that ketohydroxyoestrin is the actual oestrus-producing hormone elaborated by the ovary, and that prior to excretion in the urine it is converted to trioxyoestrin in order to increase its water solubility. There seems good reason to suppose that the ovary is the ultimate source of both.

Considering a "mouse unit" of oestrin as what is necessary to cause vaginal cornification in that animal, 60,000 to 80,000 such units are required to produce full sexual skin swelling in the baboon. The reaction threshold of the vagina in the mouse is much less than that of the uterus (400 more units being required for the latter and in order to bring about copulation). Oestrin also causes extensive growth, etc., in the uterus and vagina of the baboon or monkey, but never full pre-menstrual growth. This can only be induced in the oöphorectomized monkey by the additional administration of corpus luteum extract (Hisaw, Fevold, and Meyer).

Corpus Luteum

That the corpus luteum produces an internal secretion which is an essential factor in maintaining the raised nutrition of the uterus during pregnancy, besides promoting mammary growth in preparation for milk secretion, has long been known. The final and confirmatory proof has been supplied by Corner, who, by injecting luteal extract daily into rabbits oöphorectomized eighteen hours after the fertilization of the ova, has succeeded in maintaining the pregnancy for the normal time. This experimental result has been confirmed and extended by other investigators. Corner has called the active principle "progesterin." It seems certain that progesterin is elaborated by the ovary during the "luteal phase" of the ovarian cycle whether pregnancy occurs or not.

Mention must also be made of the suggestive results of G. van S. and O. W. Smith, who found that progesterin caused the excretion of injected oestrin in rabbits. Observations in women also showed that oestrin is excreted only when the organism has been exposed to the action of the corpus luteum.

Clinical Limitations

The above statements give a brief summary of the principal known facts concerning the hormones produced by the ovary and their modes of action. It will be seen that clinical applications must at present, at any rate, be strictly limited in scope. The use of oestrin is only indicated in cases where there is evidence of a natural deficiency of this substance as with certain types of amenorrhoea, or after ovarian extirpation, and, much more problematically, at the time of the menopause. The indiscriminate usage of oestrin for other disorders has no basis in physiological fact, and may justly be stigmatized as quackery. In a similar way the use of progesterin may only at present be reasonably justified in cases where there is evidence of a deficiency of this hormone, if indeed this ever occurs. Such deficiency may conceivably be an occasional cause of abortion, but, as far as I am aware, there is no direct proof of this ever happening. The possibility that these two hormones (oestrin and progesterin) may be used to regulate the cycle in the domestic animals for economic purposes lies in the future.

OVARIES AND PITUITARY BODY

The work of P. E. Smith and Engle and Zondek and Aschheim, which has been confirmed and extended by other investigators, has shown that the anterior lobe of the pituitary produces two sex hormones, one of which is oestrogenic and the other lutealizing. The oestrogenic hormone also acts on the male organs. These represent the "Rho factors" of Wiesner. Moreover, Bellerby and others have prepared an extract of anterior lobe

which when injected into an oestrous rabbit will cause ovulation in from eleven to twelve hours. A growth hormone from the anterior lobe has also been obtained by Evans and others. The precise way in which the two ovarian hormones (oestrin and progesterin) and the anterior pituitary hormones act and react upon one another is not yet clear, but it is certain that a functional correlation exists. Just as the gonads are inactive in the absence of the anterior lobe, so the latter organ is incapable of promoting sexual changes in the absence of the gonads. Clinical applications of the principles involved are probably premature until the extracts have been further tested on animals.

In conclusion, reference may be made to the important work of Knaus, who has demonstrated the existence of a physiological antagonism between the internal secretion of the posterior lobe of the pituitary and that of the corpus luteum. As a result of this work strong evidence is obtained that the action of the posterior lobe secretion in causing uterine contraction is inhibited during pregnancy, in the way postulated by Dixon and the present writer, and consequently that the regression of the corpus luteum is one of the main factors in bringing about parturition, as had already been supposed (Marshall). Further, Illingworth and Robson have claimed as a result of experimental work that the luteal hormone involved in this mechanism can be discriminated from the progestational hormone of Corner.

It must be mentioned, however, that recent work by Allan and Wiles has shown that the progress of gestation and parturition in the cat may take place in the complete absence of the pituitary (removed some days before). This does not necessarily mean that the pituitary does not normally play a part both in pregnancy and delivery, and it may be pointed out that, as shown long ago by Goltz and others, parturition may proceed in the dog in the absence of the dorso-lumbar part of the spinal cord, although normally the nervous system is a factor in the process. In such cases some compensatory mechanism may very possibly be at work.

MENTAL HEALTH IN RELATION TO EDUCATION*

BY

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The relation of the teaching to the medical profession may be considered in three phases. The first lasted roughly up to the beginning of this century; during that phase the doctor was to the schoolmaster the man who attended cases of sickness. In the second phase he was called upon to advise on measures of physical prophylaxis; such questions as ventilation, diet, physical exercise, and notably the prophylaxis of epidemics, were submitted to him. This advance was largely due to the Board of Education, and affected State schools much more than it did the schools which we designate as "Private" and "Public." Indeed there are grounds for suspecting that in these last two categories schools still exist in which the doctor's function is limited to the first phase. But in general it may be said that schools having little or no supervision by the Government are following, in somewhat laggard fashion, the obvious line of advance.

The third phase is, or rather should be, that in which the physician is regarded as a health officer in every sense of the word, and, as such, guardian not only of the pupils'

* Read in opening a discussion in the Section of Mental Disorder at the Centenary Meeting of the British Medical Association, London, 1932.

physical well-being, but also of their mental health. That phase is still a conceptual one, unless we may take the fact of to-day's discussion as evidence that it has materialized. But however obvious it may be to us that such a state of affairs is desirable, the facts do not give us much ground for hopefulness. Indeed, the truth of the matter is that, in so far as medical training goes, the doctor is less qualified than the teacher to cope with mental hygiene.

School teachers—I refer to those who hold teaching certificates—have at least had some training in psychology, whereas we doctors have not. Any knowledge of the subject that the school medical officer may possess he has acquired since graduation. It follows, therefore, that in dealing with such problems as persistent stealing or homosexuality the teacher is more likely than the doctor to have insight into the motivation, and in consequence is less likely to treat the incident on the purely objective plane of social delinquency. It is true that in some of our boarding schools for boys, including certain very ancient foundations, there is no such advantage on either side, as neither master nor doctor has any psychological insight beyond that which may come to him by the light of nature. The situation is one which entirely satisfies the complacency of our racial traditionalism. It is not one, however, that can be regarded as satisfactory in the light of modern knowledge and of educational ideals outside these islands.

Let us examine the situation more closely in order to establish as far as possible the claims of mental hygiene in the school. For the majority of the population we may take the school age as being 5 to 14; for an inconsiderable but important minority it is 5 to 18. During these years certain adaptations are continuously in progress; they are physiological, intellectual, and emotional.

GROWTH AND SEX DEVELOPMENT

The physiological adaptations are, first, growth, and secondly, sex development, the two being intimately associated. As soon as we consider the first—growth—we realize one of the difficulties of standardized education. Our State education, as in every other country, is necessarily a mass system, but all other education, private and "public," has up to recent years taken standardization as an ideal to be aimed at. The pupil had to adjust to school life, and in the process he was to find himself. It is clear that such a system, however excellent for the normal boy and girl, does make excessive demands upon those who are in any way freaks. In the matter of stature, for instance, little imagination is needed to realize how much extra hardship is involved for the giant and the dwarf. The one has to curl up in a bed too short for him; the other has to write at a desk which necessitates a contorted position, and so on.

I suggest that the ideal of standardization has been overworked. I believe that for normal, average, or standard material there is a great moral and psychological benefit in being treated exactly like one's neighbour and in having to adjust to the school instead of expecting the school to adjust to one's own demands. But with the "freak" child it is not so. I recall a boy in my own class at school who was 6 ft. 4 in. when he reached the age of 14. I cannot help thinking that his education would have been pleasanter, and perhaps even more profitable, if he had been at a school where he was not the only one who did not play football, where, in fact, there were other freaks to keep him company—not necessarily giants like himself—in short, at an individualistic school. Such schools are on the increase; they are a product of this generation. It is to be hoped that they will fulfil their function toward the abnormal child, and that they will not seriously interfere with the much more important

function of the standardized school for the child of standard equipment.

In estimating the effects of the growth factor we must realize that as the overgrown adolescent may be physically languid and easily fatigued, so his intellectual capacity is necessarily handicapped; his powers of concentration are not what they would have been with only a normal growth factor. He, and still more the overgrown adolescent girl, may require longer hours of sleep, or a midday rest in excess of what is necessary or provided for others of the same age.

Sex development, as we know, is intimately associated with growth. The most abnormal class here is perhaps the abnormal pituitary group in which long bone development is associated with sexual retardation or infantilism, and the Fröhlich group in which excessive fat is associated with genital arrest. Then there are the adrenal dwarfs—generally unrecognized in modified degree—with an excess of dark hair, precocious genital development, and diminutive stature. I mention these three groups to show that there are both physical and psychological implications, and, that being the case, they should command the interest of the school medical officer. For it is he who has the chance during adolescence to modify the balance of the endocrine system so as to turn what might have been a tragic abnormality into a passable, if not a normal, adult.

But it is with the psychological implications of these physical abnormalities that we are primarily concerned. Has it ever occurred to a school medical officer that the enormously fat girl of 15 is something more than a school joke? Has it occurred to him that he has some responsibility for her, in spite of the fact that she never takes a cold and is not sent to consult him for headaches? Has it never dawned on him that behind all that cheery good nature for which "Fatty" is notorious, there is a tragedy slowly evolving? If not, let me assure him that there is no psychotherapist of any experience but can tell him of the embittered or dejected fat woman of 25, who has come to realize that the abnormality is not merely in her contour, but that she is not as other women are, that her amenorrhoea is not without significance, and that she must renounce any dreams she may have had of "thinning down when she grew up," and, moreover, any aspirations she may have entertained of marriage and motherhood. A generation ago there was little to be done for such cases, but to-day, if taken early, much can be done, and much should be done, not merely from an aesthetic or even physiological point of view, but in order to reduce lifelong discontent and unhappiness.

Another type I would draw your attention to is the boy with an undescended or ablated testicle. I have seen a number of these; they have all undergone torments of inferiority as the result of the ridicule to which they have been exposed. Generally the parents have not considered it suitable, or at any rate necessary, to inform head master or house master; in most of the cases no master was aware of the condition, and in none did the matter come to the knowledge of the school medical officer. Now the male adolescent, under herd conditions, can be very barbarous, and the mental suffering to which these boys had been exposed was considerable. It is just this sort of suffering that makes an adolescent feel the bitterness which poisons his relations with society for life. I submit that such boys cannot possibly make a satisfactory adjustment to life if they are expected to face alone the uncomprehending disparagement of their fellows.

If we pass from the abnormal to the normal in the sphere of sex we are confronted with the common problem of masturbation. In day schools the problem can be, or at any rate is, left to the parents to deal with. How effectively or wisely they exercise their prerogative is within

the knowledge of some of us. But in boarding schools it is different. There seem to be two cardinal tenets among teachers in boarding schools; the first is that no girl masturbates unless she is "quite abnormal," and the other is that no boy masturbates unless he is "definitely vicious." The practical measures which emanate from these beliefs are that when a girl is discovered to masturbate she is taken to a "specialist," and when a boy is detected in the practice he is dealt with as a delinquent to be castigated or a sinner to be reformed. Of these two measures the first generally does the lesser harm, for when the sinner is subjected to the process of reformation it is almost certain that he will be exposed to a number of threats, some of a theological order, in which the chaplain seems to exceed his commission, and some of physical consequences which bear no relation to truth.

When in the minority of enlightened boarding schools the boy is dealt with by the school medical officer he is sure to meet with more tolerant treatment. But is he likely to meet with any constructive treatment? He will, of course, be reassured about insanity, impotence, or even hell fire; he will be told to take plenty of exercise and not to miss his cold tub; he will perhaps be enjoined to eschew constipation and feather beds. But unless the medical officer has learned much that he was not taught in his curriculum, there will be very little positive or constructive help, for it is quite certain that in the five or more years devoted to learning his craft the medical officer never heard a single allusion to auto-erotism, still less to that far-fetched concept of narcissism. Nevertheless I venture to say that, as far as boys' boarding schools are concerned, there is no opportunity greater than this for promoting sound character development, nor yet one that is so consistently misused. Is it too much to hope that a generation of school medical officers may arise who can handle this problem better than embarrassed house masters, better than celibate chaplains, and better than second-rate physiologists?

If we turn to the other problem of homo-sexuality, we find a corresponding ineptitude in our treatment of it, simply because neither teacher nor doctor knows enough about it. At girls' boarding schools, where it flourishes in its milder forms of romance, it is ruthlessly stamped out by the cultivation of athleticism and often of masculinity, in such a way that one is tempted to wonder whether *all* the mistresses, or only some of them, are suffering from what Adler would describe as the "masculine protest." In boys' boarding schools it generally smoulders and occasionally breaks out in a conflagration which leads to expulsions, some desirable and others exceedingly unjust. House masters demand the instant removal of the pervers, and parents protest bitterly that their innocent darling has been corrupted. When such things occur, as we know they do, surely there ought to be someone properly equipped with authoritative knowledge of the psychology of sex, and surely that person should be the medical officer. I urge this matter on your attention, for I am convinced that it would be better to risk twenty boys getting measles unnecessarily than to have one of these homo-sexual catastrophes, which not only impair permanently the boy's social prospects, but may also warp his sexual adjustment for life.

INTELLECTUAL DEVELOPMENT

I have dwelt too long on the physiological aspect of adaptation; let me pass to the intellectual. Many people send their children to school to pass an examination. Whether that examination be "Little-go" or for a place at a secondary school makes little difference; the point which matters is that the home emphasis is on intellectual achievement, and the result of that emphasis may be an

anxiety state that may well bring the pupil within the doctor's purview. When, on the other hand, the child is sent to school "to find his level," "to get some sense," "to grow grit" and so on, there is much less chance of that tense and conscientious application to learning which delights the teachers who are sufficiently devoid of psychological insight to value it.

But lessons and examinations are not the only aspect of intellectual adjustment which the child should achieve at school; he ought to acquire a general capacity to interpret and evaluate his own experience, he ought to learn a great deal about the logical consequences of his own actions. Now it is clear that some children have plenty of sense and very little capacity for acquiring knowledge, and there are some who show an all-round ineducability. While this is in general the teacher's sphere, the medical officer may well be consulted as to a congenital deficiency, and if he knows nothing whatever about mental defect he may be party to a child being pressed, or punished, or otherwise treated inappropriately when he might have saved the situation.

EMOTIONAL ADAPTATION

I pass now to the emotional side, which is by far the most important. The whole range of school life comprises the great transformation from the pre-school child—dependent, loved, accepting, protected—to the young adult—*independent, loving, giving, and protecting*. He began life outside society; by the time he comes to school he is expected to have made the limited adjustments of a family circle; at school he has to make his herd adjustment, and to make it while he is kept actively engaged on work and play, and while, moreover, physiological changes are going on within him of which he cannot fail to be aware and by which he is frequently bewildered or even terrified. We should not be surprised, therefore, if a small proportion of school children fail to make these necessary adjustments and develop some form of maladaptation or behaviour problem. We should be still less surprised if we considered for a moment the following very relevant circumstance. Throughout the entire educational process a compromise is being pursued, the compromise between social demands and self-realization. On the one hand the boy's behaviour has to conform to social standards, while on the other he is prompted by instinctive demands to behave quite otherwise; he has to acquire knowledge which does not interest him, while his innate curiosity stimulates him to other inquiries; he has to play the man while he would choose to be a different sort of man.

If we consider then the inherent conflict between the socializing aim of education and its simultaneous objective of self-realization, we can very easily see the possibilities of maladjustment. These maladjustments should be recognized at an early stage, and it should be regarded as evidence of second-rate pedagogy when the trouble is serious enough to demand the attention of the medical officer. But if we had a sounder outlook on mental hygiene the medical officer would be the active partner of the teacher in coping with those early manifestations which, as things stand at present, are neither dealt with by the teacher nor submitted to the doctor.

The first indication of maladjustment in many cases is an exaggeration of temperamental extraversion or introversion; these are two reactions generally determined by herd fear. The first consists of excessive self-assertion, a compensation for diffidence by means of loquacity, boastfulness, self-assurance, interference, bidding for attention, and so on. The second consists of a withdrawing into oneself; in Freudian parlance the "libido" is repressed and activates a fantasy life within the subject. This reaction is, of course, much rarer than the first, but whereas the end-result of extraversion may be

hysteria or delinquency, the end-result of introversion is dementia praecox. It would be well if school medical officers would realize the fact which Jung pointed out many years ago—namely, that for every case of dementia praecox that reaches a mental hospital there are scores of cases of schizophrenia which carry on a partially adjusted life. In all these cases, whether we designate them neurasthenia, psychasthenia, etc., we find that the school life was not normal, and that there was a noteworthy failure to make a social adjustment. I would go the length of saying that the real problem of dementia praecox is the prophylactic diagnosis and treatment of the early schizophrenic during his school life. If confirmation is required of my contention, I would point to the cases of school suicide; it is true that they are few, and fortunately fewer in this country than in some others, but I submit that if an adolescent commits suicide at school it is evidence of such a gross failure of mental prophylaxis as to imply extensive neglect of minor cases.

In this connexion I would mention one symptom which is common enough to command interest; I refer to stammering. It is true that stammers can often be improved, and sometimes cured, by teachers of elocution and speech therapists, but our experience at the Institute of Medical Psychology (where we have two very competent speech

therapists at work) confirms my experience in private practice. I believe that every stammering child has some fault of emotional development, generally, of course, a parent fixation. I sympathize with the teacher who looks to the speech therapist for help with such cases, because the teacher knows well enough that the school doctor has no contribution to make. I maintain, however, that this should not be the situation, but that a medical officer with a reasonable understanding of psychopathology should be able and willing to investigate these cases.

Finally I come to delinquency. No doubt medical officers are frequently consulted about the persistent thief, the incendiary, the forger, but I believe that I am justified in stating that the schoolmaster or schoolmistress does not in such cases approach the doctor with any great optimism. And yet these juvenile delinquents are pathological cases; they ought to be dealt with by the doctor, and in general they are extremely rewarding. But in point of fact a trained teacher (I exclude the untrained schoolmaster) knows more about the aetiology of these behaviour problems than most medical officers. I submit that the time is ripe for the profession to recognize that the field of mental hygiene in the school is in urgent need of cultivation, in that it is an opportunity for prophylaxis second to none in the whole extent of national health.

SOME COMMENTS ON SYPHILIS IN WOMEN *

BY

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Syphilis in women differs from the same disease in men only during the years when the menstrual cycle is a dominant in the rhythm of life. Before puberty, and after the menopause, sex makes little appreciable difference—the boy and the girl, the old man and the old woman, react similarly to the ravages of the organism.

We notice the dissimilarity between the sexes only, therefore, because women become infected generally during the period of sexual bloom—a time when it is known that the presence of functioning ovaries, and still more the advent of pregnancy, have a profound effect on the clinical picture of the disease. It is a commonplace of medicine, pointed out almost a hundred years ago by Colles¹ (1837), that many women go through the whole period of their sexual life without a single clinical sign of syphilis, and yet give birth to children who are obviously infected.

PATERNAL OR CONCEPTIONAL SYPHILIS

This observation gave rise to the theory that the father could infect the ovum *in utero*, and the mother might thus escape entirely. It was a theory which was badly shaken when it was found that most of such mothers gave a positive Wassermann in the blood, although they were clinically clear. No one has yet demonstrated spirochaetes in an ovum. It is even doubtful if they have ever been found in semen; so, unless there is a resting or spore stage of the spirochaete, it is difficult to see how syphilis, passing from father to child without infecting the mother, is possible. French medical opinion, however, still clings to the view; and its importance for us is that, if we accept it as feasible, there may then be exceptions to Colles's law (that a syphilitic child cannot infect its mother), and we may have to

protect the mother from her congenital child by refusing to let her breast-feed it.

In a series of 94 pregnant syphilitic cases recently tabulated at the London Lock Hospital, 92 had positive Wassermanns, and were delivered of 79 healthy children and 13 congenitals (14.1 per cent.). The other two had negative Wassermanns in their blood before delivery, were delivered of congenitals who gave a positive Wassermann, and each developed a positive Wassermann herself within a month. French observers would claim this as presumptive evidence that the mothers became infected during delivery (Gougeret²). The usual view in this country, however, would be that the mothers had already been syphilized, and pregnancy was masking the Wassermann.

The practical point arising from this is that:

Unless both mother and child have a positive Wassermann, or mother and child have a negative Wassermann, the mother should not be allowed to suckle the child direct.

With two similar blood reactions there cannot reasonably be any risk of cross-infection; but with dissimilar reactions either the diseased mother or the diseased child may infect the healthy one. It does not appear, as Uhlenhuth³ and Mulzer⁴ claimed in 1913, that milk itself is contagious; and so, if the mother is diseased and her milk is drawn off into a sterile bottle, which has not been in contact with her, such milk may apparently be given to a healthy child with impunity. The child is thus not deprived of the benefit of its mother's milk.

ABSENCE OF CLINICAL SIGNS

We do not yet know exactly why it is that, during the child-bearing period, syphilitic women frequently have so few symptoms that it is impossible clinically to diagnose the disease in them. Probably the absence of a primary sore in many cases is more apparent than real. This is due to the fact that chancres on the external genitalia are usually painless, frequently small, often not indurated, and not uncommonly tucked away in some fold unnoticed by the casual eye. The researches of Anwyl Davies⁵ also suggest that a large number of primaries occur on the cervix; and as they are evanescent, and often not looked for, another factor in frequency has been over-

* Read in opening a discussion in the Section of Dermatology at the Centenary Meeting of the British Medical Association, London, 1932.