brain of some keen beauty expert, who did not fail to

recognize the tendency for the irregular and early disappearance of the hair in this region—a somewhat difficult feature for his art to overcome—and so he called up the aid of Dame Fashion to decree its complete removal.

Kojima has recorded his findings after the examination of the thyroid gland in 100 patients who died in Claybury Mental Hospital. His observations demonstrated a very marked variation in the weights of the thyroid gland, which could not really be accounted for except on the idea that it was in some way related to insanity. Sir E. Sharpey-Schafer has stated that the principal autacoid of the thyroid is the most powerful excitant of metabolic processes known. I regard thyroid extract as being the most potent preparation with which a physician can treat a case of mental disorder, and I believe that in many cases, especially in those showing subthyroidal symptoms, the administration of it in suitable dosage over prolonged periods will prevent an attack of psychosis. For this reason I believe that every symptom of subthyroidism should be regarded with concern as to the mental future of the patient.

Norman Phillips gives the records of 291 patients examined by Brissard at the Bel-Air Asylum, Geneva; 106 were found to be goitrous, representing 36 per cent. of both sexes. This compared with a rate of 5 per cent. in other statistics in the same canton. Further, he noted that in seventy-one of these 106 cases dementia praecox was the entity present, and that eighteen were congenitally weak-minded. Out of a total number of 149 cases of dementia praecox, seventy-one were goitrous, amounting to 49 per cent., and out of a total number of thirty-seven cases of congenital idiocy eighteen, representing 48 per cent., were goitrous. Phillips also records his own investigations, and has noted the frequency with which goitre is associated with psychosis. In a mental hospital receiving no cases of idiocy one patient in every eight had some thyroid enlargement.

I think, at any rate, that we have enough evidence to justify the belief that the thyroid gland plays a very large part in the production of mental disease and defect, and therefore that every sign of a deficiency in its secretion should be treated early and with persistence. Further, patients suffering from goitre, even though of the simple variety, must be regarded with suspicion concerning their future mental history, and every effort should be made to cure them of this condition, which cannot be anything but a dangerous one. In the case of marriage and subsequent issue, this issue will be particularly liable to mental illness. I have noted for many years the frequency with which patients suffering from mental trouble can be found to have mothers or maternal aunts who suffer from goitre. Indeed, the visits of relatives have often suggested to me, by their subthyroidal appearance, the advisability of placing the patient on thyroid treatment, when often the patient did not present any obvious subthyroidal symptom.

CHRONIC SEPSIS AS A FACTOR IN MENTAL ILLNESS

It would not be reasonable to expect that every case of mental illness treated by thyroid should respond in a beneficial manner, for the causation of this illness is seldom a single one. Many other factors, both psychogenic and physiogenic, must be considered. In connexion with the latter, the part played by chronic sepsis has for the past few years been a matter of much discussion and dissension. All the organs and tissues of the body have at one time or other been investigated, with many positive results.

Recently, however, the question of sinusitis as a cause of mental disorder has been examined with great thoroughness at the Birmingham mental hospitals under the direction of Graves. He has published the results of 1,000 cases that have been examined by the Watson-Williams

technique of sinus puncture and wash-out, with the result that 818 were found to show evidence of nasal sinus infection. Of these 818 cases 304 had sphenoidal infection, 424 had ethmoidal sinus infection, and 631 antral infection. The treatment of these by sinus wash-out and drainage was followed by a marked improvement in many cases that had been considered hopeless.

The type of infection most likely to produce mental symptoms is of a chronic form, and is termed "latent" because of the few indications of its existence. Watson-Williams states that transillumination is most unreliable for its diagnosis, and that the only certain criterion of sinus infection consists in introducing a cannula into each sinus and extracting therefrom a sample of its contents for bacteriological examination. This procedure is obviously outside the scope of the family physician or alienist, but from the evidence brought forward it would appear to be advisable for such an examination to be made in many cases. Although I have no experience of sinusitis as being a cause of mental illness, yet I believe that chronic sepsis is very commonly associated with it, and indeed for a long time I have regarded it as one of its causes. One sees many brilliant results follow the removal of septic infections of a chronic nature, and sometimes the surprising point about them is the small amount of infection that would appear to be present.

It is no uncommon experience in a mental hospital for an apparently hopeless dement to get at least a temporary return of the intellectual faculties following the development of an acute inflammatory condition, and this would appear to be specially liable to happen when such inflammation proceeds to the formation of an abscess. It is of further help towards the recovery of reason if the abscess should not be evacuated at once—a point that makes one think that the production of a high standard of immunity is necessary before improvement of the mental symptoms can take place. This feature would seem to provide evidence of the presence of another and more chronic septic infection in the system, which the high degree of immunity is able to overcome, at any rate for a time. I have known, however, such an occurrence to bring about the complete and lasting recovery of a few patients.

Chronic sepsis in any portion of the body, and especially that located in the sinuses of the nasal passages, would appear to be so common in mental illness as almost to make it more than suspicious that it may be an essential factor for the production of disease. As Pickworth states:

"The prevailing tendency to ascribe all mental disorder to hereditary transmission must be challenged with new facts. Congenital mental deficiency is attributed in some cases to birth injuries or infectious diseases such as syphilis in the mother; similarly the part played by naso-oral sepsis in the mother deserves study and recognition. It has long been a contention that much of the ignorance and stupidity of the populace is due to unhygienic surroundings and disease in the parents; such tables as are already available show that the figures for hereditary mental disorder can be paralleled by figures for nasopharyngeal sepsis heredity."

Thus there are two important factors which would appear to me to be most liable, in combination, to produce a mental illness. First, a deficiency in the nature of a subthyroidal condition of the system; and secondly, the presence of a focus of septic infection essentially of a chronic nature. These conditions would seem to be preventable, at any rate to a considerable extent, but it is to the family physician we must look with hope for their amelioration or complete removal.

CRITICAL AGE PERIODS

In the presence of conditions such as these it is not surprising that many other factors, in themselves perhaps not seemingly potent, and which people more fortunately

situated are able to withstand, have a contributory and possibly even an exciting influence in the causation of mental illness. First, there are the critical age periods—namely, adolescence, the climacteric, and senescence. Robertson, in his Maudsley Lecture, gave most valuable data concerning the age-period liability to mental illness, and, contrary to the opinion usually held, he has shown that the liability to a psychosis increases with age. In his words:

"The tendency to develop insanity first shows itself between 15 and 19, but it becomes much more pronounced between 20 and 24. This is followed by a steady rise year after year till the age of 50 is reached. There is then a short period of decline, after which an extremely rapid rise occurs in old age."

To my mind the fact seems somewhat significant that mental illness should be of such rarity in those under 15 years of age, for would it not point to an absence of any marked inherent defect in the nervous tissue of the child? The intrusion of the internal secretion from the sexual glands and its disturbing effect upon the other internal secretions have been held responsible by many for the onset of mental illness in the adolescent. Regressive changes in the same glands have also been widely accepted as the cause.

Again, the changes in the social status at this age period, the necessity for adjusting himself to the ordinary difficulties of life, without the same amount of protection hitherto given to him by the parent, the sex problems, and the ordinary sex attractions incidental to youth—all these must have some bearing.

There would appear, however, to be little attention paid to the influence of the very difficult period of school life. The advance of education and the necessity for receiving and retaining in one's memory a large amount of facts and figures which may (or may not) be useful in a later period imposes one of the most difficult strains to be experienced in life. When it is remembered that at adolescence the brain is immature, and that, although mental illness may have been absent up to the school age, yet it is likely that minor physical disturbances have been present for many years, and perhaps even since birth, it will not seem a matter for surprise that psychoses occur frequently at this period.

I would suggest that there is a danger in what one might term "the excessive education of the unfit," and I would include within it backward children and those who show any marked evidence of a nervous condition associated with a predisposition to mental illness, even though some of them may be of the brilliant type. They should hasten slowly during this period, and so remove any strain upon the intellect. How often does not one see a hitherto brilliant mind become less than mediocre, and make its possessor incapable of self-support! I have often thought that if such young people had been removed early from school, and put to work upon the land, many of them might have become useful citizens of the State.

With regard to the later critical periods of the climacteric and senescence, I would lay stress upon the importance of the recognition and early treatment of nervous symptoms, especially want of sleep associated with prolonged worry. Insomnia at times is most difficult to treat, but if not allowed to develop to a marked extent it will, as a rule, respond to mild sedatives in the early stages. The longer one leaves the condition untreated the more difficult it will become.

OTHER CONTRIBUTORY FACTORS

There are so many causes of worry and strain that it would seem impossible for the family physician to protect his patients from their evil effect. There is, however, one particular strain against which he can safeguard them.

and one that is no uncommon exciting cause of mental illness. I refer to the nursing of the seriously ill person by a devoted relative, and especially if the illness should be a mental one. Here you have the predisposition to the illness, the undue anxiety concerning the patient, the want of sleep, and irregular meals which are often an accompaniment to the long hours of watchful nursing, all of which conditions, when taken together, will be very liable to precipitate an attack of psychosis.

We cannot do away with the influence of senescence. Robertson, however, has stated that much can be done "by careful living during the middle period of life," which he regarded as the best insurance against senile insanity. Senility is the greatest insanity-producing period of life, so that any measures that may tend to lessen liability to mental illness at this period are worthy of particular attention. In this and other critical periods I would emphasize the importance of rest, and preach the gospel of fatness, which, in the earlier periods of life at any rate, is nearly always accompanied by mental fitness.

Alcoholism and syphilis are, of course, well-known exciting causes of mental trouble. According to statistics the former would appear to be a diminishing factor, and one may hope that with the advance of modern anti-syphilitic treatment the influence of syphilis in mental disease production will disappear.

I have known excessive smoking to be the only apparent exciting cause in several cases, and, indeed, I regard it as being a fairly common contributory cause of mental illness. Its effects are not so obvious as those of alcohol, for alcohol, if taken in sufficient quantities, will soon terminate the desire for its consumption by means of the production of an acute psychosis; but in the case of excessive smoking the effects are insidious, with the production of gastric disturbances, loss of appetite, and a generally lowered physical condition, which make a mental attack likely to occur with little other provocation. One contemplates with some alarm the future of a generation, yet unborn, the mothers of which are harassed with a desire for slimness and excessive smoking.

The evil effects of gastric disturbances and constipation are well known, even to the public. They are such frequent phenomena in mental disease, especially in melancholia, as almost to be considered part and parcel of it. I have known some patients make a complete recovery within a few days following the administration of an enema.

Sometimes, when getting the previous history of a patient suffering from a psychosis, there is a reference to a "chill" or febrile attack perhaps a month before the onset. This has occurred so frequently that as a rule I now search for it. The attack is generally regarded as having been an influenzal one, and most likely it was so, but the point about nearly all these attacks is that they are of an ambulatory type: little or no treatment is taken for them, as a doctor's help is rarely sought for. In spite of the slight symptoms, however, they may be of the most serious importance, as representing the onset of an attack of encephalitis lethargica, or act as the precursor to a psychosis some months later.

Robertson has given some statistics with regard to marriage and its potential effects on the incidence of mental disease. Nothing but good can be said of marriage, for in the married this incidence is low, but slightly higher among women, as a result of the risk of child-bearing. The loss of a husband or wife increases to a marked extent the liability, and, indeed, up to 55 years of age the prevalence of it is almost double that among married men and women. In the case of single men and women between 35 and 55 years of age it is nearly three times as high as in the married. Robertson, however, points out that a process of selection has been at work among the married, who may be regarded as a picked lot. Both husband and wife have at least selected one another from

all the others, and, on the whole, for good reasons. The average health of the single is probably lower than that of the married, and may in itself be the reason for remaining single. The expectation of life for a married man 25 years of age is nearly five years more than for a bachelor of the same age.

It may sometimes happen that the family physician is consulted with respect to the marriage of a patient who has had a psychosis. As a general rule it should be regarded as a most unwise adventure, for a psychosis may be of the periodic variety, known as the manic-depressive psychosis, in which attacks will occur throughout life with complete remissions between. It is these very remissions which make marriage a great peril in the neuropathic. An isolated attack may occur, especially after a great shock, and will not repeat itself even after many years. In a person who has had such an attack and is in obviously good physical health, with no definite stigmata of degeneration, such as cranial anomalies, deformities of the pinna and palate, and marked hyperextensibility of the ligaments, it would seem unnecessarily hard to refuse sanction.

Trauma would appear to be an almost negligible cause of mental disease, so rare is its occurrence. It is more likely to be followed by a neurosis, and even in this respect its liability is grossly exaggerated by the public. The experiences of the war proved the extraordinary resistance of the brain to external injury; and, indeed,

the highly skilled art of the brain surgeon, for which art I have the greatest respect and admiration, has proved it again and again. He has shaved off portions of the cortex, incised the substance of the brain, probed it, extracted neoplasms from it, and even blown air into it. Notwithstanding all these things, he has the satisfaction of seeing his patient recover from the anaesthetic with a sane mind. It is only when the cortex is affected widely, usually in some insidious manner by a toxin, that we get symptoms of mental disease.

This short paper cannot hope to cover all the ground in the causation of mental trouble. The psychogenic causes have been omitted purposely, for, as a rule, they are not within the province of the family physician. I have tried to bring before you certain physical disabilities which are at least very common accompaniments of mental disorder, and which I believe to be of the greatest importance in its production.

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VIRUSES AND SKIN DISEASES*

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The investigation of virus diseases is beset with peculiar difficulties. Viruses are either ultra-microscopic or if anything particulate is seen its nature is disputed. With one possible exception no virus can be grown apart from living cells, and therefore the cultural and biochemical methods of bacteriology are unavailable for the study of viruses. This essential association with living cells makes difficult the conclusive proof of life in these minute or unorganized agents, and a further difficulty is that in many cases a suitable experimental animal is not available either. It is not surprising, therefore, that the earliest direct evidence of the existence of viruses came from pathological studies of plants and animals, although Pasteur had suggested that agents of this type might be the aetiological factor in certain diseases, as hydrophobia. Iwanowsky (1891), working on the mosaic disease of tobacco plants, was the first to demonstrate the infectivity of a bacteria-free filtrate of an extract of diseased leaves, and Loeffler and Frosch (1898) obtained corresponding results in the case of foot-and-mouth disease, even though their filtrate was culturally sterile and contained no visible micro-organisms. Evidence has accumulated to the effect that more than a hundred diseases of animals and plants are now attributable to disease-producing agents, which have the following peculiarities.

PECULIARITIES OF VIRUSES

1. They are either ultra-microscopic or may be recognized as minute particles up to 0.25μ in diameter. The smallest discrete particles are called elementary bodies, but larger forms possibly occur. In the case of psittacosis virus, at any rate, Bedson and Bland (1932) have demonstrated a cycle of development in which the particles vary greatly in size so that forms larger than some bacteria occur and masses of aggregated particles or of undivided virus produce plasmodial forms.

* Read in opening a discussion in the Section of Dermatology at the Annual Meeting of the British Medical Association, Dublin, 1933.

2. Dependent upon the minuteness of the particles is the property of filterability as compared with the bacteria. Obviously the larger forms of viruses would not be filterable; on the other hand, some of the leptospira are.

3. A peculiar histological feature is commonly associated with virus infections. This is the presence in the lesion of curious intracellular bodies—the so-called “inclusion bodies”—which occur either in the cytoplasm or in the nucleus.

4. The inability to grow in cultures in the absence of living tissue cells.

Some of these points are worthy of discussion. In the first place, it is still a matter of dispute as to whether the minute particles described are actually the virus or whether they are non-specific granular-cell products on which the virus, something unorganized, is adsorbed. Recent experimental work has strongly supported the identity of these minute bodies with the virus. Woodruff and Goodpasture (1929, 1930) demonstrated the infectivity of isolated and washed Bollinger bodies—the inclusions of fowl-pox—which consist of collections of elementary bodies; and Ledingham (1931) showed that these elementary bodies, and those of vaccinia too, could be flocculated in the presence of specific antiserum. Bedson (1932) has found that it is possible, by means of high-speed centrifugation, to concentrate and wash the elementary bodies of psittacosis, controlling the operation by direct observation, and then demonstrating their infectivity, specific agglutination, and ability to fix complement specifically. This is very strong evidence that the minute bodies are the virus. One can only escape this conclusion by assuming that the virus is adsorbed on tissue particles, but against this must be placed the observation of Bedson that the particles do not react specifically with an appropriate anti-tissue serum. Further, these experiments strongly support the conception that viruses are living organisms, and it is not proposed to discuss the more elaborate thesis of Sanfelice (1914) that a virus is a non-living poison produced by living cells which is capable of attacking new cells. Suffice it to say that viruses exhibit the essential characteristics of living organisms—for example, multiplication, adaptability, preservation of identity, antigenic properties, and sensitivity to antiseptics.