there is, of course, no guarantee that both late primary and secondary haemorrhages may not follow its use. Macnab states that after a considerable experience of this instrument both primary and secondary haemorrhages were more frequent than with the single-bladed instrument, and others have also discarded its use after a fair trial. My own view is that it is not nearly so precise or efficient an instrument to manipulate, and that in the vast majority of my own cases I find little difficulty in confining haemorrhage to a minimum. In those cases in which haemorrhage is really troublesome it is very questionable whether a crushing instrument would be of help.

The dissection operation is now reserved by most laryngologists for special cases in which enucleation by the guillotine may seem to present difficulties, but I venture to say that the more one uses the guillotine, and the more expert one becomes, the less does one dissect.

Haemorrhage.

Bleeding is brisk for thirty to sixty seconds, but usually ceases spontaneously if the patient's neck and face are freely bathed in cold water. If this does not suffice, pressure should be applied to the tonsil bed for a minute or two by means of a swab on a holder, and if in three or four minutes bleeding is still free a swab squeezed out of hydrogen peroxide should be applied and pressure maintained for a further few minutes. In the vast majority of cases this will suffice, but in a few (about 1/2 per cent.) further pressure with a swab squeezed out of adrenaline will be needed, at the same time haemoplastin being given subcutaneously.

Beyond this I have had to go on only four occasions. Twice I have ligated a refractory artery of unusual size, situated in both cases at the upper pole of the tonsil bed, and twice I have left pressure forceps on the bleeding point for two or three hours after operation. Some laryngologists advocate the ligation of all bleeding points at every operation. This is a tedious business and considerably lengthens the time of the operation; moreover, it is not an infallible method of stopping haemorrhage, as ligatures have been known to slip, with subsequent severe haemorrhage after the surgeon has left. Many ingenious instruments have been invented for suturing together the pillars of the fauces in cases of severe haemorrhage. It is not a method which appeals to me, and I have never come across a case requiring such drastic treatment.

The surgeon may be called upon to deal with haemorrhage, more or less severe, a few hours after operation. In those cases the tonsil bed is filled with a large clot under which bleeding is taking place. After clearing away the clot, pressure, with the help of hydrogen peroxide or adrenaline, and the hypodermic administration of haemoplastin, has, in my experience, always been effectual in stopping it.

Fatalities.

I have operated on well over 12,000 cases of adenoids and tonsils with two fatalities. These cases, due to post-operative haemorrhage after the removal of adenoids, I have already referred to.

In the records of the Royal Manchester Children's Hospital for the last sixteen years—that is, the period during which I have been on the staff—I can only find a further three deaths following this operation. One patient died from the effects of post-operative haemorrhage, one from tuberculous meningitis. Neither of these cases did I personally see. The third died from sepsis after being operated upon by a medical officer at the out-patient department. A fourth case in which death might possibly be attributed to the operation was that of a mentally defective child at the Children's Hospital. This child, seemingly perfectly fit in every way, collapsed suddenly and died from heart failure three days after operation. A history of diphtheria some two or three months previously was elicited. So that in a period of sixteen years, 1913-28, there was a total of five, or at most six, fatalities following the operation for tonsils and adenoids at the Royal Manchester Children's Hospital. During this period over 27,000 such operations were performed.

As to the ultimate results of the operation I have no figures of my own to give.

In general terms it may be said that if the tonsils are efficiently enucleated the results, as regards the indications for operation I have enumerated, with the exception of chronic enlargement of cervical glands and systemic infections, are excellent, the condition being cured in nearly 100 per cent. of cases. In those cases in which a cure is not obtained it will be found that tonsillar tissue has been left behind.

MATERNAL MORTALITY.*

BY

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DURING the year 1928 there were 676 maternal deaths in Scotland, representing a rate of 7 per 1,000 births, as compared with an average of 6.4 for the preceding ten years. Of these 676 deaths, 234, or 2.4 per 1,000 births, were ascribed to puerperal sepsis.

A preliminary basis for the discussion on maternal mortality may conveniently be found in the conclusions arrived at from the special investigation into a total of 252 maternal deaths occurring in Aberdeen (1928) during the ten years 1918-27—namely:

1. The analysis of the records of maternal deaths in Aberdeen over a period of ten years, as obtained by means of a special system of inquiry, has not revealed any definite relationship between environmental conditions and puerperal mortality. Thus, in turn, puerperal mortality in relation to cleanliness of house, size of house, crowdedness of house, and to congested areas, has been examined, and no significant association of any of these conditions with puerperal mortality has been ascertained.

2. Similarly, the influence on maternal mortality of more personal factors, such as age of the mother, illegitimacy, occupation of the mother, habits of the mother, health of the mother before and during pregnancy, stillbirths and syphilis, and sequence of pregnancies, has been examined, with results that confirm generally existing views as to the influence of these various factors on maternal mortality.

3. The comparative maternal death rates from all causes and for the separate causes of death in the practices of doctor, midwife, district, and institution have been analysed, the factor of selection being eliminated by transferring the case back to the original doctor or midwife in charge of the case, and it has been found that the death rate per 1,000 maternity cases is 2.8 in the practice of midwives, 6.9 in the practice of doctors, and 14.9 in in-patient institutional practice.

4. The evidence indicates that, in so far as midwife cases are concerned, the application of midwifery forceps has no prejudicial effect on the mother.

5. Statistical evidence has been obtained of the reduction in maternal mortality which accrues from the provision of ante-natal services.

6. There is reason to believe that the high incidence of puerperal sepsis in maternity institutions in Aberdeen is due to contagion.

7. The view is advanced that the higher incidence of puerperal sepsis in the practice of doctors as contrasted with that of midwives is also due to contagion, being dependent in considerable part on a streptococcal carrier condition in doctors.

8. It has been shown conclusively that the *Streptococcus haemolyticus* plays by far the most important part in the causation of puerperal sepsis.

9. It has again been demonstrated that the same type of haemolytic streptococcus can on occasion produce puerperal fever, scarlet fever, erysipelas, and pyogenic infections.

10. The evidence goes to show that an expansion and improvement of ante-natal services will result in an important reduction in maternal mortality.

11. The evidence supports the view that the development of a new midwifery organization in which midwives conduct all normal deliveries, and in which doctors provide the ante-natal services and deal with obstetrical complications, will result in a significant reduction in puerperal mortality.

12. It has been shown that if the risk of contagion in maternity hospitals is to be restricted, then the number of patients and their spacing in the wards must be rigorously controlled.

* The opening paper of a discussion in the Section of Public Health at the Annual Meeting of the British Medical Association, Manchester, 1929.

13. So far as the specific prophylaxis of puerperal fever is concerned, it has been shown that while the exotoxins of the streptococci causing puerperal sepsis can be neutralized by any monovalent streptococcal antitoxin, the destruction of the organisms is only likely to be secured by the production of a type (serological) specific antibacterial serum.

PREVENTION.

The thesis is submitted, therefore, that in so far as the prevention of maternal mortality is concerned, and within the limits of our present knowledge, a significant reduction in maternal mortality would be immediately attained by (a) an extension of adequate ante-natal services, and (b) the institution of a new midwife-doctor combination as above defined (paragraph 11).

DIAGNOSIS.

With reference to the bacteriological diagnosis of puerperal fever, confusion has resulted from the wealth of bacteriological data relating to the complexity of the flora of the genital tract (1928). It is admitted that there is a great variety of organisms in the genital tract at the time of the puerperium, and that puerperal sepsis is not necessarily associated with streptococcal infection. The point that matters, however, is that the serious forms of puerperal sepsis, and certainly some 90 per cent. of the deaths from sepsis, are due to infection with haemolytic streptococci. If serious morbidity and death from puerperal sepsis is to be countered, therefore, the essential is to concentrate on the haemolytic streptococcus.

TREATMENT.

Prevention and treatment cannot properly be considered separately, since adequate ante-natal treatment prevents maternal deaths in general, and since the early treatment of puerperal sepsis involves isolation and the prevention of further cases of sepsis by contagion.

In so far as treatment may lead to the prevention of serious morbidity and mortality from sepsis, the first essential is early recognition of the infection, and to this end puerperal pyrexia has been made notifiable in England, and is in process of being made notifiable in Scotland. Up to the present time the vast mass of cases of puerperal fever receive comprehensive treatment only when the disease is so advanced that the prospect of recovery is remote.

In this connexion the advantages of the notification of puerperal pyrexia can be seen from the following chart, wherein the figures of pyrexia notifications have been analysed and those attributable to sepsis added to the puerperal fever notifications.

The chart shows that during the four years 1925-28, during which pyrexia has been notifiable, the elicited incidence of puerperal fever has increased from an average of 3 per 1,000 births prior to 1925 to 12 per 1,000 births in 1928. It will generally be conceded that such increasingly early diagnosis of puerperal sepsis is bound to have a profound effect on the efficacy of treatment. From the clinical point of view the valuable results obtained by Remington Hobbs (1927) with reference to glycerine drainage of the uterus are noted.

LITERATURE.

- Burt-White, H.: *British Medical Journal*, 1928, i, 974.
 Burt-White, H., and Armstrong, R.: *Ibid.*, 1929, i, 532.
 Hobbs, A. Remington: *Ibid.*, 1927, 1223; and *Medical World*, 1927.
Maternal Mortality in Aberdeen, 1928, H.M. Stationery Office.

A MODIFICATION OF LAGRANGE'S OPERATION.*

BY

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FIFTEEN years ago, at the historical meeting of the British Medical Association in Aberdeen, it was my privilege to see a very interesting specimen, shown by Mr. Hill Griffith, of an eye that had been excised on account of late infection following trephining by Elliot's method. The details of that case are to be found in the *Journal* of the Association (1914, vol. ii, p. 389). They left a rather profound impression on my mind. Here was a perfectly good operation—and, after all, no fistulization operation has found greater favour with the ophthalmological world than has Elliot's—performed by a perfectly good operator, and yet it was followed by late infection that necessitated removal of the eyeball. In those days I was not in a position to do any operations for glaucoma on the living human subject, but when, a few years later, my opportunity occurred, it struck me that, after all, it was not so surprising that late infection should occur in cases of corneo-scleral trephining, because the membranous covering of the fistula must essentially be rather tenuous and flimsy if that fistula be situated at the corneo-scleral margin. Obviously, therefore, a fistulization operation, to be reasonably safeguarded against late infection, must provide for a membranous covering in the region of the fistula sufficiently thick and impermeable by micro-organisms or their toxins to prevent the occurrence of an iritis, or at any rate of a septic irido-cyclitis. Now I should like to state at the outset that it is not my intention to criticize Elliot's operation for glaucoma, nor yet to describe a new operation for that disease. Most ophthalmologists are conversant with all the operative procedures for glaucoma (and their number is legion), and have had successful results with any or all of them. The methods of Young, Holth, Herbert, Heine, Bentzen, and others have been described elsewhere, and have found, no doubt, their staunch adherents. I merely desire to describe a modification of an operation advocated by one of the greatest protagonists of sclerectomy—namely, Lagrange—which seems to me easier to perform than the operation he describes, and to yield results quite as successful as those which he claims.

Every ophthalmologist knows well the procedure of Lagrange's operation for glaucoma. Those who were present at the Oxford Ophthalmological Congress of 1927 listened with rapt attention to his address and never doubted his statement that "we have never seen late infection." The only drawback to his operation is the technical difficulty of its performance. Whitehead of Leeds alludes to this in his contribution to the discussion on the results of operative treatment of glaucoma. Besides, it will surely be conceded that the size of the scleral wound which Lagrange employed is out of all proportion to the needs of the case. As many other operators have shown, a sufficient piece of sclera can be excised from the lip of a wound made with a small keratome and the trauma to the scleral envelope correspondingly diminished.

The modification of the operation which I beg to submit is as follows:

Conjunctiva and subconjunctival tissue are grasped with forceps at a point 6 or 7 mm. above the limbus, and divided with straight-pointed scissors. The capsule of Tenon, if prolonged as far forward as this, should be divided likewise in order to secure the thickest possible covering for the fistulous track. This composite sheet of tissue, composed of the three layers named, is then cut with the scissors by means of a curved incision running concentrically with the limbus (more or less as in Elliot's operation), the total length of this incision being about 1.5 or 2 cm. It is then reflected downwards in the direction of the limbus by easy dissection until we get to within 1.5 or 2 mm. distance of the corneo-scleral margin, when the scissors are laid down. The flap should not be grasped by forceps, but simply kept out of the way by

* A paper read in the Section of Ophthalmology at the Annual Meeting of the British Medical Association, Manchester, 1929.