Within limits it would seem that the figure obtained by this formula is an accurate guide to progress, and differs widely from the basal metabolic rate figure only in the severest cases. It has a particular field of usefulness when for some reason estimation of the basal metabolic rate is not practicable.

TREATMENT.

The psychical and toxic factors in the causation of Graves's disease suggest at once two lines of treatment. The value of rest and freedom from mental excitement is too well known to need emphasis here. Removal of a focus of sepsis is also clearly indicated if the importance of such in the etiology be conceded. Unfortunately these two lines of treatment are in part antagonistic, for such an operation as tonsillectomy, for example, in an adult who has had repeated quinsies is no light one, and cannot be undertaken in a case of severe Graves's disease without anxiety. It finds its chief place in early cases, or those in which the thyro-toxicosis is slight. The question of focal sepsis should be borne in mind whenever an early case is encountered, or at a stage when the full clinical picture is still lacking. Its detection and consideration at this stage may be of great value as a preventive measure.

The modern treatment by administration of iodine, especially in the form of the French tincture or of Lugol's solution, has largely replaced earlier drug treatment. There can be no doubt of its potency, for within a very short time definite improvement is obvious in many cases, whilst the thyroid gland can be felt to become firmer. Unfortunately there is less certainty about the permanence of the good effect. Most English, German, and American observers hold that prolonged treatment is unsuccessful. Many French authorities, however, are of the contrary opinion. Thus Dautrebande,¹¹ Labbé,¹² and Boudreau¹³ state that iodine must be administered over many months, with gradually increasing dosage up to 0.5 or 0.6 gram of metallic iodine, given five or six times daily. These are truly heroic doses compared with the 2 to 10 minims of Lugol's solution, three times daily, customarily employed in this country. The rationale of iodine treatment is ambiguous, and, indeed, iodine would appear definitely to be contraindicated if it were true that Graves's disease is hyperthyroidism, and that its toxicosis is caused by excess of thyroxin. The recognition, however, that the thyro-toxicosis is related to excess of other secretion, and not to that of the iodo-colloid substance, suggests another explanation. May it not be that administration of iodine relieves or assists the thyroid in its reaction to toxins, and thus indirectly, by lessening its functional activity, reduces the output of the secretion which causes the thyro-toxicosis? In view of the unsatisfactory experience of others I have treated only a few patients by persistent and prolonged iodine therapy. The chief results have been gain in weight and lessened excitability and tremor, but there has been little beneficial effect upon the basal metabolic rate or the cardio-vascular symptoms. It must be confessed, however, that I have not yet had the temerity to use the large doses so forcibly recommended by some French writers.

About symptomatic treatment I shall not particularize as I have little new to advance. There are many occasions for such measures during the course of the disease. A mixture containing digitalis and bromide is, of course, one which has been very generally employed to combat the tachycardia and fibrillation, and to procure sleep and reduce the mental excitement. My belief is that digitalis should be used only with great caution in Graves's disease, for in this condition it may do serious harm.

There remain to be considered the two destructive procedures, which are used to cripple the over-activity of the thyroid gland—namely, x-ray therapy and operative procedures. There is no doubt that both may produce great amelioration of the symptoms, and may hasten recovery, though I think that in neither is one justified in using the word "cure." In a disease in which, under medical treatment, the tendency of the majority is slow progress in the direction of recovery, it is difficult to compute the precise value of surgical treatment unless its effects are immediately or rapidly curative. Nor is it easy to find any agreed statement as to which cases are considered by surgeons particularly suitable for surgical

treatment. There are many who regard all cases as suitable, except during an acute phase; there are others who are disinclined to operate at all. It must be acknowledged, however, that the tendency in recent years has been more and more towards operation, and the operative mortality has fallen in expert hands to a very low figure. On the other hand, x-ray treatment has become somewhat less favoured since it has been recognized that its effects cannot be controlled with precision, and that it interferes seriously with subsequent operative procedures. The common practice of preceding operation by a course of treatment by physical and mental rest, and by the administration of iodine, has certainly lessened the danger of surgical intervention. At my hospital we have no enthusiasts for surgical treatment, and it is seldom employed on my patients. In mild cases it seems to me to be unnecessary, and in very severe cases too dangerous, while of the intervening cases improvement by medical treatment is what one is accustomed to expect. In patients near the menopause, also, relief before long is to be anticipated. Perhaps I am influenced by the belief that surgical treatment for this disease is only treatment of a secondary condition, and that our chief hope lies in being able to discover and treat the primary causes. In the meantime, surgical treatment, though it may represent only a temporary phase, has undoubtedly a sphere of usefulness. To employ it as a routine measure is, I believe, irrational, but when medical treatment fails or falters it shortens the period of invalidism, which is so serious a consideration in many patients that it more than counterbalances the added risk.

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THE IMPORTANCE OF POST-NATAL MATERNAL CARE.

COMPRISING A REVIEW OF THE ORGANIZATION AND WORK OF THE POST-NATAL CLINIC OF THE EDINBURGH ROYAL MATERNITY HOSPITAL.*

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It is the common experience of those whose work is concerned with the treatment of diseases peculiar to women that parturition is ultimately responsible for a considerable proportion of the disability with which they have to deal. The importance of childbirth in this regard is reflected in the large number of gynaecological patients who refer their complaint to a previous pregnancy or labour. It is an obvious corollary that the degree of skill and care with which the process of childbirth is conducted is an important factor in a woman's subsequent well-being. The prophylaxis of future invalidism, however, requires from the accoucheur not only that pregnancy and labour be so managed as to reduce to a minimum the incidence of trauma and infection, but also such careful supervision of the patient's convalescence as will best assist the processes of involution and repair and restore a maximum degree of bodily efficiency.

Whereas the claims of the expectant mother have of recent years attracted, and rightly so, a full measure of consideration, the need for a similar attitude of guidance and

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watchful care during the weeks which follow delivery has scarcely received from obstetric teachers and writers the emphasis it deserves. It is with the object of directing attention to this important aspect of our obstetric responsibilities that I have chosen post-natal care as the subject of this address.

After the crisis of labour, with its major issues of life and death, has been successfully passed, the weeks which follow are apt to constitute a period of anti-climax in which watchfulness naturally tends to relax, to the extent occasionally that the patient is finally dismissed with or without a single examination after the conventional fortnight has elapsed. It is to be remembered that a minimum period of six weeks must always pass before the return of the pelvic organs to their normal condition is accomplished and recovery can be considered complete. Moreover, examination in a large series of women six to eight weeks after confinement has shown that even after a normal delivery, and in spite of negative examination findings at the conclusion of the lying-in period, various pathological processes may develop later, as the result of which recovery is short of perfect. It would appear desirable, accordingly, to extend the supervision of our puerperal patients so as to cover the period during which the development of such late complications remains a possibility.

The management of the more immediate convalescence after confinement has become so standardized that it is only necessary in passing to re-emphasize certain important principles. These comprise essentially the maintenance of asepsis, the establishment of lactation, and insistence on an adequate period of rest in bed, with simple bed exercises and frequent change of posture so as to relieve engorgement of pelvic veins and ensure adequate drainage. For those who can afford it massage is beneficial, both in virtue of its general stimulating effect, and also in making good the loss of muscular tone produced by the forced inactivity of the latter weeks of pregnancy and the lying-in period.

As a routine a vaginal examination should be made about a fortnight after delivery. At this time the condition of the perineum, cervix, uterus, and appendages is investigated. Injuries are inspected and the state of healing noted. If the uterus is found to be retroverted it is a simple matter to replace it at this time; in such a case the patient is instructed to report in a week for re-examination. If the displacement has recurred it is again corrected and a pessary introduced, otherwise a period of three weeks is allowed to elapse before a further examination is made.

When the patient is discharged she is given general advice in regard to the immediate future of her infant and herself; in addition, she is instructed in simple graded exercises devised to restore tone to the overstretched muscles of the abdomen and pelvic floor. Abdominal exercises of the Muller type, combined with the use of a properly fitting corset, have been found to be of much value in preventing or arresting the development of visceropptosis to which the feeble over-stretched condition of the abdominal musculature predisposes during the weeks which follow delivery. Exercises to strengthen the muscles of the perineum and pelvic floor are similarly useful in cases in which the musculo-fascial tissues round the vaginal entrance have been over-stretched at the time of delivery.

Even when the patient's condition a fortnight after delivery is satisfactory it is a wise precaution to encourage her to submit to re-examination at a later date. Two years ago, in the Edinburgh Royal Maternity Hospital, a weekly post-natal clinic was organized for the purpose of supervising the patient's progress after she left hospital, guiding and advising during the difficult weeks of convalescence, treating in their earliest stages such sequelae of parturition as might manifest themselves after the conclusion of the lying-in period, and, in short, ensuring that the mother's return to health should be as uninterrupted and as complete as possible. Every patient is instructed to report to the post-natal clinic on at least two occasions subsequent to her discharge. The first revisit is made, as a rule, about five weeks, and the second about ten or twelve weeks, after delivery. In certain cases, however,

more frequent or more prolonged attendance at the post-natal clinic may be advised.

During the past two years rather more than 2,000 patients have reported for re-examination. This represents about 60 per cent. of the total number of in-patients treated by the hospital during the same period of time. Various factors have combined to prevent the "follow-up" being more complete. About 15 per cent. of the patients lived too far from hospital to permit of subsequent attendance; nearly 10 per cent. were unmarried and disappeared at once after leaving hospital; the remaining 15 per cent. could not be persuaded that the probable benefit of further examination and advice would amply repay the little inconvenience occasioned.

An analysis of these cases shows that in approximately 1,400, or 70 per cent. of the total number, the patient's general health was satisfactory, and on examination it was found that parturition had not in any way impaired the efficiency of the pelvic organs. To this number should probably be added the majority of those patients who failed to report. In the remaining 30 per cent. abnormalities of different types and degrees of importance were present. It is a measure of the importance of post-natal work that in almost one case in three special advice or treatment was called for.

RETROVERSION.

Probably the commonest, as it was one of the most important, of the abnormal conditions encountered was backward displacement of the uterus. This lesion was met with in 18 per cent. of the patients who reported to the post-natal clinic. It is noteworthy in this connexion that at the time of discharge from hospital the uterus was found to be retroverted in not more than 8 per cent. of cases, a finding which would indicate that this displacement is most likely to occur during the third or fourth weeks after delivery rather than during the lying-in period. There was in addition a small number of cases in which at the first revisit to hospital the uterus was found to be in a normal position, but in which at a subsequent examination backward displacement was found to have occurred.

An investigation into the factors which might predispose to puerperal retroversion showed that subinvolution was present in a large proportion of the cases examined, and was probably the most important individual cause of the condition. While this is so, it is probably also true that retroversion of itself exerts an adverse influence on involution, for in most cases correction of the displacement was quickly followed by diminution in the size of the uterus and disappearance of persistent red vaginal discharge. Neither multiparity nor difficult labour appeared of itself to be of etiological importance unless at the same time there was impairment and relaxation of the lower uterine supports, with consequent descent of the uterus; the association of retroversion and partial prolapse of the uterus was not uncommon. Early rising and hard work too soon after confinement probably operate in the same way, and explain the greater frequency of retroversion in the hospital class of patient. An important and unexpected observation in this connexion was that in cases delivered by Caesarean section the incidence of retroversion, in spite of a longer period of recumbency, was relatively much lower than in those delivered per vaginam. It was found, finally, that where retroversion had been known to exist before or during pregnancy there was a pronounced tendency for the displacement to recur after delivery.

The symptoms which puerperal retroversion may produce are difficult to define. Low sacral backache, general pelvic discomfort, and prolonged lochia rubra were present in most cases. But the condition is so often associated with other pelvic abnormalities, the result of injury or infection, that it is not easy to differentiate the symptoms produced by the retro-displacement itself from those to which other accompanying conditions may give rise. The persistence of red vaginal discharge, however, was noted so frequently in this group of cases as to be almost pathognomonic of retroversion in the late puerperium. It is probably true that such bleeding is often in large part due to an associated subinvolution, but the frequency with which it subsides so soon as the position of the uterus is

corrected and without other treatment would suggest that a mechanical factor incidental to retroversion is also involved.

Reference has already been made to the treatment of puerperal retroversion when it is discovered at the conclusion of the lying-in period. Similarly, when the displacement is first noted six weeks after delivery an attempt is made to correct it and retain the uterus in normal position by means of a Hodge pessary. As a rule the uterus can be brought forward without difficulty, although in a few cases a general anaesthetic is needed. After an interval of six weeks the pessary is withdrawn and the patient asked to attend for re-examination in a further three weeks' time. If the uterus is found to have remained in good position the patient is discharged, but advised to report should pelvic symptoms of any kind appear. If, however, the displacement has recurred pessary treatment is continued for six months.

In the majority of the cases observed the end-results of pessary treatment were in a high degree satisfactory. In a small number deficiency of the pelvic floor, tenderness in the vaginal vault, or fixation of the uterus made pessary treatment unsuitable, and in a few cases the uterus tended to retrovert as soon as the pessary was withdrawn. But in rather more than 80 per cent. of the cases which were followed up symptoms were relieved and the uterus remained in good position after the support had been removed. The earlier the displacement was discovered the easier did its correction prove to be and the less its liability to recur. On the other hand, the symptoms to which retroversion in its early stages gives rise are often so slight and indefinite that unless a routine examination is made six or eight weeks after confinement the condition must frequently remain undiagnosed until such time as its cure by non-operative methods becomes unlikely.

LACERATION OF THE CERVIX.

Laceration of the cervix, associated as a rule with eversion of the edges of the tear and localized surface infection, was found in a relatively large number of cases.* In primiparous patients, apart from the superficial fissuring which is the inevitable legacy of every first labour, injury to the cervix was found in approximately 15 per cent. of the cases examined.

As a cause of trauma of this nature difficult instrumental delivery predominates, and the most serious variety of cervical injury was found in the "failed forceps" type of case, in which failure to deliver had been due to incomplete cervical dilatation. Short of this, the lesion was found in almost every case in which complete dilatation and effacement of the cervix had not occurred spontaneously: it was present, for example, in cases in which, because of maternal or foetal distress, forceps had been applied while as yet a thin rim of cervix could still be felt. Similarly, where an attempt had been made to complete the dilatation of the cervix manually or by drawing the head down into it by forceps, laceration was the common result. On the other hand it is noteworthy that in cases in which delivery had been spontaneous, cervical injury was found in 8 per cent. of cases. In a small number of these labour had been precipitate; in a considerable proportion, however, the membranes had ruptured prematurely, and it is probable that the consequent long dry first stage of labour with dilatation of the cervix by the hard head in place of the soft bag of waters was responsible. In other cases it is possible that a constitutional friability of the cervical tissues may have predisposed to injury. The lesion was not appreciably more common in elderly patients nor did undue size of the child appear of itself to be a factor of importance.

With the immediate dangers of cervical laceration—haemorrhage and acute inflammatory invasion of the pelvic cellular tissue—this paper is not concerned. On the other hand, the eversion and subsequent infection of exposed cervical mucosa, which is so apt to interfere with healing, especially in the transverse or deep stellate type of laceration,

constitutes an important puerperal lesion. It is possible at this stage to observe the early development of a condition which later may cause more or less serious ill health. Furthermore, the association of subinvolution and recent cervicitis was so frequently noted as to suggest that the process of involution may be adversely influenced by a focal infection of this type.

The immediate repair of laceration of the cervix at the time of delivery has obvious advantages. On the other hand, the increased risk of sepsis involved unless a perfect aseptic technique is assured makes the procedure inadvisable in ordinary domestic conditions. While this is so, much can be done in the later puerperium to prevent or diminish subsequent disability by controlling the tendency to eversion and by the eradication of infection before the deeper tissues of the cervix become involved.

In the series of cases under review douching, tamponage, and local applications of different types have been employed. The actual cautery, the use of which does not necessitate a general anaesthetic, has proved an effective therapeutic agent not only in suppressing infection but also in reducing eversion by reason of the cicatrization which it produces. Short of this the application once weekly of a 10 per cent. solution of silver nitrate has produced satisfactory results. In a few cases of extensive injury a plastic repair with excision of infected tissue was recommended.

SUBINVOLUTION.

Subinvolution was found with considerable frequency in the series of cases under review. In approximately 12 per cent. of those who reported to the post-natal clinic there was persistence of lochia rubra as late as the sixth or eighth week after delivery, and on examination evidence of defective involution was found. In a considerable proportion labour had been difficult and instrumental, and the adverse influence which puerperal infection, not necessarily of a major type, commonly exerts on involution of the uterus was evidenced by the frequency with which the earlier convalescence of many cases in this group had been complicated in this way. Attention has also been directed to the etiological relationship to subinvolution which retroversion and cervical infection appear to possess. The persistence of lochia rubra until the third or fourth week after confinement appeared occasionally to result from such interference with the pelvic circulation as severe constipation may produce, suitable purgation being quickly followed by cessation of haemorrhagic discharge. Only in a small number of cases could the condition be attributed to retention of fragments of placenta or membranes.

The importance of normal lactation in promoting involution was demonstrated in a convincing manner by the findings in a comparative series of two hundred cases, one hundred of whom nursed their children and one hundred did not. The duration of the red lochial discharge in the former ceased on the average on the ninth day post partum, whereas in the latter it continued until the eighteenth day after delivery.

The treatment of subinvolution was directed in the first place to the correction of such accompanying conditions as retroversion, cervicitis, constipation, or retained products of conception. Where the condition was associated with a residual pelvic infection a course of douching and vaginal tamponage was commonly employed. The administration of quinine and of ergot in some form proved a useful adjuvant in stimulating involution and in controlling persistent vaginal bleeding, although in a few cases this was so obstinate as to require curettage.

BACKACHE.

Backache proved to be a much less common disability during the weeks which follow confinement than one had anticipated. Although every patient was directly questioned in regard to it, not more than 8 per cent. of those who attended the post-natal clinic complained of discomfort of this type. Where uterine displacement, cervicitis, or other pelvic abnormality appeared to be responsible the pain was almost invariably referred to the sacral region. It was, however, only in a relatively small number

* Multiparous patients have been omitted from this analysis as the possibility of the cervix having been injured in a previous labour could not be excluded.

of cases that backache could be related to a visceral lesion. For the most part puerperal backache is of the lumbar or lumbo-sacral or sacro-iliac variety, and would appear more often to be an orthopaedic disability than an indication of gynaecological disturbance. In the majority of cases discomfort had been present for several weeks before delivery, and its origin is probably to be found in the exaggerated lordosis incident to the latter period of gestation; after the patient begins to go about the complaint may be further aggravated by faulty posture and by weakness and general relaxation of the abdominal parietes. There is considerable risk of this condition developing into a troublesome chronic disability, and from the outset treatment should be directed towards the correction of faulty posture, instruction in appropriate exercises, and the employment of a suitable brace or corset.

Apart from such relatively commonplace obstetric sequelae as those which have been considered there is an important group of cases which necessarily demands a prolonged period of supervision and treatment after delivery; such, in particular, as those in which pregnancy has been complicated by hydatidiform mole, heart disease, venereal disease, or albuminuric toxæmia. In post-eclamptic and albuminuric patients, for example, persistence of high blood pressure and albuminuria were found in more than 30 per cent. of cases, and necessitated special advice in regard to diet and in other directions.

Finally, there have been many cases in which debility, anaemia, constipation, dysuria, difficulties in regard to lactation, and other similar conditions, have called for simple advice and treatment.

There are essentially two considerations on which a plea may be based for a closer and more prolonged follow-up study of our obstetrical cases than is usually thought necessary. In the first place, the instructional value of routine examination some six or eight weeks after delivery is difficult to exaggerate. In retrospect such an investigation throws light and guidance on the conduct of labour, and, indeed, on the whole process of childbirth. It discloses the manner in which the general bodily functions have withstood or been impaired by pregnancy and parturition, and illustrates the effect on the reproductive organs which different types of labour, normal or abnormal, may exert.

Of more immediate practical value, however, than the "audit" of our work which the post-natal clinic provides is the scope which it offers in an important field of preventive medicine. It directs attention to certain conditions in their early stages which otherwise may remain untreated until such permanent structural changes have occurred that cure by non-operative measures becomes unlikely. In its relationship to the patient's future well-being it is complementary to, and rivals in importance, the more routine supervision and examination before delivery. No department of practical medicine would appear to provide a better opportunity of recognizing the early signs of disease or of treating them with such gratifying results.

The extent to which such a scheme of obstetrical after-care as I have outlined can be applied in general practice conditions is not easy to define. There are certain obvious difficulties, such as that of adding to duties for which remuneration is already seriously insufficient, and more, perhaps, the natural diffidence of patients to submit to what they may consider unnecessary examination. Furthermore, the incidence of post-partum morbidity is naturally lower in domestic than in institutional practice, which is so largely concerned with abnormal midwifery, and it may be claimed that the need for prolonged supervision after delivery is correspondingly less urgent in the former than in the latter. It is unfortunately true, however, that such conditions as retroversion, cervicitis, and backache may develop despite the most conscientious supervision during pregnancy and the most careful conduct of labour, and, in view of the impaired health to which such sequelae of childbirth may later give rise, a policy of after-care, even if it is restricted to the investigation and treatment of persistent vaginal bleeding, leucorrhoea, and backache, must necessarily help us to discharge more effectively and more completely the responsibilities we are privileged to assume.

VARIATIONS IN THE INCIDENCE OF PNEUMOCOCCAL INFECTION IN THE NASAL ACCESSORY SINUSES OF CHILDREN.

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PNEUMOCOCCAL infections in children began to attract my attention last summer, when I remarked that an unusually large number of the nasal accessory sinuses I examined were reported thus infected. I have turned up all such cases in my private file since the end of 1919, and found record of 1,002 patients, of whom 242 were under 15 years of age. In 52 adults a subsequent re-examination was made, so that for the present purpose there are 1,054 "cases," comprising 3,011 sinus explorations.

The technique employed throughout was that evolved twenty years ago by my father, Dr. P. Watson-Williams. Briefly, a cannula is introduced into the sinus, a small volume of sterile water is syringed in, withdrawn, and examined microscopically and bacteriologically. The sinuses generally examined were the maxillary antra and the sphenoidal; less commonly the posterior ethmoidal cells. The antrum is approached not from below through the inferior meatus, but from above through the middle, a method of great value in dealing with small children. It is comparatively rarely necessary to examine the posterior sinuses of children, especially young children. Six of the patients were under 3 years of age; the age distribution of the whole series was as follows:

TABLE I.

Age.	Patients.	Antra.	Sphenoids.	Ethmoids.	Sinuses.
Years.					
0-4 ...	21	41	—	—	41
5-9 ...	67	129	4	1	134
10-14 ...	154	285	41	5	332
Children ...	242	456	45	6	507
Adults ...	812	1,557	815	132	2,504
	1,054	2,013	860	138	3,011

Arranging this material in years, and expressing the incidence of pneumococcal infection as a percentage (whether of children or of sinuses examined), it was at once clear that my impression had been correct—that is, that during 1923 a very considerable rise had occurred in the rate. Further, a period of similar high incidence had passed unnoticed in 1923-24, with a much lower rate of infection before and after it. Ignoring 1922, the recorded observations for which year are too few for inference, and grouping together other years in which the incidence was closely similar, the rise and fall is seen to be from 0 to over 10 per cent., as shown in Table II.

There has been no conscious difference in technique, nor in the selection of cases for examination, to explain these variations. In order to test whether accident affected the rather small numbers involved, a similar analysis was made of the figures for "all cases," the results of which are given above. Allowing for the difference in the average number of examinations per child patient (2.1) and per adult (3.3), children form for each year so small a part of the whole that the figures for "all cases" are practically those for adults. It is seen that the incidence of pneumococcal infection for all cases shows a variation—less, it is true, in its absolute but as great in its relative extent, and occurring in approximately the same periods as for children. We may deduce that some definite factor operates to cause this variation, though whether this is climatic, epidemiological, or otherwise I am not competent to suggest. The incidence, however, of this infection is not solely of rhinological interest. *A priori* it might be supposed that an individual who harboured living pneumococci