between the beats can certainly be recognized with ease and smaller variations might be distinguished if the possibility of alternation were borne in mind when the blood pressure was being taken. If alternate beats reach a different systolic pressure the audible number of beats will be halved as soon as the pressure in the cuff exceeds the lower of the two maximum pressures. When all the beats have been obliterated by inflating the cuff to a pressure higher than the higher of the two systolic readings the halved rate will again be heard on deflation until the pressure in the cuff falls below the lower of the two systolic readings.

The pulse tracing is the only other method which can be relied upon to detect alternation of the pulse, and this is not likely to be used unless the condition is suspected. Small differences in systolic pressure cannot be recognized by palpation, and the electrocardiogram may be normal in spite of alternation. Every cardiac case is (or should be) investigated with the sphygmomanometer, and if the possibility of alternation is not forgotten few cases, where this type of arrhythmia is persistent, should be missed. It must be remembered that alternated strong and weak beats may be due to extrasystoles alternating with normal beats. In such cases there will be a disturbance of rhythm which will not, as a rule, be difficult to recognize, although the halving of the pulse rate will be observed as soon as the pressure in the cuff of the sphygmomanometer is sufficient to obliterate the beats due to the extrasystoles.

A study of the pressure relations of individual pulse beats is sometimes helpful in determining the cause of other forms of arrhythmia. Auricular fibrillation can often be diagnosed with confidence by palpation of the pulse and apex beat. If the blood pressure is taken in such cases it is found that the systolic pressure is impossible to estimate in the ordinary way; the first beat that is heard on deflating the cuff is usually an isolated one, and it may be necessary to reduce the pressure in the cuff by 20 or 30 mm. before the number of beats heard bears any relation to the charted pulse rate. If the cuff is held inflated at the pressure at which the first beat is heard only two or three beats a minute may be heard. As the cuff is *slowly* deflated the number gradually increases, and it is possible to get some idea of the variations in systolic pressure between the biggest and smallest beats. The complete disorganization of ventricular rhythm is suggested by the fact that the *sound* of each beat varies, even though the pressure in the cuff is kept constant. And the number of beats which get through at a given pressure of the cuff bears no sort of relation to normal cardiac rhythm.

In some cases where frequent extrasystoles closely simulate the arrhythmia of fibrillation careful attention to the rhythm heard with the cuff of the manometer partially inflated may give a clue to the true source of the ventricular irregularity. Ectopic beats of ventricular origin do not as a rule disturb the dominant rhythm of the heart. These beats can be excluded by raising the pressure in the cuff to a point just below the pressure generated by the normal beats. The equal spacing of the remaining (normal) beats can then be recognized with a fair degree of certainty. The method cannot be as accurate as measurement on a pulse tracing, but I have been able, on several occasions, to diagnose correctly the presence of extrasystoles in patients who have previously been thought to be suffering from fibrillation, and in whom palpation of the pulse and apex beat had certainly suggested the latter condition. Where the ectopic beats are of auricular origin there is usually interference with the dominant rhythm, and the distinction is less easy if the abnormal beats are very frequent. But in many cases the extrasystoles seem to generate a fairly constant pressure. For example, a patient may have a systolic

pressure of 160 mm., but the abnormal beats may sometimes be shown to appear in the brachial artery only when the pressure in the cuff is between 120 and 130. If one series of beats remains fairly constantly at one pressure and another series appears to lie between pressures not more than 15 mm. apart the second series are likely to be extrasystoles rather than irregular responses to a fibrillating auricle. In the latter condition the systolic pressures resulting from individual ventricular contractions are much more variable, and in this way the two conditions may sometimes be distinguished. It must not be expected that all cases can be distinguished by the method described. Ectopic beats are sometimes very variable in the pressures which they generate; in the course of half a minute there may be ventricular contractions which fail to exceed the aortic diastolic pressure and so fail to give rise to a pulse beat at all, while others may exceed the diastolic pressure sufficiently to give rise to a pulse beat whose pressure is not very far short of the maximum pressure of the normal beats. But if careful attention is paid both to the rhythm and to the actual pressures of abnormal beats I believe that valuable information may be obtained.

This method of studying the pulse is possibly well known to cardiologists, but it does not seem to be mentioned in their works, except in so far as it applies to the detection of *pulsus alternans*. Anything which simplifies clinical investigation and eliminates the necessity for employing elaborate apparatus is clearly useful, and I have therefore ventured to draw attention to a method which has proved of value to me in the routine investigation of blood pressure in patients suffering from cardiac irregularities.

CHOICE OF OPERATION FOR CATARACT ON A PREVIOUSLY TREPHINED EYE

BY

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It is well known that cataract is frequently met with in association with glaucoma. Sometimes the patient shows evidence of the former condition when he first presents himself to the surgeon. At others, the opacification of the lens follows an operation for the relief of tension. In certain cases it is obvious that the glaucoma operation has been, to some extent at least, responsible for the occurrence of the cataract, for the opacification may spread from the points where the iris has adhered to the lens capsule, thus suggesting that these synechiae are in some way responsible for the commencement of the trouble. In others the first signs of opacity are seen in the depth of the lens and are obviously independent of any interference with the capsule, though the suggestion that the lenticular nutrition has been affected cannot unhesitatingly be set aside. Whatever may be the cause of the cataract, and whether it is primary or secondary, the consequent failure of vision may often demand the removal of the lens.

Such an operation is bound to be fraught with anxiety, for added to the many risks that are always associated with cataract extraction, the surgeon is confronted with others peculiar to the condition under discussion. The cataract is rarely fully mature, the optic nerve has probably been damaged to some extent, and the interference with the circulation which was associated with the glaucomatous attack has left the eye in a condition less able to stand the strain to which a cataract operation necessarily subjects it.

In addition to all the above considerations there is added one of special importance—namely, the necessity of avoiding interference with the filtering scar. It is true that in some cases where the original filtration has been on too generous a scale it may be a positive advantage to diminish it by cutting through the filtration area and thus establishing some amount of cicatrization. Much more commonly, however, the converse holds, and the surgeon's principal anxiety is to avoid doing anything which can diminish filtration. For a long time past I have therefore focused my attention in all such cases on a *technique which will avoid any interference with the filtering scar*. My task has been made more difficult by the fact that I have since 1920 made the inclusion of a conjunctival bridge a routine step in all my extractions.

For a very long time past surgeons have recognized that a large conjunctival flap promotes the early healing of a cataract incision. Well over thirty years ago Maynard of Calcutta was advocating the stitching of the conjunctival flap to add to the safety of the operation, and I opposed him then on the ground that to introduce stitches into the near neighbourhood of a cataract wound was asking for trouble from sepsis. There was and is another objection to the ordinary conjunctival flap—namely, that it is liable to lead to the presence of a filtering scar after an extraction and also to increase the amount of astigmatism present by permitting a general healing of the wound whilst leaving the corneo-scleral edge partly ununited. It might be argued that this would be a point in favour of adopting a wide conjunctival flap in cases where a filtering scar is already in existence. I have tried this and given it up, for I found that any interference with the tissue over the trephine hole is apt to lead, not to the increase, but to the cessation of filtration. It is very difficult to limit the amount of cicatrization produced when a fresh cut is made through the filtering tissue, and one may easily cause the trephine hole to close, with the recurrence of glaucoma.

I was therefore led to seek an alternative procedure. A wholly corneal incision is unsatisfactory because it is attended with a risk of delay in the healing of the section, a complication which is even more undesirable in these cases than in ordinary straightforward cataracts. The method which I have adopted with success, and which appears to me to be rational, is to transfix the cornea in the usual way with a cataract knife and then to cut out along the sclero-corneal margin until nearly clear of the filtering pad, and finally to make a broad bridge, either upward and outward or upward and inward to the outer or inner side of the filtering scar (see diagram). This is admittedly a much more difficult thing to do than the fashioning of an ordinary bridge, which usually lies in the vertical meridian, but which may be a little to the outer or inner side without being any the worse for it. Anyone with experience in fashioning a conjunctival bridge knows that while it is comparatively easy for an expert to make one under ordinary circumstances, it is by no means so easy to get it *exactly* where one wants it. In these eyes which present a filtration scar, the corneal part of the incision must be made first, the scleral part with its attached bridge being left till the end. The difficulty in this class of case lies in the fact that the exact site of the bridge is dictated to us in advance. A greater degree of operative skill is obviously called for under such conditions.

If the procedure I have just outlined is successfully carried out, one obtains all the advantages of a bridge—namely, (1) the protection from vitreous escape; (2) the immediate closure of the wound by the straplike action of the conjunctival bridge, as soon as the incision is finished and the lens removed; and (3) the early, strong, and complete healing of the whole incision. Thus we can

combine the safety of primary union of our wound lips with the protection conferred on the deeper structures by the conjunctival bridge and with the avoidance of all interference with the essential spongy character of the filtering scar. I have adopted this technique on a number of occasions, and have satisfied myself that it is a practical working proposition.

A.—Showing the filtering scar, the trephine hole, and the peripheral coloboma of the original operation in a right eye.

B.—The same with the line of the new incision added.

The continuous line in B concentric with the corneal margin should lie on that margin, but is carried inside it so as to make the diagram clearer. It is a right eye, and so the bridge is on the left (nasal) side, where the incision finishes. If it had been a left eye the bridge would have been on the right side, on the presumption that the surgeon is ambidextrous. The sclero-corneal margin has been cut along the solid line. The dotted portion shows where the incision has passed under the bridge. The knife-point entered at *a* and emerged at *b*. The filtration scar is shown by roughly radiating lines. The bridge is shown by lines at right angles to its length.

The determination of the right period for intervention in a cataract following glaucoma must be decided on ordinary principles, the guiding rule being to operate when the vision is no longer useful. If the state of the opposite eye still permits of serviceable vision it may be advisable to postpone extraction until some measure of maturity is reached. One must never lose sight of the balance between what the patient has to gain and what he may possibly lose by operation. Nor must it for a moment be forgotten that the prognosis in these cases must necessarily be less favourable than in ordinary healthy eyes.

A FATAL CASE OF UNDULANT FEVER IN THE NORTH OF SCOTLAND

BY

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Contagious abortion amongst the herds of Aberdeen-Angus cattle in this pastoral area of Scotland has been a very common condition for many years. Undulant fever is, however, comparatively rare, but not unknown. Smith¹ described ten cases which occurred in the north-east of Scotland between July, 1929, and October, 1931. These were of a mild type, and none were fatal.

Death from undulant fever contracted in Britain is extremely rare, if not unknown. Maclean² records one fatal case in thirty-six recognized in New Zealand during the last three years. Fatal termination is not so rare on the Mediterranean littoral. In the case recorded below infection was contracted locally, and it terminated in death.

CASE RECORD

A railway porter, aged 29, was first seen on July 27th, 1932. He gave a history of influenza ten years previously. Four years ago he had his right eye removed. This was rendered necessary owing to severe infection, following the entry of a piece of steel by an accident whilst on duty. He complained of having felt "seedy" for five days before