

## **Mitral stenosis and pregnancy / by Herbert French and H.T. Hicks.**

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# MITRAL STENOSIS AND PREGNANCY

BY

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[From Volume 89 of the 'Medico-Chirurgical Transactions']



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The Council of the Royal Medical and Chirurgical Society deem it proper to state that the Society does not hold itself in any way responsible for the statements, reasonings, or opinions set forth in this paper, which, on grounds of general merit, is thought worthy of being published in 'The Transactions.'

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## INTRODUCTION.

THERE is a large amount of literature upon this subject. Many of the papers contain accounts of small numbers of cases only. References are given at the end of this.

Berthiot's (3) book, published in 1876, and MacDonald's (11), published in 1878, have long been the standard works upon the subject. More recent publications which go fully into the question are those of Handfield-Jones (8) and Allyn (1), in 1896; Jess (9), who has collected all the published material upon the subject up to 1898; and Nicholson (13) and Mackenzie (12) in 1904.

There are certain points in regard to valvular heart disease and pregnancy upon which there is general agreement. These we do not propose to discuss further, because they appear to be well established. They are the following:

(1) Of all the varieties of chronic valvular heart disease, mitral stenosis is the most commonly accompanied by heart failure during pregnancy.



We have, therefore, analysed the obstetric histories of 300 consecutive cases of mitral stenosis in women over twenty, who have been in Guy's Hospital.

We realise that it is extremely difficult to be certain of the date at which a grown-up woman with valvular heart disease first acquired it. In many cases of mitral stenosis there is no history of acute rheumatism or chorea. The mitral stenosis may be proved by autopsy to be old. It is believed that such cases have had endocarditis in childhood, when the joint pains have been so slight that they have escaped the attention of the parents.<sup>1</sup>

Even when there has been an attack of rheumatic fever in early youth there is often no means of determining with certainty that the valvular disease has dated from it. In our analysis we have excluded all cases where granular kidney was possible, and also those cases where the patient stated that rheumatic fever first occurred after twenty years of age. We have taken those in which the clinical diagnosis has been old-standing mitral stenosis, with or without other lesions, and in which there has been either rheumatic fever or chorea in childhood or youth, or no history of acute rheumatism at all. We have accepted the same evidence in all the cases, whether in married women not pregnant, in married women pregnant, or in single women over twenty, so that the analyses of each class are comparable. Our cases are given in tables at the end of the paper.

#### MANY MITRAL STENOSIS CASES BEAR CHILDREN WELL.

The likelihood is, that any woman who has mitral stenosis will, sooner or later, suffer from the results of failing compensation. There are all degrees of mitral

<sup>1</sup> Taylor, in 'The Practice of Medicine,' 1904, p. 157, says: "... the cardiac lesions may occur without any obvious affection of the joints at all. This greater liability on the part of the heart is especially frequent in children. . . ."



stenosis, and of the power of different hearts to maintain their compensation. Some hearts will fail early, whatever the woman does. Other hearts seem able to carry on their work almost as well as if no valvular disease were present. Even when heart failure comes on during pregnancy or the puerperium it is difficult to be sure that the heart would not have failed in any case, even had there been no pregnancy.

We have analysed our 300 cases as justly as we are able, attributing heart failure to child-bearing in as many as we felt we honestly could. We have come to the conclusion that the greater number of pregnancies in women with mitral stenosis, whose compensation has not previously failed, run their course as naturally as do the pregnancies of healthy people.

Thus, of the 300 consecutive cases, 205 were married. Of these, 135, or 66 per cent., did not attribute their ultimate heart failure to pregnancy, nor could we satisfy ourselves that there was any direct relation between the pregnancy and the heart failure. In one of these cases there had been as many as 17 children born alive, and the average number of children was 4.5 per mother. If 135 mothers with mitral stenosis can bear 608 children without losing cardiac compensation, it would seem unjust to prevent a young woman with compensated valvular heart-disease from getting married.

We found a direct relation between child-bearing and heart failure in 57 women, or 28 per cent. In many of these, however, there had been previous children born without trouble. In one case, indeed (No. 168), the labours with twelve children had been uneventful, heart failure occurring for the first time with the thirteenth. Upon twelve separate occasions this case might have come into our group of cases without heart symptoms; but the thirteenth transfers her to our group of cases where heart failure is related to pregnancy. It seems worth while to represent the relationship between pregnancy and heart failure in mitral stenosis in another way, as follows:



|               |   | Associated with<br>heart failure. |   | Not associated with<br>heart failure. |
|---------------|---|-----------------------------------|---|---------------------------------------|
| 1st pregnancy | . | 15                                | . | 177                                   |
| 2nd           | „ | 16                                | . | 139                                   |
| 3rd           | „ | 10                                | . | 116                                   |
| 4th           | „ | 14                                | . | 95                                    |
| 5th           | „ | 13                                | . | 74                                    |
| 6th           | „ | 14                                | . | 61                                    |
| 7th           | „ | 5                                 | . | 50                                    |
| 8th           | „ | 8                                 | . | 38                                    |
| 9th           | „ | 1                                 | . | 30                                    |
| 10th          | „ | 2                                 | . | 26                                    |
| 11th          | „ | 2                                 | . | 18                                    |
| 12th          | „ | 2                                 | . | 13                                    |
| 13th          | „ | 2                                 | . | 10                                    |
| 14th          | „ | 0                                 | . | 7                                     |
| 15th          | „ | 0                                 | . | 2                                     |
| 16th          | „ | 0                                 | . | 2                                     |
| 17th          | „ | 0                                 | . | 1                                     |

#### THE TIME AT WHICH, WHEN RELATED TO PREGNANCY, HEART FAILURE SETS IN.

We appreciate fully the fact that an existing tendency to failure of compensation is aggravated by child-bearing. Some of these patients, when they do go wrong, break down badly. Others, however, respond no less readily to treatment than do non-pregnant cases. It is difficult to determine the prognosis in any given case.

Amongst the 57 patients (see Table, Nos. 149-192) in whom we relate the cardiac failure to child-bearing we were uncertain in 7 whether the symptoms came on before, during, or after the birth of the child. In the remaining 50, 25 dated their heart trouble to the time when they were carrying, 25 went to term without difficulty and the cardiac symptoms set in during the puerperium.

## THE PROGNOSIS WHEN HEART FAILURE IS RELATED TO PREGNANCY, LABOUR, OR THE PUERPERIUM.

The prognosis in regard to heart cases is always difficult to estimate from hospital records. Many patients recover sufficiently to go away to their homes, but there is no evidence to show how long their cardiac compensation is maintained. Some such cases doubtless die comparatively soon. Others remain chronic invalids for years. A few recover sufficiently to do their work for a longer or shorter time. It is a matter of every-day experience to find heart cases, men and women alike, coming into hospital for a few weeks, recovering cardiac compensation to some extent, going away to their homes, only to return again and again to the hospital. Those who die at home are not heard of again. Those who recover completely for the time being are also lost sight of. They change their address and cannot be traced. There is the greatest difficulty, therefore, in determining whether women with mitral stenosis, whose cardiac compensation has broken down in relation to child-bearing, have a worse prospect of life than have other cases whose heart failure has been due to other causes.

The proportion who die in the hospital is really no criterion, because we do not know what proportion of the others die soon after discharge; but since this source of error is common to all hospital statistics, we give the proportions for what they are worth:

(a) Of 135 mitral stenosis women who had borne children, but whose heart failure did not date from child-bearing, 44, or 33 per cent., died in hospital.

(b) Of 57 mitral stenosis women who had borne children, and whose heart failure did date from child-bearing, 20, or 35 per cent., died in hospital.

(c) Of 13 mitral stenosis women, married but never pregnant, 6, or 46 per cent., died in hospital.

(d) Of 95 mitral stenosis women, unmarried, 17, or 18 per cent., died in hospital.



At first sight this would seem to indicate that the prognosis was worst in the sterile women, best in the unmarried, intermediate in those who had had families. A glance at the relative ages in the different groups shows that this deduction is unwarranted; for the average age of all the cases in the four groups were :

|     | Average age. <sup>1</sup> | Maximum age. | Minimum age. |
|-----|---------------------------|--------------|--------------|
| (a) | 41 years                  | 71           | 22           |
| (b) | 32 „                      | 48           | 20           |
| (c) | 34 „                      | 55           | 25           |
| (d) | 30 „                      | 60           | 20           |

The average age of the single women was less than that of the married; the mortality amongst them should naturally be less. Could we trace the unmarried cases forward into the ten years to come, we should find that many would ultimately die in hospital, and some of these would probably have entered into the married state before they died. Many of our married cases had come in and out of hospital half a dozen times or more before they ultimately died.

We think the hospital mortality statistics afford no sound basis for any deduction; but if we drew any deduction at all it would be that, allowing for differences of age, the mortality of matrons is not materially different from that of spinsters, each having mitral stenosis.

#### THE PROGNOSIS WHEN HEART FAILURE SETS IN DURING PREGNANCY.

The paragraph above indicates how difficult it is to say whether or not a given woman, a hospital patient suffering from mitral stenosis, with symptoms of heart failure, will ultimately die in hospital or not. It is less difficult to

<sup>1</sup> The average age at death of married women with mitral stenosis is obviously less than that of healthy women. If the fact that the wife is likely to predecease the husband is regarded as a bar to marriage in all cases, then we agree that women with mitral stenosis should not marry. Our point is that we think the grave influence of pregnancy upon mitral stenosis has been over-estimated.



say whether or not a given woman, being pregnant, and admitted to hospital with cardiac symptoms from mitral stenosis, will leave the hospital alive, and whether or not she will approximately reach term and bear a living child.

Amongst our 300 consecutive cases, 22 were admitted whilst actually pregnant. For the details of these we refer to the table at the end of the paper, Cases Nos. 4, 5, 8, 149, 151, 152, 153, 155, 161, 163, 165, 166, 168, 169, 171, 174, 177, 178, 180, 182, 183, 184. In addition to these, we have found fourteen other pregnant mitral stenosis patients, who came into the hospital either before or after the period of our 300 consecutive cases. The following are notes of these additional patients:

(i) Aged 43. She was admitted for retroverted gravid uterus, and had no cardiac symptoms; there was well-marked mitral stenosis. The uterus was replaced, the patient being in the ward only five days. She had been married fifteen years, had had seven living children and one miscarriage. The last labour was seventeen months before, at full term. She was now pregnant four months.

(ii) Aged 36. She was admitted when seven months pregnant for orthopnœa, precordial pain, hæmoptysis, and bronchitis, without œdema. She gave no history of acute rheumatism, but was found to have old mitral stenosis. With rest in bed and digitalis she improved rapidly. She went to term. The labour was natural. The mother and child both did well. She had had ten living previously, and with each pregnancy had had some dyspnœa in the later months, but recovered completely soon after labour.

(iii) Aged 22. She was admitted when eight months pregnant for her eleventh attack of acute rheumatism. She had mitral stenosis and regurgitation, and aortic stenosis and regurgitation, but neither now nor previously had she suffered from her heart. She went to term; labour was natural; mother and child did well. She had



had one child previously, stillborn at full term, without difficulty. She had been in Guy's Hospital eleven times before, once for hæmatemesis and (?) gastric ulcer, ten times for acute rheumatism. The heart lesion was old.

(iv) Aged 40. She had been married only six months, and was five months pregnant on admission. She came in for dyspnœa. She rested in bed for a fortnight, and went out on the twenty-fourth day, free from dyspnœa, still pregnant. The heart lesion was old mitral stenosis.

(v) Aged 25. She came in for dyspnœa when four months pregnant, and was found to have a large irregular heart and mitral stenosis and regurgitation. She was only in the ward six days, when she went home of her own accord, still pregnant. She had had rheumatic fever four times.

(vi) Aged 19. She came in when pregnant nearly to term for a sudden hemiplegia. This was found to be due to cerebral embolism from mitral stenosis. There were no cardiac symptoms. She went to term. Labour was natural. Mother and child did well, but the hemiplegia recovered but partially. There was weakness of the affected side a year later, but no heart failure. There was no history of rheumatic fever.

(vii) Aged 33. She came in for acute bronchitis and orthopnœa, without œdema, when six months pregnant. She was found to have mitral stenosis, but gave no history of acute rheumatism. She was immediately relieved by rest in bed, and went out in fifteen days, still pregnant. She had had some trouble with her first pregnancy, but had recovered completely, and had borne seven living children.

(viii) Aged 20. She had had acute rheumatism many times, first when eleven. She had aortic stenosis and regurgitation, and mitral stenosis and regurgitation. She had had one living child two years before without difficulty,



and had now missed two menstrual periods. Up till just before admission she had worked hard at a jam factory, carrying trays of jars of jam up and down stairs. She was seized with acute rheumatism again, and came to hospital with a certain amount of dyspnœa also. She rested in bed, recovered rapidly, and went out on the twentieth day, able to walk actively without dyspnœa. It was jam-jar carrying rather than pregnancy that had caused the cardiac symptoms.

(ix) Aged 29. She gave no history of acute rheumatism, but had old mitral stenosis. She had had four children previously without difficulty. Eighteen days before admission orthopnœa and cough came on simultaneously with an abortion. She was attended by the Charity and transferred to the wards. She rested, and had digitalis; on the twenty-sixth day she went out, free from dyspnœa.

(x) Aged 25. She had had acute rheumatism at sixteen and at twenty-one. She came in for dyspnœa in the later months of pregnancy, and was found to have mitral disease. The notes are incomplete; it is not known if she was married nor if she had had a previous pregnancy. With rest and digitalis she became free from dyspnœa, and went out on the twenty-fourth day, still pregnant.

(xi) Aged 27. She had had no acute rheumatism, but had old mitral stenosis. She had been married four years. Her first pregnancy ended at the seventh month in delivery of a still-born child. The second pregnancy went to term naturally, and there was no heart failure, but when two and a half months pregnant she had a "fit," which left her with hemiplegia. This passed off completely after labour. Dyspnœa first began fourteen months ago, and on admission she was eight and a half months pregnant, orthopnœic, and cyanosed. With rest in bed and digitalis she reached full term, and was delivered of a living female child weighing 6 lb. 8 oz. Both mother and child did well, and went out early in the puerperium. The



dyspnœa was still present on exertion, but not with ordinary walking.

This patient foolishly became pregnant again a year and a half later. She was admitted at the fourth month for hæmatemesis, and rapidly recovered from this, but all through the pregnancy there was severe dyspnœa and swelling of the feet. Cyanosis became extreme, and just before term labour was induced. Delivery was spontaneous twenty-four hours later, and was accompanied by post-partum hæmorrhage. The child was 17 inches long, weighed 6 lb. 8 oz., and lived. The mother had severe dyspnœa and bronchitis during the early part of the puerperium, but under treatment the œdema disappeared and the cough decreased. She walked from the hospital, but readily became dyspnœic on exertion.

(xii) Aged 22. She gave no history of acute rheumatism, but was found to have mitral stenosis. She did not come in for heart failure in the ordinary sense, but for acute pericarditis. She refused to stay in the hospital. On the third day she insisted on going home, notwithstanding that she had acute pericarditis and was very seriously ill. She was pregnant five months at this time, and had borne one child eighteen months previously without developing cardiac symptoms.

(xiii) Aged 26. She gave no history of acute rheumatism, but died, and was found to have chronic valvular heart disease, both aortic and mitral, and a fatty heart. She had been married a year, and was pregnant nearly to term. She had developed acute dyspnœa three weeks before. Labour was induced and a living male child born. The patient became much worse the day after the confinement, and the heart did not respond to any treatment. The mother died on the ninth day after labour, the child lived.

(xiv) Aged 24. She gave no history of acute rheumatism, but had mitral stenosis. She had had twins prematurely



thirteen months before. The infants were born living, but both died. There had been no cardiac symptoms with that pregnancy. When five months pregnant for the second time she became very dyspnoëic and cyanosed. When admitted, it was thought she must die; she recovered rapidly with rest in bed and digitalis, and was able to go home, still pregnant. She was re-admitted at the seventh month, extremely dyspnoëic, with œdematous legs and a rapid, irregular pulse. She was venesected and given digitalis, and rested in bed. The pregnancy continued naturally; the cardiac symptoms all abated; she was delivered at full term of a living child weighing 5 lb. 6 oz. Both mother and child did well, and the mother was free from dyspnoëa on ordinary exertion when she left the hospital.

We have, therefore, 36 cases in which mitral stenosis patients have come into Guy's Hospital when pregnant. These are all we have been able to find in a period of over twenty-five years. Leaving out cases under twenty years of age, the number of women with mitral stenosis who were admitted during the same period was something like 750. If cardiac symptoms from mitral stenosis were the rule during pregnancy, surely more cases would have sought admission when actually pregnant.

Of the 36 patients, not one died during pregnancy, if we exclude Cases No. 149 and xii, who refused to stay in, and whose fate is not known. Not one died during labour. Nine had no heart failure, but came in for other things (Nos. 4, 5, 8, 165, 168, i, iii, vi, xii). Twenty-four went out with restored cardiac compensation (Nos. 4, 5, 8, 151, 152, 153, 155, 161, 163, 165, 166, 168, 169, 171, i, ii, iii, iv, vi, vii, viii, ix, x, xiv). Only five died within three months of labour (Nos. 174, 177, 180, 183, xiii), and of these one (No. 180) died, not of mitral stenosis, but of chorea gravis and infective endocarditis.

In regard to the children, the fate of ten is unknown, because the mothers recovered and went out to be delivered elsewhere. Of the remaining 27, 23, including



twins in one case, were born living, at term, or within a month of term (Nos. 4, 5, 8, 151, 155, 161, 163, 165, 166 (twins), 169, 174, 177, 178, 182, 183, ii, iii, vi, xi (?), xiii, xiv). In two cases (Nos. 153, 171) the child was born at or near term, but dead. There were two abortions (Nos. 180, ix), and the former of these two was due to chorea gravis.

These figures are very different from those of MacDonald (11), as will be seen by comparing them side by side :

|                              | No. of cases. | Maternal mortality within three months. | Abortions.     | Lesion.   |
|------------------------------|---------------|---|----------------|---|
| MACDONALD :                  |               |   |                |   |
| (Published cases)            | 14            | 64.4 per cent.                          | 14.3 per cent. | Chronic mitral stenosis only.                           |
| OURSELVES :                  |               |   |                |   |
| (Consecutive hospital cases) | 36            | 13.9 „                                  | 5.5 „          | Chronic mitral stenosis, with or without other lesions. |

We very much wish we had a larger number of cases in which the course of pregnancy in mitral stenosis had actually been observed in hospital. We feel that the great difference between MacDonald's statistics and our own is in part due to the small number of cases we each have. Nevertheless we feel convinced that MacDonald's figures overstate the seriousness of the prognosis. His own words are : "We have thus nine cases out of fourteen, or 64.4 per cent., fatal, which indicates a tendency to death which is surely sufficiently grave. It will be observed that the deaths occurred either suddenly during the labour or within a few days or weeks afterwards." We agree that the cardiac failure, once begun, may become very grave during the puerperium, but we have no single instance in which death occurred during labour.

The patients behave very much like other cases of heart disease. Even when the heart condition seems hopeless they may recover and bear other children. An instance in point is No. 169, whose history was shortly as follows :

She became dyspnoëic during her first pregnancy, and



had had cardiac trouble many times since. On two separate occasions her symptoms were so grave that labour was induced at the eighth month ; on one of these there was post-partum hæmorrhage, which nearly proved fatal. After her fourth child she was discharged from the hospital, with the note in her report that she was "a wreck" ; at that time it was thought impossible that she could live, but she recovered at home, and bore two more children. The last, and sixth, was born at term, without induction of labour ; it was a transverse presentation, and version had to be performed ; the mother and child both did well.

#### THE TREATMENT OF MITRAL STENOSIS CASES WHEN PREGNANT.

The cases of mitral stenosis who have come into Guy's, Hospital pregnant have, almost without exception, been treated as though they had not been pregnant. Rest in bed, with digitalis, given with the same precautions as in other cases, have almost invariably brought relief, and enabled the patient to go on to natural labour at or near term. Induction of labour has hardly ever been resorted to, as reference to the cases at the end of this paper shows. Labours have in almost all cases been easy and natural, and free from post-partum hæmorrhage.

It is true that the same might not hold good for ladies in higher ranks of life. The physical work of Borough women is hard, that of most well-to-do women is less so. The relief to the Borough woman's heart is proportionately greater than is that to the rich lady's when she goes to bed. Nevertheless, we hold the view that the treatment of a pregnant woman with mitral stenosis should not be different from that of a non-pregnant woman with the same heart lesion. If the patient can be up and about, without cardiac symptoms, it is better for her to live as usual, and by moderate exercise maintain the reserve power of her heart, rather than lie up and diminish this



reserve power by prolonged rest. If cardiac symptoms supervene, the treatment should then be rest on a couch for mild cases, rest in bed for severer cases, rest in bed and digitalis for severer still. The pregnancy should, if possible, be allowed to run its course. Induction of labour in cardiac cases brings no immediate abatement of symptoms, as it does in many cases of eclampsia, for example. The puerperium is not less dangerous than is pregnancy itself to a case of mitral stenosis. The cardiac condition should be restored to as fair a state of compensation as possible before the time of labour arrives, and then forceps may be used to assist Nature. In a word, treat the patients exactly as though they were non-pregnant; treat them for mitral stenosis, do not treat them for pregnancy.

#### STERILITY IN MITRAL STENOSIS.

The opinion has been expressed that many women with mitral stenosis are sterile. Allyn (1), for example, says that "mitral disease, particularly stenosis, is much graver, as a rule, than aortic, but there is an attempt at a natural prevention of this, owing to the high proportion of sterile women among the subjects of mitral stenosis."

We do not agree with this. Out of the 205 married women in our table, only thirteen had not been pregnant. One of these had but recently got married, so that the proportion of presumably sterile women was only 5.8 per cent. The remainder had borne, upon the average, between four and five children apiece.

#### THE LIABILITY TO ABORTION IN MITRAL STENOSIS.

Allyn (1), quoting Porak (22), states that cardiac disease in the mother has a very grave influence upon the foetus, abortion being very common.

Unfortunately, this point was not particularly attended to in many of our cases. In our epitomes we have only put down whether abortions had occurred or not when we



had definite statements from the patient to that effect. We have left the doubtful cases blank.

In 90 of the women who had been pregnant we ascertained the history in regard to abortions, and found 40 of them had never had any abortion at all. The remainder had had 91 abortions between them. The general average was thus 1 per mother. The majority did not tend to abort, but in a few there were repeated abortions—in Case No. 56 as many as six.

It will be noticed that some of the abortions occurred when there was no heart failure at all. In these the association was possibly adventitious. In others the heart failure dated from an abortion, and it seems likely that in some of these the heart trouble was directly responsible for the miscarriage.

Upon the whole, however, we do not think that the tendency to abortion is obviously greater amongst mitral stenosis cases than it is amongst other Borough women.

#### CASES IN WHOM WE KNOW THE MITRAL STENOSIS CERTAINLY ANTEDATED THE PREGNANCIES.

As we have pointed out in the early part of this paper, it is impossible to state with absolute certainty that the mitral stenosis was present before marriage in a large number of cases. We have said that this is a flaw in our arguments, and might render the deductions we have drawn from our 300 cases invalid. There are, however, a small number who had been in the hospital, or under observation, years previously, and in whom we know that mitral stenosis was present before marriage. We will now consider these, seventeen in number, by themselves, and see whether what we have said about the generality of the cases holds good of these also.

CASE No. 6.—Valvular disease was known to exist at ten. There had been one child, and there had never been cardiac symptoms. The patient was admitted for a



fourth attack of acute rheumatism, with good cardiac compensation.

CASE No. 12.—There had been acute pericarditis before marriage. There had been one living child and one miscarriage. The patient was admitted for recent cardiac symptoms, not related to child-bearing.

CASE No. 59.—The physical signs of mitral disease had been present for thirty years. The patient had borne ten children without difficulty. Heart failure did not set in till she was fifty-six.

CASE No. 75.—The mitral bruits were present at twelve. The patient had had five children. She came in for acute rheumatism, and had never had cardiac failure.

CASE No. 89.—Heart disease was known at fourteen. There had been one child, without difficulty. The patient came in for lobar pneumonia, and recovered without a symptom of heart failure.

CASE No. 90.—The bruits were known before marriage. There had been three children, born without difficulty.

CASE No. 91.—The bruits were known before marriage. The patient bore five children, and her heart failure did not come on in relation to any of these.

CASE No. 92.—Heart disease was known at thirteen. There had been three children, pregnancies and labours being uneventful.

CASE No. 93.—Heart disease was known at thirteen. There had been four children and two miscarriages, without trouble.

CASE No. 94.—Heart disease was known at sixteen. The four children had been born without cardiac symptoms.

CASE No. 95.—Heart disease had been known for ten years. There had been eight children, and no heart failure with any of them.

CASE No. 96.—Heart disease was known in girlhood. There had been one child, born without trouble.

CASE No. 97.—The bruits were known to be present at nineteen. There had been one child, born without trouble.

CASE No. 138.—Heart disease was known at sixteen. There had been six children. Cough and dyspnoea had occurred during each pregnancy, but there had been good recovery of compensation each time.

CASE No. 148.—Heart disease was known at sixteen. The first five children had caused no cardiac symptoms. Failure of compensation set in with the sixth.

CASE No. 153.—This patient had been in and out of hospital seven times for heart failure before marriage. She married notwithstanding. The cardiac symptoms were severe during pregnancy. A dead child was born at the eighth month. The mother recovered rapidly enough to leave the hospital on the fourteenth day after labour.

CASE No. 161.—This patient was in hospital when eighteen for heart disease. She married after this, and bore four children without heart trouble. When pregnant with her fifth child, cardiac symptoms appeared. The patient lay up in hospital for four days only, and then went home and went naturally to term.

There were, it will be seen, many children borne by women who were known to have heart disease before marriage. In 13, or 76·5 per cent., the ultimate heart failure was not directly related to child-bearing. In 4, or 23·5 per cent., pregnancy and heart failure coincided, but even in some of these previous children had been born without causing heart trouble. None of the patients died during pregnancy or labour. All recovered and left the hospital.

If we compare these figures with those for the generality of women with mitral stenosis, we find—



|   | Heart failure<br>not directly<br>related to<br>pregnancy. | Heart failure<br>directly related<br>to a pregnancy<br>not necessarily<br>the first. |
|---|---|--|
| When the mitral stenosis was old, but of<br>unknown date (175 cases, taken con-<br>secutively) . . . . .                            | 69.7 per cent.  | 30.3 per cent.   |
| When the mitral stenosis was known<br>with certainty to date from before<br>marriage (17 cases, taken consecu-<br>tively) . . . . . | 76.5 „  | 23.5 „   |

The results are closely similar. We are fully conscious that the number of cases in which we know the mitral stenosis certainly preceded marriage is small. In the remainder the evidence that the mitral stenosis was present before marriage is presumptive only. We do not know how to collect a large number of cases where this presumption is avoidable. We have taken only those cases where the bruits suggested an old-standing valvular lesion, and have only accepted cases where there had either been acute rheumatism or chorea in youth or else no rheumatism at all. The fact that the results are so similar in the total number of cases to what they are in those where heart disease was known to antedate the pregnancies affords, we think, additional ground for the justness of the conclusions we have drawn.

#### ASSOCIATION OF OTHER HEART LESIONS WITH THE MITRAL STENOSIS.

Most observers are of the opinion that the prognosis is less good when aortic or other disease is present as well as mitral stenosis. We have taken our cases consecutively as they entered the hospital, and have made no distinction between cases where mitral stenosis alone was diagnosed and those where other lesions of the heart were present also. Amongst the associated lesions will be found mitral regurgitation, aortic regurgitation, aortic stenosis, aortic stenosis and regurgitation, pulmonary stenosis, tricuspid stenosis, pericarditis, and adherent pericardium. Notes



of these are given in the epitome of cases in the table at the end of this paper. They should make the prognosis in the affected cases proportionately worse. We do not intend to enter upon this question here. We have discussed the cases as though they were suffering from mitral stenosis only.

#### THE INCIDENCE OF FUNGATING ENDOCARDITIS.

In all the patients who died the diagnosis was verified by autopsy. We have been struck by the large proportion of mitral stenosis cases who die of a terminal fungating endocarditis. Thus—

Of 43 fatal cases where failure was not dated to pregnancy, 10, or 23 per cent., died of fungating endocarditis.

Of 22 fatal cases where failure was dated to pregnancy, 9, or 41 per cent., died of fungating endocarditis.

Of 6 fatal cases who were married, but had not been pregnant, 0 per cent. died of fungating endocarditis.

Of 18 fatal cases who were single, 7, or 39 per cent., died of fungating endocarditis.

Of the total 89 fatal cases, 26, or 29 per cent., died of fungating endocarditis.

At first we thought there might be a special tendency for pregnancy or the puerperium to lead to fungating endocarditis, but we do not think this can really be so, seeing how high the proportion of cases of terminal fungating endocarditis is in single women with old mitral stenosis.

#### SUMMARY.

We believe that heart failure is to be expected sooner or later in almost all cases of valvular heart disease.

We do not deny that pregnancy may cause serious, and even fatal, cardiac failure in cases of mitral stenosis.

We think, however, that the dangers of pregnancy in these cases have been overstated.

We attribute the overstatement to the fact that previous



statistics have been based mainly upon cases of mitral stenosis which came under observation because heart failure had developed during, or soon after, pregnancy. We feel that statistics so obtained leave out of count all those cases of mitral stenosis who go through pregnancy without developing cardiac symptoms.

We have tried to obviate this source of error by analysing the obstetric histories of 300 women over twenty who had mitral stenosis with or without other lesions. We have not selected our cases, but have taken them consecutively as they came into Guy's Hospital.

We conclude :

- (1) That comparatively few are sterile.
- (2) That they are not especially liable to abort.
- (3) That the majority bear children well.
- (4) That when heart failure develops in relation to pregnancy it is very often not with the first pregnancy, but after several.

(5) That the treatment should be the same as for a non-pregnant case of mitral stenosis.

(6) That it is not just to absolutely negative marriage in all women with mitral stenosis. The dogmatic "no" of Jellett and of Porak (p. 560) is, we think, unjustifiable. It is right that the physician should make clear to the contracting couple, or to their near relatives, the risk run. He should use his discretion, and distinguish between one case and another. The risk should not be minimised, but it should not be exaggerated. Whether the woman marry or not, it is likely that she will not reach old age. She should not have successive children rapidly. But if she has survived the age of twenty, with good cardiac compensation, the likelihood that pregnancy will accelerate the time of heart failure does not seem to be so great as has in textbooks been declared.

We thank the Treasurer of Guy's Hospital and the Physicians to Guy's Hospital for their kind permission to use the statistics embodied in this paper.



## REFERENCES.

1. ALLYN.—Univ. Med. Mag., December, 1895 ; and Brit. Med. Journ., 1896, Part I, Epitome, No. 26.
2. BAXENDELL, A.—Cardiac Disease in Pregnancy and Labour. Lancet, 1890, Part I, p. 876.
3. BERTHIOT, A.—Grossesse et Maladies du Cœur. Paris, 1876.
4. BONNET and GRIMODIE.—Bullet. et Mém. de la Soc. Obstét. et Gynéc. de Paris, April, 1897 ; and Brit. Med. Journ., 1897, Part I, Epitome, No. 467.
5. EDGE, F.—Cardiac Disease in Pregnancy and Labour. Lancet, 1890, Part I, pp. 534, 535.
6. FLEMING, E. K.—Mitral Stenosis Complicated by Pregnancy. Brit. Med. Journ., 1903, Part I, p. 606.
7. GIBBES, C. C.—The Effect of Pregnancy on Chronic Heart Disease. Lancet, 1902, Part II, p. 1262.
8. HANDFIELD-JONES, M.—The Heart in its Relation to Pregnancy, Parturition, and the Puerperal State. Harveian Lectures. Lancet, 1896, Part I, pp. 145–149, 213–217, 275–279. See this paper for many other references.
9. JESS.—Münch. med. Woch., October 4th and 11th, 1898 ; Brit. Med. Journ., 1898, Part II, Epitome, No. 503 ; and Brit. Med. Journ., 1899, Part I, Epitome, No. 139. See the original paper for full references up to date.
10. JACCOUD.—Sem. Méd., September 11th, 1896 ; and Brit. Med. Journ., 1896, Part II, Epitome, No. 348.
11. MACDONALD, A.—The Bearings of Chronic Disease of the Heart on Pregnancy, Parturition, and Childbed ; with Papers on Pleuro-Pneumonia and Eclampsia. London, 1878.
12. MACKENZIE, J.—The Maternal Heart in Pregnancy. Lancet, 1904, Part II, p. 454.
13. NICHOLSON, H. O.—The Management of Cases of Pregnancy Complicated by Heart Disease. Lancet, 1904, Part II, p. 454.



14. SEARS, G.—Pregnancy Complicated by Heart Disease. Boston Med. and Surg. Journ., March 15th, 1894.

15. SOLVIEFF.—Annales de Gynéc. et d'Obstet., April, 1894; and Brit. Med. Journ., 1894, Part I, Epitome, No. 498.

16. VINAY.—Lyon Méd., January 8th, 1899; and Brit. Med. Journ., 1899, Part I, Epitome, No. 66.

17. VINAY.—Arch. de Tocol. et de Gynéc., November, 1893, and Brit. Med. Journ., 1894, Part I, Epitome, No. 11.

18. WILKES, G. A.—Two cases of Mitral Stenosis Complicated by Pregnancy, Brit. Med. Journ., 1903, Part I, p. 133.

19. JARDINE, R.—Journ. Obst. and Gyn. of Brit. Emp., April, 1902.

20.—Fortschritte der Medicin, vol. xix, 1901, p. 217.

21. BROUARDEL, P.—Causes de l'Avortement Naturel, Annales d'Hygiène Publique, vol. xlv, 1900, p. 491.

22. PORAK.—De l'Influence réciproque de la Grossesse et des Maladies du Cœur, Thèse d'Agrégation, 1880, p. 109.

LABOUR. NO CASE IS INCLUDED UNDER THE AGE OF 20; AND IN ALL RHEUMATISM OR CHOREA HAD OCCURRED BEFORE 20, OR NOT AT ALL.

A. *Those who had been Pregnant, and did not date Cardiac Symptoms to Pregnancy or Labour.*

| Case number. | Age. | Age at which rheumatism or chorea. | Number of children. | Number of miscarriages. | Main diagnosis.   | Symptoms for which admitted. | Duration of cardiac failure. | Details.  | Result.* |
|--------------|------|------------------------------------|---------------------|-------------------------|---|------------------------------|------------------------------|---|----------|
| 1            | 22   | None                               | 1                   | 0                       | Mitral stenosis, acute bronchitis, erythema nodosum                       | Edema and dyspnoea           | 7 weeks                      | Married 18 months. One child, full term, 8½ months ago without trouble  | R.       |
| 2            | 24   | 19                                 | 1                   | 0                       | Mitral stenosis and regurgitation, infective endocarditis, various emboli | Pyrexia and rigors           | No heart failure             | The pyrexia and sepsis date from 1 month after labour; the pregnancy and labour had been free from cardiac symptoms. The infection may have been directly due to the puerperium, but there was no cardiac failure | D.       |
| 3            | 25   | None                               | 1                   | 0                       | Lobar pneumonia (double), mitral stenosis                                 | Pneumonic                    | No heart failure             | The child was born at full term 12 days before admission. There were no cardiac symptoms at all   | R.       |
| 4            | 27   | "                                  | 3                   | 0                       | Chorea, mitral stenosis   | Chorea                       | Ditto                        | Two full-term children without trouble. At present 7 months pregnant; subsequently went to term without cardiac symptoms  | R.       |
| 5            | 27   | 13                                 | 1                   | 0                       | "   | "                            | Ditto                        | Patient unmarried, and 4½ months pregnant on admission. Recovered from chorea; went to term naturally   | R.       |
| 6            | 27   | 6                                  | 1                   | 0                       | Acute rheumatism (4th), mitral stenosis                                   | Rheumatism                   | Ditto                        | Known to have had heart disease at 10; no cardiac symptoms since  | R.       |
| 7            | 33   | 10                                 | 4+<br>1 D+          | 1                       | Acute rheumatism (2nd), mitral stenosis and regurgitation                 | "                            | Ditto                        | Last confinement was 4 years ago; miscarriage 10 weeks ago. No heart failure at labours   | R.       |

\* R. = recovered and went home. D. = died in hospital.

+ D. = stillborn.



| Case Number. | Age. | Age at which rheumatism or chorea. | Number of children. | Number of miscarriages. | Main diagnosis.  | Symptoms for which admitted. | Duration of cardiac failure. | Details.   | Result. |
|--------------|------|------------------------------------|---------------------|-------------------------|--|------------------------------|------------------------------|--|---------|
| 8            | 36   | None                               | 8                   | 0                       | Acute rheumatism (1st), old mitral stenosis                          | Rheumatism                   | No heart failure             | Had had 7 children, last 2 years ago. Now admitted at term; labour natural; no cardiac failure   | R.      |
| 9            | 25   | 18                                 | 3                   | 0                       | Cerebral embolism, mitral stenosis and regurgitation                 | Hemiplegia                   | Ditto                        | First child born at 18, second at 19, third at 28; no cardiac failure with any of them. Transient hemiplegia 14 months ago; complete, 7 months ago. The child was born without trouble 2 years ago | R.      |
| 10           | 24   | 15                                 | 1                   | —*                      | Mitral stenosis and regurgitation, bronchitis, enlarged liver        | Precordial pain and dyspnoea | 1 month                      |  | R.      |
| 11           | 28   | None                               | 3                   | 2                       | Mitral stenosis, tricuspid regurgitation, cedema                     | Cyanosis and dyspnoea        | 3 weeks                      | There had been no cardiac symptoms with any of the pregnancies   | R.      |
| 12           | 30   | 20                                 | 1                   | 1                       | Mitral stenosis and regurgitation                                    | Dyspnoea                     | Acute                        | There had been pericarditis before marriage; the pregnancies had been uneventful   | R.      |
| 13           | 31   | 16                                 | 2                   | —                       | Mitral stenosis and regurgitation, pleurisy with effusion            | "                            | 1 year                       | Pregnancies uneventful   | R.      |
| 14           | 32   | 14                                 | 2                   | —                       | Mitral stenosis and regurgitation                                    | "                            | Recent                       | "  | R.      |
| 15           | 32   | None                               | 1                   | —                       | Mitral stenosis, tricuspid regurgitation                             | Ascites                      | 3 months                     | Child was born 7 years before  | R.      |
| 16           | 33   | Childhood                          | 5                   | —                       | Mitral stenosis and regurgitation, tricuspid regurgitation, pleurisy | Dyspnoea and rheumatism      | Recent                       | Last child was born 2 years before, without trouble  | R.      |
| 17           | 34   | None                               | 1                   | 0                       | Mitral stenosis and regurgitation, tricuspid regurgitation           | Edema                        | "                            | Child was born 5 years before  | R.      |

\* The mark — signifies that it is not known whether there has been any miscarriages or not.

|    |    |             |                                  |   |   | dyspnœa                     | and on, acute<br>3 weeks                       | cardiac trouble   |    |
|----|----|-------------|----------------------------------|---|---|-----------------------------|--|---|----|
| 19 | 36 | "           | 2                                | — | Mitral stenosis, aortic regurgitation                               | Precordial pain, anginal    | Acute 14 days                                  | Pain of an anginal character had been present off and on for several years; the pregnancies had been uneventful, without heart failure or increase of pain There had been no dyspnœa except on exertion until quite lately; the pregnancies had occurred without heart failure                  | R. |
| 20 | 36 | 19          | 6                                | — | Mitral stenosis, aortic stenosis and regurgitation                  | Dyspnœa and œdema           | 18 months off and on; acute 3 months           | She had not noticed any cardiac symptoms until 3 years before; the pregnancies had been uneventful The patient stated that she had not felt thoroughly well for many years; had had no trouble with any pregnancy or labour, and had only recently felt worse than usual Pregnancies uneventful | R. |
| 21 | 36 | Child-hood. | 6                                | — | Mitral stenosis and regurgitation                                   | Dyspnœa and cough           | Acute recently                                 |   | R. |
| 22 | 37 | 16          | 2+<br>$\frac{1}{1\frac{1}{2}}$ * | 2 | Mitral stenosis and regurgitation                                   | Dyspnœa                     | Recent   | The patient stated that she had not felt thoroughly well for many years; had had no trouble with any pregnancy or labour, and had only recently felt worse than usual Pregnancies uneventful  | R. |
| 23 | 38 | 8           | 3+                               | — | Mitral stenosis and regurgitation, tricuspid regurgitation          | Edema and dyspnœa           | 1 year   |   | D. |
| 24 | 38 | Childhood   | 8                                | 2 | Mitral stenosis   | Dyspnœa and precordial pain | On and off for 12 years; acute 1 month 14 days | Had been married 18 years. Though there had been shortness of breath on exertion for 12 years, the pregnancies had not caused any serious trouble Last child was born 14 years ago  | R. |
| 25 | 38 | 16          | 2                                | 0 | "   | Edema of legs               | 2 weeks  |   | R. |
| 26 | 38 | None        | 8                                | — | Mitral stenosis, tricuspid regurgitation, big liver                 | Hæmoptysis and hepatic pain | 2 months                                       | There had been twins twice. With each of these there had been hæmoptysis, but beyond that no heart trouble till 2 weeks ago Pregnancies uneventful  | R. |
| 27 | 39 | None        | 6                                | — | Mitral stenosis and regurgitation, big liver, ascites               | Edema and ascites           | 2 months                                       |   | R. |
| 28 | 39 | Childhood   | 2                                | 1 | Mitral stenosis and regurgitation, tricuspid regurgitation, ascites | Dropsy                      | 2 months                                       | "   | R. |

\*  $\frac{7}{13} = 7$  months child.



| Case number. | Age. | Age at which rheumatism or chorea. | Number of children. | Number of miscarriages. | Main diagnosis.  | Symptoms for which admitted. | Duration of cardiac failure.               | Details.  | Result. |
|--------------|------|------------------------------------|---------------------|-------------------------|--|------------------------------|--|---|---------|
| 29           | 39   | None                               | 8                   | 4                       | Mitral stenosis and regurgitation, pericarditis                      | Precordial pain              | Acute                                      | Pericarditis was the main cause for admission. No previous heart failure  | R.      |
| 30           | 39   | "                                  | 3                   | —                       | Mitral stenosis  | Dyspnoea                     | On and off for 4 years                     | Last child 12 years ago   | R.      |
| 31           | 40   | "                                  | 13                  | —                       | Mitral stenosis, big liver   | Dyspnoea and oedema          | On and off for 7 years; acute for 5 months | Pregnancies uneventful  | R.      |
| 32           | 40   | 14                                 | 1                   | 0                       | Mitral stenosis, aortic regurgitation, tricuspid regurgitation       | Palpitations and oedema      | 12 years on and off                        | Child 23 years ago  | R.      |
| 33           | 40   | None                               | 0                   | 2                       | Mitral stenosis and bronchitis                                       | Dyspnoea                     | 2 years on and off                         | Miscarriages were 20 years ago with first husband. Married a second time, no children                                 | R.      |
| 34           | 42   | "                                  | 2                   | —                       | Mitral stenosis, tricuspid regurgitation, bronchitis                 | "                            | Ditto                                      | There was hemiplegia 11 years ago; the pregnancies were uneventful, and there was no cardiac failure till 2 years ago | R.      |
| 35           | 42   | Girlhood                           | 4                   | —                       | Mitral stenosis and regurgitation, ascites                           | Oedema and ascites           | 2½ years on and off                        | Last child 6 years ago  | R.      |
| 36           | 43   | None                               | 1 + 3 d.            | 1                       | Mitral stenosis and regurgitation                                    | Dyspnoea and precordial pain | 2 years                                    | Last child 7 years ago  | R.      |
| 37           | 43   | 20                                 | 8                   | —                       | Mitral stenosis, tricuspid regurgitation                             | Dyspnoea and cough           | 8 years off and on                         | Last pregnancy long preceded heart symptoms   | R.      |
| 38           | 43   | 3                                  | 3                   | 3                       | Mitral stenosis and regurgitation                                    | Ditto                        | 14 days                                    | Pregnancies uneventful; miscarriages without heart failure  | R.      |
| 39           | 43   | 17                                 | 1                   | —                       | Mitral stenosis and regurgitation, aortic stenosis and regurgitation | Oedema and cough, ascites    | 2 years, ascites 6 weeks                   | The pregnancy was 25 years ago  | R.      |

|    |    |      |      |   |   |   |                    |   |    |
|----|----|------|------|---|---|---|--------------------|---|----|
| 41 | 44 | 9    | 1+   | 1 | Mitral stenosis, angina pectoris                                      | and precordial pain                               | 6 years            | Pregnancies uneventful  | R. |
| 42 | 45 | None | 1 d. | — | Aortic stenosis and regurgitation, mitral regurgitation, pericarditis | Angina hæmoptysis<br>Precordial pain and dyspnoea | 2 months           | Child was stillborn 20 years ago  | R. |
| 43 | 46 | 14   | 7    | 0 | Mitral stenosis and regurgitation, aortic stenosis, pleurisy          | Acute pleuritic pain                              | None               | Last child 6 years ago  | R. |
| 44 | 47 | 20   | 8    | — | Mitral stenosis and regurgitation                                     | Bronchitis and oedema                             | 5 months           | Pregnancies uneventful. Quite well till hæmoptysis 5 months ago                             | R. |
| 45 | 47 | 18   | 4    | 0 | Mitral stenosis and regurgitation, bronchitis                         | Cough   | 3 years on and off | Married at 18; youngest child is 25   | R. |
| 46 | 47 | None | 14   | 1 | Mitral stenosis and regurgitation, big liver                          | Dyspnoea and vomiting                             | 4 days             | Last pregnancy 2 years ago  | R. |
| 47 | 47 | 11   | 2    | — | Mitral stenosis and regurgitation, bronchitis, big liver              | Œdema and cough                                   | 6 weeks            | Last child 20 years ago   | R. |
| 48 | 47 | None | 6    | 1 | Mitral stenosis   | Œdema and palpitations                            | 2 months           | Married at 15; pregnancies uneventful   | R. |
| 49 | 48 | 16   | 9    | — | Mitral stenosis and regurgitation; hæmaturia                          | Dyspnoea  | 6 months           | Married at 19; pregnancies uneventful   | R. |
| 50 | 49 | None | 14+  | 1 | Mitral stenosis and regurgitation, ascites                            | Œdema   | 2 years            | Married twice. 8 and miscarriage by first husband; 6 and 1 still-born at 7 months by second | R. |
| 51 | 50 | "    | 11   | — | Mitral stenosis and regurgitation                                     | Palpitations and cedema                           | 3 years on and off | Last child 7 years ago; patient has been a widow for 5 years                                | R. |
| 52 | 50 | "    | 9    | — | Mitral stenosis   | Dyspnoea and cedema                               | 6 years off and on | Pregnancies uneventful  | R. |
| 53 | 51 | "    | 14   | — | Mitral stenosis and regurgitation, aortic stenosis and regurgitation  | Anasarca  | 3 years            | "   | R. |
| 54 | 53 | 14   | 1    | — | Mitral stenosis and regurgitation                                     | Dyspnoea  | 2½ years           | Child born many years before  | R. |



| Case number. | Age. | Age at which rheumatism or chorea. | Number of children. | Number of miscarriages. | Main diagnosis.   | Symptoms for which admitted. | Duration of cardiac failure. | Details.   | Result. |
|--------------|------|------------------------------------|---------------------|-------------------------|---|------------------------------|------------------------------|--|---------|
| 55           | 53   | None                               | 17                  | —                       | Mitral stenosis and regurgitation, tricuspid regurgitation, ascites | Dyspnoea and œdema           | 1 year                       | Pregnancies uneventful   | R.      |
| 56           | 54   | 7                                  | 2                   | 6                       | Mitral stenosis, bronchitis, extreme cyanosis                       | Dyspnoea                     | 1 month                      | "  | R.      |
| 57           | 55   | 15                                 | 14                  | —                       | Mitral stenosis and regurgitation, bronchitis                       | Dyspnoea and œdema           | 1 year                       | Last child 15 years ago  | D.      |
| 58           | 56   | 20                                 | 14                  | —                       | Mitral stenosis, ascites  | Cough and œdema              | 10 weeks                     | Married at 20, and had her children quickly and without heart trouble  | R.      |
| 59           | 56   | 15                                 | 10                  | —                       | Mitral stenosis   | Dyspnoea and œdema           | 1 year                       | There was no trouble with pregnancies, except that the first and last labours were prolonged. The physical signs of heart disease were known 30 years before; failure was recent | R.      |
| 60           | 58   | 16                                 | 6                   | —                       | Mitral stenosis and regurgitation                                   | Ditto                        | 3 years                      | Pregnancies uneventful   | R.      |
| 61           | 59   | None                               | 3                   | —                       | Mitral stenosis, aortic regurgitation, ascites                      | Dyspnoea                     | 9 months                     | Sent to an infirmary a wreck; in all probability died soon after   | D.      |
| 62           | 64   | 16                                 | 1                   | —                       | Mitral stenosis and regurgitation                                   | Dyspnoea and cough           | 1 year                       | Child born soon after marriage at 23   | R.      |
| 63           | 69   | None                               | 9                   | 2                       | Mitral stenosis, pleurisy   | Cough and chest pain         | 3 years                      | Pregnancies uneventful   | R.      |
| 64           | 71   | "                                  | 4                   | —                       | Mitral stenosis   | Palpitations                 | 6 months                     | "  | R.      |
| 65           | 22   | 10                                 | 1                   | 0                       | Mitral stenosis and regurgitation, acute rheumatism                 | Rheumatism                   | None                         | Child born a year before, without heart symptoms   | R.      |

|    |    |                |    |   | regurgitation, acute<br>rheumatism  | regurgitation, acute<br>rheumatism |   |   |   | heart symptoms  |    |
|----|----|----------------|----|---|---|------------------------------------|---|---|---|---|----|
| 67 | 23 | 10             | 2+ | 0 | Mitral stenosis and regurgitation, acute rheumatism   | "                                  | " | " | " | Last child 14 months ago. Has never had cardiac symptoms since pericarditis at 13 years | R. |
| 68 | 25 | 10             | 2  | 0 | Mitral stenosis and regurgitation, acute rheumatism   | "                                  | " | " | " | Pregnancies natural   | R. |
| 69 | 25 | 20             | 2  | 0 | Mitral stenosis and regurgitation, acute rheumatism   | "                                  | " | " | " | "   | R. |
| 70 | 27 | Child-<br>hood | 6  | 1 | Mitral stenosis, acute rheumatism   | "                                  | " | " | " | Miscarriage 1 month ago; no cardiac symptoms  | R. |
| 71 | 28 | 14             | 1  | 0 | Mitral stenosis and regurgitation, aortic stenosis and regurgitation                                | Angina (1 year)                    | " | " | " | Child born without trouble  | R. |
| 72 | 30 | 7              | 3  | — | Mitral stenosis, acute rheumatism (5th attack)  | Rheumatism                         | " | " | " | Pregnancies natural   | R. |
| 73 | 30 | None           | 0  | 2 | Mitral stenosis, general debility for 2 years   | Debility                           | " | " | " | Last miscarriage 8 years ago  | R. |
| 74 | 31 | Child-<br>hood | 3  | 1 | Mitral stenosis and regurgitation, pneumonia  | Pneumonic                          | " | " | " | Abortion 2 months ago, pneumonia followed; there were no cardiac symptoms               | R. |
| 75 | 35 | 5              | 5  | 0 | Mitral stenosis and regurgitation, aortic stenosis and regurgitation, acute rheumatism (4th attack) | Rheumatism                         | " | " | " | Was known to have bruits at 12; has never had heart failure; last child 7 months ago    | R. |
| 76 | 36 | 15             | 4  | — | Mitral stenosis and regurgitation, pleurisy   | Pleuritic                          | " | " | " | Pregnancies natural   | R. |
| 77 | 36 | 9              | 3  | — | Mitral stenosis, diabetes mellitus  | Diabetic                           | " | " | " | "   | R. |
| 78 | 37 | Child-<br>hood | 5  | 0 | Mitral stenosis, movable kidney   | Pain in loin                       | " | " | " | "   | R. |



| Case Number. | Age. | Age at which rheumatism or chorea. | Number of children. | Number of miscarriages. | Main diagnosis.  | Symptoms for which admitted. | Duration of cardiac failure. | Details.   | Result. |
|--------------|------|------------------------------------|---------------------|-------------------------|--|------------------------------|------------------------------|--|---------|
| 79           | 37   | None                               | 7                   | 1                       | Mitral stenosis, hemiplegia (sudden embolism)  | Hemiplegia                   | None                         | Last child 2 years ago without trouble   | R.      |
| 80           | 37   | 13                                 | 1                   | 0                       | Mitral stenosis, diabetes mellitus   | Diabetic                     | "                            | Child born 5 years ago   | R.      |
| 81           | 37   | 15                                 | 1                   | —                       | Mitral stenosis, acute rheumatism  | Rheumatism                   | "                            | Pregnancy natural  | R.      |
| 82           | 40   | None                               | 2                   | —                       | Mitral stenosis, carcinoma of liver  | Malignant                    | "                            | Last pregnancy 3 years ago   | Worse   |
| 83           | 40   | "                                  | 3                   | 0                       | Mitral stenosis and regurgitation, chronic osteoarthritis  | Chronic joints               | "                            | The chronic joint trouble (? septic synovitis) dated from a labour 2 years before; there had been no cardiac symptoms        | R.      |
| 84           | 41   | 15                                 | 5                   | —                       | Mitral stenosis and regurgitation, acute rheumatism and simple stricture of oesophagus                                   | Dysphagia                    | "                            | There had been no heart symptoms; she came in for simple stricture of oesophagus, and developed acute rheumatism in the ward | R.      |
| 85           | 44   | 14                                 | 7                   | —                       | Mitral stenosis, cerebral embolism, acute rheumatism   | Hemiplegia                   | "                            | Last pregnancy was 6 years ago; there had been no cardiac symptoms; the hemiplegia was recent                                | R.      |
| 86           | 47   | Childhood                          | 4                   | —                       | Mitral stenosis, phthisis  | Acute abdominal pain         | "                            | Pregnancies uneventful; there had never been cardiac symptoms  | R.      |
| 87           | 51   | None                               | 10                  | —                       | Mitral stenosis (old and fibrous) found p. m., admitted for perforated gastric ulcer, the mitral disease was unsuspected | Abdominal                    | "                            | Ditto  | D.      |
| 88           | 56   | 18                                 | 8                   | 2                       | Mitral stenosis, hysterical  | Hysterical                   | "                            | Ditto  | R.      |

| Case | Age | Sex | Duration of disease | Previous history | Present symptoms   | Course                          | Diagnosis                    | Remarks   |
|------|-----|-----|---------------------|------------------|--|---------------------------------|------------------------------|---|
| 90   | 30  | F   | 3                   | 1                | pneumonia<br>Mitral stenosis and regurgitation, ascites                        | 3 months                        | Palpitations and oedema      | R.<br>No heart symptoms till 3 months ago; bruits known before marriage; pregnancies uneventful   |
| 91   | 31  | F   | 5                   | 0                | Mitral stenosis and regurgitation, big liver, ascites, double pleural effusion | 6 months acute, 15 yrs. chronic | Dyspnoea, ascites            | R.<br>Has had dyspnoea since she was 16, when she was known to have heart disease; she married in spite of this, and has had 5 pregnancies without increase in symptoms; two of the children were short of full term, but lived; the acute symptoms definitely did not date from the last pregnancy |
| 92   | 33  | F   | 3                   | —                | Mitral stenosis and regurgitation  | Acute                           | Dyspnoea and precordial pain | R.<br>Was known to have heart disease at 13. The pregnancies caused no cardiac symptoms   |
| 93   | 41  | F   | 4                   | 2                | Ditto  | 7 weeks                         | Ascites and bronchitis       | R.<br>Has had dyspnoea and palpitations off and on since 13; she had no increase of symptoms during child-bearing   |
| 94   | 41  | F   | 4                   | —                | Mitral stenosis and regurgitation, aortic regurgitation                        | Recent                          | Dropsy                       | D.<br>Has had dyspnoea off and on since 16; she had no increase of symptoms during child-bearing; she was married at 19   |
| 95   | 42  | F   | 8                   | —                | Mitral stenosis and regurgitation, anasarca                                    | 8 months                        | Dyspnoea and dropsy          | R.<br>The last pregnancy was 3 years ago. She was married at 22. The bruits had been known to exist for 10 years. She bore her children without cardiac symptoms, but transient hemiplegia occurred 3 days after last labour, 3 years ago   |
| 96   | 43  | F   | 1                   | —                | Mitral stenosis  | Acute lately                    | Dyspnoea                     | R.<br>She has had dyspnoea on exertion as long as she can remember; the child was born 25 years ago without any trouble   |
| 97   | 69  | F   | 1                   | —                | Mitral stenosis and regurgitation  | Recent                          | Precordial pain and dyspnoea | R.<br>Cardiac bruits known since 19   |



| Case number. | Age. | Age at which rheumatism or chorea. | Number of children. | Number of miscarriages. | Main diagnosis.  | Symptoms for which admitted.             | Duration of cardiac failure.                                 | Details.   | Result. |
|--------------|------|------------------------------------|---------------------|-------------------------|--|--|--|--|---------|
| 98           | 24   | 8                                  | 1                   | 0                       | Mitral stenosis and regurgitation, pericarditis, ascites   | Pericarditic                             | Recent   | The only pregnancy was 5 years ago, without trouble  | D.      |
| 99           | 28   | 8                                  | 1                   | —                       | Mitral stenosis and regurgitation, infective endocarditis  | Dyspnoea and weakness                    | Gradual onset for 1 year                                     | The only pregnancy was 9 years ago, without trouble  | D.      |
| 100          | 28   | None                               | 1                   | 3                       | Mitral stenosis and regurgitation, infective endocarditis, thromboses                              | Edema and dyspnoea                       | 2 months   | Married 8 years, no recent pregnancy   | D.      |
| 101          | 28   | "                                  | 2                   | —                       | Mitral stenosis and regurgitation, aortic stenosis and regurgitation, ulcerative endocarditis      | Hemiplegia, acute 3 months ago, vomiting | Diagnosed as gastric ulcer 3 months ago, no cardiac symptoms | Pregnancies uneventful   | D.      |
| 102          | 32   | 10                                 | 3                   | —                       | Mitral stenosis and regurgitation, infective endocarditis  | Pyrexia and joint pains                  | Recent   | " "  | D.      |
| 103          | 32   | Childhood                          | 5                   | —                       | Mitral stenosis and regurgitation, anasarca  | Dropsy and dyspnoea                      | Getting worse for 1 year                                     | Married at 16; last labour some years before admission, without difficulty                   | D.      |
| 104          | 33   | None                               | 2                   | 0                       | Mitral stenosis and regurgitation, big liver, etc., infective endocarditis                         | Dyspnoea                                 | 11 months  | Last pregnancy was 3 years ago, without trouble. The mitral stenosis found p. m. was extreme | D.      |
| 105          | 35   | "                                  | 7                   | —                       | Mitral stenosis, pericarditis, pneumonia, the mitral stenosis was unsuspected, but was found p. m. | Pneumonic                                | Acute  | No cardiac symptoms; pregnancies uneventful  | D.      |

|     |    |           |    |   |   |                         |  |  |    |
|-----|----|-----------|----|---|---|-------------------------|--|--|----|
| 107 | 36 | "         | 4  | — | liver, etc.<br>Mitral stenosis, aortic regurgitation, infective endocarditis    | Dyspnoea and œdema      | months<br>4 weeks                          | 6 years ago<br>Pregnancies uneventful  | D. |
| 108 | 37 | Childhood | 4  | — | Mitral stenosis, pleurisy, big liver, œdema, etc.                               | Dyspnoea, dropsy        | 2 years, recent                            | Pregnancies uneventful; last some years ago  | D. |
| 109 | 37 | 17        | 1  | 1 | Mitral stenosis and regurgitation, pericarditis, anasarca                       | Edema and ascites       | Gradual onset for 2 years                  | Last pregnancy 13 years ago  | D. |
| 110 | 37 | 16        | 0  | 1 | Mitral stenosis, pleuritic effusion   | Dyspnoea and œdema      | On and off for 4 years, acute a few months | The pregnancy was several years before   | D. |
| 111 | 38 | 14        | 6  | — | Mitral stenosis, lobar pneumonia, empyema                                       | Pneumonia               | None before admission                      | Last child 9 years ago   | D. |
| 112 | 38 | Childhood | 1  | — | Mitral stenosis and regurgitation, aortic regurgitation, pleuritic effusion     | Dyspnoea and œdema      | 1 month                                    | Married at 18. Had child without trouble   | D. |
| 113 | 39 | "         | 2  | — | Mitral stenosis and regurgitation, ascites                                      | Anasarca and orthopnoea | 2 years                                    | Had had very many attacks of rheumatism before 20. Pregnancies uneventful  | D. |
| 114 | 40 | 19        | 3  | — | Mitral stenosis and regurgitation, big liver, ascites                           | Dyspnoea and anasarca   | A cardiac wreck for the last 4 years       | The pregnancies were uneventful, and long preceded the heart failure   | D. |
| 115 | 40 | 17        | 10 | 0 | Mitral stenosis, aortic stenosis, big liver, infarcts spleen and kidneys, lungs | Dyspnoea and hæmoptysis | Off and on 6 years, anasarca 1 month       | Was married at 20. The last pregnancy occurred before the onset of severe hæmoptysis, though there had been slight hæmoptysis without heart failure previously | D. |
| 116 | 40 | 15        | 6  | 1 | Mitral stenosis and regurgitation, infarcts, ante-mortem thrombi                | Dyspnoea and anasarca   | Getting worse, 2 years                     | Pregnancies uneventful   | D. |
| 117 | 41 | None      | 2  | — | Mitral stenosis and regurgitation, aortic regurgitation                         | Precordial pain, œdema  | 4 months<br>1 month                        | The children were twins 21 years ago. The husband died soon after marriage   | D. |



| Case number. | Age. | Age at which rheumatism or chorea. | Number of children. | Number of miscarriages. | Main diagnosis.  | Symptoms for which admitted. | Duration of cardiac failure.                          | Details.   | Result. |
|--------------|------|------------------------------------|---------------------|-------------------------|--|------------------------------|---|--|---------|
| 118          | 43   | 14                                 | 1                   | —                       | Mitral stenosis and regurgitation, aortic stenosis and regurgitation, infective endocarditis, adherent pericardium | Rheumatic pains              | Recent  | The child is 19 years old                                  | D.      |
| 119          | 43   | None                               | 4                   | Sev-<br>eral            | Mitral stenosis, tricuspid stenosis  | Hemiplegia                   | Sudden embolism                                       | Pregnancies uneventful                                     | D.      |
| 120          | 44   | "                                  | 13                  | —                       | Mitral stenosis and regurgitation, aortic regurgitation, adherent pericardium, infarcts in kidney and spleen       | Dyspnoea                     | Sudden onset 3 months ago                             | "  | D.      |
| 121          | 44   | 7                                  | 2                   | —                       | Mitral stenosis and regurgitation, aortic regurgitation, tricuspid stenosis  | "                            | 2 years, on and off                                   | Pregnancies uneventful, early in married life              | D.      |
| 122          | 44   | 20                                 | 3                   | —                       | Mitral stenosis and regurgitation, adherent pericardium  | Palpitations                 | 3 months  | Last child 8 years ago                                     | D.      |
| 123          | 45   | Girlhood                           | 6                   | 0                       | Mitral stenosis and regurgitation, extreme cyanosis, oedema  | Dyspnoea and oedema          | 12 years off and on, present attack began 1 month ago | Last pregnancy preceded first cardiac symptoms by years    | D.      |
| 124          | 46   | Childhood                          | 7                   | —                       | Mitral stenosis and regurgitation, aortic disease, infective endocarditis, big liver, etc.                         | Oedema and dyspnoea          | 1 year  | Husband has been dead over 6 years; pregnancies uneventful | D.      |

|     |    |                |             |   |   |                                     |                                  |  |    |
|-----|----|----------------|-------------|---|---|-------------------------------------|----------------------------------|--|----|
| 126 | 49 | Child-<br>hood | 8 +<br>1 D. | 0 | gurgitation, big liver,<br>etc.   | Ditto                               | 8 months                         | Last child 11 years ago                                    | D. |
| 127 | 49 | None           | 5           | — | Mitral stenosis, ascites,<br>infective endocar-<br>ditis  | Acute pains                         | Acute                            | Pregnancies uneventful                                     | D. |
| 128 | 51 | "              | 14          | — | Mitral stenosis, throm-<br>bosis renal and radial<br>arteries and aorta                                   | Acute pain<br>in chest              | "                                | Pregnancies uneventful; the mitral<br>stenosis was extreme | D. |
| 129 | 52 | 12             | 2           | — | Mitral stenosis and<br>regurgitation, adherent<br>pericardium   | Dyspnoea and<br>oedema              | Recent                           | Pregnancies uneventful                                     | D. |
| 130 | 52 | None           | 11          | 2 | Mitral stenosis and aortic<br>stenosis and regurgi-<br>tation, big liver, as-<br>cites, pleural effusions | Anasarca                            | 6 weeks                          | " "  | D. |
| 131 | 57 | 18             | 9           | 2 | Mitral stenosis, tri-<br>cuspid regurgitation,<br>ascites   | Cough,<br>oedema of<br>legs         | On and off<br>7 years<br>2 weeks | Pregnancies uneventful; on one occa-<br>sion twins         | D. |
| 132 | 58 | None           | 7 +<br>3 D. | — | Mitral stenosis, oedema,<br>etc.  | Anasarca                            | 1 year                           | Pregnancies uneventful                                     | D. |
| 133 | 61 | "              | 0           | 4 | Mitral stenosis and re-<br>gurgitation, ascites,<br>etc.  | Dyspnoea and<br>weakness,<br>oedema | 2 years,<br>recent               | " "  | D. |
| 134 | 61 | 14             | 2           | 3 | Mitral stenosis, quite<br>unexpected, but found<br>p. m. There had been<br>no bruit, kidneys<br>healthy   | Dyspnoea and<br>weakness            | 2 years                          | " "  | D. |
| 135 | 71 | None           | 11          | — | Mitral stenosis, aortic<br>stenosis, tricuspid<br>stenosis, pulmonary<br>stenosis                         | Oedema and<br>bronchitis            | 5 months                         | " "  | D. |



B. *Those who had been Pregnant, and did relate Cardiac Symptoms to a Pregnancy or Labour.*

| Case number. | Age. | Age at which rheumatism or chorea. | Number of children. | Number of miscarriages. | Main diagnosis.   | Symptoms for which admitted. | Duration of cardiac failure. | Details.  | Result. |
|--------------|------|------------------------------------|---------------------|-------------------------|---|------------------------------|------------------------------|---|---------|
| 136          | 24   | None                               | 2                   | 1                       | Mitral stenosis and regurgitation, ? tricuspid stenosis | Palpitations                 | 4 months                     | We are not certain of the relation, but suspect it  | R.      |
| 137          | 26   | "                                  | 4                   | 2                       | Mitral stenosis and regurgitation, ascites, etc.        | Ascites                      | 1½ years                     | Married 9 years. We suspect the condition was made worse by child-bearing   | R.      |
| 138          | 33   | "                                  | 6                   | —                       | Mitral stenosis, bronchitis                             | Bronchitis                   | 16 years off and on          | She dates her trouble from small-pox at 16. She had her first child 12 years ago, the last 9 days ago. She has had bronchitis and dyspnoea badly with each pregnancy, recovering between. The present attack has been her worst, and dates from soon after labour, 9 days ago | R.      |
| 139          | 37   | 15                                 | 12                  | —                       | Mitral stenosis and regurgitation                       | Dyspnoea                     | 2 months                     | Eleven pregnancies were uneventful; dyspnoea came on 10 days after her twelfth labour, 2 months ago   | R.      |
| 140          | 38   | None                               | 4                   | 2                       | Mitral stenosis and regurgitation, anasarca             | Edema and dyspnoea           | 4 years                      | She had no symptoms of heart trouble until just after the last labour, an 8 months living child, 4 years ago  | R.      |
| 141          | 39   | 17                                 | 4                   | 3                       | Mitral stenosis and regurgitation, big liver, etc.      | Ditto                        | 6 years                      | We do not know for certain the relationship, but suspect heart trouble was made worse by pregnancies; she had been married 11 years   | R.      |
| 142          | 39   | None                               | 6                   | 2                       | Mitral stenosis, bronchitis                             | Cough                        | —                            | She had had bronchitis each time she was carrying; no oedema  | R.      |
| 143          | 40   | 14                                 | 6                   | —                       | Mitral stenosis, pulmonary regurgitation,               | Edema                        | 11 years off and on          | She dates her cardiac symptoms from soon after the birth of her second  | R.      |

|     |    |      |    |   |   |                              |                                  |       |  |
|-----|----|------|----|---|---|------------------------------|----------------------------------|-------|--|
| 144 | 46 | 18   | 11 | — | Mitral stenosis and regurgitation, aortic stenosis and regurgitation, ascites | Palpitations, etc.           | 4 years                          | R.    | She was quite well until 4 years ago, having borne 10 children without trouble; she dates her symptoms from shortly after the birth of her eleventh child (a living 7 months infant), 4 years ago                  |
| 145 | 47 | None | 3  | — | Mitral stenosis and regurgitation, pleurisy                                   | Pleurisy                     | Heart trouble on and off 9 years | R.    | Last child 9 years ago; the two previous gave no trouble   |
| 146 | 26 | 13   | 2  | — | Mitral stenosis and regurgitation, aortic stenosis and regurgitation          | Dyspnoea                     | 2 months acute                   | R.    | Was quite well till 3 months after birth of first child, when she had acute dyspnoea; the second pregnancy was uneventful except for persistent dyspnoea, which became acutely worse again some while after labour |
| 147 | 25 | None | 2  | 0 | Mitral stenosis and regurgitation, pleuritic effusion, old hemiplegia         | "                            | On and off ever since a child    | R.    | The last pregnancy was 2 years ago; there was no trouble with the previous child, nor indeed with the last, but the dyspnoea got gradually worse and worse after the labour; she was still alive 3 years later     |
| 148 | 33 | 16   | 6  | — | Mitral stenosis, tricuspid regurgitation                                      | Œdema and precordial pain    | 8 weeks                          | R.    | No trouble with first 5 pregnancies, though heart disease was known from 16; 3 weeks before sixth child was born œdema of the legs began; after labour this went on to anasarca; she recovered                     |
| 149 | 21 | None | 1  | 0 | Infective endocarditis on old mitral stenosis                                 | Hæmoptysis, and splenic pain | 6 weeks                          | Worse | No trouble with pregnancy or labour; is now 5 months pregnant; went out, still pregnant, against advice  |
| 150 | 23 | 12   | 4  | — | Mitral stenosis and regurgitation, ascites, etc.                              | Dyspnoea                     | 3 years, acute 3 weeks           | R.    | The 4 children were born without trouble, but 3 weeks ago, 2 months after last labour, acute dyspnoea set in   |



| Case number. | Age. | Age at which<br>rheumatism<br>or chorea. | Number of<br>children. | Number of<br>miscarriages. | Main diagnosis.                          | Symptoms for<br>which<br>admitted. | Duration of<br>cardiac failure. | Details.   | Result. |
|--------------|------|--|------------------------|----------------------------|--|------------------------------------|---------------------------------|--|---------|
| 151          | 24   | Girl-<br>hood                            | 1                      | —                          | Mitral stenosis, bron-<br>chitis         | Cough; no<br>œdema                 | Recent                          | Was pregnant 5½ months on admission; she got much better and went out; relapsed, came in again, recovered, went out again, and went to term without further trouble  | R.      |
| 152          | 24   | None                                     | 0                      | 0                          | Mitral stenosis                          | Dyspnoea and<br>hæmoptysis         | 3 months                        | Was pregnant 5 months on first admission; got better on treatment, went out, relapsed, came in again, got better, went out again still pregnant  | R.      |
| 153          | 24   | 16                                       | 1 d.                   | —                          | Mitral stenosis, aortic<br>regurgitation | Dyspnoea<br>(not bad)              | Years                           | Married 12 months. Had been in and out of hospital seven times for heart disease before marriage. She was in bed in hospital 203 days; was then delivered of a dead 8-months fetus, and went out 14 days after labour pretty well  | R.      |
| 154          | 27   | 17                                       | 0                      | 1                          | Mitral stenosis, ascites,<br>tapped      | Ascites                            | 1½ years                        | She has been married 2 years. Ascites developed during first pregnancy and caused miscarriage. She has had œdema and ascites on and off ever since   | R.      |
| 155          | 27   | None                                     | 4 +<br>1 d.            | —                          | Mitral stenosis                          | Dyspnoea,<br>hæmoptysis            | 14 months,<br>6 months          | She bore 3 children without trouble. The fourth was 4 years ago; 5 months before this labour she had a cerebral embolism with hemiplegia. She got better of this, and had no heart trouble till 14 months ago, when dyspnoea began; 7½ months ago she became pregnant again, and 1½ months later hæmoptysis started. Cough increased during pregnancy, | R.      |

|     |    |            |             |   |  |                             |                                  |       |
|-----|----|------------|-------------|---|--|-----------------------------|----------------------------------|-------|
| 156 | 28 | 16         | 4           | — | Mitral stenosis and regurgitation, ascites, pleuritic effusion   | Ascites                     | 5 months                         | R.    |
| 157 | 28 | None       | 1 +<br>1 d. | — | Mitral stenosis and regurgitation, ascites                       | Dyspnoea and ascites        | 6 months                         | R.    |
| 158 | 29 | None       | 4           | 2 | Mitral stenosis, aortic regurgitation, pleuritic effusion        | Hæmoptysis, severe dyspnoea | 3 years off and on, 1 month      | R.    |
| 159 | 30 | Child-hood | 2           | 0 | Mitral stenosis and regurgitation, tricuspid regurgitation, etc. | Severe dyspnoea             | 11 months                        | R.    |
| 160 | 31 | None       | 3           | 0 | Mitral stenosis and regurgitation, oedema                        | Bronchitis, cedema          | Some years off and on, 20 months | Worse |
| 161 | 32 | Girl-hood  | 5           | 0 | Mitral regurgitation   | Hæmoptysis                  | Recent                           | R.    |

a living child weighing 8 lb. 8 oz., natural delivery. She went out fairly well

The first 3 labours were natural. Soon after the fourth child was born cardiac trouble began

She had no trouble with first pregnancy, 6 years ago. Soon after the second, 6 months ago, ascites began and increased

The third full-term child was 3 years ago; she dates hæmoptysis from then. After that she had two miscarriages; a month ago she was delivered of her fourth full-term child, living, and has been in bed with severe dyspnoea since

There was no trouble with the first child; the second was born 11 months ago, and following labour the dyspnoea set in

Was quite well till after first labour; bronchitis then set in, and recurred with each of the two pregnancies; the last labour was 20 months ago; cedema set in after this last labour. Infective endocarditis was suspected on last admission, on account of pyrexia; she went home worse

She was in hospital at 18 for palpitations and dyspnoea. She married subsequently, and had 4 children without trouble. When 6 months pregnant of fifth child she had sudden hæmoptysis, lasting 4 days. There was no other cardiac trouble; she only lay up 4 days; she went to term naturally



| Case number. | Age. | Age at which rheumatism or chorea. | Number of children. | Number of miscarriages. | Main diagnosis.   | Symptoms for which admitted. | Duration of cardiac failure. | Details.   | Result. |
|--------------|------|------------------------------------|---------------------|-------------------------|---|------------------------------|------------------------------|--|---------|
| 162          | 33   | None                               | 4                   | —                       | Mitral stenosis, bronchitis                                     | Dyspnoea and bronchitis      | 8 months, worse 1 week       | Three pregnancies gave no trouble; early in the fourth dyspnoea and hæmoptysis set in; she went to term, and the child was born alive; the dyspnoea got worse after labour; she came to hospital for relief and recovered with rest in bed   | R.      |
| 163          | 33   | Childhood                          | 7                   | 1                       | Mitral stenosis   | Dyspnoea                     | Many years                   | The first four children caused no heart symptoms; with fifth and sixth there was dyspnoea. She is now pregnant 7 months, having had hæmoptysis for 7 months; oedema set in at 7 months, and got worse to term. The child was born living naturally; there was a bad attack of dyspnoea on fourth day after labour; the mother responded to treatment, and went out moderately well | R.      |
| 164          | 34   | 20                                 | 7                   | 1                       | Mitral stenosis and regurgitation, infarcts in spleen and lungs | Œdema and ascites            | 4 months                     | She dates her heart failure directly to her miscarriage 4 months ago, when 6 months pregnant. There was no trouble with any of the previous 7 children   | D.      |
| 165          | 34   | Childhood                          | 2                   | 0                       | Mitral stenosis, pleurisy                                       | Pleurisy                     | None                         | She came in with a week's history of pleuritic pain when pregnant nearly to term. A pleuritic effusion was found. Labour at term was natural   | R.      |
| 166          | 36   | None                               | 2                   | 0                       | Mitral stenosis, tricuspid stenosis                             | Dyspnoea                     | 4 months                     | No trouble with pregnancy till fourth month, when acute dyspnoea set in. She had several attacks of dyspnoea, but went to term, and was delivered  | R.      |

|   |    |      |         |   |  |                      |                       |    |
|---|----|------|---------|---|--|----------------------|-----------------------|----|
| 167   | 37 | None | 5       | 1 | Mitral stenosis and regurgitation, ascites, etc. | Orthopnea and oedema | 9 weeks               | R. |
| <p>weeks after labour there was another very acute attack of dyspnoea; the patient rallied rapidly, and went out apparently well</p>  |    |      |         |   |  |                      |                       |    |
| 168   | 37 | None | 12      | — | Mitral stenosis and regurgitation                | Acute rheumatism     | No real heart failure | R. |
| <p>She was quite well during five former pregnancies, but had a miscarriage 9 weeks ago, since when she has not been well</p>   |    |      |         |   |  |                      |                       |    |
| 169   | 38 | 20   | 6       | — | Ditto  | Œdema and dyspnoea   | Many years on and off | R. |
| <p>She had no trouble at all with the first 12 children; when 4 months pregnant with the 13th she got very bad rheumatic fever, and was found to have signs of old mitral disease. She recovered and went out still pregnant</p>  |    |      |         |   |  |                      |                       |    |
| 170   | 38 | 12   | 10      | — | Ditto  | Dyspnoea             | 14 months             | R. |
| <p>She got dyspnoic during her first pregnancy, and has been bad with each subsequently. On two occasions labour was induced at the 8th month for heart failure, on one of which occasions p. p. h. was almost fatal. After her fourth child she was discharged "a wreck," but recovered at home, and bore two more children. The last of these was born without induction; it was a transverse presentation; version was performed; the mother and child both did well</p> |    |      |         |   |  |                      |                       |    |
| 171   | 41 | 16   | 5 + 1 D | 2 | Aortic disease and mitral stenosis               | "                    | Recent                | R. |
| <p>There was no trouble with first nine children; after the birth of the tenth, 14 months ago, dyspnoea set in, and has been getting worse and worse since</p>  |    |      |         |   |  |                      |                       |    |
| <p>No trouble with former labours. When pregnant for eighth time, and near to term, dyspnoea began, followed by easy labour and recovery. The child was dead</p>  |    |      |         |   |  |                      |                       |    |



| Case number. | Age. | Age at which rheumatism or chorea. | Number of children. | Number of miscarriages. | Main diagnosis.   | Symptoms for which admitted.        | Duration of cardiac failure.    | Details.   | Result.   |
|--------------|------|------------------------------------|---------------------|-------------------------|---|-------------------------------------|---------------------------------|--|-----------|
| 172          | 43   | 18                                 | 13                  | —                       | Mitral stenosis and regurgitation, aortic stenosis and regurgitation  | Œdema                               | 5 months                        | 12 pregnancies were uneventful; with the 13th cardiac symptoms began; œdema set in 2 months after labour, and grew worse. She recovered with rest in bed   | R.        |
| 173          | 41   | None                               | 7                   | —                       | Mitral stenosis and regurgitation                                     | Anginal pain                        | 14 years                        | 3 pregnancies were uneventful; after the fourth labour anginal attacks began. Notwithstanding these, she bore three more living children, the last six years ago. She is a chronic invalid.        | Very ill. |
| 174          | 25   | None                               | 1                   | —                       | Mitral stenosis, thromboses, anasarca                                 | Dyspnoea                            | 14 days                         | The child was born living 14 days ago; there were no symptoms till after labour  | D.        |
| 175          | 38   | "                                  | 8                   | —                       | Mitral stenosis and regurgitation, calcareous vegetations             | "                                   | 11 weeks                        | Was quite well until after last confinement, 11 weeks ago; the first 7 pregnancies were uneventful   | D.        |
| 176          | 31   | "                                  | 8                   | —                       | Mitral stenosis, pleuritic effusion                                   | Anasarca, precordial pain, dyspnoea | 7 weeks + many years on and off | She had cardiac symptoms shortly after second pregnancy, and was short of breath through all the subsequent ones; the first was natural, the last was 7 weeks ago                                  | D.        |
| 177          | 31   | "                                  | 5                   | 1                       | Mitral stenosis and regurgitation, aortic stenosis, infarcts in lungs | Dyspnoea and œdema                  | 1 year                          | She came in pregnant and got better under treatment; she went out and went to term naturally; she came in again a few weeks afterwards. She dated her heart symptoms to the miscarriage 1 year ago | D.        |

|     |    |      |   |   |   |  |                     |  |    |
|-----|----|------|---|---|---|--|---------------------|--|----|
| 179 | 25 | None | 2 | 2 | Mid stenosis, aortic stenosis, infarcts in lungs, gastric ulcer         | dyspnoea, dyspnoea, and hæmatemesis      | Recent + some years | in the only pregnancy, but she rested and went to term; the child was small, living; she collapsed 10 days after labour, a few days before admission; she got worse and worse, and died  | D. |
| 180 | 23 | "    | 3 | 1 | Ditto   | Edema and weakness, and acute hemiplegia | Recent              | The first labour at term was natural; then followed two miscarriages, and there were cardiac symptoms with each; the last labour at term was 10 months ago, without much trouble, but the patient has never been well since; the progress was downhill continuously                    | D. |
| 181 | 31 | 12   | 5 | — | Mitral stenosis and regurgitation, adherent pericardium, ascites, etc.  | Cough<br>Edema                           | 9 years<br>2 years  | There had been no previous chorea; the three children were born without trouble. When pregnant fourth time, she developed chorea at sixth month and aborted 21 days afterwards; she went rapidly downhill and died 23 days after the abortion  | D. |
| 182 | 20 | 14   | 1 | 0 | Mitral stenosis and regurgitation, infective endocarditis, pericarditis | Edema                                    | 2½ years            | The first 4 children were born without trouble; the fifth was born alive at term 3 months ago naturally; oedema of legs and ascites came on one week after labour; the patient went rapidly downhill   | D. |
|     |    |      |   |   |   |  |                     | Symptoms of heart failure came on early during the only pregnancy, 2½ years ago; the cardiac symptoms were so bad that labour was induced at the eighth month; the child lived. The mother recovered a little, but was a chronic invalid, and finally developed malignant endocarditis |    |



| Case number. | Age. | Age at which rheumatism or chorea. | Number of children. | Number of miscarriages. | Main diagnosis.  | Symptoms for which admitted. | Duration of cardiac failure. | Details.   | Result. |
|--------------|------|------------------------------------|---------------------|-------------------------|--|------------------------------|------------------------------|--|---------|
| 183          | 28   | None                               | 4                   | 0                       | Mitral stenosis, tricuspid regurgitation                     | Dyspnoea                     | Some months                  | She "had never been ill in her life" until, when 4 months pregnant of the fourth child, symptoms of dyspnoea and cough came on; after rest and digitalis in hospital she got better and went home. She returned at term, and had a living child easily; the mother did well at first, but a few days after getting up she developed further heart symptoms, and rapidly went downhill and died | D.      |
| 184          | 24   | 16                                 | 1                   | —                       | Mitral stenosis and regurgitation, bronchitis                | Dyspnoea and oedema          | 18 months                    | Heart failure began during the pregnancy, but acute symptoms did not arise until a living child had been born at term. Since then she had been in and out of hospital 5 times in a year, never really recovering compensation  | D.      |
| 185          | 40   | None                               | 4                   | 4                       | Mitral stenosis, infarcts in kidneys                         | Dyspnoea                     | 5 months                     | She had always been well, except that 10 years ago she was in hospital for albuminuria during pregnancy. Four labours and 3 miscarriages were without cardiac symptoms; the latter date from a miscarriage at the 3rd month, 5 months ago  | D.      |
| 186          | 28   | Childhood                          | 1                   | —                       | Mitral stenosis, tricuspid stenosis, aortic regurgitation    | General failure              | 2 years                      | She was quite well till the child was born, 2 years ago; heart failure set in soon after labour, and she has never been well since   | D.      |
| 187          | 28   | None                               | 1                   | —                       | Mitral stenosis, hemiplegia, infarcts, tricuspid vegetations | Palpitations and hæmoptysis  | 5 years                      | Palpitations and hæmoptysis have recurred during the last five years. The only child was born living at the  | D.      |

|   |    |          |          |   |   |                         |                    |    |
|---|----|----------|----------|---|---|-------------------------|--------------------|----|
| 188   | 32 | 17       | 2        | — | Mitral stenosis and regurgitation, hæmiplegia                                 | Œdema                   | 3 years on and off | D. |
| cardiac symptoms became much worse. Cardiac symptoms became much worse. She has gone downhill ever since. The first child was born normally. The symptoms date from soon after the birth of the second child, 3 years ago.                        |    |          |          |   |   |                         |                    |    |
| 189   | 38 | 6        | 1        | — | Mitral stenosis, infective endocarditis, pleuritic effusion, various infarcts | Dyspnoea and hæmoptysis | 7 months           | D. |
| 190   | 41 | 8        | 6 + 1 D. | 1 | Mitral stenosis and regurgitation, infective endocarditis                     | Œdema, dyspnoea, acute  | 9 months 2 weeks   | D. |
| 191   | 43 | 8        | 2        | — | Mitral stenosis and regurgitation, vegetations, œdema, hæmoptysis             | Dyspnoea, œdema         | 1½ years 1 month   | D. |
| 192   | 48 | Girlhood | 8        | 4 | Mitral stenosis and regurgitation, general heart failure                      | Dyspnoea                | 10 years           | D. |
| The patient directly dates symptoms to a labour 10 years ago. She has since been pregnant 3 times. The eldest child is 25, the youngest 6. She has never been well since the last was born, though she has done her work on and off till recently |    |          |          |   |   |                         |                    |    |

## C. Cases Married, but never Pregnant.

|     |    |    |   |   |                                   |            |                  |    |
|-----|----|----|---|---|-----------------------------------|------------|------------------|----|
| 193 | 25 | 18 | — | — | Mitral stenosis and regurgitation | Rheumatism | None             | R. |
|     |    |    |   |   |                                   |            | Married 3 years. |    |



| Case number. | Age. | Age at which rheumatism or chorea. | Number of children. | Number of miscarriages. | Main diagnosis.   | Symptoms for which admitted. | Duration of cardiac failure. | Details.  | Result. |
|--------------|------|------------------------------------|---------------------|-------------------------|---|------------------------------|------------------------------|---|---------|
| 194          | 26   | None                               | —                   | —                       | Mitral stenosis and regurgitation   | Dyspnoea and precordial pain | 2 years                      | Married recently. Heart troubles started before marriage  | Worse   |
| 195          | 26   | Girlhood                           | —                   | —                       | Mitral stenosis, bronchitis   | Œdema and cough              | 5 weeks                      | —   | D.      |
| 196          | 29   | None                               | —                   | —                       | Mitral stenosis, tricuspid regurgitation                                  | Dyspnoea and weakness        | 6 years                      | Married 9 years   | D.      |
| 197          | 31   | 16                                 | —                   | —                       | Mitral stenosis and regurgitation, bronchitis                             | Cough and precordial pain    | 2 months                     | Married 11 years  | R.      |
| 198          | 34   | None                               | —                   | —                       | Mitral stenosis and regurgitation, pulmonary regurgitation, ascites, etc. | Œdema and ascites            | "                            | Married 8 years, and has been out of health on and off ever since   | R.      |
| 199          | 34   | "                                  | —                   | —                       | Mitral stenosis and regurgitation, aortic stenosis and regurgitation      | Dyspnoea and œdema           | 4 months                     | —   | R.      |
| 200          | 35   | 16                                 | —                   | —                       | Mitral stenosis, general failure  | Dyspnoea                     | 18 months                    | Has been in Guy's Hospital more than a dozen times. She recovers quickly, but soon relapses. She is a widow | R.      |
| 201          | 36   | 7                                  | —                   | —                       | Mitral stenosis, anasarca   | Dyspnoea and ascites         | 1 year                       | Had cerebral embolism 9 years ago.  | D.      |
| 202          | 36   | None                               | —                   | —                       | Mitral stenosis and regurgitation, tricuspid regurgitation                | Orthopnoea and œdema         | 17 years                     | Married 18 years<br>Married 8 years. A chronic hospital inmate  | R.      |
| 203          | 39   | "                                  | —                   | —                       | Mitral stenosis, epithelioma of œsophagus                                 | Dysphagia                    | None                         | Married 9 years. Mitral stenosis, unsuspected, found p. m.  | D.      |
| 204          | 41   | 4                                  | —                   | —                       | Mitral stenosis and regurgitation, double aortic disease                  | Dyspnoea                     | Months                       | —   | D.      |
| 205          | 55   | 12                                 | —                   | —                       | Mitral stenosis, hæmatemesis  | Dyspnoea and cyanosis        | 28 years on and off          | —   | D.      |

|     |    |            |   |   |  |                           |  |    |
|-----|----|------------|---|---|--|---------------------------|--|----|
| 206 | 20 | 6          | — | — | Mitral stenosis  | Dyspnoea, hæmoptysis      | 2 years  | R. |
| 207 | 20 | None       | — | — | Mitral stenosis, aortic stenosis                                     | Dyspnoea and palpitations | 2 months   | R. |
| 208 | 20 | "          | — | — | Mitral stenosis  | Dyspnoea                  | 3 years  | R. |
| 209 | 21 | Child-hood | — | — | Mitral stenosis, acute rheumatism                                    | Precordial pain           | None   | R. |
| 210 | 21 | 19         | — | — | Mitral stenosis and regurgitation, acute rheumatism                  | Dyspnoea                  | 2 years on and off   | R. |
|     |    |            |   |   |  |                           | Hemiplegia due to cerebral embolism occurred just before admission |    |
| 211 | 21 | 12         | — | — | Mitral stenosis and regurgitation                                    | Dyspnoea                  | Acute  | R. |
| 212 | 21 | Girl-hood  | — | — | Mitral stenosis and regurgitation, aortic stenosis, acute rheumatism | Precordial pain           | 3 months   | R. |
| 213 | 21 | 12         | — | — | Mitral stenosis and bronchitis                                       | Cough and dyspnoea        | 7 years  | R. |
| 214 | 21 | None       | — | — | Mitral stenosis and regurgitation, aortic stenosis and regurgitation | Precordial pain           | Acute  | R. |
| 215 | 21 | 10         | — | — | Mitral stenosis and regurgitation, bronchitis                        | Cough and pain in chest   | 2 weeks  | R. |
| 216 | 21 | 10         | — | — | Mitral stenosis and regurgitation, anasarca                          | Dyspnoea and œdema        | Recent   | R. |
| 217 | 21 | 7          | — | — | Mitral stenosis and regurgitation                                    | Pain in side, œdema       | "  | R. |
| 218 | 22 | 14         | — | — | Mitral stenosis and regurgitation, paracentesis abdominis            | Precordial pain, ascites  | 1 year   | R. |
| 219 | 22 | 10         | — | — | Mitral stenosis and regurgitation                                    | Dyspnoea                  | Recent   | R. |
| 220 | 22 | 10         | — | — | Mitral stenosis and regurgitation, large liver, etc.                 | œdema                     | 1 month  | R. |



| Case number. | Age. | Age at which rheumatism or chorea. | Number of children. | Number of miscarriages. | Main diagnosis.   | Symptoms for which admitted. | Duration of cardiac failure. | Details.   | Result. |
|--------------|------|------------------------------------|---------------------|-------------------------|---|------------------------------|------------------------------|--|---------|
| 221          | 22   | None                               | —                   | —                       | Mitral stenosis and regurgitation, bronchitis                             | Dyspnoea and oedema          | 6 months                     | Was often admitted afterwards. A chronic invalid | R.      |
| 222          | 22   | 11                                 | —                   | —                       | Mitral stenosis and regurgitation   | Acute rheumatism             | None                         | —  | R.      |
| 223          | 23   | 11                                 | —                   | —                       | Mitral stenosis and regurgitation, infective endocarditis                 | Hæmaturia                    | Recent                       | Went home to die                                 | Worse   |
| 224          | 23   | 12                                 | —                   | —                       | Mitral stenosis, epilepsy   | Fits                         | None                         | —  | R.      |
| 225          | 23   | None                               | —                   | —                       | Mitral stenosis and regurgitation, rheumatic nodules                      | Weakness                     | Months                       | —  | R.      |
| 226          | 23   | Childhood                          | —                   | —                       | Mitral stenosis, hæmatemesis  | Hæmatemesis                  | None                         | —  | R.      |
| 227          | 23   | 14                                 | —                   | —                       | Mitral stenosis and regurgitation   | Oedema                       | 5 months                     | —  | R.      |
| 228          | 23   | 14                                 | —                   | —                       | Ditto   | Dyspnoea                     | Recent                       | —  | R.      |
| 229          | 23   | Childhood                          | —                   | —                       | Mitral stenosis and regurgitation, aortic stenosis and regurgitation      | "                            | 4 years                      | —  | R.      |
| 230          | 23   | 16                                 | —                   | —                       | Mitral stenosis and regurgitation, pericarditis                           | Dyspnoea                     | 3 months                     | —  | R.      |
| 231          | 23   | None                               | —                   | —                       | Mitral stenosis and regurgitation, exophthalmic goitre, Raynaud's disease | Nervousness                  | None                         | —  | R.      |
| 232          | 23   | 16                                 | —                   | —                       | Mitral stenosis and regurgitation, bronchitis                             | Cough and dyspnoea           | 4 months                     | —  | R.      |

|     |    |      |   |   |  |                           |           |  |         |
|-----|----|------|---|---|--|---------------------------|-----------|--|---------|
| 234 | 24 | 7    | — | — | Mitral stenosis and regurgitation, acute rheumatism (3rd attack)     | Rheumatism and vomiting   | "         | —  | R.      |
| 235 | 24 | 19   | — | — | Mitral stenosis and regurgitation, gastritis                         | Gastric pain              | "         | —  | R.      |
| 236 | 24 | None | — | — | Mitral stenosis, ganglion on wrist                                   | Ganglion                  | "         | —  | R.      |
| 237 | 24 | 9    | — | — | Mitral stenosis and regurgitation, nutmeg liver                      | Dyspnœa and œdema         | Years     | —  | R.      |
| 238 | 24 | 16   | — | — | Mitral stenosis and regurgitation, aortic stenosis and regurgitation | Dyspnœa                   | "         | —  | R.      |
| 239 | 25 | 9    | — | — | Mitral stenosis and regurgitation, ascites                           | "                         | 2 months  | —  | R.      |
| 240 | 25 | None | — | — | Mitral stenosis and regurgitation                                    | Edema                     | 1 year    | Palpitations for 7 years                             | R.      |
| 241 | 25 | 16   | — | — | Ditto  | Precordial pain and œdema | Recent    | —  | R.      |
| 242 | 25 | None | — | — | Ditto  | Palpitation               | 1 year    | —  | R.      |
| 243 | 25 | "    | — | — | Ditto  | Dyspnœa and œdema         | 4 years   | —  | R.      |
| 244 | 26 | 20   | — | — | Mitral stenosis and regurgitation, pleuritic effusion                | Ditto                     | 1 year    | There was slight cerebral embolism 1 year ago        | R.      |
| 245 | 26 | None | — | — | Mitral stenosis and regurgitation, pericarditis                      | Ditto                     | 10 months | —  | R.      |
| 246 | 27 | 7    | — | — | Mitral stenosis and regurgitation                                    | Edema                     | 2 weeks   | —  | R.      |
| 247 | 27 | 12   | — | — | Mitral stenosis and regurgitation, aortic regurgitation              | Bad dyspnœa and cough     | Years     | Has been in and out of hospital nearly a dozen times | A wreck |



| Case number. | Age. | Age at which rheumatism or chorea. | Number of children. | Number of miscarriages. | Main diagnosis.  | Symptoms for which admitted.              | Duration of cardiac failure. | Details. | Result. |
|--------------|------|------------------------------------|---------------------|-------------------------|--|---|------------------------------|----------|---------|
| 248          | 27   | 7                                  | —                   | —                       | Mitral stenosis and regurgitation, aortic stenosis                   | Dyspnoea and palpitations<br>Edema        | 7 months                     | —        | R.      |
| 249          | 28   | 10                                 | —                   | —                       | Mitral stenosis and regurgitation                                    | Deformed joints                           | 2 years                      | —        | R.      |
| 250          | 28   | 16                                 | —                   | —                       | Mitral stenosis, chronic osteoarthritis                              | Pleuritic effusion                        | None                         | —        | R.      |
| 251          | 28   | 12                                 | —                   | —                       | Mitral stenosis and regurgitation, aortic stenosis and regurgitation |   | Acute                        | —        | R.      |
| 252          | 28   | Childhood                          | —                   | —                       | Mitral stenosis, tricuspid regurgitation                             | Dyspnoea and oedema                       | 1 year                       | —        | R.      |
| 253          | 28   | None                               | —                   | —                       | Mitral stenosis and regurgitation, cerebral embolism                 | Hemiplegia                                | None                         | —        | R.      |
| 254          | 29   | 11                                 | —                   | —                       | Mitral stenosis and regurgitation, aortic regurgitation, big liver   | Orthopnoea                                | 4 years                      | —        | R.      |
| 255          | 30   | 10                                 | —                   | —                       | Mitral stenosis and regurgitation, aortic regurgitation              | Hæmoptysis                                | Recent                       | —        | R.      |
| 256          | 30   | 6                                  | —                   | —                       | Mitral stenosis  | Precordial pain<br>Hæmoptysis<br>Dyspnoea | 4 years                      | —        | R.      |
| 257          | 31   | 18                                 | —                   | —                       | "  |   | None                         | —        | R.      |
| 258          | 31   | 14                                 | —                   | —                       | Mitral stenosis and regurgitation, aortic stenosis and regurgitation |   | 1 year                       | —        | R.      |
| 259          | 32   | None                               | —                   | —                       | Mitral stenosis and regurgitation, big liver, etc., ascites          | Orthopnoea                                | 6 years                      | —        | Worse   |

|     |    |                |   |   |  |                         |                         |  |    |
|-----|----|----------------|---|---|--|-------------------------|-------------------------|--|----|
| 261 | 32 | None           | — | — | gurgitation, pleurisy,<br>typhoid fever                            | Dyspnoea,<br>Hæmoptysis | 6 months                | —                                      | R. |
| 262 | 33 | "              | — | — | Mitral stenosis  | Dyspnoea                | 1 year                  | —                                      | R. |
| 263 | 33 | 16             | — | — | Mitral stenosis and re-<br>gurgitation, bronchitis                 | Pleurisy                | None                    | —                                      | R. |
| 264 | 34 | 7              | — | — | Mitral stenosis and re-<br>gurgitation                             | Dyspnoea                | Years                   | Known to have had heart disease at 15. | R. |
| 265 | 34 | None           | — | — | Ditto  | Paraplegia              | None                    |  | R. |
| 266 | 35 | "              | — | — | Mitral stenosis, trans-<br>verse myelitis                          | Dyspnoea                | 11 years                | —                                      | R. |
| 267 | 35 | 5              | — | — | Mitral stenosis, carci-<br>noma of breast                          | Appendicu-<br>lar       | None                    | —                                      | R. |
| 268 | 35 | 16             | — | — | Mitral stenosis, appen-<br>dicitis                                 | Dyspnoea                | 9 years                 | Known to have had heart disease at 14. | R. |
| 269 | 35 | Child-<br>hood | — | — | Mitral stenosis and re-<br>gurgitation, tricuspid<br>regurgitation | "                       | 3 years                 |  | R. |
| 270 | 35 | None           | — | — | Mitral stenosis and re-<br>gurgitation, aortic re-<br>gurgitation  | Precordial<br>pain      | 8 months                | —                                      | R. |
| 271 | 36 | "              | — | — | "  | Cough and<br>weakness   | 1 year                  | —                                      | R. |
| 272 | 37 | "              | — | — | Mitral stenosis, acute<br>rheumatism, mania                        | Insanity                | None                    | —                                      | R. |
| 273 | 37 | 16             | — | — | Mitral stenosis, cere-<br>bral embolism                            | Hemiplegia              | 6 years                 | —                                      | R. |
| 274 | 38 | Girl-<br>hood  | — | — | Mitral stenosis, gastric<br>ulcer                                  | Hæmateme-<br>sis        | None                    | —                                      | R. |
| 275 | 39 | 20             | — | — | Mitral stenosis, mad<br>with delusions                             | Hæmoptysis              | 11 years, on<br>and off | —                                      | R. |
| 276 | 40 | None           | — | — | Mitral stenosis, aortic<br>regurgitation                           | Dyspnoea                | 6 weeks                 | —                                      | R. |
| 277 | 40 | 19             | — | — | Mitral stenosis, tri-<br>cuspid regurgitation,<br>bronchitis       | Dyspnoea<br>and cough   | 3 years                 | —                                      | R. |



| Case number. | Age. | Age at which rheumatism or chorea. | Number of children. | Number of miscarriages. | Main diagnosis.  | Symptoms for which admitted. | Duration of cardiac failure. | Details. | Result. |
|--------------|------|------------------------------------|---------------------|-------------------------|--|------------------------------|------------------------------|----------|---------|
| 278          | 40   | None                               | —                   | —                       | Mitral stenosis, pelvic tumour, no operation                         | Dyspnoea                     | Many years                   | —        | R.      |
| 279          | 43   | "                                  | —                   | —                       | Mitral stenosis and regurgitation, aortic stenosis                   | "                            | Years                        | —        | R.      |
| 280          | 45   | Childhood                          | —                   | —                       | Mitral stenosis and regurgitation                                    | Dyspnoea and oedema          | 4 months                     | —        | R.      |
| 281          | 47   | 20                                 | —                   | —                       | Mitral stenosis and regurgitation, big liver, etc.                   | Dyspnoea and pain            | Years                        | —        | R.      |
| 282          | 48   | None                               | —                   | —                       | Mitral stenosis and regurgitation, big heart, bronchitis             | Ditto                        | 1 year                       | —        | R.      |
| 283          | 60   | "                                  | —                   | —                       | Mitral stenosis and regurgitation                                    | Dyspnoea and cough           | 1 month                      | —        | R.      |
| 284          | 21   | None                               | —                   | —                       | Mitral stenosis and regurgitation, aortic regurgitation              | Dyspnoea                     | 1½ years                     | —        | D.      |
| 285          | 23   | 9                                  | —                   | —                       | Mitral stenosis, pericarditis  | "                            | 1 year                       | —        | D.      |
| 286          | 23   | None                               | —                   | —                       | Mitral stenosis, infective endocarditis, infarcts                    | Malaise                      | Recent                       | —        | D.      |
| 287          | 23   | 16                                 | —                   | —                       | Mitral stenosis and regurgitation, acute endocarditis                | Dyspnoea                     | 7 years                      | —        | D.      |
| 288          | 23   | None                               | —                   | —                       | Mitral stenosis, pericarditis, infective endocarditis                | Dyspnoea and pain            | 4 months                     | —        | D.      |
| 289          | 24   | 12                                 | —                   | —                       | Mitral stenosis and regurgitation, aortic stenosis and regurgitation | Angina pectoris              | 6 years                      | —        | D.      |

|     |    |                |   |   |  |                      |          |   |    |
|-----|----|----------------|---|---|--|----------------------|----------|---|----|
| 291 | 26 | "              | — | — | infective and aortic<br>Mitral stenosis, peri-<br>carditis, pleurisy, ex-<br>ophthalmic goitre               | Joint pains          | None     | — | D. |
| 292 | 28 | Child-<br>hood | — | — | Mitral stenosis, tricus-<br>pid stenosis, dropsy   | Dropsy               | 3 years  | — | D. |
| 293 | 29 | 15             | — | — | Mitral stenosis, peri-<br>carditis, pleuritic effu-<br>sion, infarcts  | Dyspnoea             | Recent   | — | D. |
| 294 | 33 | None           | — | — | Mitral stenosis, infec-<br>tive endocarditis, in-<br>farcts  | Sudden<br>hemiplegia | "        | — | D. |
| 295 | 38 | "              | — | — | Mitral stenosis and re-<br>gurgitation, big liver,<br>infarcts   | Dyspnoea             | 2 years  | — | D. |
| 296 | 40 | Child-<br>hood | — | — | Mitral stenosis and re-<br>gurgitation, adherent<br>pericardium  | "                    | Recent   | — | D. |
| 297 | 42 | None           | — | — | Mitral stenosis and re-<br>gurgitation, tricuspid<br>stenosis, anasarca                                      | Dropsy               | "        | — | D. |
| 298 | 44 | "              | — | — | Mitral stenosis, big<br>liver, ascites, pericar-<br>ditis, pleuritic effu-<br>sion                           | "                    | "        | — | D. |
| 299 | 44 | 12             | — | — | Mitral stenosis and<br>regurgitation, aortic<br>stenosis and regurgi-<br>tation, adherent peri-<br>cardium   | Dyspnoea             | Years    | — | D. |
| 300 | 41 | 19             | — | — | Mitral stenosis and<br>regurgitation, aortic<br>stenosis and regurgi-<br>tation, infective endo-<br>carditis | "                    | 4 months | — | D. |



## DISCUSSION.

Sir DYCE DUCKWORTH thought that Dr. French had done good service in bringing forward the facts he had gathered from that excellent storehouse of them at Guy's Hospital. The question as to the desirability of marriage in cases of heart disease was a very important one, and had enlisted his interest in the course of practice as a physician. He might state at once that he was in the habit of forbidding matrimony to young women suffering from mitral stenosis, although he was bound to add that his advice was, as a rule, not taken. Alluding to the greater frequency of this condition in women, to the fact of its dependence on previous rheumatic endocarditis, and to the special risks entailed owing to the natural plethora of pregnancy and the mechanical pressure, he conceived the risk to be so considerable as to justify abstention from maternity. Dr. French had, however, shown by statistics that the risks were less grave by far than was commonly taught and believed. After all, statistics did not prove everything, and each case required to be studied as to age, soundness of constitution, and the prospects of future comfort and suitable environment. Women with old rheumatic heart-disease he thought more liable than others to transmit a vicious tendency in this direction to their offspring. The condition of mitral stenosis was much more serious than that of mitral reflux, and the latter condition might be consistent with viability to the natural term. In spite of Dr. French's statistics and views, it would still remain difficult to sanction matrimony, and all that that state entailed, for young women with mitral stenosis.

Dr. HERMAN said the paper was a most valuable and important one. He had long thought, taught by clinical experience, that the monographs on pregnancy with heart disease, by Macdonald and others, put the dangers of this complication far too high. This was because, as the authors of this evening's paper said, the monographs were based on selected cases, cases which had been reported because with pregnancy there was trouble from heart disease. Nevertheless these monographs had been compiled with great ability and care, and therefore the writers of text-books on midwifery could not neglect them, and thus these exaggerations appeared in one text-book after another. The able paper they had just listened to would, he hoped, cause them to disappear. The authors had also, he thought, disposed of the fictions that mitral disease caused sterility and that it caused abortion. Although in the majority of cases of mitral stenosis with good compensation the patients went through pregnancy and labour perfectly well, yet there were a few in which, although compensation was adequate while the patient



was not pregnant, yet in the last two months of pregnancy compensation began to fail. In such cases he had seen wonderfully great and rapid improvement follow the induction of premature labour. He had seen a patient unable to lie down from breathlessness up and about a fortnight after the induction of labour. He thought the best practice was to do this as soon as signs of failure of compensation appeared. He agreed with the authors in thinking that the dogmatic "No" as to marriage was unjustifiable. To forbid marriage was beyond the doctor's province. If a patient consulted a doctor as to marriage, all the doctor had to do was to explain to the patient what he thought would be the effects upon her health. If, knowing what those effects were likely to be, she yet chose to marry, that was her business, and not the doctor's. In the case of heart disease the present paper showed how small the risk was, although some increased risk in the event of pregnancy did exist. It was so small that he thought that if the circumstances of a contemplated marriage were in every other respect all that they should be, the patient should be advised to accept the small risk.

Dr. J. T. GARDNER (Chelsea) remarked that he had had a large midwifery practice extending over more than a quarter of a century, and during that time had had to deal with several cases of labour complicated with mitral stenosis. He had always in bad cases, as soon as labour had definitely set in, put the patient under chloroform, dilated, and delivered with forceps, and in every case the patient had had no bad symptoms. With regard to the statement quoted by Dr. French that one authority had said that women suffering from mitral stenosis were often sterile, he thought such a condition might in some measure be due to medical advice, and quoted a case in which a lady when young had suffered from rheumatic fever, in which the heart was seriously involved. She had fallen in love and consulted her medical man, who advised her not to marry, and told her if she did and became pregnant she would certainly die in her confinement. This advice was not followed and the couple married, and religiously used various methods for preventing conception. In spite of these precautions, however, she got in the family way and her husband consulted him (the speaker) and asked him what was to be done as he felt much distressed and considered himself, after what had previously been stated, in the light of her murderer. He advised him to relieve his mind of all anxiety, to let her go to full time, and simply keep her under supervision. This was done, and as soon as labour had actually set in chloroform was administered, the os dilated and forceps applied, and the case did well. Now, as in this case the patient had been told she would certainly die if she had a child, so in other cases if the same advice was given probably in case of marriage preventives would be used and the case would apparently be sterile,



and perhaps that would give rise to a false impression that sterility was associated with mitral stenosis. In his experience he had never noticed that the two conditions were so associated.

Dr. GIBBES quite agreed with the deductions of the authors, for the more he saw of pregnancy in mitral stenosis the more he was convinced that the accepted statistics were wrong and the less he dreaded its results in that disease. He believed that even cases of marked loss of compensation could be safely piloted through child-birth if treatment were commenced at an early period of pregnancy. He, however, went farther than this, for he believed that in certain cases pregnancy could be utilised to restore compensation, and quoted two illustrative cases. First, a young married lady who suffered from mitral stenosis previous to her marriage was confined in November, 1900, without showing any loss of compensation. In March, 1901, she contracted diphtheria, and miscarried in the following month, being then three months pregnant. Compensation failed consequent on the diphtheria; in spite of all treatment it could not be restored. At the end of 1903 she again became pregnant, and the physiological cardiac hypertrophy consequent on that condition fully restored compensation. She passed through her confinement and puerperium without any heart failure, nor has she had any signs of it since. The second case was somewhat similar. The patient was confined with her first child in January, 1903, without any loss of compensation, but contracted typhoid fever in July of the same year, and failure ensued. Treatment greatly improved the heart, but only restored compensation up to a certain point. He then recommended that she should have another child, and she was confined in September, 1905. The results were quite as satisfactory as in the former case, and the patient stated quite recently that she felt as well as she did before her marriage. He considered that great care should be taken in the selection of cases, and should not recommend pregnancy in any case of mitral stenosis unless there had been a previous parturition without any heart-failure, because he thought that gave a reliable basis upon which to form a prognosis. He had also recommended it in a third case with equally good results, and should not hesitate to do so again provided the case was a suitable one. He considered that heart-failure in mitral stenosis more frequently resulted from pregnancy following some intercurrent disease or some debilitating cause, such as over-lactation, than from the pregnancy *per se*.

Dr. POYNTON said that he must apologise to the meeting if he turned the path of the discussion a little to one side for a moment. He wished to put on record some statistics which he thought simply and clearly explained the frequency of mitral stenosis in women. In 350 consecutive cases of rheumatism in childhood he had found 228 were female and 122 were males.



This preponderance of female children was a recognised fact. He also found that heart disease was as frequent in the female as in the male children. It followed, therefore, that at the age of twelve there would be more females than males with rheumatic heart disease. He also found that he had among these 350 cases 25 fatal ones—15 males, 10 females; that is, 10 in 228 females had died of acute rheumatism, and 15 of the 122 males. In his opinion these numbers expressed the general law that acute rheumatism was more acutely fatal in the males and more chronic in type in the females. After puberty the strain on the man's heart, especially among the poor, in whom rheumatism was so rife, was, by nature of his employment, greater than on the woman's, and so in adult life even more females were met with suffering from rheumatic heart disease than males. But, as he had already remarked, the form of heart disease in females was more chronic, and the common type of chronic rheumatic heart disease was mitral stenosis, and thus it was that so many cases were met with in women. The second point he would like to speak upon was suggested in Dr. French's most interesting paper, by his allusion to the occurrence of fungating endocarditis in some cases of his series. Where Dr. French had said that the authors fancied that possibly pregnancy might have had some influence in producing this type of endocarditis he himself had fell in agreement with them. He would now speak of the entire question of rheumatism and pregnancy. Rheumatism he believed to be an infection secondarily in importance in this country to the infection of tuberculosis, and he believed that the general tendency of pregnancy and the puerperium was to intensify the virulence of the rheumatic infection. With Dr. Paine before this Society he had demonstrated that the micro-organism which could produce simple endocarditis was also able to produce fungating endocarditis. Further, pregnant animals were, in their experience and that of Dr. Vernon Shaw, particularly liable to severe and fungating endocarditis when infected during pregnancy. He believed, then, that rheumatic endocarditis in pregnancy was liable to become fungating in type. Chorea, too, was more malignant under those circumstances, and owing to the kindness of Sir Cooper Perry and Dr. French, he had recently with Dr. Gordon Holmes demonstrated a diplococcus in the central nervous system of such a case, a point of considerable interest which would be published in detail shortly. Then, lastly, he thought that some of those severe forms of arthritis, rheumatoid in type and following the puerperium in rheumatic women, were in reality malignant rheumatic arthritis. It was then, he thought, an important point for consideration in prognosis whether these married women were suffering still from repeated attacks of subacute rheumatism, or whether the rheumatism had been quiescent for



years and had only left the stamp of its early reign in the form of mitral stenosis.

Dr. VICTOR BONNEY, whilst agreeing in the main with the conclusions which the authors had drawn, thought that puerperal women the subject of old-standing valvulitis should certainly be regarded as peculiarly liable to acute infective endocarditis in the event of puerperal sepsis. He had himself seen three cases in whom death from puerperal sepsis had been associated with acute streptococcal valvulitis. In all these three cases the organism found in the valves was proved to be present in the uterus also; they therefore did not belong to the class of acute rheumatic valvulitis to which Dr. Poynton had drawn attention. On the other hand, he recalled a case in which acute infective valvulitis developed some weeks *before* the onset of labour. Unfortunately, no bacteriological examination of the valves was made, but this might well be such a case as Dr. Poynton had described. He felt most strongly that in patients the subjects of cardiac disease very special precautions should be taken to include the possibility of puerperal sepsis. The poorer patients should go into a lying-in hospital.

Dr. GRIFFITH said that the paper was a valuable contribution to our knowledge of the subject and an excellent corrective to the opinions which all obstetricians must form of the great gravity of the cases which usually come under their notice. The cases to which the obstetrician is called to advise are mostly those in which there is some great heart-failure. You find the patient advanced in pregnancy, sitting up in bed in great distress, cyanosed, with considerable œdema, and sometimes hæmoptysis, and in these very grave cases, undoubtedly aggravated by the advanced pregnancy, a favourable prognosis, not only as to safe delivery but of eventual recovery, which may, however, be rapid and far more complete than might be expected, cannot with certainty be given until several weeks have elapsed, when the heart has had time to settle down to its previous normal condition to which it has been accustomed. These cases of varying degrees of severity are naturally those that impress the mind of the obstetrician. Dr. Ingram, senior resident medical officer at Queen Charlotte's Hospital, collected for him the following information about the cases under care during the years 1902, 1903, 1904: The total number of women delivered in these three years was 4171, of whom 28 were found to have marked cardiac disease; 2 were aortic, both recovered; 14 mitral regurgitation, with 2 deaths; 12 mitral stenosis, with or without regurgitation, 1 death. The latter was a 1-para with heart dilated and the lungs œdematous. She died forty-five minutes after delivery. The two cases of regurgitation which died, one a 10-para, the labour precipitate, death ten minutes afterwards. The third case, a 6-para, the child born in a cab; general œdema with increasing incompetence, died the nineteenth day.



Mr. HICKS, in reply, said that as to the question of induction of labour in heart cases, it seems that most authorities are against induction of premature labour during an acute attack of dyspnoea, because labour must necessarily throw more work upon an already distressed heart. He agreed with Dr. Herman that induction, if carried out, should be done after compensation had been established by suitable medical treatment. When this paper was commenced the authors thought that the occurrence of infective endocarditis during the puerperium would be more frequent than at other times, but could not find sufficient evidence to support their view. They begged to thank the fellows of the Society for the kind way in which they had received this paper.

Dr. HERBERT FRENCH also replied. He agreed with Sir Dyce Duckworth that the children of a mother who had mitral stenosis were liable to suffer from rheumatic affections, and that many of them might develop heart disease. This tendency in the children, however, was probably not greater when the mother had mitral stenosis than when the mother had had acute rheumatism without developing a valvular lesion. It would be impossible to prevent all persons who had had acute rheumatism from getting married on this account, and therefore this could not be used as a real argument against the marriage of a woman who had mitral stenosis, who had survived the age of twenty without showing signs of failing compensation. He thanked Sir Dyce Duckworth for the kind way in which he had referred to the "accumulated stores of wealth in the Guy's Hospital 'Reports.'"

He thanked Dr. Herman for his cordial appreciation of the paper, and for his remarks as to the necessity for re-investigating many statistical points that were based upon fallacies, but were so often blindly copied from book to book. He was interested in the remarks of Dr. Poynton and Dr. Bonney upon the bacteriology of rheumatism and chorea, and the suggestion that pregnancy increased the virulence of the *Diplococcus rheumaticus*. In regard to the incidence of fungating endocarditis, however, he was afraid that Dr. Poynton had mistaken him. As far as could be judged from the cases in the paper, the incidence of fungating endocarditis at the end of mitral stenosis in women was *not* appreciably greater in women who had borne children than it was in women who had not been married. He thanked Dr. Griffith for adding statistics from Queen Charlotte's Hospital; he felt that these afforded the strongest support to the conclusions drawn in the paper. Dr. Griffith's cases were as much *selected* as were MacDonald's; the cases were only discovered to have mitral disease because they had cardiac symptoms. There was no record as to how many of the other cases (between 4000 and 5000) at Queen Charlotte's Hospital had mitral disease, because there were apparently no records of



the heart condition, except when symptoms led to its particular examination. It was possible, or even probable, that some at least of the other cases had mitral stenosis and had no trouble with pregnancy or labour; and yet the mortality amongst the virtually selected bad cases was much less than the 64 per cent. given by MacDonald. Several of these bad cases, moreover, had had no fewer than ten or eleven children previously without trouble. He also thanked the other speakers for their support. He only regretted that several questions had not been raised which he had hoped would be discussed. Amongst these were the question of the behaviour of the blood-pressure in pregnancy and labour, with and without pregnancy respectively; and the question as to whether uterine hæmorrhage should or should not be encouraged after delivery in mitral stenosis cases. Some books suggested that it should be encouraged as a means of relieving the heart in bad cases. Dr. French would have wished to hear the views of others on this point, but he himself was strongly opposed to it. He felt that uterine hæmorrhage was so difficult to control that it was in every case best to minimise it to the utmost; venesection being easy to control, he thought that relief to the heart, if necessary, should be given by letting blood from a peripheral vein, but never purposely from the uterus. He thanked the meeting for the very kind way in which his report of a laborious investigation by himself and Mr. Hicks had been listened to, received, and discussed.