T H E S I S.

Presented for the Degree of M.D.,
Edinburgh University.

THE PROGNOSIS AND TREATMENT
OF PULMONARY TUBERCULOSIS
COMPLICATED BY PREGNANCY.

A Study based on the Examination
of Two hundred and ninety five Cases.

BY

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VOLUME I.

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# PART I.

## INTRODUCTION.

5.

## HISTORICAL SURVEY OF THE LITERATURE.

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PART I.

INTRODUCTION.

The pernicious influence of pregnancy on pulmonary tuberculosis has been the object of continual controversy for centuries, and even to-day a conspicuous diversity of opinion still exists with regard to their relationship, in spite of the voluminous literature and careful consideration directed towards the subject.

The intention of this treatise is to provide a suitable explanation for this unceasing dispute. In addition, a satisfactory scheme, which has so far received little attention from the contenders, and by whose agency, the probable influence of gestation on a tuberculous individual can be estimated to a thoroughly reliable degree, is then outlined.

The importance of the relationship cannot be over-estimated. Tuberculosis reaches a very high incidence, and exercises a distressing mortality among women of child-bearing age, and yearly many tuberculous women become pregnant. Bacon (1915) has estimated that 32,000 women suffering from pulmonary tuberculosis become pregnant every year in the United States. Consequently, obstetricians and phthisiologists throughout the world are constantly confronted with the combination.

Its /
Its seriousness is equally demonstrated by the manner in which it involves the personal conscience of the physician with regard to the practice of therapeutic abortion. The necessity and indications for intervention, when the combination exists, (if the harmful influence of pregnancy is agreed on), has moreover aroused perhaps even more acrimonious controversy than the original problem of the relationship.

The complexity of the problem is easily comprehensible. Our knowledge of the physiological and pathological processes, which are undergone by the human body when pregnancy and tuberculosis occur, is fundamentally and totally inadequate to reach a logical and satisfactory agreement. In addition, both of these conditions are liable to so many variations in themselves, that when in combination, and in different patients, their reactions towards each other result in a manifold diversity, which defies all attempts to reduce the prognosis of the disease to a dogmatic formula.

Consequently, it is not surprising that perusal of the enormous amount of literature, universal in its source, on the subject reveals a lack of unanimity, which prohibits any attempt to formulate any opinion on the possibilities of this relationship. The inability to find a satisfactory answer /
answer is in part due to the common sources of errors when deductions are made from statistics. The erroneous conclusions may result from an insufficient number of cases, or insufficient individual data, when the number of cases is satisfactory. Moreover, the immense progress made in the diagnosis and treatment of tuberculosis in later years has rendered the work of early authors of little significance, and valueless as the basis of any deduction. Further explanations for the conflicting conclusions will become apparent during the following survey of the literature, and will be stressed at its termination.

It was essential for particular attention to be directed towards the origin of these fallacies, in order that their avoidance could be undertaken in compiling the statistics of this survey. When this was accomplished, it was discovered that the deductions resulting therefrom, were in agreement with the conception towards this combination formulated in this thesis, namely that the prognosis varies according to the anatomo-pathological type of pulmonary tuberculosis, by which the gravid woman is affected, and gestation per se has very little influence, with minor exceptions, on the ultimate course pursued by this affliction. The statistical and clinical evidence for this conclusion are furnished exhaustively.

Other /
Other subsidiary factors, especially the exact moment at which the diagnosis of tuberculosis is established with regard to the occurrence of impregnation, whether prior to, during, or consequent upon pregnancy, the social and financial status of the patient, multiparity, and age, and their effect on the eventual outcome of the malady, are next reviewed in detail. Thereafter, the theoretical explanations for the clinical observations, accompanying this association, receive discussion, and their very apparent inadequacy demonstrated.

Consideration of the modifications of the treatment of phthisis imposed by pregnancy, and of the place occupied by the highly controversial procedure, therapeutic abortion, is then undertaken. The necessity for the interruption of gestation is discussed from the three viewpoints meantime upheld, systematic abstention, systematic intervention, and elective intervention. The evidence accumulated from the statistics of this study would point to the fact that individualisation of each case, an inherent requisite for the performance of the last-mentioned policy, is vastly superior to the absolutism expressed by the other two opinions. The therapeutic procedure in a pregnant phthisical woman is then summarised in the general management of such a case.
1. FROM THE HIPPOCRATIC ERA TO THE BEGINNING OF THE PRESENT CENTURY.

The aphorism of Hippocrates, (juvenes coelibes fiunt postea vero matrimonio sponte curantur) expressed the optimistic theory, which prevailed with regard to the relationship of pregnancy and pulmonary tuberculosis until the middle of the nineteenth century. Marriage and conception were actually recommended by certain of the eminent physicians of this period.

Roziere de la Chassance (1770) asserted that,

"Of two tuberculous women with the same stage of disease, the one, who becomes pregnant, will carry her seed to term, the other will die before this limit."

Sims (1778) testified that,

"I have never seen less females suffering from tuberculosis than among pregnant women."

Among the authors of the earlier part of the nineteenth century, who maintained that pregnancy exerted a favourable influence, may be quoted Briende (1803), Duges (1823), and Andral (1840), who collected a series of cases, which appeared to show that pregnancy suspended the course of the disease. In the latter part of this century, Cullen /
1. FROM THE HIPPOCRATIC ERA TO THE BEGINNING OF THE PRESENT CENTURY (CONTD.)

Cullen (1878) commented on the fact that he had never observed death occurring in a pregnant tuberculous woman, but admitted, however, that frequently the disease progressed after parturition. Lasseque (1880) quoted three cases of pulmonary tuberculosis moderated by pregnancy. Fonsagrives (1886), and Mercier (1894) also remarked on the remissions of the manifestations of phthisis in pregnant women.

The first contradiction to this optimistic doctrine was expressed by Mauriceau (1715), who stated that confinement constituted "un mauvais port" where females with weak chests perish, and counselled that tuberculous women should not have children in the future, for their lung condition degenerated the more children they had; and that they usually died through some exacerbation of the disease occurring nearly always at the time of their pregnancy, or a little time after their confinement. His voice echoed unheeded in the wilderness until almost a century later.

Actually, the pernicious influence of pregnancy was not finally established, or the recognised ideas supplanted, until the clinical observations of Louis and Grisolle received favourable /
1. FROM THE HIPPOCRATIC ERA TO THE BEGINNING OF THE PRESENT CENTURY (CONTD.)

favourable attention. Louis (1825) expressed his scepticism concerning the positive assertions on the subject, considering the nature of the evidence. Grisolle (1843) denounced the prevailing optimism, and produced 27 cases of aggravation in support of his contention. Gradually, further observations of the deleterious effect of pregnancy were recorded, and became so numerous that they could no longer be considered exceptions to the predominant rule.

Debruilh (1851) contributed further support to the pessimistic attitude, and substantiated his views by communicating a further 17 cases of aggravation.

The relationship of these two conditions now began to receive international attention, and the predominant opinion of the literature at this period sought to establish definitely that the different acts of maternity, - conception, pregnancy, confinement, and suckling, - did not exercise a beneficial influence on pulmonary tuberculosis. Gueneau de Mussy (1888), Hergott (1891), Grancher (1900), and Ribiere (1900) in France; Lebert (1862), Schroeder (1874), and Bumm (1908) in Germany; Chiara (1886), Berghesio (1886), Bossi /
1. FROM THE HIPPOCRATIC ERA TO THE BEGINNING OF THE PRESENT CENTURY (CONTD.)

Bossi (1902), Peri (1903), Pestalosa (1905), and Margliano (1906), in Italy; Guinsborgue (1874) in Russia, all contributed statistics in favour of this outlook. In England, Duncan (1890) shared the current pessimism, and later in 1910, Williams corroborated his countryman’s assertions.

2. FROM 1900 TO THE FIRST GREAT WAR.

(a) Exponents of the Pessimistic Theory.

At the beginning of the present century, the interest in this question of the compatibility or incompatibility of pregnancy with tuberculosis was mainly confined to France, and most of the literature on this subject at this time emanated from that country. It generally indicated a serious prognosis for the tuberculous woman who became pregnant.

Meissen (1902) claimed that the latent forms of tuberculosis were transformed into malignant types. Proust (1903) furnished 52 observations of this combination, and concluded that pregnancy was revealed as an unfavourable condition for the tuberculous woman, whose lesions and accidents it aggravated. Renon (1906) also stressed the adverse effects and categorically forbade /
2. FROM 1900 TO THE FIRST GREAT WAR (CONTD.)

(a) Exponents of the Pessimistic Theory (Contd.)

forbade the marriage of "delicate" females with a family history of phthisis.

Bar (1911), the eminent French obstetrician, who conducted considerable research on this problem, inferred a harmful influence from 131 cases he had collected. Colombet (1912), quotes the following names and statistics in upholding the view that pregnancy usually aggravates tuberculosis:

"Heimann (aggravation in 73.4 per cent. of cases), Padella (aggravation 80 per cent.), Chauta (reawakening of the tuberculosis 68 per cent.), Landau (aggravation 75 per cent.), Vicarelli, Strassmann, Cocq, Mendes de Leon.

In 1913, Sergent after careful consideration of the problem, stressed the aggravation produced in the pulmonary condition, above all after the confinement.

Indeed at this period, the pernicious influence of pregnancy on tuberculosis gradually became accepted as an axiom, and the following conclusions of Bar (1912), summarises the almost universal opinion:

"In the great majority of cases, pregnancy is the cause of:

1. Reawakening a latent pulmonary lesion.
2. The aggravation of an active pulmonary tuberculosis."

Particular /
2. FROM 1900 TO THE FIRST GREAT WAR (CONT'D.)

(a) Exponents of the Pessimistic Theory (Contd.)

Particular stress was laid on these conclusions by the German authors. Kaminer (1901) observed 50 cases with aggravation in 60 per cent. Fellner (1910) also upheld the pessimistic doctrine. Von Bardeleben (1911) affirmed:

"Pregnancy aggravates the tuberculosis in 71 per cent. of the cases (mortality 47 per cent.) at least, and has been established by numerous experiences and researches. It is impossible to escape it or doubt it."

(b) Exponents of the Optimistic Theory.

Although the pessimistic outlook reached its zenith shortly before the Great War, several dissentient voices were still raised. Pinard (1902), although recognising the harmful effect of pregnancy on tuberculosis in its serious forms, commented on the fact that aggravation has often no relation to pregnancy.

"The pregnant state is not in the very great majority of cases the whip-lash, which aggravates the lesions; the latter progress in non-pregnant tuberculous women with the same intensity as in a pregnant tuberculous woman."

Kaminer (1901) maintained an optimistic viewpoint with regard to the puerperal state of women predisposed to tuberculosis. Bonnaire (1905), was struck by the rarity of cases of tuberculosis appearing in the course of pregnancy. He expressed
2. FROM 1900 TO THE FIRST GREAT WAR (CONTD.)

(b) Exponents of the Optimistic Theory (Contd.)

This opinion to the International Congress of Tuberculosis in Paris in the same year. He was warmly supported by Buckhardt (1905) who furnished 14 cases of the combination with satisfactory results - 10 cases of amelioration and apparent cure, 3 cases of non-aggravation, and 1 death from eclampsia. Monnier (1908) adopted the same view. Weinberg (1908), approaching the problem from a hitherto unexplored angle, concluded that during the year following confinement, deaths are no more numerous in pregnant tuberculous women than in others.

In 1913, Tecon, at a meeting at Leysin, published the results of the treatment of 26 pregnant tuberculous patients there - 26.9 per cent. aggravation, 57.5 per cent. stationary, and 15.38 per cent. amelioration.

Although the optimistic doctrine had been relegated to the background, several of its adherents during these years prevented it from reaching oblivion. Lack of unanimity still persisted.
3. **DURING THE GREAT WAR.**

*American Literature.*

During the Great War, American obstetricians and phthisiologists contributed most of the observations concerning this controversy, and again different opinions were formulated. In 1909, Trembley of Saranac Lake, found 61 per cent. of 584 married tuberculous women developed phthisis during or following pregnancy. Moreover, the mortality of the cases related to pregnancy was 52 per cent. compared with 40 per cent. for the remainder of the women. Bacon (1915) summarised his final judgment in the dictum that many women do well in the first three months of pregnancy, fewer in the second three months, and very few in the last three months. He also found that the termination of pregnancy was by no means the end of danger. The most fateful part of the childbearing circle begins with parturition, and one-third of child-bearing tuberculous women die within a year of labour. Douglas and Harris (1917) concluded that pregnancy is an important factor in lighting up quiescent cases, and counselled the avoidance of pregnancy by tuberculous women.

Walsh (1918), on the other hand, summarised the prevailing Continental opinion as a "veritable /
3. DURING THE GREAT WAR (CONTD.)

American Literature (Contd.)

"veritable German and Italian hysteria", and pointed out that a certain number of female tuberculous cases go on to death each year, apart from pregnancy and other complications, under the best of treatment. He finally concluded that quiescent cases becoming pregnant, if put on a rigid regimen, may be expected to come through their pregnancy with but little, if any, advance in their tuberculosis.

McSweeney (1918) formed the impression that,

"Pregnancy and labour whip a slightly active tuberculosis into a rapidly advancing and quickly fatal disease."

Norris of Philadelphia, in conjunction with Landis in 1918, reported on 103 cases of pulmonary tuberculosis complicated by pregnancy, and believed that no observer can fail to be impressed by the unfavourable influence often exerted by pregnancy on the course of the disease. According to these authors, pregnancy was found to have such an influence in 75 per cent. of the cases of Lebert, 64 per cent. of those of Deibel, 70 per cent. of Rosthorn's, 73 per cent. of Herman's, 94 per cent. of Pankow and Koppeler's, and /
3. **DURING THE GREAT WAR (CONTD.)**

American Literature (Contd.)

and 38 per cent. of Freud's. They themselves recorded exacerbation in 20 per cent. of mild quiescent tuberculous cases, and in 70 per cent. of their more advanced patients. Four years later, the same author, in collaboration with Murphy on this occasion, reporting on 166 pregnant tuberculous women, found 18 per cent. improved, 37 per cent. unchanged, 38 per cent. worse, and 6 per cent dead. He again concluded that pregnancy had a deleterious influence on tuberculosis. Elliot (1920) practically reiterated Norris's statements, and found some improvement in the first months of pregnancy, but deterioration in the later months.

Fishberg (1921), as a result of a statistical study, stated that in about 20 per cent. of cases aggravation of the pulmonary lesion occurs soon after pregnancy, but almost the same percentage of tuberculous patients, who do not become pregnant, show exacerbation of the disease during the period which pregnancy and lactation involves.

Stewart (1922) in Canada, commenting on 200 women of child-bearing age admitted to Manitoba /
3. **DURING THE GREAT WAR (CONT'D.)**

**American Literature (Contd.)**

Manitoba Sanatorium, found in 85 per cent. of these the commencement of symptoms had some relation to pregnancy, and stated that after all allowances had been made, the conclusion cannot be avoided that child-bearing has a definite place in favouring the progress of the tuberculosis.

4. **FROM THE END OF THE GREAT WAR TO THE PRESENT DAY.**

(a) **Exponents of the Pessimistic Theory.**

(i) **Continental Literature.**

In Europe, the debate, after the War, soon assumed its previous interest, and the different viewpoints were expressed admirably by many protagonists renowned in the world of Phthisiology. The progress in diagnosis and treatment attained in this branch of medicine, and which ensued in the years following, stimulated further interest in the controversy, as well as providing increasing and more reliable statistical and clinical data for the elucidation of the problem. This is demonstrated by the numerous occasions on which this topic provided discussion at many conferences, the subject matter of many theses, and articles to leading journals of international repute.
4. FROM THE END OF THE GREAT WAR TO THE PRESENT DAY (CONTD.)

(a) Exponents of the Pessimistic Theory (Contd.)

(i) Continental Literature. (Contd.)

The pessimistic theory had a staunch supporter in Rist (1921), who adopted the radical outlook that pregnancy was a severe, often fatal, complication of tuberculosis, and that the most favourable cases had been erroneously diagnosed as tuberculosis. He maintained,

"In practice all tuberculous women, who become pregnant or every pregnant woman who becomes tuberculous is threatened with a quick death."

Bar (1922) adopted a very similar attitude. He cited 55 out of 400 tuberculous women who died the month following confinement.

"I certainly do not exaggerate," he said, "in saying that the number of deaths would have exceeded the hundred if I had overburdened the statistics with women who had left hospital to die at home."

Bernard (1922) also contributed his opinion, derived from the study of 164 cases of tuberculous pregnant women to the same meeting of the French Academy. A year later he published a further study of 327 female patients and found pulmonary tuberculosis more common in primiparae than in multiparae, and estimated that the disease in 24 per cent. of these cases either had its origin or became aggravated during pregnancy or after confinement.
4. FROM THE END OF THE GREAT WAR TO THE PRESENT DAY (CONTD.)

(a) Exponents of the Pessimistic Theory (Contd.)

(i) Continental Literature (Contd.)

Sergent (1926), who took a prominent part in many of these debates, feared pregnancy in women, mainly because of the acute exacerbation which the tuberculosis undergoes during the puerperium, showing itself in death within a relatively short time, or which may have a slow and insidious onset and not become recognisable for three to four months after confinement. He pointed out that it is in these cases that the statistics furnished by obstetricians are misleading, as the patients have long since left the care of their accoucheurs, and a physician called in. In 23 cases out of 39, 17 being in their first pregnancy, he has been able to obtain a previous history of pregnancy, eight to ten months before the appearance of their symptoms of phthisis.

Mazet (1927) produced statistics showing 80 per cent. aggravation in progressive cases of tuberculosis.

Stiassne (1930) reported 34 cases from which he concludes that as a general proposition, pregnancy and parturition exercise an unfavourable influence on the evolution of pulmonary tuberculosis and /
4. FROM THE END OF THE GREAT WAR TO THE PRESENT DAY (CONT'D.)

(a) Exponents of the Pessimistic Theory (Cont'd.)

(1) Continental Literature (Cont'd.)

and every pregnancy occurring in a tuberculous woman, or again tuberculosis developing in a pregnant woman, brings with it aggravation of the prognosis.

In 1932, Bergeron accepted the pernicious influence of pregnancy, and produced 25 deaths in 41 cases after three years. At the same debate, however, Astruc, looking at the problem from the therapeutic and medico-social angle, commented on the fact that there are many cases which appeared neither to undergo deterioration nor to be unfavourable influenced by pregnancy.

Obstetricians in France, also participated in this controversy. In 1931, Professor Brindeau of the Tarnier Clinic was impressed by the deleterious effect of pregnancy. Konovaloff (1931) one of his pupils, collected 254 cases in his clinic between 1920 and 1929, suffering from tuberculosis, and found 20 deaths and 95 cases of exacerbation among them. In collaboration with Raoul and Simone Kourilsky (1935), he was forced to conclude that in spite of every preconceived opinion, biologically, pregnancy and above all the post-partum /
4. **FROM THE END OF THE GREAT WAR TO THE PRESENT DAY (CONTD.)**

(a) **Exponents of the Pessimistic Theory (Contd.)**

(i) **Continental Literature (Contd.)**

post-partum aggravate every tuberculous process if it be feebly extending and caseating, even if the action is not clinically and immediately seen.

Couvelaire (1932) of the Baudeloque Maternity Clinic, commenting on 370 cases suffering from fibro-caseous tuberculosis, of whom 200 died in the year following confinement, observed that during gestation, but more often during the puerperium, there is more or less rapid exacerbation of the pulmonary disease. Later, in conjunction with Lacomme (1929), he published further statistics illustrating this post-puerperal exacerbation. Of 500 pregnant tuberculous women, 180 died in the three months following parturition. In 1931 Ghinsberg Haim analysed 612 cases admitted to the maternity hospital, and found a mortality rate of 39 per cent. in the year following delivery.

In Belgium, Derscheid (1936) admitted that in certain cases, rare it is true, pregnancy can have a happy influence on the course of the tuberculosis and quotes 5 cases showing this result.

In Germany also, the harmful influence of pregnancy and tuberculosis had its adherents.
(a) Exponents of the Pessimistic Theory (Contd.)

(i) Continental Literature (Contd.)

In 1921, Kehrer recognised this effect of pregnancy and especially the puerperium on pulmonary and laryngeal tuberculosis. Of the latter cases, 90 per cent. died in the puerperium. In 1923 Winter, in conjunction with Opperman, stated that out of 129 pregnant tuberculous women attending his clinic, two-thirds showed aggravation of their disease as a result of pregnancy.

"Pregnancies are like stages in the life of a tuberculous woman, which brings death one step nearer to them."

He wrote when emphasising the specially pernicious effect of repeated confinements -

"A tuberculous woman, having had no children, sees her life proceed towards the grave slowly, whereas the woman who brings several children into the world goes rapidly to a premature death."

Four years later he published statistics showing aggravation in 67 per cent. of 138 pregnant tuberculous women. Reactivation occurred in 5 per cent. of the patients with latent and healed tuberculosis, and in 86 per cent. of those suffering from progressive active lesions. Gross (1927), Klemperer (1929), Lydtin and Linde (1930), and Divoux (1931), were also impressed by the frequency of the danger involved when pregnancy complicates pulmonary /
4. FROM THE END OF THE GREAT WAR TO THE PRESENT DAY (CONT'D.)

(a) Exponents of the Pessimistic Theory (Contd.)

(i) Continental Literature (Contd.)

pulmonary tuberculosis.

(ii) American Literature.

On the other side of the Atlantic, interest in the relationship of these two conditions continued to excite attention. Monckeberg and Vergerak (1925) published their conclusions after nine years experience of the subject in Chile. Of tuberculous patients, 7 per cent. were found to die before the third month; 21 per cent. of latent lesions showed clearly clinical indications of active disease during pregnancy; 53 per cent. of active lesions showed aggravation with a marked tendency to generalisation. Extension of the disease was more noticable in multiparae and in the latter months of pregnancy.

In the United States, Bethel (1927) and Morse (1928) appreciated the depressing attitude of numerous authors in the light of their own experience. Hutchison (1929) studied 911 tuberculous women between 1913 and 1929. In 439 women who had borne children, there was a mortality rate of 61.7 per cent. compared with 53.8 per cent. of the women who had never been pregnant. There were
4. **FROM THE END OF THE GREAT WAR TO THE PRESENT DAY (CONTD.)**

(a) **Exponents of the Pessimistic Theory (Contd.)**

(ii) **American Literature (Contd.)**

9 deaths among 12 women whose tuberculosis appeared during pregnancy, and 23 deaths in 42 women who manifested symptoms of the disease during the puerperium. There was a mortality of 75.5 per cent. among the women whose phthisis appeared during the first year after confinement, as compared with a figure of 53.4 per cent. for those in whom the disease did not appear until one year had passed.

In 1930 Matthews and Bryant investigated the question of parturition and pregnancy in 484 women discharged from Sanatorium by a questionnaire and found that pregnancy in tuberculous women had a pernicious influence in direct ratio to the activity of the tuberculosis. However, these letters of enquiry were sent to the patients themselves and not to their medical advisers. Another questionnaire was sent by Robinson (1932) to "authorities on the subject" in all parts of the world. He found them predominantly of the opinion that parturition involves a special risk for the tuberculous woman. This is obviously a fallacious approach statistically, as no evidence is available of the data on which these opinions were based. Moreover, /
4. FROM THE END OF THE GREAT WAR TO THE PRESENT DAY (CONTD.)

(a) Exponents of the Pessimistic Theory (Contd.)

(ii) American Literature (Contd.)

Moreover, of the replies received, only 40 were received from countries such as France and America where considerable research had been devoted to the subject.

(iii) British Literature.

In Britain, periodic interest was evinced in this relationship in the post-war years. In 1923 Ward published particulars of 433 pregnancies in 237 tuberculous women. In 53 per cent. pregnancy had no effect on the disease; in 16 per cent. the lesion was improved; in 31 per cent. it was rendered worse by the pregnancy.

Rist (1927) in a paper opening the discussion at the Edinburgh meeting of the British Medical Association, was convinced that,

"Pregnancy in a tuberculous woman leads to an aggravation of symptoms, to the extension of existing lesions, to the production of fresh ones, and the flaring up of those which were quiescent. In some of the papers where the association of tuberculosis is regarded as only being exceptionally harmful, we may observe that the diagnostic criteria used by their authors are generally very disputable."

In a series of 117 cases, where tuberculosis began either during or shortly after pregnancy, 60, (51.2 per cent.) died after two years; 43 (36.7 per /
4. **FROM THE END OF THE GREAT WAR TO THE PRESENT DAY (Contd.)**

(a) **Exponents of the Pessimistic Theory (Contd.)**

(iii) **British Literature (Contd.)**

per cent.) were still alive in a severe condition, leaving little hope of recovery; 14 (11.9 per cent) were temporarily arrested or quiescent, but in these pregnancy was the determining cause of the onset of the tuberculosis. No indication was given of the method of treatment of these cases, and no distinction made between the various stages and types of lesions that existed. Moreover, no mortality statistics of a control group were included.

In 1931, a joint meeting of the Tuberculosis Association was held with the Section of the Obstetricians and Gynaecologists of the Royal Society of Medicine. Marshall pointed out that older writers from Hippocrates to Sydenham held that pregnancy was beneficial to lung disease, but more recent authorities contended that pregnancy did nothing but harm, and so was disastrous. The pendulum was now swinging back to a neutral position. Hiley was of the opinion that if continuous treatment is carried out during pregnancy and strain avoided, pregnancy will not affect much the tuberculous patient. Bourne admitted that further /
4. FROM THE END OF THE GREAT WAR TO THE PRESENT DAY (CONT'D.)

(a) Exponents of the Pessimistic Theory (Contd.)

(iii) British Literature (Contd.)

Further knowledge of the effect of tuberculosis on pregnancy was required. Rivett looked upon tuberculosis when associated with pregnancy as a very serious condition.

In the same year, Haig Ferguson before the Tuberculosis Society of Scotland confessed that his experience led him to believe that pregnancy had a deleterious effect on active tuberculous conditions from the maternal standpoint.

In 1936, Young, at a joint meeting of the Tuberculosis and Obstetrical and Gynaecological Sections of the British Medical Association stated that of all the facts in regard to the influence of pregnancy on pulmonary tuberculosis with which the obstetrician is brought face to face, the most significant is the devastating influence of labour and the puerperium on the course of the disease. He quoted a summary of 36 cases, with a total of 14 (38.9 per cent.) deaths. Of this total 8, or 17.4 per cent. died during the interval from a few days up to three and a half months immediately after the confinement. In 75 per cent. there was an appreciable deterioration in the clinical condition during the puerperium.

(b) /
4. FROM THE END OF THE GREAT WAR TO THE PRESENT DAY (CONTD.)

(b) Exponents of the Optimistic Theory.

(i) Continental Literature.

In contradistinction to this formidable expression of the theory of aggravation, numerous authors, many with international reputations in phthisiology, acclaimed with vigour the opposite view. In 1919, Petersen, in Denmark, only observed 12 per cent. of aggravation in his cases, and without any relationship to the pregnancy accompanying the phthisis. In Sweden, Lindhagen (1920) admitted that the harmful influence is not always the rule.

In Germany, an impressive example of how necessity resulted in a complete change of opinion occurred after the Great War. German authors who had before this period been most vehement in advocating the pernicious influence of gestation, but faced with a rapidly falling birth rate, reversed their former teachings. The pregnancy was disregarded and the tuberculosis treated by every available means. Their conclusions showed that no harmful effects resulted, and the combination need not be feared if the tuberculosis can be given proper treatment. Successively appeared the works of Krauss (1917), Franz (1921), and Scherer /
4. FROM THE END OF THE GREAT WAR TO THE PRESENT DAY (CONTD.)

(b) Exponents of the Optimistic Theory (Contd.)

(1) Continental Literature (Contd.)

Scherer (1922), who from a study of 2,777 women among 8,520 women and children who passed through 8,198 pregnancies, concluded that pulmonary tuberculosis does not pursue a more unfavourable course during pregnancy than in its absence. Repeated successive pregnancies, in some cases 13 to 19, were noted, and were not rarely unfavourable.

Later, Menge (1926), believed that the reported unfavourable influence of pregnancy in pulmonary tuberculosis either does not exist, or is over-estimated. Schrag (1928) studied 41 patients who went to term. In only 8 per cent. was the disease actually aggravated by the gestation. Schultze-Rhonof (1929) has made an extensive and careful survey of the problem, in the course of which he has reviewed the statistics of Baden, Prussia, and Bavaria for the period 1905 to 1922. He concludes that pregnancy, labour and the puerperium exert very little influence on an existing pulmonary tuberculosis in the majority of instances, and that they do not usually cause a reactivation of quiescent disease. He is inclined to believe that the unfavourable influence of gestation in phthisis /
4. FROM THE END OF THE GREAT WAR TO THE PRESENT DAY (CONTD.)

(b) Exponents of the Optimistic Theory (Contd.)

(i) Continental Literature (Contd.)

Phthisis has been greatly exaggerated. In a series of 44 pregnant women with clinical pulmonary tuberculosis treated conservatively, he found 21 improved, 10 unchanged, and 13 worse after confinement. 7 of the last group died within a year of confinement, but it does not appear that all of these deaths were due to the aggravation of the phthisis by the pregnancy.

In France, Sabourin in 1920 wrote that the greater number of experienced phthisiologists know tuberculous women who have managed well one or more pregnancies, have been confined normally, have breast-fed the children, and are no worse than before.

"Moreover, I strongly affirm that in 30 years I have seen a number of marriages among tuberculous women, and I have never had a disaster to deplore."

Gleisz (1923) recognised a little later that, although in the majority of cases, pregnancy, far from stopping phthisis, on the contrary accelerates the progress, sometimes the illness is neither influenced well nor ill, and that even in a few cases the symptoms appeared manifestly to have been arrested. This is also the opinion of Lamonier (1923).
4. FROM THE END OF THE GREAT WAR TO THE PRESENT DAY (CONTD.)

(b) Exponents of the Optimistic Theory (Contd.)

(1) Continental Literature (Contd.)

In 1926 Pissavy and Lejard believed that women suffering from tuberculosis of average gravity, and who are unfavourably influenced, are few in number. Demelin (1929) upheld that pregnancy is not a complication of pulmonary tuberculosis, and he supports those who think that the progress of the illness is not in any way influenced.

In Portugal Lopo de Carvalho in 1927, after studying 51 cases, is not impressed by the pernicious influence of pregnancy.

Forssner (1924) of Stockholm presented in collaboration with Sundell and Kjellin at the International Congress of Tuberculosis at Lausanne, a very optimistic report. Of 203 pregnant tuberculous women, 57 were aggravated and 26 died (unfavourable 40 per cent.) Of 396 non-pregnant women, 85 were aggravated and 58 died (unfavourable 36 per cent.) The percentages were almost equal.

"I affirm," he said, "that we have no method of proving that pregnancy had provoked their exaggeration. Would not the latter have shown itself even without the former? It is thus completely false to pretend that every aggravation appearing in the course of pregnancy is caused by that pregnancy."

Forssner's /
4. FROM THE END OF THE GREAT WAR TO THE PRESENT DAY (CONT'D.)

(b) Exponents of the Optimistic Theory (Contd.)

(i) Continental Literature (Contd.)

Forssner's optimism was shared by the Congress in general. Although fought at the same meeting by Bernard, Rist, Kuss, and Bezancon, it provoked such enthusiasm that Giraud (1932) later wrote sarcastically,

"Nothing remained but to make pregnancy a form of treatment."

Sergent accused Forssner later of errors of interpretation, and Andler (1927) in particular criticised his statistics, and produced evidence of an 87.5 per cent. aggravation in his own statistics.

(ii) American Literature.

In America, support for the optimistic theory was readily forthcoming. In 1926 Bridgman and Norwood raised the question whether the association of pregnancy and tuberculosis had not been exaggerated. Hill in 1928 made a comprehensive survey of 349 women, whose pregnancy occurred during or immediately preceding the onset of pulmonary tuberculosis, and contrasted the end-results with those obtained in 160 non-pregnant tuberculous women. Although only one-third of the women had as much as six weeks institutional care /
4. FROM THE END OF THE GREAT WAR TO THE PRESENT DAY (CONTD.)

(b) Exponents of the Optimistic Theory (Contd.)

(ii) American Literature (Contd.)

care, she found that the pregnancy had no appreciable influence on the progress of the pulmonary lesion.

Barnes (1930) based his stand on cases collected from the literature and the results obtained in 385 patients. In the latter series, 78 per cent. of the minimal cases, 65 per cent. of the moderately advanced, and 28 per cent. of the far advanced group were apparently arrested, quiescent, or cured after confinement. Jameson (1935), after a review of the literature wondered if the harmful relationship may not be more apparent than real. He pointed out that probably about the same proportion of an unselected group of non-pregnant women will fail to improve and grow worse in spite of the best sanatorium cure.
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PART II.

A CRITICAL ANALYSIS OF THE LITERATURE, WITH EXPLANATIONS FOR THE EXISTING CONTROVERSY.

1. CONTROVERSIAL NATURE OF THE LITERATURE.

From the review of the literature concerning the relationship of gestation and pulmonary tuberculosis in the preceding chapter, the unremitting interest with which this subject has been invested throughout the centuries becomes very apparent. The responsibility for its protracted nature can undoubtedly be attributed partly to the intense controversy with which it has been surrounded during this prolonged period. From the time of the Hippocratic axiom until the nineteenth century scepticism, generally an optimistic outlook was maintained with regard to the combination. Thereafter, disapproval was expressed by the majority of physicians until the Great War, when circumstances allowed a more favourable viewpoint to attempt to prohibit pessimism from governing the current opinion. From thenceforth a neutral disposition was gradually evolved, and today is most frequently supported.

Moreover,
1. CONTROVERSIAL NATURE OF THE LITERATURE (CONTD.)

Moreover, it will be observed that the contributions have been international in their source. Every country, with a reasonably high standard of medical education, has participated in the debate, nor have the viewpoints emanating from each individual country demonstrated any tendency towards agreement. Simultaneously there have appeared in the same country, especially in France, where most research has been conducted on this question, and where the dispute has been most acrimonious, works and theses, whose conclusions have been in diametrical opposition. A similar state of affairs prevails at the present moment.

2. EXPLANATIONS FOR THIS CONFLICT.

Explanations for this chaotic conflict of opinion are numerous and diverse, and will necessitate careful scrutiny to avoid repetition of similar errors, and the contribution of a further collection of clinical data to a disagreement already overburdened with erroneous statistics. Several of these reasons have already been put forward, and misinterpretations and faulty conclusions of other authors pointed out during the foregoing resumé of the literature.

Until our knowledge of the pathological physiology /
2. **EXPLANATIONS FOR THIS CONFLICT (CONT'D.)**

physiology and the factors concerned in estimating the prognosis of pulmonary tuberculosis is considerably increased, it is impossible to answer this question in a scientific manner. Obviously when we cannot forecast with absolute certainty and without fear of contradiction, the course any disease will pursue in any particular patient, it is impossible to expect to be capable of reducing the prognosis of that disease to a dogmatic formula. When it is further complicated by the presence of another condition - namely pregnancy, - about which, although permissible to consider physiological, our information is again far from satisfactory.

Fortunately, however, information regarding the processes undergone by the human organism when subjected to these two conditions, has made immense progress and when combined with a sufficiently adequate experience of the consequences of the combination, derived from carefully compiled clinical and statistical data, the probable course of events can be anticipated with a reasonable degree of accuracy.

(a) **Lack of Diagnostic Criteria.**

Consequently, little significance can be attached to statistics, which were formulated before /
(a) Lack of Diagnostic Criteria (Contd.)

before the introduction of modern methods of diagnosis and treatment of pulmonary tuberculosis. Ever since the latest improvements and increasing excellence of radiological technique have demonstrated the looseness of our diagnostic criteria in this affliction, the necessity for their immediate revision became most apparent. Our clinical methods of diagnosis can now be more easily adjusted to coincide with the important discovery in the pathology of tuberculosis made at the beginning of the present century. We have now learned to discriminate between tuberculous infection in the adult, which is almost universal in civilised countries, and tuberculous disease, which only develops in comparatively few of the infected patients. Moreover, we can no longer rely upon general and functional symptoms, upon which diagnosis rested predominantly in the past, but on much more positive, fundamental evidence, namely - a definite lesion demonstrable by radiology and tubercle bacilli in the sputum. Rist has stressed this reason as one of the principal causes for such divergency of opinion in the relationship of pulmonary tuberculosis and pregnancy, and pointed out in his address to the British /
2. EXPLANATIONS FOR THIS CONFLICT (CONTD.)

(a) Lack of Diagnostic Criteria (Contd.)

British Medical Association in 1927, that although a large proportion of tuberculous disease of the lung is still missed, since we have introduced more correct methods of diagnosis, the reverse error was by no means less common. A considerable portion of morbid conditions, some very harmless, some serious, were in ordinary practice mistaken for tuberculosis and unduly treated as such. It must be admitted that in many of the papers previously reviewed, the diagnostic criteria in many cases, are very disputable, or the evidence for the diagnosis of tuberculosis remains unmentioned.

(b) Different Methods of Treatment.

Similarly little importance can be attached to statistics compiled before the introduction of collapse therapy. It was not until some years after the World War that this mode of treatment was performed in pregnant women, and even then with some trepidation in case it might lead to abortion or perhaps fatal respiratory embarrassment from further pressure on already compressed, diseased and overtaxed lungs. As these fears proved unfounded, figures previous to this innovation, will naturally show comparatively a greater mortality.

(c) /
2. EXPLANATIONS FOR THIS CONFLICT (CONT'D.)

(c) Varying Experiences of the Different Authors.

Individual experiences of the authors, who have contributed to the literature concerning this problem, will have varied necessarily according to certain circumstances. One of the most important of these is whether the author practised as an obstetrician or a phthisiologist. In most instances pregnant women are delivered by midwives or general practitioners, while only a relatively small proportion receive the attention of specialists. It follows naturally the specialist is only called into consultation in the worst cases, and the most desperately ill patients are sent into the obstetrical service of a hospital for delivery. Consequently the accoucheur is most likely to see those patients who are in extremis, and this fact doubtless plays a leading role in the high mortality and morbidity generally reported by obstetricians in this condition. Moreover, owing to the absence of co-operation between these two health services, many obstetricians may be totally unaware that their patients are perhaps suffering from pulmonary tuberculosis which is quiescent at the time of delivery. Again, statistics compiled from obstetrical records may be misleading, as patients are discharged two or three
(c) Varying Experiences of the Different Authors (Contd.)

three weeks after delivery, without subsequent careful supervision, and no history is obtained of exacerbations, which may occur during the puerperium and period of lactation.

Pathologists, on the other hand, are likelier to have a more comprehensive survey of the situation as they are aware of pregnancy occurring in both benign and malignant forms of tuberculosis provided that there is an adequate follow-up system to keep patients under supervision after sanatorium treatment. In addition, they have greater facilities for observing the consequences of pregnancy, if exacerbation should happen, in the months following delivery and suckling - observations of the greatest importance as will be seen later. Rarely does a tuberculous woman hide her pregnancy from the tuberculosis specialist, but usually attends him of her own volition for advice, whereas provided she feels in reasonable good health she may conceal the fact that she is a consumptive from her obstetrician, owing to the stigma attached to this dreaded disease.

(d) Insufficient Statistical and Clinical Data.

The inability to find a satisfactory solution
2. EXPLANATIONS FOR THIS CONFLICT (CONT'D.)

(d) Insufficient Statistical and Clinical Data (Cont'd.)

solution to the problem is again partly due to forming deductions from an insufficient number of cases. When the numerous clinical and pathological forms of pulmonary tuberculosis are remembered and the number of complications which may occur during pregnancy - e.g. hyperemesis, hydranmios, and other pathological conditions, it will be seen that a very large number of cases must be studied before observations on every eventuality can be deemed satisfactory with justification.

Erroneous conclusions may also be the consequence of insufficient clinical data on the individual case, even although the total number is quite comprehensive. The obstetrical history of many of the patients included in the statistics of the literature reviewed, receives little deliberation if any. Actually the prognosis is decidedly more serious if such complications as eclampsia, or post partum haemorrhage occur. The outcome would certainly be unfavourably influenced in a woman whose general resistance was lowered by continued nausea, vomiting, and anorexia, in comparison with another woman with a pulmonary lesion of /
2. **EXPLANATIONS FOR THIS CONFLICT (CONT'D.).**

(d) **Insufficient Statistical and Clinical Data (Contd.)**

of equal activity and extent, who had none of these distressing symptoms. The duration, and normal or abnormal character of the pregnancy, the necessity of terminating the pregnancy by operative delivery, twins, or post partum complications, must be emphasised. The medical history, with a special regard to cardiac, renal, and pancreatic disease, would also require serious consideration. Lastly, the previous obstetrical history, with regard to the number of pregnancies already undergone, should always be elicited.

(e) **Inattention to the Social and Financial Status of the Patient.**

Bridgman and Norwood (1926) have stressed the significance of the difference in the social and financial status of patients and believe that much of the diversity of opinion results from the lack of observation, which this factor has received. Undoubtedly, certain individuals are so situated that the burden of their household duties prevents them from taking adequate relaxation. These patients, in whom the pulmonary lesion is just kept in check, while undertaking their daily domestic duties, will be unable to prevent its advance,
2. **EXPLANATIONS FOR THIS CONFLICT (CONTD.)**

(e) **Inattention to the Social and Financial Status of the Patient (Contd.)**

advance, if a further addition is made to their household with its accompanying increase in toil with regard to nursing. On the contrary, others are so situated financially that they are able to avail themselves of the best possible means of combatting the associated lesion. This difference in nutrition, hygiene, and necessity to work must also receive due emphasis.

(f) **Inadequate Consideration of the Anatomopathological type of Phthisis presented by the Patient.**

From the foregoing resume of the literature and a study of the statistics published here subsequently, it will become very evident that the considerable variations in the conclusions adopted, and the radical differences of opinion reached by the authors, were mainly caused by the paucity of precise information on the forms of pulmonary tuberculosis, which affected the patients. Tuberculosis of the lungs can appear in various totally dissimilar forms.

Bernard (1913) differentiated the action of pregnancy on the "cured fibroid" and "progressive" forms of phthisis. However, little significance was attached to this novel consideration of the /
2. EXPLANATIONS FOR THIS CONFLICT (CONT'D.)

(f) Inadequate Consideration of the Anatomo-
pathological type of Phthisis presented by
the Patient. (Contd.)

the problem, or it was received with scepticism.
Dumarest and Brette (1922) carried this differentia-
tion still further and concluded that the
correct specification of the question was the
effect on the types of pulmonary tuberculosis.
Although it is obviously a fallacy to compare the
results of pregnancy in patients with minimal
disease with those with far advanced lesions, this
has been done repeatedly in discussion of this
subject with scarcely a dissenting voice.

Even when some endeavour has been made
to distinguish between the different forms of
pulmonary tuberculosis, which may occur in preg-
nant tuberculous women, so far only the fibroid
types have been collected together, whether the
pulmonary lesion was undergoing fibrosis or casea-
tion to varying degrees, and the effect of preg-
nancy discussed with regard to the whole group, no
matter what pathological reaction prevailed in the
individual case.

Undoubtedly the anatomo-pathological
nature, and the progressive or retrogressive course
of the pulmonary lesion is predominant among the
factors governing the prognosis, and explains the
different /
2. EXPLANATIONS FOR THIS CONFLICT (CONTD.)

(f) Inadequate Consideration of the Anatomo-pathological type of Phthisis presented by the Patient. (Contd.)

different influences of pregnancy most successfully. This influence perhaps harmful in caseous forms, is indifferent and sometimes favourable when fibrosis is the predominant reaction of the body to the tuberculous infection.

It is the purpose of this thesis to demonstrate that until this fundamental, and hitherto insufficiently recognised distinction between the different types of tuberculosis in women, who become pregnant, receives adequate attention, no effective doctrine regarding the relationship of these two conditions can be formulated.

THE COMPILATION OF THE PRESENT STATISTICAL SURVEY WITH THE AVOIDANCE OF PREVIOUS CONTROVERSIAL CAUSES.

In compiling these statistics published below, special attention was directed towards the various factors hitherto stated as being responsible for the existing diversity of opinion, thus avoiding simultaneously the production of a new contribution to the disagreements already formulated. It soon became /
became very evident that patient and minute observation of each case included had to be undertaken, and every patient studied individually with regard to the following points:-

(1) The variety of pulmonary tuberculosis, ascertained in the pregnant woman, its anatomical extent, its activity and progressive disposition.

(2) The exact moment in its progress at which pregnancy supervened.

(3) The treatment, which had been undertaken, which was being carried out, or which followed.

(4) The social condition of the patient, and the previous obstetrical history.

(5) A sufficiently lengthy period of observation after pregnancy and confinement, or abortion.

1. SUITABILITY OF THE PRESENT STATISTICAL MATERIAL.

The records of each particular patient kept at the Royal Victoria Dispensary, Edinburgh, and from which most of the statistical data of this study are derived, are eminently suitable for ascertaining the above particulars.

On first coming under the supervision of the above clinic, the variety and extent of the tuberculous lesion present in the lungs is estimated clinically and radiologically, and the diagnosis confirmed bacteriologically if possible. Any necessary treatment is then undertaken, whether sanatorium /
SUITABILITY OF THE PRESENT STATISTICAL MATERIAL

(contd.)

Sanatorium regime, collapse therapy, or merely dispensary supervision.

The subsequent progress of the patient is then carefully followed until a cure results and is definitely established, until death, or until he or she takes up residence in a district under another local authority. In this way the exact state of the pulmonary lesion with regard to its extent and activity could be ascertained at the time pregnancy supervened, as well as the treatment being carried out and which followed at this juncture. Moreover, the conditions and events resulting from gestation could be estimated for a considerable period thereafter.

As domiciliary visitation is carried out by nurses, the social and financial status of the patients were accurately estimated, and the obstacles imposed by these factors assessed if possible. The significance of the difference in these factors in affecting the prognosis could be calculated and taken into consideration. The great majority of the patients included in this study belonged to the artisan class. The obstetrical history, especially with regard to the number of previous pregnancies, and any complications or sequelae of the pregnancy of this study had
1. SUITABILITY OF THE PRESENT STATISTICAL MATERIAL (CONT.)

had been ascertained, and was available.

In this manner, a careful, minute observation of the phthisiological and obstetrical record of each individual patient could be undertaken for the purposes of this study.

2. METHOD OF COMPILATION.

The records consulted in this survey were restricted to those of tuberculous women known to the Dispensary at some time during the period 1st January 1929 to 31st December 1938. Histories were compiled from the files of tuberculous women, who had had pregnancies, which had terminated during the period mentioned, and which accompanied or immediately preceded their tuberculous disease, whether the pregnancy resulted in a live-born child at term, a still-birth, a premature live birth, or an abortion, therapeutic or otherwise. Histories were also obtained of married tuberculous women, who had not been pregnant for at least a year prior to their diagnosis and whose pregnancies if any, did not immediately precede the disease. The histories of these non-pregnant women were taken for purposes of comparison with those of the pregnant women. Those women only were considered who had been known for at least a year, or who had died /
1. SUITABILITY OF THE PRESENT STATISTICAL MATERIAL (CONTD.)

had been ascertained, and was available.

In this manner, a careful, minute observation of the phthisiological and obstetrical record of each individual patient could be undertaken for the purposes of this study.

2. METHOD OF COMPILATION.

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2. **METHOD OF COMPILATION (CONT.)**

(died within the twelvemonth.

(a) **Period of Survey Selected 1929 - 1938.**

The ten year period mentioned above was chosen for several reasons. In the first instance, modern methods of diagnostic technique had reached a high stage of excellence shortly before. All cases included in this study were diagnosed tuberculous on clinical and radiological, or clinical and bacteriological evidence and in many cases by a combination of all three methods. Tubercle bacilli were discovered in the sputum of 97.0 per cent of cases. Clinical manifestations and the subsequent progress of the remaining 9 patients clearly demonstrated the tuberculous nature of their disease, and in 6 of them radiological evidence was also available. 5 of these cases became pregnant during the course of their supervision, while the other 4 served as controls. A diagnosis of pulmonary tuberculosis was, therefore, definitely established in every woman included in this study.

Secondly, during this period, these patients were submitted to the same methods of modern treatment throughout, whenever they were applicable. Pregnant patients, who received or were receiving collapse /
2. METHOD OF COMPILATION (CONT'D.)

(a) Period of Survey Selected (Contd.)
collapse therapy, were matched with controls, who had received similar treatment for an equal length of time. This procedure was also carried out with regard to treatment by means of gold salts. The length of residence in sanatorium or hospital, the time of its occurrence during the tuberculous career of the patient, and the number of its repetitions, was taken into account also when controls were being assessed for the tuberculous mothers. In no cases did the time of the patient and her control in hospital exceed that of each other by more than a few weeks. Consequently, each patient and control were treated by the best available means of modern tuberculous therapy and matched accordingly.

Finally, the number of tuberculous women, who became pregnant between the years 1929 – 1938 was considered sufficiently large for a comprehensive survey of the problem to be undertaken, and to avoid arriving at erroneous conclusions from insufficient clinical data. Moreover, all types of pulmonary tuberculosis, whether latent, quiescent, or active, were available for analysis regarding the relationship of pregnancy to tuberculosis. Thus, instead of tuberculous women by chance /
2. METHOD OF COMPILATION (CONTD.)

(a) Period of Survey Selected (Contd.)

chance known to obstetricians, these women have been known to phthisiologists with pregnancy an incident in their history - a more satisfactory state of affairs for statistical study of this controversy, as has been shown previously.

In this manner, the numerous and diverse factors, inadequate attention of which have been reputed to be responsible for the chaotic conflict of opinion on this subject, were dealt with and received full consideration.

(b) Formation of Pregnant and Control Groups.

This study includes 295 women whose pregnancies occurred during their pulmonary tuberculosis or preceded it by six months, and 230 women who had never been pregnant or whose pregnancies were in no way associated with their tuberculosis, and who served as a control group. The control group represents 78 per cent. of the number of women in the pregnant group. While it would have been more desirable to have a larger number of controls, greater significance can be attached to the findings owing to the comparability of the groups.

The aim was to obtain for each pregnant woman a control, who would not only be in the same stage of /
(b) Formation of Pregnant and Control Groups (Contd)

of the disease but who would be of approximately
the same age, as well as living under the same
social conditions, and with the same history with
regard to previous pregnancies, and with about a
similar amount of sanatorium care. Histories
were transcribed of the great majority of women
known to the Dispensary for a sufficient length
of time, whose tuberculosis was unassociated with
pregnancy. Had the stage of tuberculous disease
been the single factor to be taken into considera-
tion, it would have been a simple matter to have
obtained the desired number of cases comparable
with those of the pregnant women. But it is
evident that a patient 38 years of age is not com-
parable with a patient of 17, even though both be
in the minimal stage of tuberculosis. Neither is
a patient living in comparative affluence compar-
able with a patient living on Public Assistance.
Since age and social status are held to influence
the course of tuberculosis, they must be taken
into consideration in choosing a control group.
So also should the other items mentioned.

Comparability of the age groups.

(i) With regard to Age Distribution. The classi-
fication of the age distribution of the 230 pregnant
tuberculous /
<table>
<thead>
<tr>
<th>Time of Diagnosis and Type of Disease</th>
<th>TOTAL</th>
<th>Under 20.</th>
<th>20 - 24</th>
<th>25 - 29</th>
<th>30 - 34</th>
<th>35 - 39</th>
<th>40 - 44</th>
<th>45 and over</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pat- trol</td>
<td>Pat- trol</td>
<td>Pat- trol</td>
<td>Pat- trol</td>
<td>Pat- trol</td>
<td>Pat- trol</td>
<td>Pat- trol</td>
<td>Pat- trol</td>
</tr>
<tr>
<td>TOTAL</td>
<td>230</td>
<td>230</td>
<td>8</td>
<td>8</td>
<td>71</td>
<td>71</td>
<td>64</td>
<td>64</td>
</tr>
<tr>
<td>BEFORE PREGNANCY</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>80</td>
<td>80</td>
<td>1</td>
<td>1</td>
<td>16</td>
<td>16</td>
<td>22</td>
<td>22</td>
</tr>
<tr>
<td>Group I</td>
<td>29</td>
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<td>-</td>
<td>-</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Group II</td>
<td>7</td>
<td>7</td>
<td>-</td>
<td>-</td>
<td>5</td>
<td>5</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Group III.A</td>
<td>27</td>
<td>27</td>
<td>1</td>
<td>1</td>
<td>6</td>
<td>6</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td>Group III.B</td>
<td>17</td>
<td>17</td>
<td>-</td>
<td>-</td>
<td>5</td>
<td>5</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>DURING PREGNANCY</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td>51</td>
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<tr>
<td>Group I</td>
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<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Group II</td>
<td>15</td>
<td>15</td>
<td>2</td>
<td>2</td>
<td>7</td>
<td>7</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Group III.A</td>
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<td>7</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Group III.B</td>
<td>27</td>
<td>27</td>
<td>-</td>
<td>-</td>
<td>3</td>
<td>3</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>AFTER PREGNANCY</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>99</td>
<td>99</td>
<td>5</td>
<td>5</td>
<td>40</td>
<td>40</td>
<td>29</td>
<td>29</td>
</tr>
<tr>
<td>Group I</td>
<td>3</td>
<td>3</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Group II</td>
<td>20</td>
<td>20</td>
<td>4</td>
<td>4</td>
<td>10</td>
<td>10</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Group III.A</td>
<td>22</td>
<td>22</td>
<td>-</td>
<td>-</td>
<td>9</td>
<td>9</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Group III.B</td>
<td>54</td>
<td>54</td>
<td>1</td>
<td>1</td>
<td>21</td>
<td>21</td>
<td>20</td>
<td>20</td>
</tr>
</tbody>
</table>
(b) Formation of Pregnant and Control Groups (Contd.)

tuberculous women and their controls with the time of diagnosis (before, during, or after pregnancy), and with the anatomo-pathological type of their lesions, is given in Table I. on the opposite page. In this table, owing to the exigencies of space, it was found convenient to divide the age groups into quinquennia during the child-bearing years. This division, however, must not lead to the assumption that almost five years might be the difference in age between the members of the pregnant survey and the corresponding members of the control group. Although it was not found possible to attribute a control of exactly the same to each pregnant woman, in every case the control obtained was never more than 15 months senior or junior to her corresponding partner. In some cases, some of the mothers had proceeded to later age groups before the pregnancy terminated.

The complete definitions of the different groups, into which the various anatomo-pathological types of pulmonary tuberculosis have been divided, will be found on page 63, but pending this more detailed discussion, they may be summarised at this juncture in the following brief fashion:

Group /
(b) Formation of Pregnant and Control Groups (Contd.)

Group I. includes all fibroid healing forms.

Group II. includes all progressive caseating forms.

Group III.A. includes all fibro-caseous forms, in which the fibrotic element has gained the ascendancy.

Group III.B. includes all fibro-caseous forms, in which the caseous element is more pronounced.

Consideration of the figures given in this table will demonstrate that a high degree of correspondence was obtained in each sub-group of age distribution and clinical type, and that as far as age was concerned, the matching was sufficiently accurate to prevent age from affecting the prognosis in the comparison of the two groups. As was to be expected, most cases fell within the age groups 20 - 25, and 25 - 30, when both tuberculosis and pregnancy are commonest in women.

(ii) With regard to Social and Financial Status.
The consideration of the social and financial status of these patients presented some difficulty, as it was not possible to discover the exact income and how it was expended. However, by the collection of the undermentioned data, it was possible to attain a sufficiently accurate estimate of the manner in which the social conditions affected the outcome /
2. **METHOD OF COMPILATION (CONTD.)**

(b) Formation of Pregnant and Control Groups (Contd.)

outcome of the pulmonary disease in both pregnant and non-pregnant women. The patients were divided into the following three categories:

(1) Patients whose home conditions were satisfactory. The women placed in this category were able to undergo adequate treatment either at home or in a sanatorium while pregnant or after confinement, and to whom a further addition to the family did not necessitate financial sacrifice or additional household activity.

(2) Patients in whom the home conditions did not reach the same satisfactory standard, but who were allowed some rest from domestic duties and who could direct some attention towards the treatment of the pulmonary lesion during and after pregnancy, and the arrival of a new addition to the household did not mean that this attention had to be foregone.

(3) Patients whose home conditions were entirely unsatisfactory, where only the minimum of care could be directed towards husbanding the patient's strength for the forthcoming confinement, and where a further addition to the family constituted a further burden to a financial state already perilous, and a considerable increase in domestic worries and labour.

The required data for this classification of these tuberculous women was accumulated from the reports of the Health Visitors attached to the Dispensary, the occupation of the husband, the locality of the patient's home (whether in a high class suburban area or a tenement in a slum), the size and ages of the original family, but mainly from the impressions gained by the Health Visitors while visiting the homes of these patients. These nurses /
2. METHOD OF COMPILATION (CONT'D.)

(b) Formation of Pregnant and Control Groups (Contd.)

nurses were able to give a first-hand report of how the home conditions were likely to affect the prognosis and the category in which the particular patient should be placed. In this manner, the possibility of comparison between the pregnant tuberculous women and their controls was estimated, and although imperfect, provided at least a workable basis, by which the social and financial status of the patients could be taken into consideration.

Of the 230 women with their controls, 27 were placed in the first category, 93 in the second, and the remaining 110 in the third, a distribution which could be anticipated when the type of patient attending the clinic is considered.

(iii) With regard to Treatment. The treatment of the 460 patients consisted mainly of supervision in sanatoria at some time in their tuberculous career. Controls were assigned according to whether sanatorium regime had been undertaken before pregnancy, while pregnancy supervened, or within two years after confinement, and the length of this regime did not exceed that of her partner by more than six weeks either way. Ten patients became pregnant during the course of artificial pneumothorax therapy, and in two patients this /
2. METHOD OF COMPILATION (CONT'D.)

(b) Formation of Pregnant and Control Groups (Contd.)

This form of treatment was commenced during pregnancy. Thirty-two patients received gold therapy while undergoing sanatorium supervision. Two women who had had a phrenicectomy performed, later became pregnant, but no controls were found for these, and they are not included in the comparison. Thoracoplasty was performed in none of these patients. Although these groups were comparable as far as treatment was concerned, admittedly it was far from adequate. This point will receive further discussion later.

(c) Time of Estimation of the Effect of Pregnancy.

This report throughout concerns itself with the condition of the patient one year after the end of pregnancy, and one year after diagnosis in the case of women diagnosed within six months after their confinement, except where specifically stated otherwise, as the situation at this time presents the clearest picture of the effect of pregnancy and confinement. The condition of several of the patients, even after the short interval of two years, was unknown, and the large number of patients at subsequent intervals in the same category, make the figures of those of specific known condition of little /
2. METHOD OF COMPILATION (CONTD.)

(c) **Time of Estimation of the Effect of Pregnancy (Contd.)**

little or no value. It is evident that a large number of patients could not have been known for much more than two years after their labour, as the clinic records were examined about two years after the close of 1938; and, of course, contact was broken with a certain number for other reasons. In this analysis, the status of the patient has been designated - "Dead", "Worse", "Unchanged", and "Improved". This terminology is not satisfactory, but it is possibly the best that could be devised with the data available for making the decision as to the condition of the patient. It was in the nature of things impossible to obtain records on each and every case, which would state with scientific precision the degree and severity of the symptoms, correlated with the extent of the lung involvement at specified intervals before, during, and after the pregnancy.

(d) **Differentiation into Groups According to the Time of Diagnosis with regard to the Pregnancy.**

The women, who had pregnancies associated with their tuberculosis fall at once into three groups, those diagnosed before conception, those diagnosed during pregnancy, and those diagnosed within six months after confinement. The selection /
2. **METHOD OF COMPILATION (CONT'D.)**

(d) **Differentiation into Groups etc. (Cont'd.)**

Selection of this period of six months will receive further discussion on page 171 and the reasons for its choice will then be stated. The importance of this classification will be demonstrated in another unmistakable manner by the different mortality rates, which were found to exist in these different categories. In connection with the first group, it should be noted that the pregnancy considered in the study, with its concomitant conditions, has been the first terminated in the 1929 - 1938 period. In a few instances, one or more gestations have occurred since the diagnosis of tuberculosis. These are discussed later in the report.

(e) **Differentiation into Groups according to the Anatomo-Pathological Lesions.**

The immense importance, which must be attached to the anatomical and pathological nature of the form of tuberculosis present, and its progressive or retrogressive course, has already been stressed, and will receive more exhaustive investigation later.

When the classification of the 295 patients and 230 controls had to be undertaken, it was discovered that none of the standard methods of classification /
(c) Differentiation into Groups according to the
Anatomo-Pathological Lesions (Contd.)

classification took into consideration in a sig-
nificant manner the type of pulmonary lesion, which
was present, dealing mainly with its extent and its
apparent gravity. The Turban-Gerhardt system is
based on these features of the disease. Sir
Robert Phillips' classification also embodies the
extent of the pulmonary damage, and in addition
notes the amount of systemic disturbance. The
classification of the National Tuberculosis
Association of America also possessed these dis-
advantages. For the purposes of this survey, and
in order that the progressive nature of the pulmon-
ary disease might receive full consideration, the
cases were divided into the following groups:

I. Fibroid, healing forms, in which fibrosis
    is the predominating reaction of the
    pulmonary tissue to the tuberculous disease,

II. Caseating progressive forms, in which the
tuberculous disease is advancing rapidly
    and very little resistance, if any, is
    occurring to stay its progress.

III. The fibro-caseous forms, an intermediate
    group, in which both fibrosis and casea-
tion are occurring. This group can be
    further sub-divided, according to which of
    these bodily reactions to the tubercle
    bacillus is predominating:

    A. In which the fibrotic element has
        gained ascendancy.

    B. In which the caseous element is more
        pronounced.
2. METHOD OF COMPILATION (CONT'D.)

(e) Differentiation into Groups according to the Anatomo-Pathological Lesions (Contd.)

In some patients it is difficult to estimate at a specific moment, into which category they fall. A careful study of the progress of the case for a few weeks, with continual reference to the temperature chart, the increase or decrease in weight, the appearance of further symptoms or an increase in the symptoms already present, or their amelioration, and serial radiographic control, is usually sufficient to reach a decision. The more closely pregnancy supervenes to the beginning of the patient's last progressing process, and the more extensive the lesion, the more likely is the caseating process to predominate, as so little time will have then been available for treatment to have established fibrosis.

THE STATISTICAL RESULTS OF THIS SURVEY.

1. THE PROGNOSTIC SIGNIFICANCE OF PREGNANCY IN TUBERCULOUS WOMEN.

The statistical results of this survey with regard to prognosis, when pregnancy is associated with tuberculosis, and when its effect is contrasted with /
**TABLE II.**

A COMPARISON of the CONDITION after one year of 230 Pregnant Tuberculous Women, and of their Tuberculous Controls, classified according to the Anatomo-pathological Type of Disease, and to time of diagnosis.

<table>
<thead>
<tr>
<th>Type of Disease at Diagnosis with condition at one year</th>
<th>Class I. diagnosed before pregnancy</th>
<th>Controls for Class I.</th>
<th>Class II. diagnosed during pregnancy</th>
<th>Controls for Class II.</th>
<th>Class III. diagnosed after pregnancy</th>
<th>Controls for Class III.</th>
<th>TOTAL.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GROUP I.</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>FIBROID TYPE.</strong></td>
<td>29</td>
<td>29</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>34</td>
</tr>
<tr>
<td>Dead</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Worse</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>1</td>
<td>-</td>
<td>1</td>
</tr>
<tr>
<td>Unchanged</td>
<td>24</td>
<td>23</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>2</td>
<td>28</td>
</tr>
<tr>
<td>Improved</td>
<td>5</td>
<td>5</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>5</td>
</tr>
<tr>
<td><strong>GROUP II.</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>ULCERO-CASEOUS ETC. TYPE.</strong></td>
<td>7</td>
<td>7</td>
<td>15</td>
<td>15</td>
<td>20</td>
<td>20</td>
<td>42</td>
</tr>
<tr>
<td>Dead</td>
<td>6</td>
<td>7</td>
<td>13</td>
<td>12</td>
<td>19</td>
<td>18</td>
<td>38</td>
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<tr>
<td>Worse</td>
<td>1</td>
<td>-</td>
<td>2</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Unchanged</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Improved</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>GROUP III.A.</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>HEALING FIBRO-CASEOUS TYPE.</strong></td>
<td>27</td>
<td>27</td>
<td>7</td>
<td>7</td>
<td>22</td>
<td>22</td>
<td>56</td>
</tr>
<tr>
<td>Dead</td>
<td>1</td>
<td>5</td>
<td>2</td>
<td>2</td>
<td>5</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Worse</td>
<td>4</td>
<td>13</td>
<td>-</td>
<td>1</td>
<td>8</td>
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<td>12</td>
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<td>5</td>
<td>3</td>
<td>1</td>
<td>5</td>
<td>2</td>
<td>21</td>
</tr>
<tr>
<td>Improved</td>
<td>9</td>
<td>4</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>3</td>
<td>15</td>
</tr>
<tr>
<td><strong>GROUP III.B.</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>PROGRESSIVE FIBRO-CASEOUS TYPE.</strong></td>
<td>17</td>
<td>17</td>
<td>27</td>
<td>27</td>
<td>54</td>
<td>54</td>
<td>98</td>
</tr>
<tr>
<td>Dead</td>
<td>6</td>
<td>10</td>
<td>10</td>
<td>8</td>
<td>33</td>
<td>31</td>
<td>49</td>
</tr>
<tr>
<td>Worse</td>
<td>6</td>
<td>7</td>
<td>12</td>
<td>12</td>
<td>19</td>
<td>12</td>
<td>37</td>
</tr>
<tr>
<td>Unchanged</td>
<td>4</td>
<td>-</td>
<td>5</td>
<td>5</td>
<td>2</td>
<td>6</td>
<td>11</td>
</tr>
<tr>
<td>Improved</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>2</td>
<td>-</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td><strong>TOTAL.</strong></td>
<td>80</td>
<td>80</td>
<td>51</td>
<td>51</td>
<td>99</td>
<td>99</td>
<td>230</td>
</tr>
</tbody>
</table>

*Note: The table shows the distribution of pregnant women and their controls across different types of disease and time of diagnosis.*
1. **THE PROGNOSTIC SIGNIFICANCE OF PREGNANCY IN TUBERCULOUS WOMEN (CONTD.)**

with a carefully selected control group of cases, are presented initially in Table II.

In this table, the prognostic standards adopted and defined above, dead, worse, unchanged, or improved, are recorded in each anatomo-pathological type of the disease in Column I. The remaining columns in the table give an indication of the number of patients falling into each of these groups, whether diagnosed before, during, or after pregnancy, and of their condition after one year. A comparison is afforded in the incorporation of corresponding data for the control cases. Finally, the combined results for all the cases, whether diagnosed before, during, or after pregnancy are recorded in the last column.

The implications of the data emerging from this table will be discussed in greater detail in the ensuing chapter. Meantime, it may be noted that in Group I, the fibrotic type of the disease, the majority of these cases, whether belonging to the pregnant or control series, were either unchanged or improved in their condition after one year. Again, in Group II, the progressive ulcerocaseous type, all the cases, pregnant or otherwise, were worse or dead. Similarly, if attention be directed /
1. THE PROGNOSTIC SIGNIFICANCE OF PREGNANCY IN TUBERCULOUS WOMEN (CONTD.)

directed to the last group of cases designated III.B., that is, the progressive fibro-caseous type, little or no difference emerges between the condition of the pregnant woman or her control. Indeed, it is not until Group III.A. is investigated, namely the healing fibro-caseous type, that any noteworthy difference is observed in the condition of the pregnant women and their corresponding partners. It will be seen that the statistics were more favourable prognostically towards the pregnant women, 8 being dead, and 12 worse, compared with 12 dead, and 26 worse in the control group.

In formulating a summary of Table II, it may be stated that a comparison of the figures for the 230 women, whose pregnancies accompanied or immediately preceded their tuberculosis with those of their controls regarding their condition at one year after diagnosis (and in the case of the pregnant women, one year after confinement if diagnosed before and during pregnancy, or one year after diagnosis if diagnosed six months after confinement) leads to the conclusion that pregnancy had apparently no deleterious effect upon the progress of the disease.

2. /
TABLE III.

COMPARISON of the CONDITION of 230 Pregnant Tuberculous Women and their Controls one year after Confinement or Diagnosis, according to Time of Diagnosis.

<table>
<thead>
<tr>
<th>CONDITION AFTER ONE YEAR.</th>
<th>Class I diagnosed before pregnancy</th>
<th>Controls for Class I</th>
<th>Class II diagnosed during pregnancy</th>
<th>Controls for Class II</th>
<th>Class III diagnosed after pregnancy</th>
<th>Controls for Class III</th>
<th>TOTAL. PATIENTS</th>
<th>TOTAL. CONTROLS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Worse</td>
<td>13</td>
<td>17.5</td>
<td>23</td>
<td>27.5</td>
<td>25</td>
<td>49.0</td>
<td>22</td>
<td>43.1</td>
</tr>
<tr>
<td>Unchanged</td>
<td>41</td>
<td>41.2</td>
<td>28</td>
<td>35.0</td>
<td>10</td>
<td>15.7</td>
<td>8</td>
<td>9.1</td>
</tr>
<tr>
<td>Improved</td>
<td>15</td>
<td>20.0</td>
<td>9</td>
<td>11.2</td>
<td>2</td>
<td>4.0</td>
<td>5</td>
<td>9.8</td>
</tr>
<tr>
<td>TOTAL.</td>
<td>80</td>
<td>100.0</td>
<td>80</td>
<td>100.0</td>
<td>51</td>
<td>100.0</td>
<td>51</td>
<td>100.0</td>
</tr>
</tbody>
</table>
2. **THE PROGNOSTIC SIGNIFICANCE OF THE TIME OF DIAGNOSIS OF TUBERCULOSIS WITH REGARD TO PREGNANCY.**

Tuberculous women, whose disease has some relationship to pregnancy, fall into three categories, those diagnosed before pregnancy, those diagnosed during pregnancy, and those diagnosed after confinement. The importance of this classification in the estimation of the prognosis is pregnant tuberculous women is shown in Table III.

In this Table, the prognostic standards adopted in this survey are given in the first column. In the remaining columns, the condition of the 230 women, whose pregnancies accompanied or immediately preceded their tuberculosis one year after delivery (or one year after diagnosis in the case of the women diagnosed within six months of confinement) is given with their percentage distribution. A comparison is again afforded by the incorporation of corresponding data for the control cases. In the last two columns the total distribution of the 230 pregnant tuberculous women, regardless of time of diagnosis, and their controls is inserted.

From this Table, the significance of this classification according to the time of diagnosis in relation to pregnancy will become evident. The longer /
2. THE PROGNOSTIC SIGNIFICANCE OF THE TIME OF DIAGNOSIS OF TUBERCULOSIS WITH REGARD TO PREGNANCY (CONTD.)

longer pregnancy has advanced before the tuberculous disease is discovered, the greater is the mortality. In those, in whom phthisis was detected before conception occurred, the mortality was only 17.5 per cent. compared with 49. per cent, in those in whom the disease was not diagnosed until pregnancy had already happened. The greatest mortality rate was found among those, in whom the diagnosis of tuberculosis was not established until after delivery (57.6 per cent.). Further discussion of these statistics will be undertaken in part IV. of this thesis, and suitable explanations tendered.

It will also be observed from this Table that when the condition of the women, whose disease was associated with pregnancy, is compared with that of their controls, one year after diagnosis or confinement, very little difference exists between the women diagnosed during and after pregnancy and their corresponding control partners. Between the women diagnosed before their pregnancy and their controls, the differences were more noticeable than in either of the other groups, and it was in favour of the pregnant women. Of the 80 women diagnosed before pregnancy, 13 were dead, 11 were worse, 40 were unchanged, and 16 were improved. The corresponding /
2. **THE PROGNOSTIC SIGNIFICANCE OF THE TIME OF DIAGNOSIS OF TUBERCULOSIS WITH REGARD TO PREGNANCY (CONTD.)**

Corresponding figures for the controls were 22 dead, 21 worse, 28 unchanged, and 9 improved.

These results in the previous paragraph lead us to the same conclusion as was reached from a consideration of Table II, namely that pregnancy had no deleterious effect on the prognosis of the disease.

3. **Conclusions.**

The statistical results of this survey should not be construed that pregnancy is to be advocated for tuberculous women, but they would seem to indicate that the pregnant tuberculous woman, under treatment for her tuberculosis, faces no greater risk than that for the tuberculous woman, in addition to that of the normal woman, who becomes pregnant. Since she will probably take much more care and pay more attention to her physician's guidance during and after her pregnancy with regard to her disease, this additional risk is greatly offset. In as much as pregnancy brings more or less physical stress to the normal woman, it is to be expected that it would do the same for the tuberculous woman. But from the fashion in which those diagnosed before pregnancy survive the experience, it is reasonably clear that the woman, who knows she has tuberculosis, and who undergoes the /
3. **CONCLUSIONS (CONTD.)**

the regime for the usual tuberculous patient similar to herself, will pass through the gravid state with results approximately what they would have been had she not become pregnant. These data would seem to point, not to any action dealing with the condition of pregnancy per se, but rather to the need for early diagnosis of the patient's condition followed by appropriate treatment for her tuberculosis. It is quite permissible to say that had each of these women been given a thorough chest examination at the time the pregnant condition was discovered, the mortality of those not diagnosed until during their pregnancy or subsequent to confinement, would have been much less.

A more exhaustive analysis of these statistics will now be undertaken in the next two chapters with special reference to the anatomo-pathological type of pulmonary tuberculosis dominating the clinical picture in the pregnant woman, and the importance, which must be attached to the time at which pregnancy supervenes - before, during, or after the diagnosis of the presence of phthisis.
PART III.

THE PROGNOSTIC IMPORTANCE OF THE ANATOMO-PATHOLOGICAL TYPE OF TUBERCULOSIS PREVAILING IN THE PREGNANT WOMAN.

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Ulcero-fibroid Forms and Pregnancy. 91.
Healing Fibro-caseous Forms and Pregnancy. 94.

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PART III.

THE PROGNOSTIC IMPORTANCE OF THE ANATOMO-PATHOLOGICAL TYPE OF TUBERCULOSIS PREVAILING IN THE PREGNANT WOMAN.

The factors concerned in establishing the prognosis in a tuberculous woman becoming pregnant are so numerous and diverse that it is impossible to solve the problem by means of a simple formula.

Moreover, pregnancy, supervening in a tuberculous woman, is merely a new factor in a multiple complex, and it is erroneous to wish to solve the problem as an equation of two unknowns. The problem of the tuberculosis itself already admits of several factors, with which the pregnancy element will have to be successively confronted.

The main factors concerned in the prognosis of the tuberculosis itself is the anatomo-pathological type of tubercle present, and as it was stressed in the previous chapter, the prognosis of this combination of pregnancy and phthisis is more than half solved when the prognosis of the tuberculosis itself is solved. It follows, therefore, that the solution of establishing the prognosis in the relationship of these /
these two conditions is mainly concerned with the diagnosis of the progressive form of the disease, its extent, and its anatomical tendency, whether towards healing fibrosis or caseating necrosis.

In spite of the voluminous literature, which has been published with reference to this combination, very inadequate attention has been directed towards this method of establishing the prognosis. Bernard (1913), and later in collaboration with Even and Contini (1933), was the first to demonstrate the necessity of attempting to group and separate the factors concerned in the relationship of pregnancy and tuberculosis according to the clinical forms of tuberculosis, instead of grouping them altogether in a combined view. In this manner, he differentiated the "fibroid healing" forms of tuberculosis, and contrasted the different prognostic results in these cases and the other types of phthisis. Dumarest and Brette (1922) also supported this view strongly, and came to the conclusion that the problem did not consist of the effect of pregnancy on pulmonary tuberculosis, but rather on the different types of pulmonary tuberculosis. They particularly stressed the favourable effect on chronic fibrous cases.

The results of this investigation would appear to substantiate the claims of these authors.
In addition, however, the differentiation of the various forms of tuberculosis has been carried out to an even greater extent than visualised by the above observers. By this means, even greater reliability in estimating the prognosis can be attained.

1. **THE RELATIONSHIP OF THE ANATOMO-PATHOLOGICAL TYPES TO THE VARIOUS CLINICAL FORMS.**

Thus, consideration must be given to the type of tuberculosis present, before any attempt to appreciate the possible influence, which the pregnancy can exercise on its progress, can be made. This classification is comparatively easy to reach, as the anatomical forms correspond closely to the clinical forms of the disease. It rests, in the greater number of cases, on the predominance of one of three elements, which are always present at one time or other, and to different degrees in every tuberculous lesion, to wit:—the exudative reaction, the necrotic and destructive reaction, and the fibrous healing or cicatricial reaction. The clear predominance of one of these reactionary types corresponds at a given moment to the particular behaviour of the illness, the exudative forms taking on the aspect of serious pneumonic exacerbations, more or less lasting,
1. **THE RELATIONSHIP OF THE ANATOMO-PATHOLOGICAL TYPES TO THE VARIOUS CLINICAL FORMS (CONTD.)**

lasting, the caseous forms being generally the serious forms, accompanied by very troublesome pulmonary symptoms, marked wasting and toxicity, the fibroid forms being the benign types, when the patient can experience little difficulty in leading a normal life, apart perhaps from dyspnoea of varying severity.

The anatomical forms would not therefore appear to be distinct from the clinical forms, and the study of the former allows us to recognise the latter. However, these different anatomical aspects can mutually give rise to and succeed each other in time. In addition, due to the multiplicity of the factors, which intervene in the determination of each of them, every possible distribution of the lesions will be able to be associated with all the alterations and their different effects on the normal anatomical elements of the lungs, and moreover, at the same time. At a given moment all three elements may be capable of demonstration in the same lung. This complexity is undoubtedly the characteristic of chronic pulmonary tuberculosis, paralleled only by the clinical diversity of this affliction.

It is in these cases that difficulties arise /
1. THE RELATIONSHIP OF THE ANATOMIC-PATHOLOGICAL TYPES TO THE VARIOUS CLINICAL FORMS (CONTD.)

arise in the recognition of the progressive nature of the disease, whether caseation or fibrosis is the predominating factor. Recourse to serial radiography and a careful study of the temperature and weight charts are sufficient usually to allow the determination of this point. The anatomical tendencies, therefore, correspond to certain clinical and radiological manifestations, and the study of the former are inseparately bound up with the latter.

To demonstrate the decisive manner with which the relationship of pregnancy and tuberculosis is indubitably associated with the anatomic-pathological forms of tuberculosis present, and in addition, as has been shown, with the clinical form, the effect of pregnancy will be studied first on the healing types of tuberculosis, where the fibroid element has gained supremacy, and secondly on the destructive types, where caseation and necrosis predominate.

A. HEALING TUBERCULOSIS AND PREGNANCY.

In this group of tuberculosis of the healing type are included the cases belonging to Group I., the fibroid forms, and Group III.A., the healing fibro-caseous forms, in which the fibrous reaction /
reaction takes precedence over the caseating and destructive types in a distinct manner.

(a) Fibroid Forms. This fibrous reaction can itself appear in very different degrees, and its formation can be more or less abundant, and need not respond exactly to the seriousness or to the extent of the lesions. There are all the intermediate forms between those of the unadulterated resolving forms in which the "restitutio ad integrum" of the pulmonary tissue follows after the acute infection, and the progressive and extensive fibrosis, which leads after many years ultimately to right ventricular insufficiency.

Although radiology allows us to appreciate the importance of this sclerosis of the pulmonary parenchyma, it only offers presumptive evidence. Corroboration, however, has been amply provided by post-mortem examination, when all the different degrees of fibrosis mentioned above can be seen as white fibrous tissue, grating under the knife, radiating from the hilum to the periphery, and enclosing the normal tissue in a network of dense sclerosis in a well-marked case.

The formation of this fibrous tissue occurs slowly. The clinical history of these patients, who
A. HEALING TUBERCULOSIS AND PREGNANCY (CONTD.)

(a) Fibroid Forms (Contd.)

who show this aspect on necropsy, is interrupted with pulmonary episodes, often of a petty nature. The appearance of modern bacteriological and radiological technique was necessary before it was possible to establish a connection between tuberculosis and these treacherous broncho-pulmonary affections, which drag on for years without serious alteration of the general condition, and which without doubt on occasion are able to become genuine cases of tuberculosis with bacilli in the sputum.

This sclerosis is generally scattered throughout the interstices of the lung in a more or less diffuse manner, but in every case spreading to very important parts of the lung parenchyma. It presents the appearance due to an inflammatory reaction, whose origin must be looked for either in the hilar ganglia or in the parenchyma itself, and which maintain in every territory where it appears, a constantly renewed infection, and a chronic inflammatory reaction.

To this diffuse sclerosis is generally added a sclerosis, localised more closely in the neighbourhood of more specific alterations, and which is the consequence of a more local defence reaction, tending to the isolation of the typical lesion.

This /
A. HEALING TUBERCULOSIS AND PREGNANCY (CONT'D.)

(a) Fibroid Forms (Contd.)

This fibrous reaction, which may be diffuse and progressive (Case 1, page 83), or localised and more discrete (Case 2, page 84), or which may include as is the more frequent occurrence, the association of the two processes, (Case 3, page 85), is in every case a witness of the bodily defence victorious over the bacillary infection.

Occasionally the pulmonary fibrosis is followed by pleurisy, and progresses in a parallel fashion with a pleural sclerosis, which can be, moreover, the point of departure for this generalised fibrosis. The fibro-thorax of Vincenti with its accentuated pulmonary sclerosis and accompanied by a retractile pachypleuritis, which seems to immobilise not only the pulmonary lesions, but also to cause a veritable ankylosis of the thorax, often so marked that it results in complete suppression of the thoracic movement, demonstrates this fibrotic reaction in a marked manner.

It is with these forms of fibroid tubercle that it will be logical to include the innumerable cases of latent and benign tuberculosis, which are completely unknown to the interested parties themselves and their doctors. These conditions, which can hardly be regarded as pathological, and the greater number /
A. HEALING TUBERCULOSIS AND PREGNANCY (CONTD.)

(a) Fibroid Forms (Contd.)

number of which occur in infancy, are accompanied by no serious morbid mishap, and escape our examinations and control. Their discovery has become more and more frequent since the popularisation of X-rays, which alone can permit us to recognise them. The greater number of them pass unperceived. The obstetrician whose attention will not be drawn to the respiratory system by any clinical manifestation whatsoever, is ignorant of them. A large number of these women, (more numerous in an urban surrounding), manage one or more pregnancies without incident, suckle their children, with a trifling torpid lesion, which may never be diagnosed, and which will cause no deterioration in the general condition to permit it to be suspected (Case 4, page 86).

Clinical Considerations.

The clinical picture of these different types of fibroid tubercle is extremely varied. Many of them are only recognised during the routine screening of contacts, and have no symptoms whatsoever (Case 5, page 87). Others have a long career in which they remain fairly well, but in whom from time to time a characteristic mishap, such as a haemorrhage unaccompanied by fever, or the intermittent emission of /
A. HEALING TUBERCULOSIS AND PREGNANCY (CONTD.)

(a) Fibroid Forms - Clinical Considerations (Contd.)

of bacilli, provides the clue to the tuberculous nature of the infection. Sometimes these incidents are reduced to a minimum and long years may pass before the sign arrives, which provides proof of the bacillary origin of the respiratory or radiological modifications, discovered more or less fortuitously. In others, the fibroid tuberculosis is accompanied by reactionary exacerbations on the part of the bronchi, characterised by secretory periods sometimes febrile, occurring from time to time and sometimes according to regular seasonal influences. In such a case (Case 6, page 88), the repeated bronchitis favours the establishment of the diagnosis of fibroid tuberculosis, on condition that the latter is searched for in connection with the secretory exacerbations. In these patients with discrete and commonplace signs of fibroid tuberculosis impairment at one or both upper lobes with enfeebled breath sounds, are superadded at the moment of the bronchitis, loud sibilant rhonchi with coarse rales, accompanied by purulent sputum, in which it is not usual to find bacilli. At long intervals, in the course of the disease, these can appear as a manifestation of the reawakening of a focus of badly extinguished caseation. Later, a frank fibro-caseous type /
A. HEALING TUBERCULOSIS AND PREGNANCY (CONTD.)

(a) Fibroid Forms - Clinical Considerations (Contd.)

type may succeed the fibroid bronchitic form. In other cases, emphysematous changes appear, when the dyspnoea, a universal complaint where the bronchitic episodes are numerous, becomes even more incapacitating (Case 7, page 89).

In yet other cases, the fibroid tubercle is accompanied by repeated haemoptyses, which have two characterising features. These haemoptyses occur repeatedly at remote intervals, and although they may be more or less profuse, they are followed in every case without fever, without serious general signs, and without progressive exacerbation. Otherwise, the patient has no complaints unless a superimposed bronchitis is present (Case 8, page 90).

In all these cases of fibroid tubercle, pregnancy does not impose a sufficient upset to change the nature of the affection. As is shown by the following illustrative examples, selected from the 35 cases, all of which are presented in the appendix, who were suffering from the above anatomo-pathological and clinical forms of fibroid phthisis in this investigation when pregnancy occurred, it is almost universally well undertaken.
Fig. 1. X-ray of Case No. 1. taken on 7. 4. '32, showing interstitial fibrotic changes throughout both lung fields, more marked at right mid-zone and base. Patient two months pregnant.

Fig. 2. X-ray of same case on 24. 10. '32, ten months after confinement, showing little change from the previous skiagram above.
CASE NO. 1.  Mrs. C.B. (Age 37 yrs).  Para. 4

HISTORY.

22. 4. '31.  Patient has been ailing for the past year, always feeling tired and listless. Has had a cough accompanied by sputum for several years, and these have become more troublesome in the last few months. Three weeks ago, she coughed up a spoonful of blood. Has had four attacks of pleurisy, the last being three years previously.

DIAGNOSIS.

Radiological.  Interstitial fibrotic changes throughout both lung fields, more marked right mid-zone and base. Fibro-calcareous changed right apex with scattered calcified foci both lungs. Increased broncho-vascular strands both bases with puckering of right hemi-diaphragm.

Bacteriological.  Sputum positive - 31. 5. '31.

Clinical.  Chronic fibroid tuberculosis.

TREATMENT.

Dispensary Supervision.

PROGRESS.

7. 4. '32.  Cough has gradually improved during the past year. Had a small haemoptysis three weeks ago. Apart from dyspnoea on exertion, chest never gives ground for complaint. No deterioration in pulmonary lesions since first visit to be demonstrated radiologically.

29. 10. '32.  Patient seven months pregnant. Feeling very well. No change to note locally.


Fig. 3. X-ray of Case No. 2 taken on 7. 10. '30, one month before pregnancy, showing pronounced fibrocalcareous changes right upper lobe, and calcified foci left upper lobe.

Fig. 4. X-ray of same case taken on 26. 3. '32, five months after confinement, showing no deterioration in lung lesion from the previous skiagram above.

HISTORY.

7. 10. '30. Patient has always been subject to colds. Three weeks ago, she had an attack of bronchitis, which has left her with a cough and thick greenish sputum. Developed a sharp, stabbing pain in the right side of the chest four days ago.

DIAGNOSIS.

Radiological. Pronounced fibro-calcareous changes right upper lobe with calcified nodules right hilum. Increased bronchocascular strands right base and kinking of right hemi-diaphragm. Calcified foci left upper lobe.

Bacteriological. Sputum positive on culture, 23. 7. '37.

Clinical. Chronic Fibroid Tuberculosis.

TREATMENT.

Dispensary Supervision.

PROGRESS.


12. 2. '31. Reports two months amenorrhoea. Feels very well. Cough continues to improve.

27. 8. '31. Apart from more noticeable dyspnoea on exertion patient has no complaints.

3. 10. '31. Confined thirteen days ago. No increase in cough or sputum. Feels rather tired in the evenings. No deterioration in pulmonary condition.

26. 3. '32. Feels very well. Chest never gives cause for complaint. X-ray shows no deterioration in lesions since first visit.

2. 7. '34. Confined three weeks previously. No change to note in local or general condition.

22. 6. '35. No evidence of activity in chest.

3. 12. '35. Keeps very well. Cough and sputum only occasionally. No deterioration in pulmonary condition in spite of above two pregnancies.
Fig. 5. X-ray of Case No. 3, taken on 16. 11. '37, three months before pregnancy, showing increase in interstitial lung markings left mid-zone and base, with more localised fibrotic changes second left interspace, and right upper lobe.

Fig. 6. X-ray of same case taken on 16. 2. '39, two months after confinement, showing no change from the previous skiagram above.

HISTORY.

12. 3. '37. Patient has had an aching, intermittent pain in the back for one month. Was referred to the Royal Victoria Dispensary by her own doctor, as her brother died of tuberculosis three months previously, and her husband is at present in a sanatorium. No cough or sputum.

DIAGNOSIS.

Radiological. Increase in interstitial lung markings left mid-zone and base, radiating outwards from hilum to periphery. More localised fibrotic changes second left interspace, and right upper lobe.


Clinical. Chronic Fibroid Tuberculosis.

TREATMENT.

Dispensary Supervision.

PROGRESS.

26, 12. '37. Feels very well. Symptom free. No deterioration to be noted in local condition.
14. 7. '38. Is four and a half months pregnant. No lung symptoms. No change to be noted in pulmonary condition.
16. 2. '39. Confined two months ago. X-ray shows no deterioration in lung condition, compared with that on first visit.
26, 12. '39. Putting on weight. No evidence of deterioration in local or general condition.
Fig. 7. X-ray of Case No. 4, taken on 30. 9. '36, showing localised fibrotic changes left upper lobe in infraclavicular region. Patient two and a half months pregnant.

Fig. 8. X-ray of same case, taken on 24. 12. '37, eight months after confinement, showing no deterioration in pulmonary condition compared with above skiagram.
CASE NO. 4. Mrs. S.S. (Age 34 yrs.) Para. 6.

HISTORY.

31. 7. '33. Patient reported for contact examination, her two year old child dying of tuberculous meningitis. Has never had any trouble with her chest.

DIAGNOSIS.

Radiological. Localised fibrotic changes left upper lobe in infraclavicular region.

Bacteriological. Sputum positive, 23. 11. '38.

Clinical. Chronic Fibroid Tuberculosis.

TREATMENT.

Dispensary Supervision.

PROGRESS.

30. 9. '36. No deterioration to be noted in local or general condition during the last three years. Now two and a half months pregnant.


24. 12. '37. No radiological evidence of deterioration in lungs compared with their condition previous to pregnancy.
CASE NO. 5.  Mrs. E.U. (Age 33 yrs.) Para. 3.

HISTORY.

6. 4. '33.  Patient examined as a contact, her mother having died three weeks previously from phthisis. No complaints meantime, but there was a history of pleurisy one year ago.

DIAGNOSIS.

Radiological.  Old standing fibrotic changes right upper lobe with retraction of trachea to right, and elevation of interlobar fissure.

Bacteriological.  Sputum positive, 3. 6. '39.

Clinical.  Chronic Fibroid Tuberculosis.

TREATMENT.

Dispensary Supervision.

PROGRESS.

7. 12. '35.  Apart from slight cough with very little sputum, patient has remained well for the last two years.

16. 12. '36.  Is now five months pregnant. No deterioration in local or general condition to be noted.

2. 6. '37.  Delivered five weeks ago. Feels tired, but no increase in cough or sputum. Pulmonary condition clinically satisfactory.


HISTORY.

21. 7. '37.  Has been troubled with "bronchial" attacks for several years during the winter.  Cough and sputum always present.  Developed pain in the left side of the chest eight days ago.  Pleurisy on right side four years ago.

DIAGNOSIS.

Radiological.  Increase in interstitial markings left mid-zone and base, radiating from hilum to periphery.

Bacteriological.  Sputum positive, 24.  7. '37.

Clinical.  Chronic Fibroid Tuberculosis, with superimposed bronchitis.

TREATMENT.

Dispensary Supervision.

PROGRESS.

13. 12. '37.  Is two months pregnant.  Cough and sputum have improved since first visit, but dyspnoea is still troublesome.

31. 12. '38.  Confined six months ago.  No deterioration to be found in local condition radiologically.  General condition shows some improvement compared with that previous to pregnancy.

24. 6. '39.  Apart from occasional bronchitic attacks during the past winter, patient has remained comparatively well since her confinement.  No change to note in pulmonary lesions.
CASE NO. 7. Mrs. E.C. (Age 38 yrs.) Para. 3.

HISTORY.

19. 7. '34. Patient has suffered from bronchitis for a great number of years, and for the last two years has been having asthmatic attacks. Has been becoming increasingly breathless since then. Cough very troublesome on occasion and accompanied by thick greenish sputum.

DIAGNOSIS.

Radiological. Marked fibro-calcareous changes right upper lobe with hilum pulled upwards to apex, and trachea deviated to right. Kinking of right hemi-diaphragm. Fibro-calcareous changes left intercleido-hilar zone.

Bacteriological. Sputum positive on culture, 23, 3, '34.

Clinical. Chronic Fibroid Tuberculosis, with superimposed bronchitis and emphysema.

TREATMENT.

Dispensary Supervision.

PROGRESS.

9. 1. '35. Reports a three months pregnancy. No change to note in local or general condition.

7. 9. '35. Confined six weeks ago. Dyspnoea is troublesome, and patient complains of lassitude.

30. 8. '36. No deterioration radiologically evident in pulmonary condition compared with that previous to pregnancy. No change to note in general condition as well. Dyspnoea still incapacitating, but cough and sputum have decreased since first visit.
CASE NO. 8.  Mrs. E.L. (Age 37 yrs.)  Para. 3.

HISTORY.

3. 7. '30.  Patient had a small haemoptysis three years previously, but there was no recurrence until seven days ago, and another yesterday. Has had a cough for several years. Sister died of phthisis eight years ago.

DIAGNOSIS.

Radiological.  Fibrotic changes left upper lobe with small calcified foci at right apex. Increased interstitial markings throughout left lung.

Bacteriological.  Sputum positive, 9. 7. '30.

Clinical.  Chronic Fibroid Tuberculosis.

TREATMENT.

Dispensary Supervision.

PROGRESS.

6. 7. '32.  No deterioration in local or general condition compared with that on first visit.  Cough and sputum occasionally.  Had three further small haemoptyses during the last year. Manages her housework quite easily.
(b) Ulcero-Fibroid Forms. In other cases, the patient may attend for supervision at the commencement of her tuberculosis, when the pulmonary disease is frankly progressive and accompanied by ineffaceable destruction. After undergoing treatment, however, this process is stabilised, and the lesion then undergoes fibrosis to a varying extent.

This process, in some of these patients, ultimately becomes ulcer-ofibroid in character, where cavities of varying proportion can be seen on X-ray to be surrounded by dense fibrous tissue (Case 32 page 92).

On other occasions patients may report on their first visit exhibiting this pathological picture on their X-ray photograph (Case 33 page 93.)

Clinical Considerations. The clinical picture presented by these patients is very similar to that of the other types of fibroid tubercle, the remote, afebrile, haemorrhages with occasional bronchitic attacks and dyspnoea of varying severity.

These cases also undergo pregnancy and still maintain the sclerosing character of their pulmonary lesion. The radiological evidence of cavitation in these cases need not immediately entail the prospect of an abortion, especially if the fibrosis round the cavities is extensive and of long-standing duration. Physical examination in these cases gives a more precise prognosis than radiology, for often these cavities/
cavities are mute to auscultation, being non-secretory and non-expansile, thereby giving neither accompaniments nor breath sounds, which may be present in some cases over the lesion. Bernard (1933) has shown that these cases support pregnancy admirably, and it would be an unpardonable error to interrupt on the sole consideration of the X-ray appearance.

CASE NO. 32. Mrs. M.N. (Age 23 yrs.) Para. 1.

HISTORY.

26. 4. '29. Developed a cough with thick yellow sputum two months ago. Losing weight recently with troublesome night sweats.

DIAGNOSIS.

Radiological. Infiltrative changes right upper lobe down to third rib with appearances suggestive of multiple small cavities. Early changes right upper lobe.

Bacteriological. Sputum positive, 30. 4. '29.


TREATMENT.

Admitted to sanatorium. Hygieno-dietetic treatment. Left at her own request after six weeks stay, owing to domestic difficulties.

PROGRESS.

31. 9. '29. Confined to bed at home. Disease progressing, with cavity formation left upper lobe.
7. 2. '31. Discharged from sanatorium. Local condition greatly improved. Sputum still positive.
2. 9. '34.
Fig. 9. X-ray of Case No. 32, taken on 2. 9. '34, seven months before pregnancy commenced, showing ulcero-fibroid changes throughout left lung with complete sinistro-cardia, and fibro-calcaceous disease right upper lobe.

Fig. 10. X-ray of same case taken on 4. 3. '36, six weeks after labour, showing little change from previous radiograph.
CASE NO. 32 (CONTD.)

PROGRESS (Contd.)

2. 9. '34. X-ray shows ulcero-fibroid changes throughout entire left lung with complete sinistro-cardia. Trachea pulled over to left. Old standing, mainly fibro-clacareous disease right upper lobe down to second interspace. Dorsal scoliosis. General condition very satisfactory. Still coughing. Sputum positive.

4. 6. '35. Is two months pregnant. Feels very well. No change to note in pulmonary condition.


8. 6. '37. Local and general condition have shown no change during the past year.

CASE NO. 33. Mrs. R.T. (Age 24 yrs.) Para. 2.

HISTORY.

14. 3. '33. Patient has always had a weak chest since infancy. Cough and breathlessness becoming increasingly evident. Coughed up a teaspoonful of blood three days ago. Sputum has been stained red since.

DIAGNOSIS.

Radiological. Ulcero-fibroid disease right upper lobe with retraction of trachea to right. Fibrotic changes left apex above clavicle.

Bacteriological. Sputum positive, 18. 3. '33.

Clinical. Chronic Ulcero-fibroid tuberculosis.

TREATMENT.

Admitted to sanatorium. Course of Sanocrysin discontinued after 2 grammes of the gold salt had been given, owing to the appearance of a gingivitis. Hygi eno-dietetic treatment.

PROGRESS. /
CASE NO. 33 (CONTD.)

PROGRESS.

6. 7. '35. Improvement in local and general condition has been maintained during the past two years.
25. 9. '35. Reports three months pregnancy.
15. 2. '39. Was confined four weeks ago. No radiological changes to be noted since discharge from sanatorium. Slight loss in weight, otherwise general condition has been maintained as well.

(c) Healing Fibro-Caseous Forms. Unfortunately, pregnancy may supervene before this satisfactory state of affairs exists. There are the fibro-caseous types, in which the fibrotic element is slow in gaining the ascendancy over the caseous necrotic element. The latter is slowly being replaced by fibrous tissue, and had the patient not become pregnant, and treatment had been continued adequately, this process would probably have continued until it would have become wholly of a fibroid character. Fortunately, this may still occur in certain of these cases in spite of the supervening pregnancy. In many of them, however, it is difficult to decide in which direction the process will eventually progress, whether towards further caseation and necrosis, or further fibrosis.

Greater care must be taken with this fibro-caseous type in giving a favourable prognosis. The factors /
A. HEALING TUBERCULOSIS AND PREGNANCY (CONTD.)

(c) Healing Fibro-Caseous Forms (Contd.)

Factors to be taken into consideration are numerous, and must include careful radiological and clinical examination of the particular patient. Only those cases in which the fibrotic element takes precedence in a distinct manner can be included in this survey of the group of healing tuberculosis and pregnancy. Those in which the caseous element is supreme will receive comment under the destructive types of tuberculosis and pregnancy.

Serial radiography will allow us to estimate whether the fibrotic element is of recent origin, or whether it has been confirmed by long duration. Naturally the more closely pregnancy supervenes to the time when the caseous process was predominant, the more serious the prognosis. Whereas the fibrotic element is more stable, and more likely to gain ascendancy over caseation, the more remote was the last progressing process, since treatment will have more time to produce better results. Radiographic control will also permit us to appreciate whether the healing or the destructive process gains supremacy as the pregnancy continues. In this manner the local condition of the woman can be supervised and estimated.
A. HEALING TUBERCULOSIS AND PREGNANCY (CONTD.)

(c) Healing Fibro-Caseous Forms (Contd.)

Clinical Considerations.

The clinical picture presented by these patients must also receive consideration. If the fibrotic reaction is triumphant, they are generally afebrile, their weight is stationary or slowly increasing, with occasional cough and sputum, which at infrequent intervals may contain bacilli, and they enjoy comparatively good health. Any deterioration in this state of affairs such as bouts of temperature, loss of weight, increase in cough or sputum, or the appearance of other symptoms, for example, lassitude, pains in the chest, or increasing dyspnoea, will give further indications concerning the progress of the disease, and will be available for consideration in deciding whether fibrosis or caseation is occurring in the lungs.

Prognosis, as has been previously stated, must be more guarded in these healing fibro-caseous cases, but as the following cases demonstrate, if the sclerotic process is undoubtedly in the ascendency, and of sufficient duration, pregnancy will be well tolerated.
Fig. 11. X-ray of Case No. 94, taken on 24. 3. '38, two months before pregnancy, showing healing fibro-caseous right upper lobe, with similar changes 1st. left interspace.

Fig. 12. X-ray of same case taken on 22. 12. '39, ten months after confinement, showing little change in lesions right upper lobe, with slight improvement in left upper lobe.
CASE NO. 94.  Mrs. C.A. (Age 22 yrs.).  Para O.

HISTORY.
13. 10. '37.  Patient has had repeated bronchitic attacks for the past two years, and has noticed her cough and sputum increasing during the last three months. Coughed up a mouthful of blood four days ago, and sputum has been stained red since.

DIAGNOSIS.
Radiological.  Non-homogenous diffuse infiltrative change right upper lobe from apex down to upper border of third rib.  Hila increased.  Small micro-nodular deposits second left interspace.

Bacteriological.  Sputum positive, 24.10.'37.

Clinical.  Progressive fibro-caseous tuberculosis.

TREATMENT.

PROGRESS.
24. 3. '38.  Discharged from hospital.
Skiagram shows healing fibro-caseous changes right upper lobe, with accentuation of both basal broncho-vascular strands. Small calcified nodules left infraclavicular region. General condition excellent.  Slight anugh and sputum persist.
25. 7. '38.  Is two, months pregnant.
3. 8. '39.  No deterioration to note in local or general condition.
31. 12. '39.  Patient feels very well.  Slight cough and sputum in the mornings, otherwise symptom free.  Radiograph shows no deterioration in pulmonary condition compared with that before pregnancy.
CASE NO. 95.  Mrs. M.P. (Age 26 yrs.)  Para. 0.

HISTORY.

21. 9. '32.  Complains of cough and sputum for past five months.  Subject to colds every winter.  Father is a notified case of phthisis.

DIAGNOSIS.

**Radiological.**  Fibro-caseous changes of old standing left upper lobe.  Increased basal markings right side.

**Bacteriological.**  Sputum positive, 30. 9. '32.

**Clinical.**  Healing fibro-caseous tuberculosis.

TREATMENT.


PROGRESS.

6. 2. '33.  Discharged from hospital.  Lesion left upper lobe quiescent.

10. 3. '35.  Confined two months ago.  No deterioration was to be noted in local or general condition in spite of pregnancy and confinement.


CASE NO. 97. Mrs. S.O. (Age 36 yrs.) Para. 3.

HISTORY.

2. 8. '33. Developed very troublesome cough and sputum three months ago. Was confined to bed two weeks ago with sharp stabbing pain in the right side.

DIAGNOSIS.

Radiological. Infiltration right infraclavicular region undergoing fibrosis with accentuation of markings in right intercleidohilar zone from upper pole of right hilum. Left root increased.

Bacteriological. Sputum positive, 7. 8. '33.

Clinical. Healing fibro-caseous tuberculosis.

TREATMENT.

Dispensary Supervision.

PROGRESS.

23. 12. '33. Some deterioration in general condition but local condition remains unchanged.
4. 2. '34. Reports two months amenorrhoea.
2. 5. '34. Becoming slightly breathless. Cough and sputum slight. No deterioration in lungs.
12. 10. '34. Confined three weeks ago. Feels tired, but has no chest symptoms apart from slight cough.
3. 11. '35. Slight improvement in general condition during the last year. X-ray shows disease in right upper lobe has undergone further fibrosis and diminution in extent.
A. HEALING TUBERCULOSIS AND PREGNANCY (CONTD.)

The Effect of Pregnancy on the Healing Forms of Tuberculosis.

Prior to this juncture, only clinical data, demonstrating the satisfactory manner in which those women suffering from the healing forms of phthisis undergo gestation and confinement, have been tendered. Further consideration of Table II. page 64a will furnish corroborative, statistical, evidence.

Of the 31 women in this Table suffering from the fibroid type (Group I.), and who became pregnant, not one death was recorded, and only one woman became worse. Of the 34 women, diagnosed prior to and during gestation, and who suffered from the healing fibro-caseous type (Group III.A.), 3 died and 4 became worse one year after confinement. That the unfavourable results in these women were not due to pregnancy can be demonstrated by reference to the condition of their controls after a similar interval. In the control group, 4 women died and 14 were classified as worse.

Consequently, it would appear that pregnancy, occurring in women in whom the fibrotic element is predominating over the caseous and necrotic process, has little deleterious effect on the disease.

B. /
B. DESTRUCTIVE TUBERCULOSIS AND PREGNANCY.

A comparison of the mortality rate, which occurred in women suffering from the healing types of phthisis on the intervention of pregnancy, with that which resulted in those, in whom the tuberculous disease was progressive (Group II. and Group III.B.), shows a considerably greater mortality occurring in the latter group. In the women, suffering from the healing types of the disease, and diagnosed prior to and during pregnancy, the mortality was 4.6 per cent., whereas in the women with progressive forms, and diagnosed at similar intervals with regard to gestation, it was 53. per cent.

Pathological Considerations.

From the anatomo-pathological view-point, these progressive types correspond to exudative and destructive processes of the disease, the latter usually succeeding the former, when the exacerbation has continued its course for any length of time.

(a) Exudative Type and Pregnancy. Fortunately, this exudative process need not progress in the above manner, and undoubtedly in certain cases, tuberculous exudates, which are diagnosed early and which are of moderate extent, may undergo resolution, or the pulmonary parenchyma may become fibrotic to a varying degree /
Fig. 13. X-ray of Case No. 196, taken on 23. 8. '37, showing exudative change under right clavicle in 1st interspace. Patient two months pregnant.

Fig. 14. X-ray of same case, taken on 15. 10. '37, when patient four months pregnant, showing disappearance of above lesion.
A. DESTRUCTIVE TUBERCULOSIS AND PREGNANCY (CONTD.)

(a) Exudative Type and Pregnancy (Contd.)

degree where the exudative change occurred. This may happen occasionally during pregnancy also, as illustrated by the following case:--

CASE NO. 196. Mrs. I.R. (Age 37 yrs.) Para. 3.

HISTORY.

23. 9. '35. Patient developed a severe cold nine months ago, and has had a slight cough and sputum since. Seven days ago, she began to have a severe pain in the left side. Husband is a notified case of tuberculosis.

DIAGNOSIS.

Radiological. Infiltrative changes in left upper lobe in infraclavicular region.

Bacteriological. Sputum positive, 27. 9. '35.


TREATMENT.


PROGRESS.

27. 12. '35. Discharged from hospital. Apart from slight morning sputum has no complaints. Local lesion has undergone stabilisation.

20. 6. '37. Patient has remained very well during the past two years. No symptoms. X-ray shows all that remains of previous lesion is small well-defined fibrotic nodule under shadow of second left rib anteriorly.

23. 8. '37. /
B. DESTRUCTIVE TUBERCULOSIS AND PREGNANCY (CONT'D.)

(a) Exudative Type and Pregnancy (Contd.)

CASE No. 94 - Progress (Contd.)


15. 10. '37. Symptom free. X-ray shows focus formerly in right costo-clavicular angle now entirely cleared up.

14. 4. '38. Confined three weeks previously. Feels quite well, apart from slight weakness after confinement. X-ray shows no deterioration has occurred in pulmonary condition compared with that before confinement.

3. 5. '39. Continues to keep well. No deterioration in local or general condition during the past year.

Leonardi (1935) has pointed out, however, that when these exudative changes occur during pregnancy, or pregnancy supervenes in a woman suffering from this type of phthisis, if it is not possible to oppose the lesion with a complete and efficient artificial pneumothorax, it is to be feared that they will progress still further. In the nine women found to be suffering from this type of tuberculosis in this survey, the above case was the only one which underwent resolution. In the others, artificial pneumothorax was found inapplicable for various reasons, and in all the exudative changes underwent caseation and ulceration after confinement with broncho-pneumonic spread in addition in six of them in the terminal stage.
Fig. 15. X-ray of Case No. 44, taken on 22. 4. '38, showing exudative changes throughout the greater part of the left lung, with small commencing cavity in the infraclavicular region.

This patient was too ill to be X-rayed after confinement.

Patient was one month pregnant when the above X-ray was taken.
CASE NO. 44.  MRS. M.A. (Age 23 yrs.)  Para 0.

HISTORY.

21. 7. '37. Has not felt well for the past three months, always feeling tired and listless. Developed a cough four weeks ago. Father died of pulmonary tuberculosis three years previously.

DIAGNOSIS.

Radiological. Early infiltrative changes left apical and subapical regions.

Bacteriological. Sputum positive, 24. 7. '37.

Clinical. Progressive fibro-caseous tuberculosis.

TREATMENT.

Dispensary supervision. Patient refused hospitalisation.

PROGRESS.

22. 4. '38. Patient has been going downhill gradually since first visit. X-ray now reveals exudative changes throughout the greater part of the left lung with small commencing cavity in the infraclavicular region.

2. 6. '38. Reported two months pregnant. Feels slightly better with some decrease in night sweats and amount of sputum.

23. 7. '38. Disease showing some exacerbation clinically, lung symptoms becoming more troublesome. Now three and a half months pregnant.

4. 9. '38. Feels some improvement in her condition last month. No evidence of progress of local lesion meantime.

30. 1. '39. Confined. Has felt some improvement in her cough, sputum and night sweats in the last two months.

27. 2. '39. Died, after developing a tuberculous broncho-pneumonia in the terminal stages.
DESTRUCTIVE TUBERCULOSIS AND PREGNANCY (CONT'D.)

(b) Destructive Types and Pregnancy. Consequently these forms with an acute exudative beginning will be grouped in the same chapter with the more complex forms, in which the caseating and necrotic processes are superadded, and predominate over any attempt of the bodily resistance to impose a fibrotic or healing reaction.

Consideration of the destructive types of tuberculosis and their relationship to pregnancy in the following illustrations, will show the supreme importance in the prognosis of the combination, of the progressive factor of the disease, and the anatomo-pathological form subsequently produced.

Four methods of progressive exacerbation in the lungs must be contemplated, spread by the blood stream, the air-passages, the lymphatics, and by direct contiguity.

(i) Miliary Type. If haematogenous spread occurs in a decided manner, then the anatomo-clinical picture of acute miliary tuberculosis results, usually not only confined to the lungs, but perhaps involving as well the peritoneum, meninges, et cetera. In the lungs, the typical picture of diffuse, wide-spread, small tubercles coalescing to form larger areas of caseation and subsequent necrosis are seen. Jameson (1935) points out, however, that miliary spread is no more common
B. DESTRUCTIVE TUBERCULOSIS AND PREGNANCY (CONTD.)

(b) Destructive Types and Pregnancy - (i) Miliary Type (Contd.)

common in tuberculous gravida than in tuberculous non-pregnant women. Couvelaire and Lacomme (1929) encountered only four cases of the meningeal variety out of six hundred reviewed. Acute miliary tuberculosis developed during pregnancy in only one of the 153 women, who were diagnosed to be suffering from pulmonary tuberculosis before or during pregnancy, of the 295 women who compose this study.

CASE NO. 42. Mrs. A.P. (Age 25 yrs.) Para 0.

HISTORY.

4. 7. '47. Has not been feeling well for the past month. Cough and sputum very troublesome. Has been losing weight very rapidly during this period.

DIAGNOSIS.

Radiological. Widespread ulcero-caseous disease both lungs with multiple small cavities both upper lobes.

Bacteriological. Sputum positive, 11. 4. '37.

Clinical. Acute Ulcer-caseous tuberculosis.

TREATMENT.

Dispensary Supervision, patient refusing hospitalisation.

PROGRESS.

21. 11. '37. /
CASE No. 42 (CONTD.)

PROGRESS.


4. 3. '38. Clinical signs of abdominal involvement now present. Complaining of severe headaches.

12. 3. '38. Delivered this morning.

24. 3. '38. Patient died. Post-mortem revealed tuberculous involvement of peritoneum and meninges with widespread ulcerocaseous changes in both lungs and terminal miliary spread at both bases.

Unfortunately, this type of spread developed quite frequently during the puerperium after the woman had safely undergone her confinement. This observation will receive further consideration when the progress during the puerperium is discussed.

(ii) Bronchopneumonic Type. Tuberculous bronchopneumonia resulting from mass bronchogenic spread is also uncommon during pregnancy, and no cases are recorded in the literature. It could not be demonstrated in any of the 153 women, who were diagnosed tuberculous before or during pregnancy in this study.

(iii) Ulcero-caseous and progressive fibro-caseous Types. Lymphatic spread can occur during pregnancy if there is a progressive tendency, and is responsible for fresh infiltrates in areas of the pulmonary parenchyma, which so far were undamaged. However, it rarely, if ever, occurs by itself, but is more often accompanied /
B. DESTRUCTIVE TUBERCULOSIS AND PREGNANCY (CONT'D.)

(b) Destructive Types and Pregnancy - (iii) Ulcero-caseous and Progressive Fibro-caseous Types - (Contd.)

accompanied by the last and commonest method of spread, that of direct contiguity.

This latter means of spread arises in varying degrees in every case where progress occurs, depending wholly on the resistance of the individual woman concerned. This latter reaction is, of course, expressed in the anatomo-pathological specimen by the amount of fibrosis occurring. As we are considering in this section those cases, in which the destructive process is supreme, this fibrotic reaction is being overcome, slowly in some women, more quickly in others.

Where the fibroid element is almost wholly absent, caseation and ulceration takes place with remarkable rapidity, resulting in the ulcero-caseous type of pulmonary tuberculosis.

Where the resistance of the patient is more pronounced, the fibro-caseous type is produced, but in the cases about to be discussed, the caseous element is slowly overcoming the fibrotic reaction, thus distinguishing and in contradistinction to the fibro-caseous types considered in the previous section of this chapter.

It must be emphasised, however, that these forms of aggravation also rarely happen during gestation /
B. DESTRUCTIVE TUBERCULOSIS AND PREGNANCY (CONTD.)

(b) Destructive Types and Pregnancy - (iii) Ulcero-caseous and Progressive Fibro-caseous Types (Contd.)

gestation to any very evident degree, but are exceedingly common during the puerperium and the months, which ensue, in the ulcero-caseous and progressive fibro-caseous types. More detailed consideration of this observation is deferred until the next chapter, but it may be stated here briefly that slight aggravation of the pulmonary condition may appear during the first trimester of pregnancy, when the maternal organism is adapting itself to the demands of the foetus, and nausea, morning sickness, etcetera may become troublesome. This deterioration is difficult to demonstrate on most occasions radiologically, as pregnancy may never be suspected, and X-ray investigation may not be undertaken at the appropriate times. The amenorrhoea, and other indications of deterioration in the clinical condition are usually considered to be due to the tuberculosis itself. Moreover, during the remaining months of pregnancy, amelioration in the pulmonary lesions is almost always the rule.

Clinical Considerations.

In the progressive forms of the disease, the clinical manifestations are mainly of importance in the estimation of the exact anatomo-pathological type present.
B. DESTRUCTIVE TUBERCULOSIS AND PREGNANCY (CONT)

Clinical Considerations (Contd.)

The acute miliary and broncho-pneumonic types are easily recognised clinically, and it is in the differentiation of the ulcerocaseous and the advanced progressive fibro-caseous cases that difficulties arise. The rapidity and the extent of the deterioration in the following manifestations of the progressiveness of the disease will allow us to determine which of these two types is present: appearance or increase in the discomfort produced by night sweats, appearance or the elevation of the temperature, increase in the cough and expectoration, the appearance of haemoptyses, or attacks of pleurisy, bacilli in the sputum appearing or becoming more numerous, the extension of adventitious sounds, whose quality becomes moister and louder, and the appearance of bronchial breathing and evidence of cavitation. These signs would indicate the extension of a pre-existing lesion or new deposits in the same or contra-lateral lung.

Undoubtedly border-line cases will occur, in which difficulties will arise in regard to which of the above two categories the case under review will fall. In these, serial radiography will allow us to differentiate the two types by demonstrating the scarcity of fibrous tissue, and the rapidity of spread /
B. DESTRUCTIVE TUBERCULOSIS AND PREGNANCY (CONTD.)

Clinical Considerations (Contd.)

spread and cavitation, which is characteristic of the ulcero-caseous type, in comparison with the slower progress and greater evidence of fibrosis in the progressive fibro-caseous types.

The Effect of Pregnancy on the Destructive Forms of Tuberculosis.

However, although aggravation undoubtedly can be demonstrated in these cases, especially after confinement, it must be remembered that the ulcero-caseous and progressive fibro-caseous types of phthisis have generally a very poor prognosis, and exacerbation will result in these cases without an intercurrent pregnancy. Weymeersch and Albrechts (1923) have remarked on the difficulty of determining the exact influence of pregnancy on the illness, and the necessity for making proper allowance for the spontaneous tendency of the tuberculosis without any action from a supervening pregnancy.

In the series of cases meanwhile under discussion, 22 women were found to be suffering from ulcero-caseous disease during pregnancy. 19 of these were dead after one year, and the other 3 were definitely worse. But an exactly similar state of affairs existed at the end of this period with regard to the 22 controls. In the 44 women suffering from progressive /*
progressive fibro-caseous disease, 17 had died, 22 were definitely worse, 4 were unchanged and 1 improved. In the control group, 18 had died, 19 were worse, 5 were unchanged, and 2 improved - a very small difference with the mortality showing that any advantage lay with the pregnant women.

Norris (1922), Forssner (1924), and de Carvalho (1927), have also combatted this tendency to blame every aggravation appearing in pregnancy as being caused by that gestation.

Moreover, in practice, if every case is studied individually with constant reference to a non-pregnant control, the degree of responsibility which can be placed on the co-existing pregnancy, can be made with comparative ease. The circumstances of the appearance of the exacerbation, the history of the illness previous to the pregnancy, the length of the pregnancy when the aggravation or the appearance of the tuberculosis supervenes, generally permit it to be known whether exacerbation has resulted primarily on account of the pregnancy, or is merely a repetition of a previous set-back before pregnancy complicated the issue.

In none of the above 66 women matched to controls, found to be suffering from a destructive type of phthisis in this survey, could the pregnancy be /
be blamed for the exacerbations which occurred. The progress and the mortality differed little from those of the control group. If any difference was noted, it appeared that the spontaneous tendency of the disease was somewhat slower during pregnancy, and rather quicker after confinement compared with the progress in the non-pregnant women. An explanation for this phenomenon has been attempted by emphasising the mechanical role of the diaphragm in influencing the course of the pulmonary disease, and will be discussed later.

Bernard (1923) has pointed out that frequently the destructive types of phthisis appear during pregnancy, and has blamed this condition for their appearance. This has been hotly disputed by Brindeau (1935). Further consideration will be directed to this point when the importance of the period at which pregnancy becomes apparent, before, during or after pregnancy, is discussed.

Otherwise, pregnancy would appear to have as little influence in the progress of the destructive types of pulmonary tuberculosis as it did in the healing fibroid types.
PART IV.

THE PROGNOSTIC IMPORTANCE OF THE TIME OF DIAGNOSIS OF TUBERCULOSIS IN RELATION TO PREGNANCY. 115.

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PART IV.

THE PROGNOSTIC IMPORTANCE OF THE TIME OF DIAGNOSIS OF TUBERCULOSIS IN RELATION TO PREGNANCY.

Attention will now be directed towards the immense importance of the exact moment at which the diagnosis of tuberculosis is established with regard to the pregnancy, before conception occurs, during pregnancy, or in the months which follow confinement.

The necessity for dividing tuberculosis gravida into the foregoing categories has already been demonstrated in Part II., where the decided influence of this classification on the prognosis of the relationship of these two conditions became apparent. Of the 230 pregnant women matched to controls, the mortality after one year in those diagnosed before pregnancy was 17.5 per cent.; in those diagnosed during pregnancy 49 per cent.; in those diagnosed within six months after the confinement 66 per cent.

The high percentage of healing types of phthisis in those diagnosed before pregnancy compared with those in which tuberculosis was not demonstrated until pregnancy supervened, or had been undergone recently /
TABLE IV.

COMPARISON of the CONDITION of 80 Tuberculous Women Diagnosed before Pregnancy, one year after Confinement, and their Controls one year after Diagnosis, and classified according to the Anatomo-pathological type of their Disease.

Condition one year after Labour.

<table>
<thead>
<tr>
<th>Type of Disease</th>
<th>Group I. Fibroid</th>
<th>Group II. Ulcer- caseous etc.</th>
<th>Group IIIA Healing Fibro-caseous</th>
<th>Group IIIB Progressive Fibro Caseous</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Tuber- culous</td>
<td>Tuber- culous</td>
<td>Tuber- culous</td>
<td>Tuber- culous</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Controls</td>
<td>Controls</td>
<td>Controls</td>
<td>Controls</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Dead</td>
<td>Worse</td>
<td>Un- changed</td>
<td>Improved</td>
<td>Total</td>
</tr>
<tr>
<td>-----------------</td>
<td>-------</td>
<td>-------</td>
<td>-----------</td>
<td>----------</td>
<td>--------</td>
</tr>
<tr>
<td>Group I.</td>
<td></td>
<td></td>
<td>24</td>
<td>5</td>
<td>29</td>
</tr>
<tr>
<td>Fibroid</td>
<td></td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group II.</td>
<td>6</td>
<td>1</td>
<td></td>
<td></td>
<td>7</td>
</tr>
<tr>
<td>Ulcer- caseous</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>etc.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group IIIA</td>
<td>1</td>
<td>4</td>
<td>13</td>
<td>9</td>
<td>27</td>
</tr>
<tr>
<td>Healing Fibro-</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>caseous</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Group IIIB</td>
<td>6</td>
<td>6</td>
<td>4</td>
<td>1</td>
<td>17</td>
</tr>
<tr>
<td>Progressive</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fibro Caseous</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>13</td>
<td>11</td>
<td>41</td>
<td>15</td>
<td>80</td>
</tr>
<tr>
<td>Women.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Controls</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>
recently, together with other as yet unrelated factors concerned in the prognosis, and the different tendencies of the disease in these categories, make it essential to divide this chapter into the following sections:–

A. Effect of Pregnancy on those diagnosed prior to conception.

B. Effect of Pregnancy on those diagnosed during pregnancy.

C. Effect of Pregnancy on those diagnosed subsequent to the confinement.

A. **EFFECT OF PREGNANCY ON THOSE DIAGNOSED PRIOR TO CONCEPTION.**

1. **Statistics.**

The effect of gestation on this class of women is shown admirably by Table II. page 64a, the relevant part of which is reprinted at this juncture for the sake of convenience as Table IV. on the opposite page.

In this Table, the different anatomo-pathological types of tuberculosis, into which the women of this survey have been classified, are given in Column 1. The second column is inserted to allow differentiation between the pregnant women of this survey and their controls. In the four following columns, the condition of these women one year after confinement or diagnosis, whether dead, worse, unchanged, or improved can be elicited.
TABLE V.

CONDITION of 93 Tuberculous Women Diagnosed before Pregnancy one year after Confinement, and classified according to the Anatomo Pathological Type of their Disease.

<table>
<thead>
<tr>
<th>Type of Disease</th>
<th>Dead</th>
<th>Worse</th>
<th>Unchanged</th>
<th>Improved</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group I. Fibroid.</td>
<td></td>
<td>1</td>
<td>29</td>
<td>5</td>
<td>35</td>
</tr>
<tr>
<td>Group II. Ulcerocaseous etc.</td>
<td>6</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>7</td>
</tr>
<tr>
<td>Group III.A. Healing Fibrocaseous</td>
<td>1</td>
<td>4</td>
<td>15</td>
<td>10</td>
<td>30</td>
</tr>
<tr>
<td>Group III.B. Progressive Fibrocaseous</td>
<td>6</td>
<td>7</td>
<td>7</td>
<td>1</td>
<td>21</td>
</tr>
<tr>
<td>TOTAL</td>
<td>13</td>
<td>13</td>
<td>51</td>
<td>16</td>
<td>93</td>
</tr>
<tr>
<td>Per Cent.</td>
<td>14</td>
<td>14</td>
<td>55</td>
<td>17</td>
<td>100</td>
</tr>
</tbody>
</table>
A. DIAGNOSED PRIOR TO CONCEPTION (CONT'D.)

1. Statistics (Contd.)

elicited. In the last column the total number of women belonging to each pathological type of disease can be found.

This Table, however, includes only the 80 women, who were found to be suffering from tuberculosis before diagnosis, and who were matched to controls. A further 13 women, to whom no controls could be allocated, also became pregnant after their diagnosis and were discovered during this survey. The fate of these 93 women one year after confinement is shown in Table V. on the opposite page.

This table is constructed in a similar fashion to that of Table IV. with the exclusion of data relating to controls given in that table. The anatomo-pathological type of tuberculosis prevailing, the condition of the 93 women one year after confinement according to the prognostic standards adopted in this survey, and the total number of women in the different pathological groups are given in Columns 1 to 6 respectively.

The relatively low mortality, which prevails in this class of women diagnosed before pregnancy, has already been noted as far as the pregnant women /
A. DIAGNOSED PRIOR TO CONCEPTION (CONT'D.)

1. Statistics (Contd.)

women included in Table IV. are concerned. If the mortality rate (14 per cent.) of the women in Table V. is compared with that prevailing in Table VII., on page 145a which includes all women diagnosed during pregnancy, whether matched to controls or otherwise, and that of all women diagnosed after confinement, given in Table VIII. on page 157a, this fact again emerges. The mortality rate for all women diagnosed during pregnancy was 46.6 per cent. and for all women diagnosed after labour was 56.3 per cent.

Reasons for the Low Mortality in this Class.
The relatively low mortality observed in this class of woman diagnosed before pregnancy in comparison with the death rate in the other two classes diagnosed during and after pregnancy, has a variety of explanations. Undoubtedly the predominance of the healing types of tuberculosis in this group (71 per cent.) is the main factor concerned. This predominance itself, however, is dependent upon other important factors, which must receive due consideration.

In these women, the tuberculous disease has generally been in existence for some considerable time, /
A. **DIAGNOSED PRIOR TO CONCEPTION (CONT'D.)**  

1. **Statistics (Cont'd.)**

   time, and has consequently been under supervision and possibly treatment, so that particular care has been exercised to encourage fibrosis and healing. If pregnancy supervenes, the body resistance has been encouraged to a certain extent and the prognosis is correspondingly brightened.

   In addition, during pregnancy, the patient realising the precariousness of her position, will place herself under the care of her physician and may be able to undergo sanatorium regime. Any exacerbation of her tuberculosis which might have become apparent, can then receive prompt and adequate treatment. If the regimen is carried out properly, the additional strain of labour is greatly offset. None of these factors can operate for the benefit of those women diagnosed during or after pregnancy so satisfactorily.

2. **Progress of the Disease in Women Diagnosed before Pregnancy.**

   (a) **In Fibroid Forms.** If pregnancy is delayed until the activity of the disease has been practically eradicated by the above means, the fibroid types of phthisis result. In the previous chapter, it has been shown that pregnancy has no effect /
A. DIAGNOSED PRIOR TO CONCEPTION (CONTD.)

2. Progress of the Disease - (a) In Fibroid Forms (Contd.)

Effect on this anatomo-pathological group. From Table V., page 116a, it will be observed that of the 35 women belonging to this group, diagnosed before pregnancy, only 1 patient could be classified "worse" one year after her delivery. As the deterioration in her local and general condition did not commence until nine months after confinement, and was relatively slight, the pregnancy can hardly be inculpated.

CASE NO. 35. Mrs. W.O. (Age 37 yrs.) Para 5.

HISTORY.

28. 3. '35. Patient has had a chronic cough for several years, occasionally productive. Three weeks ago, she developed a pain in the left side. Mother died from pulmonary tuberculosis.

DIAGNOSIS.

Radiological. Old-standing fibroid changes both upper lobes, more marked left side. Enlarged left root.

Bacteriological. Sputum positive, 26. 5. '38

Clinical. Chronic Fibroid Tuberculosis.

TREATMENT.

Dispensary Supervision.

PROGRESS. /
A. DIAGNOSED PRIOR TO CONCEPTION (CONTD.)

2. Progress of the Disease - (a) In Fibroid Forms (Contd.)

CASE NO. 35 (CONTD.)

PROGRESS.

9. 6. '36. Slight improvement in general condition since first attendance at dispensary. Local lesions remain satisfactory.
22. 3. '37. Is four months pregnant. Feels very well. No increase in pulmonary symptoms. No deterioration locally.
12. 9. '37. Confined two weeks ago. Cough and sputum show slight increase lately after a recent cold. No change to note in pulmonary lesions.
9. 6. '38. Patient felt quite well until three weeks previously when she contracted a severe chill. Sputum now positive, and has increased in amount lately. X-ray shows the appearance of a small infiltrate in left upper lobe.
24. 6. '38. Admitted to sanatorium.
30. 10. '38. Discharged. Disease now quiescent.
31. 12. '39. General condition has been maintained since discharge from sanatorium. No evidence of activity locally.

(b) In Healing Fibro-Caseous Forms. However, if pregnancy occurs before these factors can produce such a satisfactory condition of the lungs, but the fibrotic action still predominates, the healing fibro-caseous type of tuberculosis will exist. As has been shown in the last chapter, the prognosis must be more guarded in these cases, but generally they tolerate pregnancy fairly well. Of the 30 women belonging to this group, 25, or 83 per cent. /
A. **DIAGNOSED PRIOR TO CONCEPTION (CONTD.)**

2. **Progress of the Disease - (b) In Healing Fibro-Caseous Forms (Contd.)**

83 per cent., underwent their confinement, and suffered no deterioration after one year. Of the other 5, 1 died, and 4 were classified "worse" after this period.

The immense importance of the time which has elapsed since the last progressive thrust of the disease, and the occurrence of pregnancy, is admirably illustrated on further analysis of these statistics. Of the 5 cases in which deterioration resulted after pregnancy, in 4, the caseous and destructive process was still in the ascendancy in the year in which pregnancy occurred, so that the sclerosing process had had little time or opportunity to establish itself. The nearer pregnancy supervenes to the last progressive exacerbation, the more unfavourable is the prognosis.

Couvelaire (1932) has also demonstrated the necessity for taking this factor into consideration when estimating the prognosis. Of 370 of his patients, diagnosed before impregnation, 200 were dead in the year following confinement. In those patients, whose tuberculosis had commenced more than one year before conception, the mortality was 27.4 per cent. In those whose illness had preceded /
A. **DIAGNOSED PRIOR TO CONCEPTION (CONT'D.)**

2. **Progress of the Disease - (b) In Healing Fibro-Caseous Forms (Contd.)**

preceded the pregnancy by six to seven months, it was 34 per cent.; when the disease appeared in less than six months, it was 45 per cent. Unfortunately, he tendered no information regarding the prevailing anatomo-pathological type of phthisis present.

These figures give further evidence of the importance of the progressive factor, but it is naturally rendered even more obvious upon consideration of the course of pulmonary tuberculosis in the destructive type of phthisis, where it has gained supremacy over the fibrotic element.

(c) **In the Ulcero-caseous Types.** In the 7 cases of ulcero-caseous tuberculosis out of the 93 women diagnosed before conception, 6 were dead, and 1 considerably worse in the year following parturition. In 3 cases, pregnancy occurred within four months of diagnosis, and in the other 4 at various intervals from nine months to three years after diagnosis, when varying factors had caused the body resistance to be disrupted, and this fatal type to be established and to be advancing rapidly to its inevitable termination.

However, /
A. DIAGNOSIS PRIOR TO CONCEPTION (CONTD.)

2. Progress of the Disease - (c) In the Ulcero-Caseous Types (Contd.)

However, the typical course of the disease was seen to be somewhat modified by the intervention of pregnancy, when comparison was undertaken with the control patients, whose disease had no relationship to gestation.

Leonardi (1935) has remarked that aggravation may arise from the beginning of pregnancy, and constitute one of the first signs that this condition has supervened, although definite evidence may not be forthcoming until some weeks later when the Ascheim-Zondek reaction proves positive. As this was the only reference to be found in the literature regarding exacerbation at this very early period, it must be relatively uncommon. It could not be demonstrated in any of the 295 cases comprising this survey.

Much more prevalent is the aggravation which becomes apparent during the second or third months of pregnancy, and generally finds expression in deterioration of the general condition of the patients with loss of weight, feverishness, nausea, vomiting, and dizziness. These manifestations probably express the adaptation of the woman to her new state, and any exacerbation in the tuberculous condition /
A. DIAGNOSED PRIOR TO CONCEPTION (CONTD.)

2. Progress of the Disease - (c) In the Ulcero-Caseous Types (Contd.)

condition appears to resolve with their disappearance after the third month. An illustrative case of this form of exacerbation and subsequent resolution is given below.

CASE NO. 41. Mrs. E.L. (Age 27 yrs.) Para 1.

HISTORY.

8. 8. '35. Complained of a severe pain in the left side of the chest five weeks ago. Developed a severe cough a few days later, which has gradually become worse and is accompanied by a thick sputum. Sweating heavily at night.

DIAGNOSIS.

Radiological. Widespread exudative changes throughout left lung more marked at left base external to heart border. Small nodular deposits first right interspace.

Bacteriological. Sputum positive, 11. 8. '35.

Clinical. Acute Pulmonary Tuberculosis.

TREATMENT.

Patient refused hospitalisation. Attended Dispensary for supervision.

PROGRESS.

11. 12. '35. Is four months pregnant. Morning sickness was troublesome. Has lost 8 lbs. during the last three months. General condition now beginning to improve. Physical signs at right apex indicated extension in this area during this period. 5. 4. '36. /
A. DIAGNOSED PRIOR TO CONCEPTION (CONTD.)

2. Progress of the Disease - (c) In the Ulcero-Caseous Types (Contd.)

CASE NO. 41 (CONTD.)

5. 4. '36. Feels improved now. Disease at right apex less active than previously.
16. 5. '36. Confined.
5. 8. '36. Patient went rapidly downhill after confinement. Developed meningitis eleven days previously and died on this date.

Exacerbation in the later months of pregnancy has been stressed by Couvelaire (1932), and occurred in this series in one case, which has already been described in the previous chapter, (Case No. 42, page 106). Acute miliary tuberculosis developed after a seven and a half months pregnancy and one week before confinement occurred. Death resulted twelve days after this premature delivery. According to Couvelaire, these accidents of the latter months are rarer but also more serious, less willingly resolved spontaneously, and are also less respondent to anti-tuberculosis therapy in all its forms. They represent a weakness in the patient's resistance.

Apart from this latter case, the progress of the disease in these gravida appeared to proceed more slowly, and with less distress towards a fatal termination. The average duration of life in these cases from the commencement of the development /
A. **DIAGNOSED PRIOR TO CONCEPTION (CONTD.)**

2. **Progress of the Disease - (c) In the Ulcero-Caseous Types (Contd.)**

   development of the ulcero-caseous type of tubercle was eleven months, compared with seven months in the case of their controls. Pregnancy seemed to delay the inevitable for this short period.

   Aggravation undoubtedly appeared in its most evident form in the days or weeks following confinement. Of the 6 cases which reached term, five were dead within the first three months after the confinement from either acute miliary or broncho-pneumonic tuberculosis. This fate was avoided by the remaining case for a further eleven months before she too succumbed.

**CASE NO. 47.** Mrs. P.I. (Age 24 yrs.) Para 2.

**HISTORY.**

24. 5. '35. Patient developed a heavy cold six weeks ago, which has never cleared up. Has been losing a lot of weight recently, with occasional pains across the front of the chest.

**DIAGNOSIS.**

Radiological. Fibro-caseous changes scattered throughout right lung with small cavity under clavicle. Calcified foci left apex and infraclavicular region with recent activation in surrounding area.

Bacteriological. Sputum positive 27. 5. '35.

Clinical. Progressive fibro-caseous tuberculosis.

**TREATMENT.** /
A. DIAGNOSED PRIOR TO CONCEPTION (CONT'D.)

2. Progress of the Disease - (c) In the Ulcero-Caseous Types (Contd.)

CASE NO. 47 (CONT'D.)

PROGRESS.

26. 7.'35. Discharged from hospital at own request. Some improvement in general condition but little change to note locally.
7. 12. '35. General and local condition have remained stationary since discharge.
2. 4. '36. Disease now progressing rapidly. Cavity right upper lobe increasing in size, with exudative changes now present upper lobe left lung, and commencing cavitation under left clavicle. Disease now ulcero-caseous in character.
17. 8. '36. Is now three months pregnant. Little change to note in local or general condition during the last three months. Readmitted to Hospital.
26. 2. '37. Transferred to Maternity Hospital two weeks ago for confinement and then readmitted to sanatorium. Slight extension of disease to both bases, otherwise no change to note in condition previous to labour.
3. 9. '37. Patient going slowly downhill.
14. 3. '38. Symptoms and signs of abdominal involvement now present. Extensive disease both lungs. Patient gravely ill.
22. 3. '38. Patient died.

(d) In the Progressive Fibro-Caseous Types.

In the progressive fibro-caseous form, these exacerbations also take place although perhaps in a less spectacular manner than in the ulcero-caseous type.

Of the 21 cases belonging to this category and /
A. DIAGNOSED PRIOR TO CONCEPTION (CONT'D.)

2. Progress of the Disease - (d) In the Progressive Fibro-Caseous Types. (Contd.)

and diagnosed before pregnancy, 6 were dead, 7 were worse, 7 showed little change, and 1 had improved in their condition one year after confinement, compared with their state of health previous to conception. In all these cases but one, gestation occurred two years after diagnosis when the patient's resistance had been undermined for various reasons, and the caseous destructive process was overcoming the fibrotic reaction with varying degrees of celerity. In the remaining case, pregnancy supervened two months after diagnosis, the patient refusing hospitalisation. Treatment had then had insufficient time to establish an adequate protective barrier of fibrous tissue to combat the caseating process.

No aggravations were noticed in any of these patients on the commencement, but 9 of them experienced the set-back occurring at the second to the third month of pregnancy. The usual concomitants at this exacerbation, denoting the adaptation of the mother to her new state, became evident - nausea, vomiting, morning sickness, and painful breasts. Increase in the cough and sputum, or other symptoms suggestive of deterioration /
A. **DIAGNOSED PRIOR TO CONCEPTION (CONTD.)**

2. **Progress of the Disease — (d) In the Progressive Fibro-Caseous Types (Contd.)**

Deterioration in the lung condition were also reported. Physical examination of the chest also revealed evidence of this. The patient herself did not feel as fit as she did before pregnancy occurred. Gross (1927) has particularly stressed this aggravation occurring in the first trimester or pregnancy, and Bar (1922) considers it an indication for abortion.

In the remaining six months of pregnancy, all these patients, with two exceptions (Cases 151 and 152, page 131), apart from increasing dyspnoea, noticed a definite amelioration in their symptoms. A general and unsolicited remark was "I've never felt better since I developed this trouble." Clinically, there was usually a diminution in the moist accompaniments on auscultation, with no evidence of further extension of the disease ascertainable. The progressive process, observed at the beginning of impregnation, seemed now to have settled down in varying degrees in each individual patient. Haig Ferguson (1931) and Young (1936) are among the obstetricians who have commented on the abatement of the clinical symptoms of the disease during pregnancy. The condition /
A. DIAGNOSED PRIOR TO CONCEPTION (CONT'D.)

2. Progress of the Disease - (d) In the Progressive Fibro-Caseous Types (Contd.)

Condition is universally recognised by phthisiologists who have devoted any research to the relationship of tuberculosis and pregnancy.

Unfortunately, this satisfactory improvement during this period allows of exceptions as Couvelaire has pointed out. Metzger (1928) has published 3 cases, demonstrating that this amelioration during the last trimester cannot always be expected. The two cases illustrating exacerbation at this juncture are given below.

CASE NO. 151. Mrs. E.W. (Age 28 yrs.) Para O.

HISTORY.

5. 4. '34. Patient has had a troublesome cough for the last three months. Is now accompanied with thick sputum. Sputum was blood stained three days ago.

DIAGNOSIS.

Radiological. Diffuse infiltrative changes both upper lung zones, more extensive right side.

Bacteriological. Sputum positive - 10. 4. '34.

Clinical. Admitted to sanatorium. Hygieno-dietetic regime.

PROGRESS.

16. 4. '35. /
A. DIAGNOSED PRIOR TO CONCEPTION (CONT'D.)

2. Progress of the Disease - (d) In the Progressive Fibro-Caseous Types (Contd.)

CASE NO. 151 (Contd.)

PROGRESS.

16. 4. '35. Discharged from hospital. Immense improvement in local and general condition. Lung lesions have undergone satisfactory fibrosis.
5. 9. '35. Has lost some weight since discharge from hospital, and cough and sputum have returned. Some deterioration in local condition on auscultation.
10. 2. '38. During the last three years, lesions have slowly undergone deterioration in lungs. X-ray shows fibro-caseous changes of a progressive nature both upper lobes, with a small cavity at the level of the first rib on the right side. Is four and a half months pregnant.
22. 5. '38. Disease slowly extending locally. Now eight months pregnant.
Feels very breathless, and cough increasing.
29. 6. '38. Confined ten days ago. Admitted to sanatorium today. Looking ill and toxic. Disease has made rapid progress. Whole of right lung now affected with cavitation occurring at right base. Lesion now ulcero-caseous in type.
16. 7. '38. Patient went rapidly downhill and died one week later.

CASE NO. 152. Mrs. J.D. (Age 32 yrs.) Para. 2.

HISTORY.

26. 6. '33. Patient had an attack of influenza six months ago, and has never felt well since. Had a small haemoptysis last night. Sputum still blood-stained.

DIAGNOSIS.

Radiological. /
A. DIAGNOSED PRIOR TO CONCEPTION. (CONTD.)

2. Progress of the Disease – (d) In the Progressive Fibro-Caseous Types (Contd.)

CASE NO. 152 (Contd.)

DIAGNOSIS.

Radiological. Infiltrations upper and mid-lung zones with cavity formation at both apices.

Bacteriological. Sputum positive, 30. 6. '33.


TREATMENT.


PROGRESS.

24. 8. ’33. Patient discharged from hospital at her own request. Some improvement noted in local condition.
15. 9. ’34. Slow deterioration in local and general condition since discharge from hospital. Reports four months pregnancy.
3. 12. ’34. Local deterioration continues slowly. Has developed swollen ankles and albuminuria. Now seven months pregnant.
25. 12. ’34. Had a large haemoptysis of six ounces two days ago. Temperature elevated in the evenings.
4. 2. ’35. Delivered two days ago, and admitted to sanatorium.
15. 2. ’35. Developed broncho-pneumonic spread of disease and died five days later.

The puerperium, however, is the period at which aggravation occurs most frequently and in a most intense manner.

Sergent /
A. DIAGNOSED PRIOR TO CONCEPTION (CONTD.)

2. Progress of the Disease - (d) In the Progressive Fibro-Caseous Types (Contd.)

Sergent (1922) fears pregnancy in a tuberculous woman mainly because of the acute tuberculosis of the puerperium, and no author has ever questioned this observation. Aggravation during this period is universally recognised to occur frequently. Sergent has pointed out that it may become evident in two forms, one resulting in death within a relatively short time, the other having a more slow and insidious onset, and not becoming recognisable for three to four months after the confinement.

Of the 13 cases of this group which deteriorated during the year following confinement, in 3 the aggravation exploded abruptly, and most dramatically in the first few days following the confinement. In two of these, aggravation really commenced during the last three months of pregnancy, but this process was greatly accelerated once the uterus was evacuated. These two examples (Cases Nos. 151 and 152, pages 131 and 132.) have already been described in this section. In the other case, in whom the tuberculosis had assumed a benign, delusive aspect, it suddenly adopted a most aggressive role, and took a terrible /
A. DIAGNOSED PRIOR TO CONCEPTION (CONTD.)

2. Progress of the Disease - (d) In the Progressive Fibro-Caseous Types (Contd.)
terrible revenge. According to Delmas (1929),
immediately after parturition, the situation darkens,
and too often life is destroyed. An acute miliary,
a broncho-pneumonic, or an ulcerocaseous
form of rapid and progressive aspect, may ensue,
against which all treatment is impotent. The
conflagration flares up, and in some weeks these
women succumb, often with liver manifestations,
albuminuria, and nearly always with laryngeal
involvement.

CASE NO. 153. Mrs. E.B. (Age 33 yrs.) Para. 1.

HISTORY.

10. 12. '34. Chest has been troubling patient for some months past. Cough
frequent and hard, but no sputum. Breathless on the slightest exertion. Son
died with tuberculous meningitis two years ago.

DIAGNOSIS.

Radiological. Dense infiltrative changes right side down to level of fourth rib.
Left lung appears clear.

Bacteriological. Sputum positive, - 16. 1. '35.


TREATMENT.

Dispensary /
A. DIAGNOSED PRIOR TO CONCEPTION (CONT'D.)

2. Progress of the Disease - (d) In the Progressive Fibro-Caseous Types (Contd.)

CASE NO. 153 (Contd.)

TREATMENT.

Dispensary supervision. Patient refused hospitalisation.

PROGRESS.

21. 2. '35. Slight deterioration in pulmonary condition. Cough shows no improvement. Reports two months amenorrhoea.
20. 4. '35. Does not feel well at all. Morning sickness very troublesome. Local condition still deteriorating.
2. 7. '35. Now seven months pregnant. Feels improved. Dyspnoea only distressing symptom. No further deterioration in local condition, but small cavity now present in second right interspace.
13. 9. '35. Confined three days ago. Admitted to sanatorium.
25. 9. '35. Looking very ill and toxic. Large cavity forming at right base. Disease now ulcerocaseous in character.
24. 10. '35. Patient went rapidly downhill and died three days later.

In the remaining 10 cases of aggravation, the tuberculosis assumed its more subdued role, and the progressive thrust was expressed in these cases by a slow but steady spread by direct contiguity with fresh foci appearing occasionally due to lymphogenous spread. Deterioration in these cases could only be demonstrated conclusively by comparing the condition of these patients at the commencement /
A. DIAGNOSED PRIOR TO CONCEPTION (CONTD.)

2. Progress of the Disease - (d) In the Progressive Fibro-Caseous Types (Contd.)

commencement of the puerperium and one, two, or three months later. It was so insidious that it could not be noticed from week to week, a vastly different state of affairs in the other type of puerperal exacerbation where the retrogression could almost be estimated with facility daily. Two examples of this form of aggravation are given below.

CASE NO. 154. Mrs. A.G. (Age 22 yrs.) Para. 0.

HISTORY.

30. 5. 34. Patient has not been feeling well for the last two months. Has a very troublesome cough at nights. Has been losing weight recently.

DIAGNOSIS.

Radiological. Infiltrative changes both upper lobes with cavitation right infra-clavicular region. Increased broncho-vascular strands both bases.

Bacteriological. Sputum positive, 3. 6. '34.


TREATMENT.

Admitted to sanatorium. Hygieno-dietetic treatment. A course of gold therapy had to be discontinued as patient developed albuminuria.

PROGRESS. /
A. DIAGNOSED PRIOR TO CONCEPTION (CONT'D.)

2. Progress of the Disease - (d) In the Progressive Fibro-Caseous Types (Contd.)

CASE No. 154 (Contd.)

PROGRESS.

5. 10. '34. Discharged from hospital at own request. Good improvement in local and general condition. Going to stay in the country.

3. 9. '35. Returned from country. Definite deterioration in local condition. X-ray shows fibro-caseous changes right upper lobe have extended with some increase in the size of the cavity in the right infraclavicular region. Fresh deposits left infraclavicular region.

14. 10. '35. Feels ill and is being sick in the morning. Amenorrhoea for the last three months.

16. 1. '36. Feeling much better. Apart from slight breathlessness and occasional bouts of coughing, has no complaints. No change in local condition.

24. 4. '36. Was delivered three weeks ago. Feels weak and sputum has been increasing lately. Disease has made some slight progress.

4. 10. '36. Lung condition deteriorating slowly. Fresh deposits now present at left base.

6. 1. '37. Patient going downhill. Looking very ill and toxic.

12. 1. '37. Had two large haemoptyses yesterday.

12. 1. '37. Patient died.


HISTORY.

1. 6. '36. Patient developed a heavy cold three weeks ago, and has never felt well since. Has a cough and sputum with a sharp cutting pain in the left side.

DIAGNOSIS. /
A. DIAGNOSED PRIOR TO CONCEPTION (CONTD.)

2. Progress of the Disease - (d) In the Progressive Fibro-Caseous Types (Contd.)

CASE No. 155 (Contd.)

DIAGNOSIS.

Radiological. Extensive disease of fibro-caseous type both lungs, but mainly the left, with cavities in the left upper lobe.

Bacteriological. Sputum positive, 4. 6. '36.

Clinical. Progressive fibro-caseous tuberculosis.

TREATMENT.

Admitted to sanatorium. Higieno-dietetic regime.

PROGRESS.

21. 11. '36. Discharged from hospital. Satisfactory improvement in local and general condition.
13. 8. '37. Has been attending as outpatient for supervision. Disease making slow progress locally.
27. 12. '37. Not feeling well. Reports three months amenorrhoea. No change to note locally.
24. 9. '38. Local deterioration more evident. Looking ill and toxic.
27. 12. '38. Going downhill slowly. Confined to bed.
3. 5. '39. Patient died.
A. DIAGNOSED PRIOR TO CONCEPTION (CONT'D.)

2. Progress of the Disease - (d) In the Progressive Fibro-Caseous Types (Contd.)

In the eight cases of this progressive fibro-caseous group, in which deterioration did not occur, abortion was performed in five cases, and in the other three hospitalisation was arranged immediately after confinement, and this benign post-puerperal exacerbation responded to treatment, illustrating another difference in these two types of aggravation occurring after delivery.


HISTORY.

3. 4. '35. Patient has had a bad cold of three months duration. Is meantime complaining of a severe cough with sputum. Mother and brother died from tuberculosis.

DIAGNOSIS.

Radiological. Extensive bilateral infiltration in mid-zone both sides with cavity under right clavicle and overlying second rib on right side.

Bacteriological. Sputum positive, 11. 4. '35.

Clinical. Progressive fibro-caseous tuberculosis.

TREATMENT.


PROGRESS. /
A. DIAGNOSED PRIOR TO CONCEPTION (CONTD.)

2. Progress of the Disease - (d) In the Progressive Fibro-Caseous Types (Contd.)

CASE No. 164 (Contd.)

PROGRESS.


22. 2. '37. Patient's resistance lowered by poor social conditions. Disease progressing slowly.

7. 2. '38. Reports seven months pregnancy. Feels fairly well. Lesions very active locally but have been improving recently.

10. 4. '38. Confined eleven days ago. Feels quite well. Tired at end of the day. Very little cough and sputum. Some deterioration in local condition.

25. 6. '38. Readmitted to hospital.

18. 11. '38. Local lesions gradually improving. General condition satisfactory.

4. 2. '39. Discharged from hospital. Very satisfactory improvement in local and general condition.

27. 4. '39. Has maintained improvement since discharge. Bilateral fibro-caseous disease both upper lobes but cavities present on admission have disappeared.


It must be apparent from the above exposition that in the discussion of the effect of pregnancy on pulmonary tuberculosis in women diagnosted before conception, continued reference must be made to the anatomo-pathological type of tuberculosis present at the time pregnancy supervenes. In the pure fibroid types, aggravation is exceptional /
A. **DIAGNOSED PRIOR TO CONCEPTION (CONTD.)**

3. **Summary (Contd.)**

exceptional, and in the healing fibro-caseous types, gestation is generally well maintained.

In the ulcero-caseous and progressive fibro-caseous types, when the exudative and caseating, necrotic processes are in the ascendancy, exacerbation is seen in the majority of cases. Deterioration in the local and general condition occasionally becomes manifest in the first weeks, or the last months of this state, but more commonly in the second or third months. But the greatest incidence is noticed during the puerperium, where it may assume an acute or a more chronic course. However, in these progressive cases of tuberculosis, there is a definite amelioration of the clinical condition during the last six months in the majority of cases.

Authors, who have attributed a pernicious influence to pregnancy with regard to its effect on phthisis, have stressed these exacerbations, and blamed them wholly on the co-existing pregnancy, notably Bernard (1923), Sergent (1926), Rist (1927), and in this country, Haig Ferguson (1931), and Young (1936). None of these authors, however, has distinguished the various types of phthisis present in
A. **DIAGNOSED PRIOR TO CONCEPTION (CONTD.)**

3. **Summary (Contd.)**

in their cases when exacerbation occurred, or at what stage of the pregnancy, the deleterious effect became manifest, with the exception of Sergent regarding the latter criticism.

Undoubtedly exacerbations occur in the destructive types, but in these, prognosis always admits of a sombre outlook, and aggravation will occur without any intercurrent pregnancy in any case. In comparison with a control group, in the ulcero-caseous types, the statistics of this survey have shown that the aggravations caused by pregnancy cause no greater mortality than those produced by the spontaneous tendency of the disease, which is offset in the pregnant cases by the amelioration produced in the later stages and the greater care to which these patients are subjected and receive in a more cooperative manner. Any improvement lasting even for six months in this type of phthisis, which generally proves fatal within a year, is of definite import, and appeared to postpone this inevitable fatal termination for four months in this series of cases. The mortality and aggravation produced in the progressive fibro-caseous type reveal a similar state of affairs. It /
A. DIAGNOSED PRIOR TO CONCEPTION (CONTD.)

3. Summary (Contd.)

It is noteworthy that none of these authors deemed it necessary to contrast their pregnant women with a suitable series of non-pregnant women. In contra-distinction, Hill (1928), who adopted this method, came to the conclusion that pregnancy had no appreciable effect on the progress of the disease.

Pregnancy, therefore, although exercising some influence on the course taken by pulmonary tuberculosis, would appear to exert very little effect on the ultimate outcome in women diagnosed before impregnation takes place.

B. EFFECT OF PREGNANCY ON WOMEN DIAGNOSED DURING GESTATION.

The appearance in the course of pregnancy of the first clinical manifestations of tuberculosis in a woman previously healthy, is of sufficiently frequent occurrence to have attracted comment by numerous authors, and is probably the principal reason why the relationship between these two conditions has constantly commanded the attention and ingenuity of the physician. Rist (1927) has pointed out that the largest proportion of facts where tuberculosis is associated with pregnancy /
TABLE VI.

COMPARISON of the Condition of 51 Pregnant Tuberculous Women diagnosed during pregnancy and their Controls one year after Confinement or Diagnosis.

<table>
<thead>
<tr>
<th>Condition after one year.</th>
<th>Women Diagnosed during Pregnancy</th>
<th>Controls</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Per Cent.</td>
</tr>
<tr>
<td>DEAD.</td>
<td>25</td>
<td>49</td>
</tr>
<tr>
<td>WORSE.</td>
<td>14</td>
<td>33.3</td>
</tr>
<tr>
<td>UNCHANGED.</td>
<td>10</td>
<td>13.7</td>
</tr>
<tr>
<td>IMPROVED.</td>
<td>2</td>
<td>4.0</td>
</tr>
<tr>
<td>TOTAL.</td>
<td>51</td>
<td>100</td>
</tr>
</tbody>
</table>
B. DIAGNOSED DURING GESTATION (CONTD.)

Pregnancy is not made up of cases where an already tuberculous woman becomes pregnant, but that we meet more frequently with women, who previous to becoming pregnant, were in good health, and in whom the symptoms and signs of phthisis appear either during pregnancy or immediately after confinement. Of 169 cases associated with pregnancy discovered by him between the years 1919 and 1927, 117 of them fell into the latter category.

Bernard (1923) has also stressed this manner of association. In 327 observations in tuberculous women, 81, or 24 per cent. gave a previous history of pregnancy which seemed clearly to have influenced the course, or marked the beginning of the manifestations of tuberculosis. 22 of these 81 patients were diagnosed to be suffering from the disease during pregnancy, and 33 after confinement.

1. Statistics.

In this survey, 51 of the 230 women, whose disease had some relationship to gestation and who were matched to controls, were diagnosed during pregnancy. The clinical condition of these women one year after confinement compared with their controls has already been shown in Table III.

on /
CONDITION of Sixty Tuberculous Women diagnosed during pregnancy one year after confinement, classified according to the Anatomo-pathological Type of their Disease.

<table>
<thead>
<tr>
<th>Anatomo-Pathological Type of Disease</th>
<th>Dead</th>
<th>Worse</th>
<th>Unchanged</th>
<th>Improved</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group I. Fibroid.</td>
<td>-</td>
<td>-</td>
<td>2</td>
<td>-</td>
<td>2</td>
</tr>
<tr>
<td>Group II. Ulcero-Caseous etc.</td>
<td>15</td>
<td>5</td>
<td>-</td>
<td>-</td>
<td>20</td>
</tr>
<tr>
<td>Group IIIA. Healing Fibre-caseous</td>
<td>2</td>
<td>-</td>
<td>3</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>Group IIIB. Progressive Fibro-caseous</td>
<td>11</td>
<td>12</td>
<td>8</td>
<td>-</td>
<td>31</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td>28</td>
<td>17</td>
<td>13</td>
<td>2</td>
<td>60</td>
</tr>
<tr>
<td><strong>PER CENT.</strong></td>
<td>47</td>
<td>28</td>
<td>22</td>
<td>3</td>
<td>100</td>
</tr>
</tbody>
</table>
B. DIAGNOSED DURING GESTATION (CONT'D.)

1. Statistics (Contd.)

on page 66a, the relevant part of which is reprinted at this point for convenience as Table VI., shown on the previous opposite page.

Of the total 295 women comprising this survey, an additional 9 were discovered tuberculous during pregnancy, for whom no controls could be apportioned. The subsequent progress of these women is illustrated in Table VII. on the opposite page.

In this table, the anatomo-pathological type of tuberculosis prevailing, the condition of the 60 women one year after confinement according to the prognostic standards adopted in this survey, dead, worse, unchanged or improved, and the total number of women in the different pathological groups are given in columns 1 - 6 respectively.

The greater mortality rate existing in these women diagnosed during gestation (49 per cent.) compared with that in the women diagnosed before pregnancy (17.5 per cent.) has already received comment. Undoubtedly it is mainly due to the higher proportion of the progressive types of tuberculosis, often accompanied by very toxic phenomena, than in the former. Moreover, the time and opportunity available for treatment to stabilise /
B. DIAGNOSED DURING GESTATION (CONT'D.)

1. Statistics (Contd.)

stabilise the pulmonary lesions and allow fibrosis to erect an adequate barrier against the excursions of the caseating process into healthy lung tissue, before the patient undergoes the rigours of confinement is substantially abbreviated. However, the prognosis, from consideration of Table VI, page 144a would appear to be affected in some measure by the appearance of the disease during pregnancy, in contra-distinction to the conclusions emerging from the previous chapter, in which it appeared that this complication had little deleterious effect on the prognosis of the disease.

The mortality observed in the women diagnosed during pregnancy was 49 per cent. against 43.1 per cent. among the controls.

Further analysis of these statistics, however, provide very illuminating results. 35 out of the 51 women diagnosed during pregnancy were diagnosed in the first four months. Of this number, 16, or 45 per cent. died within a year of confinement, compared with 9, or 56 per cent. in those diagnosed after this period, in the later months of gestation. For their controls, these percentages were 43 and 44 respectively. The mortality rate, therefore, would appear only to be /
B. DIAGNOSED DURING GESTATION (CONT'D.)

1. Statistics (Contd.)

be influenced by pregnancy only in those in whom the first manifestations occur in the last few months of this state. The earlier the diagnosis is established during pregnancy, the less influence does the illness have on the prognosis. This is probably due to the fact that these patients have undergone a longer period of treatment and have benefitted from the amelioration observed during the last months of pregnancy, and are therefore in a more suitable condition physically and mentally to undergo the strain of confinement. Whereas, those diagnosed in the later stages face the ordeal with an acute progressive type of phthisis, which has had no time or opportunity to stabilise and commence to heal.

No statistics for corroboration are available from the literature, as this method of analysis of the figures dealing with women diagnosed during pregnancy and a control group, has not yet been performed. Trembley (1909), however, found in his group of 584 cases, that in those in whom the first symptom of tuberculosis appeared during pregnancy, the mortality in these cases traceable to pregnancy was 52 per cent., compared with 40 per cent. /
B. DIAGNOSED DURING GESTATION (CONT'D.)

1. Statistics (Contd.)

cent. for the remainder of the women. Hill (1928) in her statistical study, to which reference has already been made, found that of the women diagnosed during pregnancy, more were dead than in a non-pregnant group otherwise comparable with them. Unfortunately, in neither case was the time during pregnancy at which the tuberculosis supervened, or the activity or extent of the disease at that moment, stated.

Thus far in the report, as later on, it has been deemed advisable to place the emphasis on mortality rather than any change for the better or the worse in the patient's condition, because death is a condition upon which there can be no doubt, whereas different diagnosticians might disagree with the conclusions based upon clinical findings in some of the patients when last known.


The course pursued by the disease differs little from the exacerbations and ameliorations observed in the women diagnosed before pregnancy. In those diagnosed during the first trimester,
B. DIAGNOSED DURING GESTATION (CONTD.)

2. Progress of the Disease (Contd.)

trimester, amelioration generally occurred during the following months of pregnancy, but it must be remembered that treatment was immediately instituted on diagnosis in these cases. In several of them, depending on the progressive nature of their disease and its extent, aggravation was clinically evident during the puerperium, and again occurred in two varieties, the immediate acute type in the days following confinement, or the more gradual, chronic process only observable two or three months subsequently.

In those diagnosed towards the termination of pregnancy, at a period when tuberculous mothers generally tolerate their pregnancies well, the prognosis was much more serious and the confinement precipitated the acute progressive processes more frequently than in the previous group. The importance of early diagnosis during pregnancy was shown by the mortality which resulted in the above groups. 50 out of the 60 women were diagnosed in the first four months. 17, or 42 per cent. died within a year after confinement compared with 11, or 55 per cent in those diagnosed after this /
B. **DIAGNOSED DURING GESTATION (CONTD.)**

2. **Progress of the Disease (Contd.)**

this period.

To Bacon (1915) must be attributed the dictum that many tuberculous mothers do well during the first three months of pregnancy, fewer in the second three months, but very few in the last three months. Rist has stressed the rapidly progressive behaviour of tuberculosis, whose appearance occurs towards the second or third month of pregnancy. The patients, according to him, succumb in the course of their pregnancy or are removed shortly after confinement. In 55 patients in whom tuberculosis developed during gestation, 33 were diagnosed in the first three months of pregnancy with a mortality of 45.4 per cent., whereas in the remaining 22, the mortality was only 32.2 per cent.

Couvelaire (1932) however, believes that deaths are more frequent when the disease manifests itself towards the termination of pregnancy, when, according to him it would appear to have a mortality of 55 per cent. Leonardi (1935) was also of the same opinion, although he quoted no statistics. In his estimation, a tuberculosis, whose
2. **Progress of the Disease (Contd.)**

whose apparent commencement appears in the first months of a pregnancy has not always a rapid progressive demeanour. Often even the acute exacerbations cease with the troubles peculiar to gestation, whereas the appearance of a tuberculosis coincidental with the last months of pregnancy appears on the other hand, most grave. This summarises the experience of the majority of authorities, who have studied the subject.

3. **The Influence of Gestation on the Appearance of Tuberculosis during Pregnancy.**

The appearance itself of tuberculosis during pregnancy and after confinement requires some comment. It has been maintained frequently that the gravid state increases the percentage incidence of this malady. Stewart (1922) quotes the following authors, who support this viewpoint: Funk of Philadelphia found 30 per cent. of married women at a maternity hospital dated the onset of their acute symptoms to pregnancy and parturition: Trembley of Saranac Lake stated that among 584 mothers, active disease was first discovered in 61 per cent. after the birth of a child: Schauta observed the disease originated or became recognisable during pregnancy or the puerperium in 29 per
B. DIAGNOSED DURING GESTATION (CONT'D.)

3. The Influence of Gestation on the Appearance of Tuberculosis during Pregnancy (Contd.)

per cent. of his cases. Bernard's statistics have been quoted above. Bethel (1927) believes that 40 to 45 per cent. of married tuberculous women can trace the onset of their disease to a previous pregnancy. However, he arrived at this conclusion from a review of the literature, but gave no statistics of his own.

These figures illustrate the high proportion of cases established as tuberculous, whose history has some relation to pregnancy. On the other hand, when an attempt is made to locate tuberculosis in women with a history of pregnancy, the problem appears in a different light. Bridgman and Norwood (1926) found 134 women diagnosed from 14,000 parturient records of a maternity hospital. These figures were found to correspond roughly with the morbidity percentage of the city of Baltimore in which the hospital was situated, and cannot be regarded as a high tuberculosis morbidity for an urban centre. This means in other words that the physical examination by the obstetrical staff of the hospital, according to these figures, suggest an incidence rate closely approximating that reported by the physicians of the /
B. DIAGNOSED DURING GESTATION (CONTD.)

3. The Influence of Gestation on the Appearance of Tuberculosis during Pregnancy (Contd.)

the city, which is, moreover, believed to be definitely below the actual figures. The authors point out that this number of 14,000, including a large proportion of multiparae, shows no increase over the expected incidence of pulmonary tuberculosis during gestation. Although they believe pregnancy and the puerperium may serve as a final factor to break down patients who have tuberculosis they can find no evidence that pregnancy promotes the incidence rate.

Brindeau (1931) found only 254 women who developed tuberculosis during pregnancy and parturition out of 32,267 pregnant women admitted to his maternity hospital during a ten year period, and later in collaboration with Kourilsky and Kourilsky (1935) stated pregnancy only exercises any influence on the advent of tuberculosis by the succession of numerous pregnancies, rapidly following each other, and succeeded by breast-feeding. When tuberculosis apparently shows itself at the same time as pregnancy, one can only see in these circumstances a coincidence between a pregnancy and an incipient tuberculosis, which would have appeared in any case.

Sergent /
B. DIAGNOSED DURING GESTATION (CONTD.)

3. The Influence of Gestation on the Appearance of Tuberculosis during Pregnancy (Contd.)

Sergent at the same debate, however, criticised this opinion of coincidence, and observed that of all women of child-bearing age, whose aetiological antecedents could be traced in the 10 months preceding his examination, he had established the presence of a pregnancy or a confinement in 25 per cent. of his cases, a result in considerable disproportion with the percentage of other occasional factors.

In attempting to give a satisfactory answer to the possibility of pregnancy increasing the incidence of pulmonary tuberculosis, it is necessary to take into consideration that the child-bearing age of women corresponds to that age when tuberculosis occurs with greatest frequency, even without gestation. Moreover, the type of tuberculosis appearing at the commencement of this group is usually of an acute progressive nature with a correspondingly dismal prognosis.

If it be conceded that tuberculosis in adults is the development of a disease contracted in childhood, even in those instances in which clinical tuberculosis appears in the latter half of gestation or after confinement, there is always /
always the possibility, almost the probability, that it is the manifestation of a lesion heretofore unrecognised, and would have appeared in any case due to the aggravating influence of some other aetiological factor, as Erindeau has emphasised above. Pregnancy, being one of the commonest causes of added strain during the period when tuberculosis is so prevalent in women, receives a disproportionate share of the blame.

Unfortunately, it must be confessed that an exhaustive search of the literature fails lamentably to provide reliable statistics or the relation in incidence-rate of tuberculosis between pregnancy and non-pregnant women as Cohen (1936) has pointed out, and has remarked, in addition, that the difficulties associated with the task are almost insurmountable. Until these have been overcome, any decision will necessitate the opinion of clinical experience, the concensus of which appears to be that pregnancy might well be one of several factors, which would cause a woman with incipient tuberculosis to break down. What statistics and biological evidence as is available seem to indicate that pregnancy per se has no /
B. DIAGNOSED DURING GESTATION (CONT'D.)

3. The Influence of Gestation on the Appearance of Tuberculosis during Pregnancy (Contd.)

no specific action in causing an increase in the incidence rate.

Although pregnancy and labour may have some responsibility for the appearance of an incipient tuberculosis, the course pursued by the disease after its inception, differs in no way from that followed by the disease occurring in a woman diagnosed before impregnation, as has been demonstrated earlier in this section.

Summary. Pregnancy would therefore appear to be one of the determining factors concerned in the appearance of pulmonary tuberculosis in women of child-bearing age, although no definite evidence of this has yet been evinced. In addition, it seems to have little influence on the course of the disease, once this has been established, or on the prognosis, except in those cases in which the first manifestations of tuberculosis occur in the later months of its duration.

C. EFFECT OF PREGNANCY ON WOMEN DIAGNOSED AFTER CONFINEMENT.

1. Statistics.

The frequency, with which this method of the combination of tuberculosis and pregnancy is /
TABLE VIII.

CONDITION of 142 Tuberculous Women Diagnosed after confinement one year after Diagnosis, classified according to the Anatomo-pathological Type of their Disease.

<table>
<thead>
<tr>
<th>Anatomo-Pathological Type of Disease</th>
<th>Condition one year after Labour.</th>
<th></th>
<th></th>
<th></th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>GROUP I. Fibroid.</td>
<td>Dead</td>
<td>Worse</td>
<td>Unchanged</td>
<td>Improved</td>
<td></td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>1</td>
<td>2</td>
<td>-</td>
<td>3</td>
</tr>
<tr>
<td>GROUP II. Ulcero-caseous etc.</td>
<td>19</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>20</td>
</tr>
<tr>
<td>GROUP III.A. Healing Fibro-caseous</td>
<td>8</td>
<td>8</td>
<td>6</td>
<td>4</td>
<td>26</td>
</tr>
<tr>
<td>GROUP III.B. Progressive Fibro-Caseous</td>
<td>53</td>
<td>32</td>
<td>3</td>
<td>5</td>
<td>93</td>
</tr>
<tr>
<td>TOTAL</td>
<td>80</td>
<td>42</td>
<td>11</td>
<td>9</td>
<td>142</td>
</tr>
<tr>
<td>PER CENT.</td>
<td>56</td>
<td>30</td>
<td>8</td>
<td>6</td>
<td>100</td>
</tr>
</tbody>
</table>
C. DIAGNOSED AFTER CONFINEMENT. (CONTD.)

1. Statistics (Contd.)

is met, has already been stressed. Of the 295 women comprising this study, in 142, or 48 per cent. almost half of the total number of cases, the first manifestations of the disease made their appearance after confinement. The ultimate condition of these patients is given in Table VIII. on the opposite page.

In the table, the anatomo-pathological type of tuberculosis prevailing, the condition of the 142 women one year after confinement according to the prognostic standards adopted in this survey, dead, worse, unchanged, or improved, and the total number of women in the different pathological groups are given in columns 1 to 6 respectively.

Of the 230 women, who were matched to controls, 99, or 43 per cent. were diagnosed after confinement. The ultimate condition of these patients has already been given in Table II., the relevant part of which is reprinted at this juncture for the sake of convenience as Table IX. on the following opposite page.

The greater mortality, which exists among these women, (57.6 per cent. compared with 17.5 /
TABLE IX.

COMPARISON of the CONDITION of 99 Tuberculous Women diagnosed after confinement and their Controls one year after diagnosis, and classified according to the Anatomo-pathological Type of their Disease.

<table>
<thead>
<tr>
<th>Type of Disease</th>
<th>Condition one year after Labour.</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Dead</td>
<td>Worse</td>
<td>Unchanged</td>
<td>Improved</td>
<td>TOTAL</td>
</tr>
<tr>
<td>GROUP I.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fibroid</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tuberculous Women</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>-</td>
<td>3</td>
</tr>
<tr>
<td>Controls</td>
<td>1</td>
<td>-</td>
<td>2</td>
<td>-</td>
<td>3</td>
</tr>
<tr>
<td>GROUP II.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ulcero-caseous etc.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tuberculous Women</td>
<td>19</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>20</td>
</tr>
<tr>
<td>Controls</td>
<td>18</td>
<td>2</td>
<td>-</td>
<td>-</td>
<td>20</td>
</tr>
<tr>
<td>GROUP III.A.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Healing Fibro-caseous</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tuberculous Women</td>
<td>5</td>
<td>8</td>
<td>5</td>
<td>4</td>
<td>22</td>
</tr>
<tr>
<td>Controls</td>
<td>5</td>
<td>12</td>
<td>2</td>
<td>3</td>
<td>22</td>
</tr>
<tr>
<td>GROUP III.B.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Progressive Fibro-caseous</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tuberculous Women</td>
<td>33</td>
<td>19</td>
<td>2</td>
<td>-</td>
<td>54</td>
</tr>
<tr>
<td>Controls</td>
<td>31</td>
<td>12</td>
<td>6</td>
<td>5</td>
<td>54</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tuberculous Women</td>
<td>57</td>
<td>29</td>
<td>9</td>
<td>4</td>
<td>99</td>
</tr>
<tr>
<td>Controls</td>
<td>55</td>
<td>26</td>
<td>10</td>
<td>8</td>
<td>99</td>
</tr>
</tbody>
</table>
C. DIAGNOSED AFTER CONFINEMENT (CONT'D.)

1. Statistics (Contd.)

17.5 per cent. in women diagnosed prior to conception, and 49 per cent. in women diagnosed during gestation) has already been noted, and adequate explanations for it tendered in the previous sections of this chapter.

Table IX. also demonstrates that once pregnancy has occurred, and confinement undergone, the progress of the disease in these women differs little from that in women with no reference to maternity in their history as far as this survey is concerned, the mortality in both groups being practically identical. A more detailed investigation of this point will be undertaken later in this section.

2. Period of Occurrence of Tuberculosis in Women Diagnosed after Confinement.

   (a) Immediately after Confinement.

The appearance of pulmonary tuberculosis after labour occurs at identical periods in these cases with the exacerbations described after delivery in patients diagnosed before and during pregnancy. The acute fulminating type of manifestation of the disease is rarer than the more chronic process occurring in the later months. Of the 21 cases of /
C. DIAGNOSED AFTER CONFINEMENT (CONTD.)

2. Period of Occurrence of Tuberculosis -
   (a) Immediately after Confinement.
   of the former type, one was found to be suffering
   from acute miliary tuberculosis, 3 from acute
   tuberculous broncho-pneumonia, 12 from ulcerocaseous and 5 from progressive fibro-caseous
   disease. From a detailed examination of the
   history of these cases, in 17 the disease had
   obviously been present while the patient was preg-
   nant, but no attention had been paid to the
   prevailing symptoms, the patient attributing her
   lassitude and increasing dyspnoea to her expectant
   state. In these cases apparently, (for example,
   Case No. 203 below), the patient underwent her
   confinement suffering from a progressive type of
   phthisis, and labour was responsible for the
   catastrophe which ensued. (Cases Nos. 68 to 83,
   and 203 to 207 in the Appendix.)

CASE NO. 203.  Mrs. J.K. (Age 25 yrs.)  Para. 1.

HISTORY.

17. 5. '36. Patient was confined two
   weeks ago. Since then, she developed
   night sweats and has felt tired and
   listless. Her cough, present two months
   before confinement, has become increas-
   ingly worse, with a corresponding increase
   in sputum. Temperature has never settled
   since labour, rising to 100.2° in the
   evenings. First baby died of tuberculous
   meningitis three years ago.

DIAGNOSIS. /
C. DIAGNOSED AFTER CONFINEMENT (CONT'D.)

2. Period of Occurrence of Tuberculosis -
   (a) Immediately after Confinement.

CASE No. 203 (Cont'd.)

DIAGNOSIS.

Radiological. Extensive fibro-caseous disease both upper lobes, with appearances suggestive of cavitation in first left interspace.

Bacteriological. Sputum positive, 20. 5. '36.


TREATMENT.

Transferred from Maternity Hospital to Sanatorium. Hygieno-dietetic treatment.

PROGRESS.

24. 8. '36. Some little improvement in both local and general condition. Very little cough and sputum still present.
25. 4. '37. Some deterioration in lungs, disease once more progressing. Has lost almost a stone in weight since discharge from hospital. Had two small haemoptyses three weeks ago.
11. 6. '37. Deterioration continues.

In these cases, in which the conflagration flares up in the days following pregnancy, the diagnosis may be difficult, especially as the patient may never complain of her chest, but merely appear /
C. DIAGNOSED AFTER CONFINEMENT (Contd.)

2. Period of Occurrence of Tuberculosis -
   (a) Immediately after Confinement (Contd.)

appear from her general condition and temperature chart to be suffering from some acute infection. Puerperal fever is often suspected and indeed 5 of the above patients (Cases Nos. 68 to 72) were admitted to hospital with this diagnosis. Case No. 68, printed below, remained with the diagnosis of pyrexia of unknown origin until meningeal symptoms developed, when a diagnosis of acute miliary tuberculosis was made.

The prognosis in these acute and sub-acute progressive types is extremely poor, treatment being almost impotent. 20 of them were dead after one year, the remaining case (Case No. 203) dying one month later.

CASE NO. 68. Mrs. N.S. (Age 33 yrs.) Para. 2.

HISTORY.

8.9. '33. Patient admitted to City Fever Hospital with a diagnosis of Puerperal Fever. Was confined three weeks before this date, and has felt ill and depressed since. Has had a cough for six weeks but no sputum, and during this period night-sweating has been very troublesome.

PROGRESS.

12.9. '33. /
C. **DIAGNOSED AFTER CONFINEMENT (CONT'D.)**

2. **Period of Occurrence of Tuberculosis -**
   (a) **Immediately after Confinement (Contd.)**

**CASE No. 68 (Contd.)**

**PROGRESS.**

*12. 9. '33.* No clinical or bacteriological evidence of puerperal infection obtained. Patient beginning to complain of violent headaches, and temperature very unsettled. Dyspnoeic.

*16. 9. '33.* Clinical manifestations of tuberculous meningitis now present. Tubercle bacilli recovered from the C.S.F.

*24. 9. '33.* Patient died. Post-mortem revealed tuberculous cavitation of both upper lobes with terminal miliary spread to both bases, as well as evidence of tuberculous meningitis.

(b) **Within Three Months of Confinement.** In the other 121 cases, the disease did not commence to produce clinical manifestations until some weeks or months after the labour had been successfully accomplished.

Of the 74 cases, which occurred within three months of confinement, the patient blamed the pregnancy for the development of her disease. A very general remark offered on interrogation was "I have never really felt well since baby was born - always tired and listless." It was not until the appearance of a cough, loss of weight, pleurisy, or a haemoptysis, that these cases consulted /
C. **DIAGNOSED AFTER CONFINEMENT (CONT'D.)**

2. **Period of Occurrence of Tuberculosis -**

   (b) Within Three Months of Confinement (Contd)

consulted their physician. In only 20 of them could symptoms of phthisis occurring before labour be definitely established. Probably all these cases had fortunately missed the acute fulminating processes owing to the small extent of the pulmonary lesion existing during pregnancy, together with a greater inherent resistance to the disease. Aggravation continued, however, under the disguise of a lasting condition of tiredness and prolonged asthenia, only to become apparent at the end of some months.

The prognosis in this second group was undoubtedly less formidable. Of the 74 patients, 38, or 51.4 per cent. had succumbed one year after diagnosis. 59 of the cases suffered from the progressive fibro-caseous type of disease, while in 15 fibrosis was enjoying a doubtful supremacy.

Three cases, representative of this group will now be given.

**CASE NO. 126. Mrs. E.W. (Age 22 yrs.) Para. 0.**

**HISTORY.**

16. 3. '34. Patient was confined two months ago. For six weeks preceding delivery, she developed a very troublesome cough.
C. DIAGNOSED AFTER CONFINEMENT (CONTD.)

2. Period of Occurrence of Tuberculosis -
   (b) Within Three Months of Confinement (Contd.)

CASE No. 186 (Contd.)

HISTORY (CONTD.)

cough, and was sweating occasionally at
night. Since confinement, cough has
become more severe, and is now accompanied
by a thick copious sputum.

DIAGNOSIS.

Radiological. Fibro-caseous changes
both upper lobes, especially right side.

Bacteriological. Sputum positive,
20. 3. '34.

Clinical. Healing Fibro-caseous tuber-
culosis.

PROGRESS.

24. 3. '34. Patient refused hospital
treatment, owing to domestic difficulties.
4. 5. '34. Patient eventually agreed to
accept hospitalisation, but only remained
for one month, and was discharged on
17. 6. '34. Very little improvement
resulted during stay.
26. 7. '34. Patient continues her house-
hold duties, and refuses to rest. Lesions
gradually extending. Has lost twelve
pounds in the last three months.
3. 12. '34. Now confined to bed. Very
ill.
6. 2. '35. Patient died.

CASE NO. 208. Mrs. O.W. (Age 32 yrs.) Para. 2.

HISTORY.

3. 10. '36. /
C. DIAGNOSED AFTER CONFINEMENT (CONT'D.)

2. Period of Occurrence of Tuberculosis -  
   (b) Within Three Months of Confinement (Contd.)

CASE NO. 208. Mrs. O.W. (Age 32 yrs.) Para. 2.

HISTORY.

3. 10. '36. Patient commenced to feel tired, and developed a cough shortly before she was confined ten weeks previously. Since confinement, these symptoms have gradually increased. Has noticed she has been losing weight for the last two months.

DIAGNOSIS.

Radiological. Infiltrative changes both upper lobes, more extensive on left side down to third interspace. Small cavity present in left infraclavicular region.

Bacteriological. Sputum positive, 5. 10. '36.


TREATMENT.


PROGRESS.

24. 2. '37. Patient left hospital at her own request. Some improvement in general condition and chest symptoms, but little change to note locally.
29. 5. '37. Pulmonary lesions have been deteriorating slowly since discharge from hospital.
4. 7. '37. Now confined to bed. Had a large haemoptysis last week.
24. 8. '37. Patient died.
C. DIAGNOSED AFTER CONFINEMENT (CONTD.)

2. Period of Occurrence of Tuberculosis -
   (b) Within Three Months of Confinement (Contd.)

CASE NO. 239. Mrs. E.B. (Age 24 yrs.) Para 0.

HISTORY.

8. 11. '34. Patient was confined seven weeks ago, and has never felt well since, complaining mainly of loss of energy and tiredness. Cough, which was present before confinement, has been becoming increasingly troublesome. Developed a severe pain in the left chest four days previously.

DIAGNOSIS.

Radiological. Fibro-caseous changes left apex down to third rib. More recent disease second right interspace.

Bacteriological. Sputum positive, 12. 11. '34.


TREATMENT.


PROGRESS.

23. 4. '35. Patient improved considerably during her stay in hospital. Small exudative foci in right upper lobe have now disappeared with considerable improvement in disease in left upper lobe. General condition satisfactory.

19. 11. '35. Improvement shown in hospital has been maintained. Very little cough and sputum. Feels very well.
C. DIAGNOSED AFTER CONFINEMENT (CONT'D.)

2. Period of Occurrence of Tuberculosis (Contd.)

(c) After Three Months from Confinement.

In this group of 47 patients, diagnosed three to six months after confinement, 15 again attributed their breakdown in health to pregnancy or labour, although the diagnosis was not established till later. The remaining 32 patients, on the other hand, stated that they had enjoyed comparatively good health for varying periods from three to six months after confinement.

The prognosis in this group was rather less than in the previous, to wit 47 per cent. The cases were again mainly of the progressive fibro-caseous type, with a greater proportion, in whom the fibrotic element had gained the ascendancy. The mortality in the 32 patients whose symptoms appeared later in the puerperium was only 38 per cent.

Two illustrative examples of this group are now described:

CASE NO._132. Mrs. H.P. (Age 24 yrs.) Para. 0.

HISTORY.

24. 6. '30. Patient has never felt well since her confinement five months ago. Went to her doctor two months ago, complaining of tiredness, and was treated for anaemia. A few weeks later, she developed a cough and was sent to the dispensary for investigation.
C. DIAGNOSED AFTER CONFINEMENT (CONT'D.)

2. Period of Occurrence of Tuberculosis -
   (c) After Three Months from Confinement (Contd)

Case No. 132 (Contd.)

DIAGNOSIS.

Radiological. Chronic fibro-caseous changes both upper lobes, fibrotic reaction predominating. Increased broncho-vascular strands both bases.

Bacteriological. Sputum positive, 28. 6. '30

Clinical. Healing Fibro-caseous tuberculosis.

TREATMENT.


PROGRESS.

5. 12. '30. Patient's general and local condition were improving satisfactorily, when she suddenly commenced to run a temperature with increase in cough and sputum. Examination revealed spread of disease throughout entire right base.
6. 4. '31. Patient went downhill, and died seven days later.

CASE NO. 265. Mrs. C.U. (Age 36 yrs.) Para. 3.

HISTORY.

16. 5. '36. Patient was confined four months ago. Felt quite well, apart from slight tiredness, until three weeks ago when she developed a sharp cutting pain in the chest. Has had a cough and sputum for a similar period.
C. DIAGNOSED AFTER CONFINEMENT (CONTD.)

2. Period of Occurrence of Tuberculosis -
   (c) After Three Months from Confinement (Contd.)

CASE No. 265 (Contd.)

DIAGNOSIS.

Radiological. Infiltrative changes throughout upper two-thirds of left lung, with a few nodular deposits of more recent disease right inter-cleido hilar region.

Bacteriological. Sputum positive, 20. 5. '36.


TREATMENT.


PROGRESS.

24. 10. '35. Discharged from sanatorium much improved in local and general condition. Has no symptoms apart from slight morning cough and sputum.

24. 6. '37. Patient has maintained improvement since her discharge from hospital. Is now symptom free. Disease slowly stabilising locally.

3. Causes of the Appearance of Tuberculosis after Confinement.

   (a) Labour. Sergent (1922) considers that the aggravation producing the manifestations, even in those 32 patients with no symptoms until three months later, was due to the confinement, and /
C. DIAGNOSED AFTER CONFINEMENT (CONT'D.)

3. Causes of the Appearance of Tuberculosis after Confinement - (a) Labour (Cont'd.)

and would attribute every exacerbation in the year following confinement to the physical stress of labour. Bernard, Rist, and Demelin (1929) have criticised this assertion as being somewhat excessive. Bernard would limit the period, during which pregnancy and confinement may be inculpated to three or more often four months; Rist and Demelin to six. For the purposes of this study, only cases in which the diagnosis was confirmed within six months of confinement have been included. It would appear that in a year a sufficient interval is present for other factors, which are capable of producing exacerbation to influence the disease. Several cases were noted during the perusal of the case histories for material for this study, however, where the patients again noticed the appearance of their ill-health immediately after delivery and in whom diagnosis was not established till ten months after confinement.

(b) Breast-Feeding. Another of these aggravating factors, upon which numerous authors, including Bernard (1923), Mignot (1927), Hiley (1931), and Jameson (1935) have insisted, is breast-feeding.
3. Causes of the Appearance of Tuberculosis after Confinement - (b) Breast-Feeding (Contd.)

breast-feeding. Other authorities, however, including Sabourin (1918), Dumarest and Brette (1922), Marshall (1931) and Walker (1931) have been dissenters. The only statistics quoted by the above writers are those of Bernard, who found in 27 cases beginning after confinement, 18 breast-fed their children against 3 who did not, and 6 concerning whom sufficient information was not available. Unfortunately, complete details are not available for the 32 patients above, whose symptoms did not become evident till some time after the confinement, but apparently the majority suckled their children.

(c) Social and Financial Factors.

Another aetiological factor concerned in producing exacerbation during the puerperium is the overwork resulting from the addition of another person to the household, with perhaps consequent financial and mental worries. Moreover, some of these cases had to leave the sanatorium before their residence could be considered sufficiently prolonged owing to the difficulties experienced at home regarding the care of the new arrival.

(d) /
C. **DIAGNOSED AFTER CONFINEMENT (CONT'D.)**

3. **Causes of the Appearance of Tuberculosis after Confinement (Contd.)**

(d) Proportionate Involvement of these Causes. The culpability, which must be apportioned to these three factors - the exertion of labour, breast-feeding, and the social and financial difficulties associated with the new arrival - in producing the clinical manifestations of the disease after confinement is difficult to assess, as will be readily realised. Most probably all three are acting in every case, unless suckling is not undertaken, or the patient is so situated financially that no domestic difficulties arise with regard to the child. In most cases various combinations of the three factors will exercise some pernicious influence to different extents, depending on the circumstances of the individual case. If the interval between confinement and the appearance of the disease is of sufficient length, then breast-feeding, and the financial burden of the new baby must bear a correspondingly greater share of the blame than in a case in which the diagnosis is made considerably earlier, and the strain of labour is the main factor operating.

The /
C. DIAGNOSED AFTER CONFINEMENT (CONTD.)

3. Causes of the Appearance of Tuberculosis after Confinement - (d) Proportionate Involvement of these Causes (Contd.)

The mortality of the group, in which the appearance of the disease was attributed by the patient to the strain of delivery, and in whom the symptoms commenced shortly after this event was 62 per cent. This group numbered 110 patients. Of the 32 patients, who did not become ill until three months after delivery, and in whom the remaining two factors were mainly concerned, the mortality was only 33 per cent.

The exacerbations caused by breast-feeding, and financial and social difficulties would therefore not appear to have such an adverse effect on the prognosis as the strain of confinement, although verification of this statement would require a more detailed analysis of the statistics than the above.

It must be borne in mind, in addition, that the production of the clinical manifestations of tuberculosis in these patients after confinement by the three determining factors mentioned above rests entirely on clinical evidence, and no statistical observations so far have been produced to prove it, a position similar to the appearance /
C. DIAGNOSED AFTER CONFINEMENT (CONT'D.)

3. Causes of the Appearance of Tuberculosis after Confinement - (d) Proportionate Involvement of these Causes (Contd.)

appearance of tuberculosis during pregnancy discussed in the previous section. Moreover, symptoms of the presence of this disease were present in 37 of these patients even before labour had commenced.


From Table IX., page 158a, it will be observed that once the clinical manifestations of the disease have been produced, pregnancy appears to have little effect on the progress of the disease. Of the 99 women out of the 230 patients, who were diagnosed after confinement and matched to controls, 20 fell into the category of those diagnosed within the first few weeks after delivery. 19 of these patients died within one year of diagnosis, compared with 18 of the controls.

In the 54 patients, diagnosed within three months of delivery, 28 were dead, 18 were worse, and 8 unchanged, compared with 27 dead, 15 worse, and 12 unchanged or showing improvement in the control group. The slight difference in these figures could be attributed to the pregnant patients.
C. **DIAGNOSED AFTER CONFINEMENT. (CONT'D.)**

4. **Progress of the Disease (Contd.)**

Patients having to forego treatment, and nourishing food owing to financial difficulty, and any deleterious influence of the confinement, which may have been prolonged for three months. Breastfeeding was prohibited immediately these women were diagnosed tuberculous.

Of the 25 patients of the third group, who were diagnosed three to six months after confinement, 10 were dead one year after diagnosis, 10 were worse, and 5 were unchanged or improved. In the controls, the corresponding figures were 10 dead, 9 worse, and 6 unchanged or improved.

5. **Summary.**

The relationship of pregnancy to tuberculosis is met most frequently in women diagnosed after confinement, and exerts the greatest mortality in this form of the combination.

Pregnancy would also appear to be one of the aetiologial factors concerned in the production of tuberculosis in those diagnosed after confinement, but indirectly through the exertions of labour, breast-feeding, and the necessity for some of these patients to forego adequate rest and nourishment.
c. DIAGNOSED AFTER CONFINEMENT (CONTD.)

5. Summary (Contd.)
nourishment after confinement. Once the disease has made itself manifest, however, it exerts little influence on the course or the progress of the disease, unless the last factor continues to operate, and the woman is unable to accept proper treatment in a sanatorium, or furnish it for herself at home.
PART V.

OTHER FACTORS CONCERNED IN THE ESTIMATION OF THE PROGNOSIS IN PREGNANT TUBERCULOUS WOMEN.

Other Tuberculous Manifestations. 179.

Financial and Social Considerations. 181.

Mental Attitude of the Mother. 182.

Multiparity. 183.

Age. 184.
Consideration of the previous chapters, and the foregoing statistics will have demonstrated that the estimation of the prognosis in the relationship of pulmonary tuberculosis and gestation is dependent in a substantial degree on the anatomo-pathological type of tuberculosis in existence when pregnancy supervenes. The more active and progressive the illness, as indicated by the domination of caseation and subsequent excavation over fibrosis, the more pessimistic must be the physician's expectations of the course, which the disease will pursue.

An additional element, closely related to the preceding factor in this estimation, is the time which has elapsed between the occasion when the tuberculosis was established clinically and the intervention of pregnancy. As the interval increases in length, the prognosis becomes more promising. But of even greater significance is the period separating the occurrence of the last progressive exacerbation of
of the malady and the impregnation.

This observation is admirably illustrated by the variation in the mortality in the women diagnosed before, during, and after gestation. In patients diagnosed before conception, the prognosis can be calculated with less temerity than in those diagnosed after conception. A similar state of affairs exists between the latter and those women, in whom the disease was not apparent until after confinement. This fact has been substantiated by all authorities, who have investigated it.

Moreover, in those diagnosed during pregnancy, the establishment of the disease in the earlier months is also of good prognostic significance comparatively. In the women diagnosed after confinement, the prognosis varies according to the interval which elapses between labour and the commencement of the clinical manifestations of phthisis. Optimism can generally increase with the lengthening of this interval.

Other elements, such as the development of other tuberculous manifestations, for example, laryngitis or peritonitis, the social and financial status of the patient, et cetera, which must receive due consideration in estimating the course of the illness, when complicated by pregnancy, will now receive attention.
1. OTHER TUBERCULOUS MANIFESTATIONS.

Laryngeal tuberculosis has received particular attention in the estimation of the prognosis by numerous authors, chiefly because they are of the opinion that it constitutes an absolute indication for abortion. 5 of the 166 cases studied by Norris and Murphy (1922) developed laryngeal lesions and 3 were dead, and 2 in poor condition when the follow-up was made. Russi (1926) found 91 per cent. of his patients with laryngeal tuberculosis died almost all within the first week of the puerperium. Gellhorn (1928) and Pratten (1931) also indicated the poor prognosis in these cases.

On the other hand, Divoux (1931) found interruption of the pregnancy halted the disease in 2 out of 4 cases, and Fink (1931) collected 300 cases from the literature with 75 recoveries, 42 of them without intervention.

In estimating the prognosis in a case with, or in which laryngeal involvement occurs, it must be remembered that the lesion is usually a complication of severe pulmonary disease, in which the prognosis is at the best grave. The laryngeal tuberculosis per se is not the cause of the poor prognosis, but rather the advanced pulmonary disease which accompanies it.
1. OTHER TUBERCULOUS MANIFESTATIONS (CONT'D.)

The appearance of tuberculous disease in other parts of the body is either rare, or its main significance lies in the fact that it generally represents a terminal bacillaemia. Abdominal tuberculosis usually results in sterility, and it must be an uncommon occurrence for pregnancy to be established in a woman suffering from pulmonary and peritoneal involvement. It was noted, however, to appear after confinement in several cases in this survey shortly before death, in one case during pregnancy, but in no cases prior to pregnancy. The rarity of meningeal involvement during gestation has already been referred to on page 106.

2. FINANCIAL AND SOCIAL CONSIDERATIONS.

However, there are numerous other factors, associated with the pregnancy itself, which have so far received insufficient interrogation, and which may reverberate harmfully on the general resistance of the patient to her disease. The data furnished by these additional investigations are essential for the completion of an opinion on the prognosis.

Reference has already been made to the importance /
2. **FINANCIAL AND SOCIAL CONSIDERATIONS (CONTD.)**

Importance which must be attached to the changes, which the advent of an additional member may occasion, on the financial and domestic arrangements of a household. If this necessitates the reduction of essential nourishment and adequate relaxation, the outcome is to be anticipated with anxiety. A woman, who has borne several children already and is in the process of rearing them, will have an inestimably greater chance of succumbing to her active tuberculosis if yet another child arrives to constitute a further drain on her strength, purse, and opportunity for leisure and recuperation, compared with the woman, who has the ability to delegate the nursing and rearing of her progeny to another, and to enter a sanatorium after confinement. Every degree will be found in practice between these two extremes, and must be taken into account in estimating the prognosis.

3. **MENTAL ATTITUDE OF THE MOTHER.**

The atmosphere, into which the child is born, and the mental attitude adopted on its arrival, also requires some consideration. The child may be illegitimate, with the mother facing the prospect of being evicted from her parent's home,
3. **MENTAL ATTITUDE OF THE MOTHER (CONTD.)**

home, and unable to support either the child or herself. Or the mother, weary from continual child bearing and broken in spirit from constant and ineffective struggling against poverty and drudgery, may face the future of a further increase in the squalor and unhappiness with hopelessness and a strong desire to end it all. Consequently, the prognosis is for her much more serious than in the case of a woman, who, so far deprived of the satisfaction of motherhood, can plan systematically and well for the new arrival, and anticipate events with equanimity.

Another two factors which have been stressed in the literature as having a very significant bearing on the problem, are multiparity, and the age of the patient.

4. **MULTIPARITY.**

The relationship of multiparity to tuberculosis has been expressed by Dubois (1843) in his famous remark "If a woman threatened with phthisis marries, she may bear the first accouchement well; a second with difficulty; a third, never." Reiteration by Bar (1922) in a similar form "If some women stand a first pregnancy, few resist a second, and almost none a third." has often /
4. MULTIPARITY (CONTD.)

often been quoted to support the contention that a tuberculous primipara will have a better prognosis than a multiparous patient with a similar type of lesion.

To acquiesce with such a precise and dogmatic statement would require indisputable statistical and clinical proof, and no statistics have been encountered that have approached the problem from this viewpoint to furnish the necessary data. In the 6 primiparae found in this study, otherwise comparable with a similar number of multiparae, 3 were dead, 2 worse, and 1 improved, one year after diagnosis. In the other group, 3 were dead, 1 classified worse, and 2 unchanged. These numbers are too small for any deductions to be made. Russi (1926), however, studied the mortality among primiparae and multiparae, and found it in favour of the former, 33 per cent. compared with 51 per cent. In the group diagnosed during pregnancy, there were 11 primiparae, of whom 7 died in the puerperium, (3 at term, 4 labours during the eighth month); of the 18 multiparae, 13 died during the puerperium (3 at term, 7 during the eighth month, 1 during the seventh month, and 2 during the sixth month). Russi /
4. MULTIPARITY (CONT'D.)

Russi, however, detracted from the value of the above statistics by omitting to mention the extent of the lesions, and the type of tuberculosis from which these patients were suffering, and upon which the prognosis mainly rests. As the chances of a gravida going to term are in inverse proportion to the seriousness of her pulmonary disease, it would appear that the illness was more advanced and progressive in the multiparae, and would have carried a more sombre prognosis in any case. In those diagnosed before pregnancy, Russi again found a greater mortality in multiparae 48.5 per cent., compared with 20 per cent. in primiparae. Similar objections can be raised against these two groups, and render his conclusions invalid.

(a) Pregnancies occurring prior to the Pregnancy of this Study.

Nor must the assumption arise from the above statistics that progressive disease is more common among multiparae. In fact, the antithesis could be demonstrated in the 295 cases comprising this study. 100, or 34 per cent. of these were primiparae. The distribution of the form of tuberculosis among them was 26 per cent. of the healing type, and 74 per cent. of the destructive type, in comparison with 40 per cent. and 60 per cent. /
4. MULTIPARTITY (CONT'D.)

(a) Pregnancies occurring prior to the Pregnancy of this Study (Contd.)

cent. respectively among the 195 multiparae. The mortality was consequently correspondingly greater among the primiparae in these statistics, being 55 per cent. against 34 per cent. for those with multiple pregnancies.

An examination of the pregnancies of the mothers according to when the latter were diagnosed, again reveals striking differences. 20 per cent. of the offspring of the women in the group diagnosed before pregnancy were the first, 35 per cent. of those diagnosed during pregnancy, and 42 per cent. of those diagnosed after confinement. Second pregnancies constituted 18 per cent. of those women diagnosed before, 16 per cent. of those diagnosed during, and 24 per cent. of those diagnosed after the pregnancy of this study. Third pregnancies comprised 12, 13, and 20 per cent. of the pregnancies of those diagnosed before, during and after gestation respectively. Thus, 80 per cent. of the women diagnosed after confinement were diagnosed after their first, second or third pregnancy, while 64 per cent. of those during pregnancy were diagnosed during such, and 50 per cent. of those diagnosed before pregnancy were diagnosed /
COMPARISON of the NUMBER of DEATHS and the MORTALITY RATES occurring among the primiparæ, multiparæ, and the total 295 tuberculous women comprising this study, classified according to the time of diagnosis.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number Dead</td>
<td>Per Cent.</td>
<td>Number Dead</td>
</tr>
<tr>
<td>Primiparæ</td>
<td>5</td>
<td>26</td>
<td>11</td>
</tr>
<tr>
<td>Multiparæ</td>
<td>8</td>
<td>11</td>
<td>17</td>
</tr>
<tr>
<td>Total 295 women of this study</td>
<td>14</td>
<td>15</td>
<td>28</td>
</tr>
</tbody>
</table>
4. **MULTIPARITY (CONTD.)**

(a) **Pregnancies occurring prior to the Pregnancy of this Study (Contd.)**

diagnosed before such. Primiparae, and women with few pregnancies, are therefore more commonly found in those groups with the greatest mortality rates.

Further statistical proof from the records of this study demonstrating that the tuberculous woman, pregnant for the first time, occupies the position of greater danger is shown in Table X. on the opposite page. In this Table, the number of deaths and the mortality rate as a percentage occurring among primiparae and multiparae for each of the three classes of women of this survey, namely those diagnosed before, during, and after gestation, are given. The number of deaths, and the mortality rate expressed as a percentage, are shown for the whole of these three classes for the sake of comparison.

From this table it will be observed that of the 19 primiparae diagnosed before conception, 6, or 26 per cent., died after the termination of their first pregnancy, in comparison with 8, or 15 per cent. of the 74 multiparae. The mortality for the whole group of 93 women diagnosed before pregnancy out of the 295 women was 13, or 14 per cent.
4. MULTIPARITY (CONT'D.)

(a) Pregnancies occurring prior to the Pregnancy of this Study (Contd.)

Similar mortality rates, with an even more divided adverse result in those of the primiparae diagnosed during and after pregnancy compared with those of the multiparae and the total number diagnosed at the same period, will be observed.

(b) Pregnancies occurring subsequent to the Pregnancy of this Study.

When attention is turned to the 58 women who were known to become pregnant, subsequent to the pregnancy on which this study is primarily based, repeated pregnancies would not appear to influence the course pursued by the disease to any extent. Of these women, 38 fell into the category of those diagnosed before conception, 9 among those during, and 12 among those after the pregnancy of this survey.

In the first group of 38 women, 27 were reported subsequently pregnant once, 7 twice, and 2 three times, and 2 four times. Only 7 of these women were reported worse after the subsequent confinements. Moreover, in three, including the 2 deaths, the relapse was sufficiently far removed from the later pregnancy, that no blame could be attached to it. In the other 4, all suffering from /
4. MULTIPARITY (CONT'D.)

(b) Pregnancies occurring subsequent to the Pregnancy of this Study (Contd.)

from progressive fibro-caseous disease a poor prognosis was given in any case. One woman with three pregnancies in five years, seemed undoubtedly to be affected in health by the repeated confinements. In the others, however, the exacerbations could equally have been caused by other factors that the subsequent pregnancies.

The data for the nine women diagnosed during the pregnancy of this survey, 7 were pregnant once, and 2 twice, subsequently, are insufficient to justify comment, but all women were alive when last known.

Neither can any lesson be drawn from the histories of the 11 women diagnosed after confinement, 6 once, 4 twice, and 1 three times pregnant subsequently.

Examination of the above records would convey the impression that further pregnancies are not necessarily dangerous, provided the patient receives proper instruction in the regime she must follow during and after gestation. When a second and third pregnancy is less well supported that the first,
4. **Multiparity (Contd.)**

(b) **Pregnancies occurring subsequent to the Pregnancy of this Study (Contd.)**

First, sufficient evidence is not thereby offered that the aggravation of the tuberculosis must be the result of the successive pregnancies. Tuberculosis is a disease, whose course is interspersed with exacerbations separated by varying intervals, and after several years have elapsed a new pregnancy may find the patient with a spontaneous aggravation of her tuberculosis.

On the other hand, it is well recognised that repeated child-bearing, when only a short interval separates the pregnancies, has an unfavourable influence on the woman's general health, and must lower her resistance to any infection. Weymeersch and Albrechts (1923) and Haim (1931) found a mild elevation of the mortality rate in multiparae, and attributed it to this cause.

Bernard (1923), however, has pointed out that it is usually the first pregnancy that determines or aggravates the illness, and in reality one rarely finds among tuberculous women in hospital many who have had large families — a conclusion, which is borne out by the analysis of the cases with subsequent pregnancies given above. Bethel (1927) has also stressed the fact that the primiparae is particularly susceptible to pulmonary changes.
4. MULTIPARITY (CONT'D.)

(b) Pregnancies occurring subsequent to the Pregnancy of this Study (Contd.)

changes during gestation. Haig Ferguson feels that on occasion accumulating babies at home rather than successive babies in the uterus may constitute the serious factor.

In conclusion, therefore, in estimating the influence of parity on the prognosis of tuberculous women, who have become pregnant, attention should be mainly directed towards the type of tuberculosis present (the destructive type being more common in primiparae), the social and financial status of the patient, especially if the introduction of further children means worry and increased difficulties for the mother, and on the interval, which has occurred between the previous pregnancies, rather than on the specific number of confinements which the mother has undergone.

5. AGE.

Examination of the literature with regard to the influence of age on the prognosis of this combination demonstrates that generally the
5. **AGE (CONT'D.)**

the prevailing opinion believes the younger the patient, the more pessimistic the outlook. As Stewart (1922) has phrased it "In a woman under 20, pregnancy as a complication of tuberculosis is more serious than in a woman beyond 20."

The age distribution of the 230 women, whose history had some relationship to pregnancy, and their controls, has already been given in Table I., which can be consulted on page 55a.

As was shown in the consideration of the parity on the prognosis, the primiparous tuberculous woman showed a greater mortality than the multiparous, following in this respect, mortality among mothers in general. But the maternal mortality rates for the tuberculous women do not agree with the maternal mortality rates for mothers in the general population in the matter of age at death. For mothers in general, according to the Edinburgh statistics for the years 1929 to 1938, the lowest mortality rate is found from 20 to 24, while among the tuberculous mothers the highest death rate was found at these ages. A study of the deaths from tuberculosis in the same area during the same years shows that the same age period is the one in which the death rate from tuberculosis /
TABLE XI.

PER CENT. DISTRIBUTION of the 295 tuberculous mothers, classified according to the time of diagnosis, and of Edinburgh mothers, 1929 - 1938, arranged in quinquennial age groups.

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Of Edinburgh Mothers</th>
<th>PERCENTAGE DISTRIBUTION.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>Diagnosed before Pregnancy</td>
</tr>
<tr>
<td>All ages</td>
<td>100.0</td>
<td>100.0</td>
</tr>
<tr>
<td>Under 20</td>
<td>3.67</td>
<td>3.5</td>
</tr>
<tr>
<td>20 - 24</td>
<td>29.76</td>
<td>30.5</td>
</tr>
<tr>
<td>25 - 29</td>
<td>28.04</td>
<td>28.0</td>
</tr>
<tr>
<td>30 - 34</td>
<td>22.97</td>
<td>23.0</td>
</tr>
<tr>
<td>35 - 39</td>
<td>11.24</td>
<td>11.0</td>
</tr>
<tr>
<td>40 - 44</td>
<td>3.25</td>
<td>3.0</td>
</tr>
<tr>
<td>45 and over</td>
<td>1.04</td>
<td>1.0</td>
</tr>
</tbody>
</table>
5. **AGE (CONTD.)**

tuberculosis is highest among females, with the period from 25 to 30 the next dangerous. A curve plotted to show the deaths at different ages of the tuberculous pregnant women would therefore generally correspond to a curve plotted to show the deaths at different ages of all tuberculous women.

The percentage age distribution in the different age groups for the tuberculous mothers of this study in the years 1929 to 1938, and for mothers in general according to the statistics of the Edinburgh Public Health Department for a similar period, is given in Table XI. on the opposite page. In this Table, the different age groups, arranged in quinquennia, are given in Column 1. The percentage distribution of all Edinburgh mothers for the period 1929 to 1938 under this grouping is given in Column 2. The same distribution for the 295 women comprising this study, and for the women diagnosed before, during, and after pregnancy are placed respectively in the remaining columns.

From this Table, it will be noticed that the ages at the close of their pregnancy of the tuberculous mothers differ in no material way from /
5. **AGE (CONT'D.)**

from the ages of all women at the birth of their children. However, when the ages of the tuberculous women are considered in relation to the time when they were diagnosed, a different light is thrown on the problem. In general, the ages of the patients diagnosed during pregnancy corresponded with the ages of the whole tuberculous group, and with the mothers in general. But this was not the case among the women diagnosed before and after pregnancy, the ages in these two groups being the antithesis of each other.

In those diagnosed after pregnancy, the disease was not discovered sufficiently early. Five per cent. of the mothers diagnosed after confinement were under 20 years of age, when their pregnancy terminated, as compared with only 1 per cent. of those diagnosed before the pregnancy of this study. 40 per cent. of the women diagnosed after pregnancy were from 20 to 24 years old, whereas only 20 per cent. were of those diagnosed before conception. In contradistinction, 30 per cent. of those diagnosed before pregnancy were from 30 to 34 years old, and 16 per cent. from 35 to 39; while among those diagnosed after confinement, the percentages were 18 and 6 respectively. Thus, of the mothers found to be tuberculous before conception /
DISTRIBUTION of the anatomo-pathological type of tuberculosis in the 295 women of this study, arranged in quinquennial age groups.

<table>
<thead>
<tr>
<th>Type of Phthisis Prevailing.</th>
<th>AGE OF PATIENT.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Under 20.</td>
</tr>
<tr>
<td>FIBROID - Group I.</td>
<td>-</td>
</tr>
<tr>
<td>ULCERO-CASEOUS ETC. - Group II.</td>
<td>6</td>
</tr>
<tr>
<td>HEALING FIBRO-CASEOUS - Group III.A.</td>
<td>1</td>
</tr>
<tr>
<td>PROGRESSIVE FIBRO-CASEOUS - Group III.B.</td>
<td>1</td>
</tr>
<tr>
<td><strong>TOTAL.</strong></td>
<td><strong>8</strong></td>
</tr>
</tbody>
</table>
5. **AGE (CONT'D.)**

conception, 49 per cent. were under 30 years of age, whereas 74 per cent. of those diagnosed after confinement belonged to this age period.

Moreover, when consideration is given to the type of pulmonary tuberculosis, from which these patients were suffering; it will be seen from Table XII. opposite, that there was a greater incidence of the destructive types of phthisis among these younger patients. In this Table, the anatomo-pathological type of tuberculosis prevailing among these women is given in Column 1. The number of women in the different quinquennia falling into these groups are given in the remaining columns.

From this Table, it will be observed that of the 8 women diagnosed under 20 years, 7 were suffering from progressive disease, and of the 71 patients in the age group 20 to 24, 56, or 80 per cent. were suffering from this form. As the age of the patient increased, so did the incidence of the healing type.

Age would therefore not appear to exert any influence on the prognosis in the tuberculous pregnant woman other than it generally does with regard to tuberculous women as a whole. Attention should /
5. **AGE (CONTD.)**

should be mainly directed towards rather the time of diagnosis with regard to when the pregnancy occurs, and the form of pulmonary tuberculosis from which the patient is suffering. Undoubtedly young mothers under the age of 30 are subject to the serious progressive forms of phthisis, and the clinical manifestations become apparent after confinement, whereas after this age, the fibroid healing types predominate, and diagnosis is established earlier with regard to the occurrence of pregnancy. It is the age of the tuberculous disease itself rather than the age of the patient that is of primary importance.
PART VI.

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PART VI.

THEORETICAL EXPLANATIONS REGARDING THE CLINICAL OBSERVATIONS OF THE EFFECT OF PREGNANCY ON PULMONARY TUBERCULOSIS.

After these observations on which type of case maternity appears to exercise a beneficial or pernicious influence, and at what period of pregnancy improvement or aggravation becomes evident, attention will now be directed to the pathologicophysiological explanations, which have been advanced to account for them. Mechanical factors, such as the muscular exertion associated with labour, which have been implicated, will thereafter receive critical examination.

1. AMELIORATIVE FACTORS ON PULMONARY TUBERCULOSIS ASSOCIATED WITH PREGNANCY.

It will be remembered that amelioration in a pregnant tuberculous woman is universally recognised to occur during the latter months of pregnancy.

Obstetricians have always considered that pregnancy constitutes a harmonious symbiosis, from which the maternal organism often extracts considerable...
1. AMELIORATIVE FACTORS ON PULMONARY TUBERCULOSIS, ASSOCIATED WITH PREGNANCY (CONT'D.)

considerable benefit. Two very distinct phases are recognised to exist during the course of gestation. The first is that of foetal edification, and the adaptation of the maternal organism to her new function, in which, emaciation, nausea, and vomiting may cause apprehension - the injurious phase of pregnancy. A second period commences about the third or fourth month, during which it seems on the contrary, the woman receives very adequate compensation. With the storage of protein, water, fats, and minerals, her weight increases more rapidly than the simple development of the foetus would account for. Simultaneously, there is experienced by the patient herself a feeling of excellent health, which is responsible for the unsolicited testimony "I have never felt so well." Wodon (1936) has calculated, on the average, a woman gains about 12 Kg. in the course of gestation, half of which is gained by the mother. This increase in weight, according to him, would appear advantageous to the tuberculous mother.

Undoubtedly, it is difficult to believe that this condition of excellent welfare accompanying pregnancy normally, should be restricted to normal /
normal women, especially when the great majority of tuberculous women, who were diagnosed previously to or shortly after impregnation, have remarked upon it spontaneously. Some authors, however, have attempted to postulate that arrest, or more commonly amelioration, of the pulmonary lesions occur simultaneously and in addition during this period of well-being, and to offer some explanation for this verified improvement.

Demelin (1929) has summarised this viewpoint. According to him the pregnant condition brings into operation defensive processes, which are antagonistic and wholly opposed to the unfavourable modifications dependent on the tuberculous disease. There is a struggle between the two conditions, during which the degree of resistance, previous or present, in the face of the bacillus and its varied attacks, derives benefit from the pregnancy sometimes, at others is lowered by the illness. The former would thus not be favourable, and would be contested by the latter.

Suppression of Menstruation. During gestation, the modification, to which amelioration is most commonly attributed, is the suppression of a factor, which is universally recognised to favour the
1. **AMELIORATIVE FACTORS ON PULMONARY TUBERCULOSIS, ASSOCIATED WITH PREGNANCY (CONTD.)**

the exacerbations of phthisis, namely menstruation.

While Sabourin's statement that tuberculous women are killed by their menses may be somewhat too dogmatic, it is difficult to avoid the fact that their condition undergoes deterioration because of them.

The deleterious effect of menstruation may receive expression by a pre-menstrual elevation of temperature, as has been observed by Bezancon (1924), Beekman (1928), Bernard and Desbuquois (1929) and Caussimon (1931). Comenstrual elevations have been observed by Jameson (1935), and Leonardi (1935) has attributed a prolongation of these rises in temperature to the difficulty of the organism in "extinguishing a flame, which is always latent, waiting for a chance to burst forth."

The occurrence of haemoptyses at the time the menses are present is also a common phenomenon, and was shown by Jameson to be twice as frequent at this time than chance would allow in a series of 80 cases. It is also a well recognised clinical observation that tuberculous women often show exacerbation at this period in both the signs and symptoms of their disease, which disappear with the menstrual flow. Lastly, pleural complications /
1. AMELIORATIVE FACTORS ON PULMONARY TUBERCULOSIS, ASSOCIATED WITH PREGNANCY (CONT'D.)

complications also become evident, notably in patients undergoing artificial pneumothorax therapy as Dumarest and Parodi (1921) and Caussimon (1927) have observed.

Mechanisms of Ameliorative Action of this Factor. The mechanisms, by which menstruation affects pulmonary tuberculosis in such a malignant fashion, have been thoroughly investigated by numerous authorities in an attempt to discover the indirect beneficial influence of pregnancy by the suppression of this factor.

Bernard and Desbuquois (1929), and Leuret and Caussimon (1929) have expressed the opinion that the aggravation is caused by a tuberculous bacillaemia occurring at this period, and have produced "atypical" tuberculous disease in guinea pigs by the injection of blood obtained on the second day of the menses, and have discovered acid-fast organisms on smears of the animals' lymph nodes.

Endocrine activity, occurring at this time, has been evoked by Bezancçon (1913) as the main reason for any deleterious change observed especially thyroid overactivity, and the hormonal changes dependent on the ovary. Bourgeois (1939) has /
1. **AMELIORATIVE FACTORS ON PULMONARY TUBERCULOSIS, ASSOCIATED WITH PREGNANCY (CONTD.)**

has recently revived this theory, and believes the exacerbations have some relationship to the variations in the follicular hormone.

As will be discussed later, a condition of tuberculin energy seems to exist during menstruation, and has been advanced as a cause for the unfavourable course of the disease at this time. This will receive further discussion when the aggravating factors on tuberculosis due to pregnancy are under consideration.

A more plausible hypothesis has been put forward by Dumarest and Brette (1922) and revived by Jameson. They postulate the generalised hyperaemia, preceding the menstrual periods, and the increased capillary permeability observed at this point, results in some varying degree of congestion around the lesions. This in turn leads to the absorption of an unusual amount of toxic products, principally tuberculo-proteins, and in consequence of a hypersensitivity, the fever represents in reality a tuberculin reaction.

Although these authors disagree concerning the mechanisms, by which the progressive thrusts at menstruation occur, all are of the opinion that it is logical to acknowledge that suppression /
1. **AMELIORATIVE FACTORS ON PULMONARY TUBERCULOSIS, ASSOCIATED WITH PREGNANCY (CONT'D.)**

The suppression of this factor results in benefit for a tuberculous woman. Derscheid (1936) has gone so far as to advocate pregnancy in certain women, pointing out that it might be less harmful than these constantly recurring feverish attacks. Dumarest and Brette have noted that this point of view is in agreement with the established fact that in cases of aggravation it is not the pregnancy that constitutes the most critical period, but the post-partum. The further suspension of the menses by breast-feeding, however, would not appear indicated to them owing to the risk of infection to the child, and the drain on the mother's resources and strength by nursing.

2. **AGGRAVATIVE FACTORS ON PULMONARY TUBERCULOSIS, ASSOCIATED WITH PREGNANCY.**

The postulated factors, productive of exacerbation during the first months of pregnancy and after confinement in a tuberculous woman, have shown a numerical superiority over the ameliorative, and closely rivalled them in perplexity. (a) **Decalcification.**

Elliot (1917), Bar (1922), and Monkeberg and Vergerak (1923) have regarded the demineralisation of pregnancy as sufficient explanation of the /
2. AGGRAVATIVE FACTORS ON PULMONARY TUBERCULOSIS, ASSOCIATED WITH PREGNANCY (CONTD.)

(a) Decalcification (Contd.)

The spread of the pulmonary disease during this period. The construction of the foetus, which demands a considerable quantity of lime salt, and the brutal decalcification during suckling led Bar to believe that a curve, which represented the rapidity of tuberculous aggravation in the different periods of pregnancy would be parallel to the curve of the foetal needs for lime, and the mother's loss of lime. This need for calcium calls upon the calcified pulmonary nodules, leading to a dissolution of these structures, and a dissemination of tubercle bacilli. Contrary opinions, however, hold that as a result of improved absorption and decreased excretion of calcium during pregnancy, a sufficient increase in the elements occurs to care fully for the foetal needs, and the logical conclusion would be that pregnancy should increase the organism's ability to calcify its tuberculous lesions. This latter view has been expressed by Young (1936), and it has been cited by Morse (1928) that frequently the presence of puerperal osteophytes has been observed on the inner surface of the skull, and new formations at the cartilaginous borders, particularly the symphysis, of calcium-containing bony tissue.
2. **AGGRAVATIVE FACTORS ON PULMONARY TUBERCULOSIS, ASSOCIATED WITH PREGNANCY (CONT'D.)**

(a) **Decalcification (Contd.)**

tissue. Woden (1936) has found little change in the blood, and Bernard (1923) has pointed out that it is now known that the decalcification far from being the cause is only the effect of the progressive exacerbation, and in consequence we cannot blame the decalcification following on the pregnancy.

(b) **Hepatic, Renal and Suprarenal Deficiencies.**

Hepatic, renal, and suprarenal deficiencies, apparently the consequence of phenomena of pregnancy intoxication, have been evoked at other times. Monkeberg and Vergerak have correlated diminished resistance to bacterial infection with impaired liver function, which they report having noted by use of many different tests on 200 tuberculous women. Cohen (1936) has pointed out that renal adequacy declines especially in the later weeks, an additional burden, which with others must play its part in determining the rate of progress of a tuberculous lesion. Sergent (1913) has particularly stressed the influence of pregnancy on the suprarenal capsules, which would interfere with the mechanism which assures the circulation and fixation of calcium, and associates adrenaline in the treatment of recalcification.

(c) /
2. AGGRAVATIVE FACTORS ON PULMONARY TUBERCULOSIS, ASSOCIATED WITH PREGNANCY (CONTD.)

(c) Increased Cholesterolaemia.

Morse (1928) has noted the fact that some authorities are impressed by the striking increase in the blood cholesterol during pregnancy, and they suggest that the extension of the pulmonary infection depends upon the fact that the tubercle bacilli thrive most favourably upon artificial media rich in cholesterol. This view is based on experiments in vitro, and there is no evidence that a similar activity occurs in the body where other factors prevail. Moreover, Saloman and de Potter (1927) have shown that the degree of cholesterolaemia allows itself to be little influenced by the degree of the illness except in the serious progressive cases, and also after confinement when the level of cholesterol in both cases falls below normal - occasions when a high level would be expected if this explanation of aggravation were true.

(d) Increase in the Blood Lypolytic and Proteolytic Ferments.

In the same way, Morse has shown that other authors have postulated a decrease in the lipolytic ferments in pregnancy, which leads to a lessened resistance as a result of the inability of the /
2. AGGRAVATIVE FACTORS ON PULMONARY TUBERCULOSIS, ASSOCIATED WITH PREGNANCY (CONTD.)

(d) Increase in the Blood Lypolytic and Proteolytic Ferments (Contd.)

the serum to overcome the waxy - capsulated tubercle bacilli. This is highly theoretical supposition, and has no basis of experimental proof, and a conclusion open to question in the light of the finding of Slemons and Stander (1923) that the lipolytic content of the blood is actually increased during pregnancy.

Falls (1927) has suggested another hypothesis to account for the spread of a tuberculous focus during the puerperium associated with changes in another constituent in the blood. According to this observer, the increase in the proteolytic ferments in the blood during pregnancy may have some influence on the protective fibrous wall that surrounds the tubercle, and the same digestive processes that act in the involution of the uterus may have some influence on the lighting up of the tuberculosis by softening the foci.

(e) Increased Basal Metabolism.

"It is only natural to expect that pregnancy should increase the chemical processes of a mother's body, and much research proves this to be the case. The basal metabolic rate has been /
2. **AGGRAVATIVE FACTORS ON PULMONARY TUBERCULOSIS.**
   **ASSOCIATED WITH PREGNANCY (CONTD.)**

**e) Increased Basal Metabolism.** (Contd.)

"been proved to be raised by about +5 towards the end of pregnancy." (Johnstone (1936)). This increased metabolic requirements of the pregnant women have been thought to explain the deleterious influence of gestation on tuberculosis. There is a physiological gain at this time which would be favourable to the tuberculous organism unless there is interference with assimilation or deficient food supply. Several authors have reported an increase in the physiological nausea and vomiting of pregnancy in tuberculous individuals but according to Stewart (1922), and Jameson (1935), this has not been borne out by their experience, although Jameson admits if present it may interfere with nutrition and bodily resistance to such an extent the tuberculous lesion may gain rapid headway. He concludes that the normal increase seen in the Basal Metabolic Rate in pregnancy, if associated with the increase brought about by persistent fever could very well have an unfavourable influence on the tuberculosis.

**f) Tuberculin Anergy.**

Lastly, the disappearance or the diminution of the tuberculin reaction of Von Pirquet and Mantoux /
2. **AGGRAVATIVE FACTORS ON PULMONARY TUBERCULOSIS, ASSOCIATED WITH PREGNANCY (CONTD.)**

(f) **Tuberculin Anergy (Contd.)**

Mantoux in the course of pregnancy have been evidenced as the disintegration of the patient's resistance to the tubercle bacillus.

Bar and Devraigne (1911) were the first to show that pregnant women show a diminished resistance to tuberculin. Later, Nobecourt and Paraf (1920) demonstrated 15 to 20 per cent. of pregnant women even in the absence of any evident tuberculosis, lost their tuberculin skin reactivity during the last trimester of pregnancy, analogous to that produced by certain illnesses particularly influenza, whooping-cough, and measles. Rist, however, has admitted that it is not universal in pregnancy as it is in measles for instance. Monkeberg and Vergerak found the intradermal reaction of tuberculous women at term was feebly positive or frankly negative in 76 per cent.

Coulard (1921) has shown that in the sexual life of a woman, pregnancy and confinement are not the only incidents which are capable of determining a temporary anergic condition. Abortion, the advent of puberty, the menopause, and bilateral ovariectomy may result in a similar diminution of the skin reaction. In some women, it /
2. AGGRAVATIVE FACTORS ON PULMONARY TUBERCULOSIS, ASSOCIATED WITH PREGNANCY (CONTD.)

(f) Tuberculin Anergy (Contd.)

it can be noticed in the first two days of the menses, or in the days preceding this in women who are irregular.

The interpretation of these results varies considerably. Bar (1922) believes this strong skin reaction in early pregnancy - always considering the pulmonary findings - should permit one to be conservative, while a negative or weak reaction in proportion to the extent of the pulmonary lesion in a similar patient indicates interruption of the gestation. This holds particularly if the pulmonary lesions have appeared simultaneously with the onset of pregnancy. Bernard (1922) severely criticised this attempt to establish the prognosis by means of the cutaneous tuberculin test.

Rist (1927) thinks that this temporary loss of the allergic state acquired by civilised man during this childhood, means his specific resistance to tuberculosis has given way, and has, therefore, led him to believe pregnancy is one of the causes which diminish this specific resistance. He points out, in addition, that the reaction of the skin to tuberculin to a certain extent runs parallel
(f) Tuberculin Anergy (Contd.)

parallel with some characteristic features of female tuberculosis, namely the unfavourable influence of menstruation, a considerable proportion of cases of tuberculosis beginning at the menopause, and after bilateral ovariectomy.

Leonardi (1935), however, has criticised these deductions and has observed that tuberculin anergy is noted in a number of acute infectious illnesses, smallpox, pneumonia, measles, and influenza, whose aggravative influence has not been shown. Its disappearance in the course of acute fulminating types of tuberculosis can just as well be considered an effect as a cause. Finally, he inquires whether one can assume the diminution of allergy is a witness of a tuberculous aggravation when it occurs in perfectly healthy women.

Jameson has also drawn attention to the fact that it is unsafe to depend upon such hypothetical and divergent views when there is so little proof that anergy to tuberculin per se betokens a lessened tissue resistance and favours the spread of the disease. Schultze-Rhonof (1926) considers the decrease in tuberculin allergy of purely theoretical importance.

Finally, /
2. AGGRAVATIVE FACTORS ON PULMONARY TUBERCULOSIS, ASSOCIATED WITH PREGNANCY (CONTD.)

Finally, further research has not confirmed the findings of the above authors with regard to the tuberculin reaction during pregnancy. Gross (1927) found an anergy of gravidity occurring in the first trimester of pregnancy which is absent in the second half. Salmond (1931) finds the skin reaction may be lessened during the latter months of pregnancy when the patient usually enjoys good health, and increased after labour, when exacerbations are common. It is interesting to note in the 15 cases, in which it was possible to tuberculin test throughout pregnancy in this survey, little change was noted in the skin reaction during gestation, and in 5 cases a slight increase was discernible after confinement.

Coulaud has attempted to correlate his findings with regard to the tuberculin skin reaction with hyper-activity of the thyroid gland, which normally accompanies almost every phase of the sexual life. It is universally recognised that the phases of hyperthyroidism usually coincide with the phases of aggravation of the pulmonary lesions, and Rist has pointed out that in North France, where goitre is prevalent, people with an abnormally /
2. AGGRAVATIVE FACTORS ON PULMONARY TUBERCULOSIS, ASSOCIATED WITH PREGNANCY (CONT'D.)

(f) Tuberculin Anergy (Contd.)

abnormally low thyroid activity were only exceptionally affected with tuberculosis, and then only in a mild form, and concludes there should be, therefore, some relation between the activity of the thyroid gland and susceptibility to tuberculous disease. Undoubtedly phases of hyperactivity of the thyroid occur in pregnancy, and some exacerbation may arise during these phases.

Certain laboratory biological tests have been utilised to provide some indication of the manner in which the tuberculous lesions are affected during the course of pregnancy.

The Blood Sedimentation Rate has been used to establish the correlations, but results have proved inconclusive. As Leonardi has shown the blood sedimentation rate is accelerated in the course of pregnancy in any event, and besides very little could be derived from this test as it is in no way specific and has only the importance of a blood upset of a general kind, which is encountered in the more normal pregnancies.

The complement-fixation test, showing the presence of antibody has been studied also with inconclusive /
2. AGGRAVATIVE FACTORS ON PULMONARY TUBERCULOSIS; ASSOCIATED WITH PREGNANCY (CONTD.)

(f) Tuberculin Anergy (Contd.)

inconclusive results. (Thjotta and Gundersen (1927).) Besides, Weymeersch and Albrechts (1923) have stated that the exact significance of the complement-fixation test has not yet been clearly established, and Pissavy and Bernard (1925) found no existing parallel between the results of the Von Pirquet test and the quantity of tuberculous antibody.

As will be observed from the above resume of the literature, there is complete discord in attempting to evolve some explanation for the deleterious effect of pregnancy on phthisis. All theories have their proponents and opponents, but it would seem that none of them satisfactorily explain why the process of gestation should influence a pulmonary lesion unfavourably.

3. MECHANICAL FACTORS ASSOCIATED WITH PREGNANCY.

In addition to the biological modifications, certain mechanical causes have been indicated as being responsible for the stabilisation of the lesion during the latter months of pregnancy and the exacerbation of the puerperium, with, it must be admitted, considerably more success.

(a) /
3. MECHANICAL FACTORS ASSOCIATED WITH PREGNANCY (CONTD)

(a) Ascension of the Diaphragm.

Among the oldest theories evoked to explain the apparent pernicious effect of pregnancy on pulmonary tuberculosis, was that the enlargement of the uterus elevated the diaphragm with consequent diminution of the capacity of the pleural spaces, and limitation of the expansion of the lung, thus causing a slowing and decrease of the pulmonary circulation. While it would appear the capacity of the lungs would be decreased under these circumstances, Dohrn (1866) showed the longitudinal diminution of the capacity of the pleural cavity by the elevation of the diaphragm was well compensated for by an increase in the width of the thoracic cage, so that the lung capacity was not actually effected. Moreover, Zuntz (1910), investigating the haemo-respiratory change during pregnancy, found it is not markedly interfered with and that while there is no great increase in the consumption of oxygen, or decrease in the output of carbon-dioxide, there is a great increase in the amount of air inspired.

From a clinical standpoint Gross also points out that this theory is untenable because the aggravation of the tuberculous process may appear /
Fig. 16. X-ray of Case No. 101, taken on 17. 10. '38, three months before pregnancy commenced, showing fibrotic changes right apical and subapical zones, with recent changes in left intercleidohilar zone, with left parahilar fibrotic changes.

Fig. 17. X-ray taken on 20. 8. '39, when patient was eight and a half months pregnant, showing slight improvement in pulmonary lesions, with marked ascension of the diaphragm.
3. MECHANICAL FACTORS ASSOCIATED WITH PREGNANCY (CONT'D)

(a) Ascension of the Diaphragm (Contd.)

appear in the early months of pregnancy, when the diaphragm still occupies its original position, and an improvement often occurs in the second half of pregnancy when this supposedly unfavourable influence would be at its maximum. Moreover, the general use of artificial pneumothorax collapse therapy and phrenicectomy dealt a decisive blow, for in spite of this disturbance of the pulmonary circulation, the patient usually derives benefit from these forms of treatment.

Most authors now agree that the raising of the diaphragm and its subsequent immobilisation simulates the appearance and the effects of bilateral phrenicectomy, as illustrated on the opposite page, thereby explaining the amelioration occurring in the latter months of pregnancy.

The proponents of the aggravative theory then advanced the idea that it was not the upward displacement of the diaphragm but rather the sudden decompression at the end of the second stage of labour, which was responsible for the deleterious effects of pregnancy on phthisis. Sergent (1935) while reviewing his long experience of the post-partum exacerbations and the painful impressions they /
3. MECHANICAL FACTORS ASSOCIATED WITH PREGNANCY (CONT'D)

(a) Ascension of the Diaphragm (Contd.)

they had caused him, stressed this mechanical explanation of these aggravations. He also gave this observation as the rationale for his practice of inducing bilateral artificial pneumothoraces, no matter how small and ineffective they seemed, as soon as possible after confinement, in an attempt to prevent this post-partum aggravation. Derscheid (1936) has recommended these artificial pneumothoraces "de sécurité", even if only temporary, owing to the critical undertaking which he realises the confinement and the puerperium may be.

This interesting modification of the original theory has been criticised as the result of studies on the intra-pleural pressures before and after confinement, arising from the considerable increase of artificial pneumothorax therapy conducted on pregnant tuberculous women. According to Zharakovski, quoted by Jameson, the vital capacity is increased by about 150 c.c.s. by the ninth to the fifteenth day post-partum in the majority of cases, but other studies have failed to confirm this alteration. In the case reported by Ford (1927) the intra-pleural pressures just before labour were -12, -5, compared with -7, -4 immediately /
3. MECHANICAL FACTORS ASSOCIATED WITH PREGNANCY (CONT'D)

(a) Ascension of the Diaphragm (Contd.)

Immediately after; and it was found the volume of air required to bring the pressure to atmospheric level was considerably less after the confinement than it was before. Lloyd and Richard (1935) found pregnancy does not appear to increase the intra-pleural pressure in the pneumothorax cavity, nor is there a big fall in pressure after delivery. The pregnant uterus relieves the tension on the lungs in the same way as phrenic evulsion. By straining the pressure in the artificial pneumothorax cavity can be increased enormously, and so during the strain of parturition it is increased, but afterwards it does not fall below the pressure existing before delivery.

Triboulet and Valtis (1929), however, had the opportunity of making detailed physiological studies on a gravida with bilateral pneumothorax, who had a normal delivery at term. Before labour the tidal air measured 450 c.cs. (normal 500 c.cs.); after delivery 440 c.cs. The vital capacity varied from 1300 c.cs. (normal 3000 c.cs.) before labour to 1100 c.cs. immediately after. The residual air was 185 c.cs. before labour as compared with 230 c.cs. afterwards (normal 1000 c.cs). The /
3. MECHANICAL FACTORS ASSOCIATED WITH PREGNANCY (CONTD.)

(a) Ascension of the Diaphragm (Contd.)

The calculated total lung capacity varied from 1735 c.c.s. (normal 4500 c.c.s.) before to 1331 c.c.s. after delivery. The ventilation in 10 minutes was 103.6 litres before labour, 89.88 litres after. These figures would indicate that no further expansion of the lungs occurred after labour.

(b) The Exertions of Labour.

Stewart (1922) considers parturition with laceration, loss of blood, anaesthesia, and changes in pressure involve an amount of shock, comparable to that of laparotomy, with overstrain and violent respiratory efforts, which are not only most exhausting to an already enfeebled woman, but tend also to force infective material from an old focus into new lung areas, as responsible for the exacerbations of the puerperium. Morse has stated that some authorities believe that bacilli are thought to be transferred into the blood stream of the uterus during the third stage of labour as the result of the tearing through of tuberculous foci, situated in the decidua basalis. This appears a highly hypothetical supposition with no basis of actual proof.

The effect of parturition with its coincident muscular exertion especially if the labour /
3. MECHANICAL FACTORS ASSOCIATED WITH PREGNANCY (CONT'D)

(b) The Exertions of Labour (Contd.)

labour is prolonged, loss of blood and the possibility of the aspiration of infected sputum would appear to be a possible cause of puerperal exacerbation in a tuberculous pregnant woman, if the disease is active and progressive at the commencement of confinement. It should be pointed out, however, by modern methods of handling the parturient, all these dangers can be reduced to a minimum or avoided altogether.

4. SUMMARY.

From the preceding discussion, it will be seen that the causes of amelioration or aggravation are far from established, and that the authors have merely contributed certain hypotheses, which may account for their observations, but which, however, do not always agree with the clinical data of others.

From the statistical data of this survey, maternity was shown as a factor, which is truly capable of improving or constituting aggravation, but from the above account a direct action on the lesions can hardly be admitted unless it concerns the two mechanical modifications discussed in the final section of this chapter. Otherwise, pregnancy /
4. **SUMMARY (CONTD.)**

Pregnancy has not yet been proved to influence the "soil" in any more specific manner than any other debilitating cause for lowering the resistance of the patient. Undoubtedly, it is the "soil" much more than the pregnancy itself, which governs the prognosis in pregnant tuberculous females. In the destructive types, pregnancy may have a pernicious and often disastrous influence. In the fibrotic healing types where the terrain is favourable, pregnancy will not often cause any modification in the lesions. Generally its effect will be indifferent, sometimes beneficial.

Thus it is not the pregnant state which must guide the therapeutic conduct, but the minute study of the form of the tuberculosis present, and which must be undertaken before concluding to respect or interrupt pregnancy. Therapeutic abortion, in addition, is only a last resource in the progressive types, when natural methods which the organism has at its command, and reinforced by therapeutic means, have been tried to the utmost.
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PART VII.

THE TREATMENT OF PREGNANT TUBERCULOUS WOMEN.

As has been demonstrated in the previous chapter, the main consideration in the elucidation of the problem, which confronts the physician in a case of phthisis complicated by pregnancy, must be devoted to the type of the pulmonary disease from which the patient suffers. Other subsidiary factors will also have become apparent during this review, namely, the time, with respect to the illness, at which pregnancy supervenes - whether before or after diagnosis; the presence of other tuberculous manifestations; the social and financial status of the patient, and any alterations therein associated with the arrival of the child; multiparity, etc. Their importance has been noted really to be mainly concerned with the alterations and modifications which they might impose on the pulmonary lesions.

In the fibroid type, diagnosed either before or after the intervention of pregnancy, clinical and statistical evidence has provided adequate proof that these patients tolerate their pregnancy with a facility,
facility, which gives rise to little apprehension and never determines a therapeutic problem of any magnitude. The pregnancy is disregarded, and treatment consists of placing the patient under constant supervision of a phthisiologist and obstetrician, and directing attention and advice towards her mode of conduct in hygiene and dietetics.

In the rapidly progressive ulcerative types, no matter the time of diagnosis with respect to when impregnation occurs, unless the lesion is of very moderate extent and capable of resolution and control by collapse therapy, the prognosis can be anticipated with such pessimism that therapeutic procedures are concentrated on conserving her strength, and minimising the strain of pregnancy so that she may undergo confinement in the best possible state of health. As neither active therapeutics nor abortion are capable of stemming the progress of the disease all precautions should be undertaken to safeguard the life of the child.

In women suffering from these types of phthisis, the conduct of the physician is unmistakable, and circumstances leave him little alternative. It is in the forms as yet unmentioned that his skill and ingenuity are taxed to the utmost, and the necessity becomes apparent for a careful consideration of /
of the facts appertaining to each case, before deciding on his line of conduct. Although he may err in his decision after individualisation of his cases, absolutism will cause more and graver errors.

In the healing fibro-caseous types, pregnancy is usually undertaken with comparative safety, and Morisson-Lacomme (1924) estimated the risk entailed under these circumstances would be about 5 to 10 per cent. of serious aggravation. The factor to be estimated is the amount of fibrosis present in each individual case, as has been demonstrated previously, and the effect of such subsidiary considerations as multiparity, the financial arrangements of the household et cetera, will have on the strengthening or otherwise of this fibrotic element during pregnancy and after confinement. If it is believed to be sufficiently in the ascendancy, always bearing in mind the amelioration occurring during the latter months of gestation, to withstand the rigours of confinement when reinforced by hygieno-dietetic measures and collapse therapy if possible, the pregnancy may be allowed to continue. If the progressive exacerbation is still liable to cause anxiety then therapeutic abortion must then be taken into consideration. In the progressive fibro-caseous types a similar procedure must be adopted, but in these cases resort will more frequently be made to therapeutic abortion.
The treatment of phthisis in a pregnant tuberculous woman thus differs in no material way from the treatment of tuberculosis uncomplicated by gestation apart from therapeutic abortion. Slight modifications, however, are imposed by the occurrence of pregnancy on the two major therapeutic methods of combating the tubercle bacillus, the hygierno-dietetic cure, and collapse therapy. Attention will first be directed to these, and then the problem of therapeutic abortion will receive consideration.

1. HYGIENO-DIETETIC TREATMENT.

(a) Sanatorium Care.

Apart from these cases of benign fibroid tuberculosis who are perhaps discovered by fortuitous radiological examination and can be treated satisfactorily by out-patient supervision, this form of treatment should be undertaken in all women suffering from tuberculosis who become pregnant. By admission to a sanatorium, the patient is placed in much better climatic surroundings, and more satisfactory arrangements can be instituted, and more efficiently directed by physicians for the reinforcement of her natural defences against the disease. Moreover, during this period, obstetricians have a most suitable opportunity for carrying out ante-natal care, and any decision with
1. HYGIENO-DIETETIC TREATMENT (CONTD.)

(a) Sanatorium Care (Contd.)

with regard to the necessity for collapse therapy can be reached, and this mode of treatment instituted under optimum conditions. Astruc (1932) has published his observations on the successful result obtained by the hospitalisation of pregnant tuberculous women, and remarks "Sanatorium care appears sufficiently decisive to conclude that sanatorium treatment can, in an important number of cases, have a result so favourable that the prognosis becomes very different from what it was in the untreated cases."

Unfortunately, the patient must have adequate financial resources, and sanatorium preparation for confinement is generally unobtainable for her less fortunately situated sister. Jameson (1935) has stressed the fact that only sporadic and totally inadequate attempts have thus far been made to meet the special requirements of the gravida, and are suffering from pulmonary tuberculosis. In most institutions the onset of pregnancy diminished rather than enhances the phthisical woman's desirability as a patient, and her chances of admission in this condition are lessened. Hill (1927) undertook a comprehensive survey /
1. HYGIENIC-DIETETIC TREATMENT (CONTD.)

(a) Sanatorium Care (Contd.)

survey of the sanatorium provisions for the pregnant tuberculous woman, and discovered that the tuberculous woman who becomes pregnant, is permitted considerably less care than are other tuberculous individuals. She concludes that as long as the care accorded a gravid tuberculous woman is not comparable, except in certain circumstances, with that accorded non-gravida, the question cannot be avoided as to what extent statements, relative to the deleterious effect of pregnancy on tuberculosis, need discounting.

Moreover, occasions will arise, when a tuberculous woman will present herself at a dispensary, perhaps three or four months pregnant, and her general and local condition necessitating immediate sanatorium admission, which, however, cannot be granted owing to the length of the waiting list. Admission may not be possible until confinement is almost due, and little can be accomplished to benefit the patient.

Hill has pointed out in addition that in many sanatoria, where pregnant women are not refused admission, they are transferred in many instances to maternity hospitals for their confinement, and their readmission is by no means a general
1. **HYGIENO-DIETETIC TREATMENT (CONT'D.)**

(a) **Sanatorium Care (Contd.)**

general rule.

The optimum conditions to be desired for these women would be the right of priority of admission to a special sanatorium, provided with an obstetrical ward where the necessary privacy could be obtained, and the patient could remain for several months after the puerperium. If this ideal is unobtainable, it would appear quite feasible for her admission to a Sanatorium as soon as possible, and her transfer to a maternity home at term. During the delivery and the puerperium, her supervision can be continued by a phthisiologist, until such times as the patient is returned to the sanatorium, where she could remain until discharge as in no further need for such treatment. The interruption of her sanatorium sojourn would probably have very little deleterious effect, especially if the patient was doing well.

(b) **Calcium Therapy.**

During her hygieno-dietetic regime, general medication can be carried out. Although the part played by declacification in pregnant tuberculous women is still unsettled, the administration of calcium salts accompanied by suprarenal therapy /
1. HYGIENO-DIETETIC TREATMENT (CONT'D.)
   (b) Calcium Therapy (Contd.)
   therapy as advocated by Sergent (1913), would appear indicated.
   (c) Gold Therapy.
   The only success which can be claimed in the application of chemotherapy to tuberculosis is by means of gold salts, in one or other form.
   Bernard, Mayer and Sakellaropoulos (1931) published several observations of tuberculous gravida treated by chrysotherapy with encouraging results. They pointed out in addition that in the unprogressive sclerotic types, this form of treatment would appear superfluous, except perhaps in the ulcero-fibroid cases, although they also are generally indifferent to the influence of maternity.

   Of the 32 patients who received gold therapy among the women of this survey, 11 were thus treated during pregnancy. The indications were taken to be the same for tuberculous women in general, and the thiosulphate of gold was administered intravenously in gradually increasing doses from 2 to 70 centigrammes where the dosage remained until a total course of 6 to 7 grammes had been given. Attention was particularly directed towards /
HYGIENO-DIETETIC TREATMENT (CONTD.)

(c) Gold Therapy (Contd.)

towards the appearance of manifestations of intolerance, especially albuminuria, the urine being tested daily. In four cases, the treatment had to be discontinued after varying dosages had been given, 2 after the appearance of erythema of the skin, 1 after the occurrence of gingivitis, 1 after a slight albuminuria, which disappeared within five days from its commencement and after the cessation of the administration. The difficulty associated with the estimation of the improvement resulting from gold therapy while the patient is also undergoing hygieno-dietetic cure also is well known. All that can be remarked concerning the above patients is that improvement did occur during the period chrysotherapy was carried out.

One of the main benefits derived from hospitalisation of the patient during pregnancy and after confinement is the opportunity gained for the commencement of collapse therapy at the most suitable period, and its continuation in ideal surroundings. Its application, and any requisite modification in pregnant tuberculous women will now receive discussion. Similar benefit will also accrue under these circumstances in
1. HYGIENO-DIETETIC TREATMENT (CONT'D.)
   
   (c) Gold Therapy (Contd.)
   
in deciding whether interruption of the pregnancy is desirable, and for pre and post operative treatment, but this discussion will be reserved until later.

2. PREGNANCY AND COLLAPSE THERAPY.

   Reports in the literature have been mainly confined to the introduction of artificial pneumothorax therapy during pregnancy, or pregnancy occurring in women undergoing this method of treatment. Several authors have published cases in which pregnancy intervened in patients in whom thoracoplasty or phrenicectomy had been performed, but these are definitely in the minority.

   Attention will be directed in the first instance to the first-mentioned method of collapse therapy and its relationship to pregnancy.

   (a) Artificial Pneumothorax and Pregnancy.

   The rapidly increasing number of reports in the literature on the use of artificial pneumothorax therapy in pregnant tuberculous women has been singularly unanimous in regarding the measure as a valuable means of preventing untoward results during gestation and the puerperium. Forlanini (1906) the pioneer in the clinical use of artificial
2. **PREGNANCY AND COLLAPSE THERAPY (CONT'D.)**

(a) **Artificial Pneumothorax and Pregnancy (Contd.)**

artificial pneumothorax, was also the first to employ the method during pregnancy. Spengler and Neumann (1913) repeated the procedure, followed by Rist and Leon-Kindberg (1914) who published four cases. Thereafter reports of the beneficial influence of this treatment in tuberculous gravida became numerous as its efficiency was realised, and its practice established.

Three types of cases can be recognised, in which artificial pneumothorax enters into the treatment of the pregnant tuberculous woman. The first group comprises those patients in whom artificial pneumothorax has already been established when impregnation occurs; the second group are those patients in whom artificial pneumothorax is induced during the course of gestation; the third in whom artificial pneumothorax is instituted following delivery, either as a therapeutic measure, or for prophylaxis as suggested by Sergent.

(i) **Pregnancy, supervening in patients undergoing artificial pneumothorax therapy.** The general concensus of opinion with regard to this subject is that, if the collapse is effective,
2. PREGNANCY AND COLLAPSE THERAPY (CONT'D.)

(a) Artificial Pneumothorax and Pregnancy - (i) Pregnancy, supervening in patients undergoing artificial pneumothorax therapy (Contd)

and of relatively long standing, such women fare well almost without exception.

Pellé (1925), Ford (1927), Roloff (1929), Young (1931), Cutler (1932), Falkiner and Micks (1933), have all published cases in which artificial pneumothorax therapy had been continued for varying intervals with satisfactory results, diminishing or suppressing the activity of the tuberculosis. Good progress continued in their cases in spite of the intervention of pregnancy during the course of treatment. In the 10 cases of the 295 women comprising this study, who became pregnant while undergoing artificial pneumothorax treatment, all underwent labour and the puerperium without exacerbation, or any deterioration in their pulmonary condition. Several of the cases are published below.

CASE NO. 104. Mrs. H.M. (Age 20 yrs.) Para. 0.

HISTORY.

18. 7. '32. Has not been feeling well for the past five months. Developed cough three weeks ago, and was spitting blood for three days last week.

DIAGNOSIS. /
2. PREGNANCY AND COLLAPSE THERAPY (CONT'D.)

(a) Artificial Pneumothorax and Pregnancy -

(i) (Contd.)

CASE No. 104 (Contd.)

DIAGNOSIS.

Radiological. Fine infiltration first left interspace. Left root markedly increased, and radiating into lung parenchyma.

Bacteriological. Sputum positive, 21. 7. '32.


TREATMENT.

Admitted to sanatorium. Artificial pneumothorax induced on left side and maintained satisfactorily.

PROGRESS.

14. 11. '33. Has been keeping very well. No cough or sputum. Artificial pneumothorax being maintained with refills at three weekly intervals.
24. 8. '34. Reports three month pregnancy. No complaints. Local condition remains satisfactory.
9. 12. '34. Feels very well. No change in local condition. Now eight and a half months pregnant.
24. 1. '35. Delivered two weeks ago. Feels tired, otherwise no complaints.
16. 6. '35. No change to note in local or general condition.
18. 8. '36. Two months pregnant. Some nausea in the morning. No cough or sputum. Artificial pneumothorax being maintained satisfactorily.
3. 3. '37. Confined.
11. 4. '38. /
2. PREGNANCY AND COLLAPSE THERAPY (CONTD.)

(a) Artificial Pneumothorax and Pregnancy -

(i) (Contd.)

CASE No. 104 - PROGRESS (Contd.)

11. 4. '38. Local and general condition very satisfactory. No symptoms. Artificial pneumothorax still maintained.

Although this patient underwent two pregnancies within a little over two years, no deterioration could be noted in either her local or general condition.

CASE NO. 105. Mrs. C.S. (Age 26 yrs.) para. 3.

HISTORY.

4. 7. '36. Has not felt well for one week. Complains of cough and pain in the back. Brother died of pulmonary tuberculosis.

DIAGNOSIS.

Radiological. Dense irregular shadow occupying left apex from first rib to second interspace. Increased markings right base.

Bacteriological. Sputum positive, 22. 4. '36.

Clinical. Progressive fibro-caseous tuberculosis.

TREATMENT.

Admitted to sanatorium. Artificial pneumothorax induced left side and maintained with satisfactory results.

PROGRESS.

25. 1. '37. /
2. PREGNANCY AND COLLAPSE THERAPY (CONTD.)

(a) Artificial Pneumothorax and Pregnancy -
(1) (Contd.)

CASE No. 105 (Contd.)

PROGRESS.

25. 1. '37. Discharged from hospital.
Feeling very well. Artificial pneumothorax being maintained satisfactorily on fortnightly refills.

27. 2. '38. Reports two months amenorrhoea.
Slight morning sickness. Occasional cough but no sputum. Having refills at three weekly intervals.

4. 3. '38. Developed pain on right side.
Otherwise feels very well. No cough or sputum. X-ray shows very good collapse of left lung with long filiform apical adhesion and adherent base in inner half. No exudates or mediastinal shift. No evidence of active disease in right lung, but some degree of increase in basal broncho-vascular strands.

5. 9. '38. Now eight and a half months pregnant. Feels very well. No lung symptoms. No change in local condition.


31. 12. '39. Has been keeping very well.
No deterioration to be noted in local or general condition in spite of pregnancy and confinement.

CASE NO. 106. Mrs. M.M. (Age 30 yrs.) Para. 3.

HISTORY.

27. 3. '35. Complains of cough of three months duration with accompanying sputum and dyspnoea. Has not been keeping well for the last few months.

DIAGNOSIS.

Radiological. Infiltration at right root with breaking down and cavity formation. Soft finely mottled shadow first right interspace.

Bacteriological. /
2. PREGNANCY AND COLLAPSE THERAPY (CONTD.)

(a) Artificial Pneumothorax and Pregnancy –

(Contd.)

CASE No. 106 – DIAGNOSIS (Contd.).

Bacteriological. Sputum positive, 1. 9. '35.


TREATMENT.

Admitted to sanatorium. Artificial pneumothorax induced on right side and maintained satisfactorily.

PROGRESS.

4. 4. '36. Discharged from hospital. Symptom free. General condition very satisfactory. Right artificial pneumothorax producing good clinical result.


12. 11. '38. Now four and a half months pregnant. Feels well. Artificial pneumothorax being continued at sixteen day intervals.

29. 4. '39. Confined one month ago. General condition does not seem to have deteriorated. Artificial pneumothorax being continued at usual intervals.

27. 5. '40. Feeling very well. No change in pulmonary condition compared with that before pregnancy.

In all these cases, however, pregnancy did not occur until a satisfactory clinical result had been produced. The stability of the lesions were never in doubt.

Rist /
2. PREGNANCY AND COLLAPSE THERAPY (CONTD.)

(a) Artificial Pneumothorax and Pregnancy - (Contd.)

Rist and Jottras (1936) have shown that pregnancy is better tolerated the longer collapse of the diseased lung has been maintained. Of 53 patients under artificial pneumothorax therapy and who later became pregnant, 39 began their pregnancy more than one year after artificial pneumothorax treatment had been commenced, and in these 26, or 67 per cent., a cure was established. Of the remaining 19 women, who began their pregnancy in less than a year after the commencement of their artificial pneumothorax treatment, 12, or 63 per cent. were cured. The authors concluded that pregnancy and confinement are much better tolerated the more complete and the more prolonged the curative action the pneumothorax had.

Forlanini (1928) has drawn attention to the fact that in certain cases the artificial pneumothorax may suppress the activity of the tuberculous lesions, and allow the patient to live a relatively useful life, but the lesions themselves are not suppressed or undergo fibrosis. In these patients any cause of deterioration in the resistance of the subject may result in exacerbation of the pulmonary condition, expressed by /
2. PREGNANCY AND COLLAPSE THERAPY (CONTD.)

(a) Artificial Pneumothorax and Pregnancy -
    (i) (Contd.)

by progress of the disease in the collapsed lung,
pleural complications, or the appearance of another
focus, particularly in the other lung. He pointed
out that the muscular exertion of labour may be one
of the aetiological factors in producing aggra-
vation in women, who have been treated by artificial
pneumothorax therapy, and in whom deterioration is
recognised during the post-partum. These exacer-
bations, however, are rare in a complete and
efficient artificial pneumothorax.

Roloff (1929) has stressed the appear-
ance of the signs of activity of bacterial infec-
tion are ordinarily seen in women whose partial
artificial pneumothorax has brought about only a
provisional arrest of the progress of the lesion.
These are the patients who retain a positive
sputum, and who in the struggle which they must
maintain against the bacillus, are on the point
of succumbing. In their history, maternity may
be only one mishap out of many others.

Leonardi (1935), however, has pointed
out that a partial artificial pneumothorax, on the
contrary, may have better success during preg-
nancy, because of the ascension of the diaphragm.

It /
2. PREGNANCY AND COLLAPSE THERAPY (CONT'D.)

(a) Artificial Pneumothorax and Pregnancy - (i) (Contd.)

It would appear therefore from this review of the literature, and the experience gained from the cases previously described that pregnancy alters the course pursued by the disease in no material way when under treatment with artificial pneumothorax, provided the collapse obtained is adequate and sufficiently prolonged. If, on the other hand, the collapse is just maintaining the resistance of the patient against her disease, abortion will require to be considered.

The technique of continuing the pneumothorax in these patients of this survey, who became pregnant while undergoing artificial pneumothorax therapy, was found most efficacious. Refills of air of the usual quantity and at the usual intervals before pregnancy supervened were maintained until the ascension of the diaphragm necessitated some modification of these two factors. They are then modified with the aid of the X-ray screen as necessity demands, the volume of air required decreasing as the pregnancy advances, the intervals remaining stationary. A last refill was given a day or two before the patient entered a maternity hospital /
(a) Artificial Pneumothorax and Pregnancy — (i) (Contd.)

hospital for her confinement provided labour commenced before the normal period of her insufflations had elapsed, or another would have required to have been given. The next refill was administered as soon as possible after the child had been born, and the collapse continued thereafter as shown necessary by screening.

Any complications of this type of collapse therapy are treated in the usual manner. Effusions are aspirated if this procedure is indicated, and contralateral localisation by the application of strict hygieno-dietetic treatment, and if possible by the commencement of a bilateral artificial pneumothorax, in combination with chrysotherapy. Weymeersch and Albrechts (1923) have claimed that these complications are more frequent in pregnant artificial pneumothorax women, but this has not been our experience or that of Roloff. No untoward occurrences were noted in the cases of this study mentioned above.

(ii) Artificial Pneumothorax Therapy Commenced in Pregnant Women. Reports on the therapeutic results arising from the commencement of artificial pneumothorax therapy during pregnancy have
2. PREGNANCY AND COLLAPSE THERAPY (CONT'D.)

(a) Artificial Pneumothorax and Pregnancy -
(II) (Contd.)

have generally been favourable. Hervé (1921), Oliver (1925), Clivio (1925), who reported six successful cases, Rist (1927), and Young (1931) have all published statistical data showing the success of this operation commenced during gestation. Rist in collaboration with Jottras, however, showed that the prognosis in these cases is more serious than in those in whom collapse therapy had already been in progress, when impregnation occurred. Of 74 patients, in whom collapse had not been commenced until during pregnancy, in only 33, or 45 per cent., were favourable results obtained, obviously inferior to those of the previous category, in whom the artificial pneumothorax had been established for some time before gestation, and where success was achieved in 65.5 per cent. Rist further discriminated between the women, in whom the artificial pneumothorax was well advanced before this procedure was commenced. In 32 cases, the collapse was established in the first four months of pregnancy, with 17, or 53 per cent., favourable results. On the other hand, in the remaining 42 women, only 16, or 38 per cent., were
2. PREGNANCY AND COLLAPSE THERAPY (CONTD.)

(a) Artificial Pneumothorax and Pregnancy – (ii) (Contd.)

were successfully treated. He concluded the intervention of collapse therapy must be expedited, for the greater are its chances of success, the earlier it is started.

Armanini (1928) also believes there is more probability of the collapse being well tolerated when started early in gestation than in the presence of an advanced pregnancy. Riemer (1931) in addition has stressed the necessity for instituting collapse therapy as soon as possible. He believes the extensions of the lesions are sometimes extremely rapid in pregnant women, and that it is always the progressive nature of the lesions more than their extent, which demands the application of artificial pneumothorax, and therefore applies this rule more rigidly in gravida.

Apart from this curtailment of the stage of temporisation, during which an exact impression of the progressive tendency of the existing exacerbation is being gained, the indications of artificial pneumothorax therapy are those in general, every case with unilateral disease, in which collapse is not prevented by pleural adhesions, or contraindicated by cardiac disease. In some cases, moreover, /
2. PREGNANCY AND COLLAPSE THERAPY (CONTD.)

(a) Artificial Pneumothorax and Pregnancy — (ii) (Contd.)

moreover, bilateral distribution of the disease may still allow artificial pneumothorax therapy to be instituted as will be seen later.

The details of the application of artificial pneumothorax therapy in pregnant women are somewhat modified, but not the principle, or the indications. Occasionally the collapse obtained is only partial, when the line of conduct to be then followed differs slightly. According to Sergent (1926) this partial collapse must be judged not only by its technical result but by its clinical efficiency. The question of its perfection by the substitution of some other method of collapse therapy in an attempt to better the technical result must be delayed in pregnant women until after confinement, instead of immediate trial in non-pregnant women. In addition, it must be remembered that the clinical success will improve as pregnancy advances, since the progressive tendency diminished with its continuation.

The maintenance of the collapse in the course of pregnancy would not appear to present any particular difficulty. Weymeersch and Albrechts claim that artificial pneumothorax constitutes a more.
2. PREGNANCY AND COLLAPSE THERAPY (CONTD.)

(a) Artificial Pneumothorax and Pregnancy -

(ii) (Contd.)

more perilous interference than in non-pregnant women, but this is not the experience of other writers. Leonardi found that the mechanical inconvenience resulting from the ascension of the diaphragm in addition to the artificial pneumothorax does not determine a cardiac or a respiratory embarrassment, resulting in dyspnoea, provided no cardiopathy is present, and if a negative pressure is maintained in the pleural cavity, the artificial pneumothorax is perfectly tolerated.

The quantity of air to be introduced, the amount of collapse to be desired, and the frequency of the insufflations will vary individually. Generally, refills will decrease in quantity as pregnancy advances, the intervals being kept constant. As in the previous group of cases, a refill should be given immediately after labour.

The question of how long the collapse should be continued after confinement will vary with the individual case, but if successful should be maintained for a number of years.

(iii) Artificial Pneumothorax Therapy
Commenced after Confinement, and Bilateral Artificial Pneumothorax Therapy. The application of artificial /
2. PREGNANCY AND COLLAPSE THERAPY (CONTD.)

(a) Artificial Pneumothorax and Pregnancy - (iii) (Contd.)

Artificial pneumothorax therapy in patients diagnosed after confinement differs in no essential from its performance in non-pregnant women. It should be noted, however, according to Rist (1927) that the results were only half as successful with this treatment in 15 of his cases, induced during the post-partum as compared with their non-pregnant sisters. In the 10 cases of artificial pneumothorax begun in parturient women in this series, the results were substantially the same as in the control group, all cases being alive one year after diagnosis.

Attention must be given here to the introduction of small bilateral pneumothoraces in the puerperium, as advocated by Sergent (1926), both as a curative measure, but mainly preventative. The theoretical principle of this preventative bilateral artificial pneumothorax therapy, on which he has based the rationale of his treatment, is the abrupt abolition at the time of confinement of the thrust exercised by the gravid uterus on the diaphragm with a consequent decrease in the intra-pleural pressures. If this decrease can play a role in the progressive exacerbations of the post-partum, /
2. PREGNANCY AND COLLAPSE THERAPY (CONT'D.)

(a) Artificial Pneumothorax and Pregnancy -

(iii) (Contd.)

post-partum, it is perfectly logical to counteract it by the institution of a bilateral artificial pneumothorax. The insufflation of gas immediately after delivery will collapse the space created by the expulsion of the foetus, and re-establish the previous equilibrium of the thoracic cavity.

Sergent published 8 cases treated by this method with favourable results, and Mignot (1927) added another 4. Derscheid (1936) has also been an advocate of this form of treatment.

Stockler and Pitta (1928) and later Jameson (1935), have criticised this method as hardly justified as a prophylactic measure, and feel the indications in a parturient women for bilateral pneumothorax therapy do not differ from those in whom it is instituted as a curative procedure. They believe that if the operation has any success in preventing the spread of the disease, and diminishing or suppressing it, it should be maintained generally.

On the whole, bilateral artificial pneumothorax therapy can be commenced during pregnancy, or pregnancy occur in a bilateral artificial pneumothorax patient. Again the considerations of its /
its application do not differ from the general application of the method.

At first it was feared that patients being treated by bilateral artificial pneumothorax and becoming pregnant might succumb to an asphyxiating dyspnoea at the moment of confinement, and abortion was usually advocated. Published results, however, of women with bilateral artificial pneumothorax, who had undergone pregnancy successfully have shown these fears were unfounded, and now the treatment is advocated if bilateralisation of the disease occurs in the course of pregnancy.

Rist and Coulaud (1929) published the first observation of a patient presenting a rapidly progressive tuberculosis and treated by bilateral artificial pneumothorax, in which pregnancy began soon after the commencement of the second collapse. A successful result was obtained in this woman, who had never ceased working, and who even presented a traumatic perforation of the lung ten days after confinement.

Triboulet and Valtis (1929) published another case of pregnancy in a woman treated by bilateral artificial pneumothorax. Roloff (1929)
2. PREGNANCY AND COLLAPSE THERAPY (CONT'D.)

(a) Artificial Pneumothorax and Pregnancy -
(ii) (Cont'd.)

and Blisnjanskaja (1931), who reported 3 good results, have also described similar cases.
Duryea (1932) concluded that the inconveniences from the point of view of the respiratory system, or cardiac embarrassment, which result from the development of the uterus, are not a contraindication of applying the method when there do not exist lesions of the valves of the heart, hepatic or renal alterations, which constitute general contraindications of artificial pneumothorax. The maintenance of a negative pressure in these cases however, is most necessary. He described one case of bilateral artificial pneumothorax instituted during pregnancy. The mother unfortunately died six months after delivery from meningitis.

Another contra-indication would appear to be if the lesions were too extensive for expectations of a successful result from this therapy to be too optimistic. In some cases difficulties will arise in deciding when to refrain in too advanced cases, and when to act quickly in suitable cases.

The technique differs in no way from the procedure in non-pregnant patients, although Armanini counsels diminishing the intra-pleural pressures /
2. PREGNANCY AND COLLAPSE THERAPY (CONT'D.)

(a) Artificial Pneumothorax and Pregnancy - (iii) (Contd.)

pressures during labour if there is any evidence of respiratory distress. Judging from the literature this is seldom noted.

(b) Thoracoplasty and Pregnancy.

The success of artificial pneumothorax therapy in tuberculous pregnant women has incited physicians to extend the indications of collapse therapy to other methods of procuring this mode of treatment, namely phrenicectomy, and even thoracoplasty. Although only 11 cases of pregnancy in patients, in whom a thoracoplasty had been performed, have been reported in the literature, the results in them have been highly satisfactory, and indicate that the combination need not be feared in the majority of instances.

In all these cases, pregnancy supervened in a woman, in whom thoracoplasty had already been carried out. Sayé (1926) and later Amorin (1934) had recourse to this operation with successful results during the fifth month of pregnancy on account of formidable haemoptyses menacing the patients' lives. Schultze-Rhonof (1929) has advised the interruption of a coexisting pregnancy before /
(b) Thoracoplasty and Pregnancy (Contd.)

Before operation is attempted, but the experience of the above authors would tend to show it is not always necessary. Our attitude to the problem would be that the question of a thoracoplasty being attempted or not, should depend entirely on the local and general condition, and not on the presence of a pregnancy, and after repeated unsuccessful attempts to induce an artificial pneumothorax.

(c) Phrenicectomy and Pregnancy.

This intervention during pregnancy would appear highly logical, as it would favour and aid the improvement produced by the immobilisation of the diaphragm in the latter months of gestation. As it is a minor procedure, one would not expect the operation per se to have an appreciable influence on the pregnancy, and the ultimate results of a successful operation are entirely comparable to those obtained by other methods of obtaining a pulmonary collapse.

The literature, however, contains but few reports on the effects of operations on the phrenic nerve during the course of pregnancy. Castagna (1930) has reported one case in which exeresis was done during the fifth month of gestation /
2. PREGNANCY AND COLLAPSE THERAPY (CONTD.)

(c) Prenicectomy and Pregnancy (Contd.)

gestation with resulting improvement in the pulmonary lesions and no effect on the pregnancy. In this series of cases, pregnancy occurred in 2 cases, who had undergone this operation 2 and 3 years respectively before impregnation. In both cases delivery was accomplished with no effect on their pulmonary condition.

CASE NO. 96. Mrs. C.C. (Age 24 yrs.) Para. 3.

HISTORY.

5. 10. '36. Cough and sputum for several years, and during past three weeks especially after patient developed a severe cold. Has had two attacks of pleurisy in the last three months.

DIAGNOSIS.

Radiological. Extensive fibro-caseous disease throughout left lung. Increased broncho-vascular strands right base.

Bacteriological. Sputum positive, 8.10. '36.

Clinical. Progressive fibro-caseous tuberculosis.

TREATMENT.

Admitted to Hospital. Hygieno-dietetic treatment with full course of gold therapy. Phrenicectomy performed 16. 11. '36.

PROGRESS.

22. 4. '37.
2. PREGNANCY AND COLLAPSE THERAPY (CONTD.)

(c) Phrenicectomy and Pregnancy (Contd.)

Case No. 96 (Contd.)

PROGRESS.

22. 4. '37. Discharged from Hospital.
Locally, lesion undergoing fibrosis.
15. 3. '38. Local improvement continues.
Patient two months pregnant.
22. 10. '38. Patient delivered.
Fibrotic reaction continues to predominate over any destructive process.

CASE NO. 112., Mrs. H.M. (Age 32 yrs.) Para. 4

HISTORY.

16. 10. '33. Patient caught a heavy cold two weeks ago. Is now suffering from a very troublesome cough with copious expectoration. Is also breathless with some pain in the left chest.

DIAGNOSIS.

Radiological. Extensive fibro-caseous disease left upper lobe with large cavity in the infraclavicular region. Increased markings right intercleido-hilar zone.

Bacteriological. Sputum positive, 20.10.'33.

Clinical. Progressive fibro-caseous tuberculosis.

TREATMENT.

Admitted to sanatorium. Artificial pneumothorax induced left side, but had to be discontinued, as adhesions prevented a satisfactory clinical result. Phrenicectomy then undertaken with good results.

PROGRESS. /
2. PREGNANCY AND COLLAPSE THERAPY (CONTD.)

(c) Phrenicectomy and Pregnancy (Contd.)

CASE No. 112 (Contd.)

PROGRESS.

14. 1. '36. Discharged from Hospital. General condition excellent, with very great improvement in local condition.
22. 2. '37. Has kept well, Symptom free. Reports three months pregnancy. X-ray shows old fibrotic changes upper half of left lung with marked elevation of the diaphragm. Increased markings in right infraclavicular zone.
9. 4. '37. Apart from slight cyanosis and dyspnoea, no change to note in local or general condition.
13. 3. '37. Confined two weeks ago. Feeling very well.
2. 9. '38. Apart from an occasional cough has no complaints. General condition satisfactory. X-ray shows no definite changes have occurred in lung parenchyma from that taken on 22. 2. '37.

It would appear, therefore, that in generally, patients who have undergone collapse therapy for a sufficiently long time, with satisfactory suppression or diminution of the activity of their lesions, are able to undergo pregnancy with little aggravation of their tuberculosis.

In those cases, however, in whom collapse of the diseased lungs has not yet resulted in suppression of the lesions themselves, and exacerbation may occur after confinement, or the collapse has been recently induced, opinions differ on the course /
2. **PREGNANCY AND COLLAPSE THERAPY (CONT'D.)**

   (c) **Phrenicectomy and Pregnancy (Contd.)**

   course which must then be followed. Morisson-Lacomme (1924) believes that in a patient, who has an old artificial pneumothorax with results that can be considered favourable and stable, pregnancy can be allowed to continue. If the artificial pneumothorax has been recently instituted, or if it is a question of an old artificial pneumothorax with only partly favourable results but no cure, the pregnancy should be regarded as a serious menace and interruption considered without waiting for a more definite indication. Rist, on the other hand, feels that in his series of cases, in which artificial pneumothorax therapy was instituted near the beginning of pregnancy or during it, they would not have shown better improvement by interruption of the pregnancy.

   Opinions also differ on the necessity of interruption in cases in which collapse therapy is commenced during pregnancy. Catallucio (1930) believes the results obtained with artificial pneumothorax are as good in the presence of pregnancy as without, except in the very rare cases in which artificial pneumothorax has a very poor influence **per se**. Riemer (1933) believes interruption /
interruption is unnecessary in unilateral cases if artificial pneumothorax can be given. Morisson-Lacomme, on the other hand, considers that tuberculosis appearing during pregnancy is to be judged a serious form; artificial pneumothorax can be instituted, but he finds the results are usually mediocre.

The logical procedure to be adopted in these patients in whom artificial pneumothorax has been recently instituted, either shortly before or during pregnancy, or in cases in whom the artificial pneumothorax has not produced favourable results, would be apparently to seriously consider abortion if the progress of the disease gives any anxiety after collapse therapy has been given a sufficient period of time to produce alleviation. It must be remembered that the treatment may produce ultimate cure or stability as time proceeds in these cases, and another pregnancy can then be safely allowed to proceed. The substance should not be sacrificed for the shadow. However, judging from the literature, the patients who meet these requirements, and do give cause for anxiety, would appear to be remarkably few.

Attention will now be directed to the highly controversial question of therapeutic abortion as a whole.
3. **THERAPEUTIC ABORTION.**

Although general unanimity has not yet resulted regarding the influence of pregnancy on pulmonary tuberculosis, it has been shown that the relationship varies essentially according to the clinical form and potential progress of the infection. However, agreement on the principles and indications for therapeutic abortion where this combination exists, shows even greater controversy. The question still remains unanswered, mainly because not only clinical observations and data have to be taken into consideration, but also political, moral and religious issues, which have contributed much in the past to maintain this unsatisfactory state of affairs.

At the present time, three courses to be followed have been defined, and each has its protagonists:—

(a) The systematic abstentionists, who condemn the interruption of pregnancy in all cases.

(b) The systematic interventionists, who advise therapeutic abortion whenever the combination of pregnancy and tuberculosis exists.

(c) The elective interventionists, who declare therapeutic abortion legitimate in certain specified cases.

(a) **The Systematic Abstentionists.**

Pinard (1912) laid down the line of conduct /
3. THERAPEUTIC ABORTION (CONT'D.)

(a) The Systematic Abstentionists (Cont'd.)

conduct to be followed by adherents to this policy. "On meeting a pregnant tuberculous woman, treat the tuberculosis by every possible means so as to prolong both the life of the mother, and the progress of the pregnancy."

This doctrine is based on two hypotheses, one concerning the child, the other the patient. To them, the heredity of tuberculosis must, without exception, be considered as a negligible element, and the majority of infants born of tuberculous mothers are viable and healthy. Secondly, the maternal affliction does not seem to benefit from interruption. The pulmonary lesion is not always unfavourably influenced by pregnancy, and abortion, if aggravation does occur, is incapable of arresting the progressive nature of the disease, often it is harmful.

In addition, as Rist (1927) has pointed out, collapse therapy and sanatorium care allow treatment in numerous cases with every regard for the pregnancy. Another argument he produced, concerned the number of cases where unjustifiable abortion might be wilfully practised by unscrupulous persons, sometimes with only the pretence of tuberculous being present.
3. THERAPEUTIC ABORTION (CONTD.)

(a) The Systematic Abstentionists (Contd.)

In France, this theory has always been defended by numerous authors. These include Sabourin (1918), Hergott (1922), Bernard (1923), Rist (1927), Pissavy and Lejard (1927), Demelin (1929), Stiassnie (1930), and Couvelaire (1932). All of these have never been convinced of the therapeutic value of abortion.

In America, Walsh (1918), considers that operations for abortion, especially those associated with sterilisation, have a mortality that makes the continuation of the pregnancy more desirable. Bridgman and Norwood (1926) are adverse to the termination of the pregnancy, and express the view that the excitement, anaesthesia, and the shock of the operation are additional factors which curtail the patient's strength at a most critical period.

Other subscribers to this theory were Forsner (1924) and de Carvalho (1927). Derscheid (1936) believed that there is no reason that interruption will have happy consequences on the illness, and that it might have the same inconvenience as the confinement itself.

In Germany, prior to the Great War, systematic /
3. THERAPEUTIC ABORTION (CONTD.)

(a) The Systematic Abstentionists (Contd.)

systematic intervention was generally adopted, but afterwards political considerations began to influence the attitude of phthisiologists. Faced with a rapidly falling birth-rate, increasing numbers of phthisical women were allowed to go to term. When the combination was discovered to be less pernicious than previously feared, this more conservative attitude received wider adoption, and the ranks of the abstentionists were swelled by Scherer (1922), Schrag (1928), Beckman and Kirch (1929) Schultze-Rhonof (1929), and Romberg (1931).

(b) The Systematic Interventionists.

The reasons for the adoption of this policy are mainly of a social nature, and have been sharply criticised on religious and moral grounds. With regard to medical and statistical evidence for this view-point, none has been forthcoming which will bear even the slightest critical analysis.

Naturally the theory of systematic intervention is a pregnant tuberculous woman arose when the deleterious influence of pregnancy on tuberculosis found decided favour.

Bompiani and Pasquali (1886) can be considered the first advocates of this policy, which /
3. THERAPEUTIC ABORTION (CONT'D.)

(b) The Systematic Interventionists (Contd.)

which was to find exceptional favour in the country of its birth. Margliano (1920), Baldarassi (1921) were two of these Italian protagonists who published their results later.

In Germany, systematic intervention was admitted to such an extent that a discussion was concerned not with the indications, but the technique of abortion. Walsh (1918) drew attention to this "veritable German and Italian hysteria." However, as pointed out in the discussion of systematic abstention, the Germans later began to show more selection. The following authors, however, can be quoted to show that abstention had not gained universal acceptance until many years later - Kehrer (1921), Hamburger (1921), Franz (1921), and Winter and Opperman (1923).

In America and this country, systematic intervention has always had its adherents. Now that the harmful influence of tuberculosis on pregnancy could not be considered applicable to every case, the advisability of interrupting every pregnancy is not justified by those who adopt this line of conduct by the desire to avoid any possible deleterious influence, even although its probability /
3. THERAPEUTIC ABORTION (CONTD.)

(b) The Systematic Interventionists (Contd.)

probability is as yet unproven. Specialisation in any type of medical work imposes restrictions on the activity of the individual clinician, and it seems inevitable that obstetrical problems should receive but little attention from phthisiologists. When confronted with a pregnancy in the course of tuberculosis, the first thought is to eliminate the complication and concentrate on the tuberculosis. In addition, the phthisiologists point out when the question of treatment arises, there are no facilities for the proper care of pregnant tuberculous women.

The financial circumstances must also receive consideration. If these are only moderate, the patient may be incapable of expending sufficient money to enable her to undergo a stay of varying length in a sanatorium. If the added expense of a baby is imposed, this monetary strain may result in the patient having her rest cure curtailed, or it may have to be foregone entirely. Even if the financial circumstances do not allow any sojourn in hospital, the necessary expenditure occurring with the recent addition to the family may require the mother to sacrifice any special food or medicines,
3. THERAPEUTIC ABORTION (Contd.)

(b) The Systematic Interventionists (Contd.)

medicines, which she may have been able to afford previously. The increase in domestic labour and worry must also be remembered. For further justification of their point of view, the interventionists point out that the mental attitude brought about by an undesired baby will unfavourably influence the patient's disease. Nor must the subsequent risk of infection to the child be forgotten.

Consultation with another phthisiologist is the rule in such cases, but as Jameson has so humourously expressed it "All too often the point of view is that held on horse thieves in frontier days - 'Give him a fair trial and then hang him.' The patient is given the benefit of a consultation and then aborted."

These are the main reasons for the popularity of this measure as given by the following authors. Douglas and Harris (1917) from the study of 300 cases, concluded that when conception has taken place, pregnancy should be terminated before the fifth month in all active cases of early and moderately advanced tuberculosis, and in all advanced cases when the process is quiescent. Norris /
3. THERAPEUTIC ABORTION (CONT'D.)

(b) The Systematic Interventionists (Contd.)

Norris and Landis (1916) and Morse (1928) also advocated systematic intervention but pointed out that interruption does not ensure an amelioration of the condition, but may improve the prognosis. Pratten (1931) and Jameson (1935) also favour this form of combatting the combination.

(c) The Elective Interventionists.

The protagonists of this method of conduct in the treatment of a pregnant tuberculous woman are decidedly in the majority. Simultaneously they consider the interest of the mother and the child, and the decision for or against abortion made according to the results of the scrutiny. Each case is, therefore, considered individually in sharp contrast to the dogmatic generalisations of the other two groups.

Bar (1902) and his pupils Colombet (1912) and Guillamet (1922) were the first accoucheurs to institute and defend this attitude, and gradually they rallied the majority of the French obstetricians and phthisiologists to adopt a similar mode of treatment in pregnant tuberculous women. Among those who have stated their adherence and published statistics are Dumarest and Brette (1922), Cleisz (1923), /
3. THERAPEUTIC ABORTION (CONT'D.)

(c) The Elective Interventionists (Contd.)

(1923), Sergent (1926), Jeannin (1927), Metzger (1928), Giraud (1932), Desoubry (1934), and Brindeau, Kourilsky and Kourilsky (1935). It has to be pointed out, however, that systematic abstention also has many defenders in France.

This line of conduct has also been followed to a certain extent in Germany by Wienenberger (1926), Gross (1927), Mayer (1928), and Klemperer (1929).

In this country elective intervention has gradually become the method of choice by the majority of obstetricians and phthisiologists, and has been carried out at this dispensary during the period of this survey. At the joint meeting of the Tuberculosis Association with the Royal Society of Medicine in 1931, it was advocated by Marshall, Bourne and Walker. Haig Ferguson (1931), and Young (1936), have also found it in their experience the proper mode of attacking the problem.

Indubitably this selective attitude appears more logical than the categorical and dogmatic generalisation made by systematic abstentionists and interventionists. The object of the physician is to safeguard, if possible, the lives /
3. **THERAPEUTIC ABORTION (CONT'D.)**

(c) The Elective Interventionists (Contd.)

lives of the mother and the infant simultaneously. And if circumstances oblige us to envisage the sacrifice of one of these, it must be at least for the certain benefit of the other. Before therapeutic abortion can be considered in the treatment of pregnant tuberculous women, the certainty that this procedure will not prejudice the chances of the mother must receive consideration.

Generally, the opinion prevailing among accoucheurs and phthisiologists as to the effects of maternal tuberculosi on the product of gestation is that if the infant is removed immediately from its mother and brought up in a tuberculous free environment, it will probably thrive as well as the average bottle-fed infant. Bernard and Debré (1923) showed that infants born at term of tuberculous mothers are free from infection if proper precautions are taken, and Gellhorn (1923) does not believe that such children are inferior. Schultze-Rhonof (1928) found the children of his series did not differ greatly from those observed in general from the same social group. According to Barnes (1930) 81 per cent. of these infants are normal, and Mathews and Bryant (1930) found that of 579 /
3. **THERAPEUTIC ABORTION (CONTD.)**

(c) **The Elective Interventionists (Contd.)**

579 children born to women, who answered the questionnaire despatched to patients who had left the sanatorium, and enquiring with regard to their obstetrical history since their discharge, 556 were alive, and 501 (86.5 per cent.) where healthy and well. Only 55 were below par (9.5 per cent.) and only 9 of these were tuberculous, or suspected of being infected.

Russi (1926) on the other hand, found the length of tuberculous infants was somewhat below the average, and the ratio between weight, length, and biparietal diameter was diminished. He concludes, however, that if the mother's condition is sufficiently favourable to permit her to go to term, the infant will be of normal size in the majority of instances.

(d) **Optimum Period for Operative Interference.**

Although general agreement has been reached that if sacrifice of the mother has to be contemplated, the future health of the infant can be anticipated with equanimity, controversy still rages regarding the improvement in the mother's condition resulting in sacrifice of the child by abortion, and the time at which the operation should be undertaken.

After /
(d) Optimum Period for Operative Interference

After the third month of pregnancy, abortion is no longer accomplished in one stage. Before this period the foetus and adnexa are expelled simultaneously. Thereafter, the adnexa are evacuated secondarily. This difference in physiological behaviour increases the seriousness of abortion performed after the third month, since it now resembles a miniature labour, with increased trauma, loss of blood, necessity for anaesthesia, et cetera. Moreover, the mother and infant have not yet established the prosperous symbiosis to which reference has already been made, and the aggravating factor, which coincides with the commencement of pregnancy and which disappears as the mother adapts herself to the foetal organism, is still functioning. Therapeutic abortion during this period would, therefore, constitute a return to equilibrium and exert a beneficial influence. On the contrary, after three months, the mother begins to derive some benefit from her pregnant state, and abortion will now exercise a deleterious effect.

Lastly, the exacerbations of the puerperium are still recognised after abortion, and more /
3. THERAPEUTIC ABORTION (CONT'D.)

(d) Optimum Period for Operative Interference (Contd.)

more noticeably the longer this procedure is postponed. If abortion is carried out after the third month, the patient is deprived of the months during which pregnancy causes amelioration, and still has to suffer the exacerbation subsequent to confinement. In addition, by allowing the pregnancy to go to term in these cases, the life of the child has been saved.

These reasons for the performance of abortion before the third month have been stressed by Bar (1922), Sergent (1926), Gellhorn (1928), Leonardi (1935), and Derscheid (1936). Metzger (1928) has increased this period to three and one half months.

Young (1936), however, has criticised this attitude that the operation is futile after the third month, and that in all cases seen after this date it is safer to allow the pregnancy to continue, and has pointed out "It is difficult on obstetrical grounds to justify this extreme view, and more supporting data than are at present available are required before it can meet with complete acceptance. In the present state of our knowledge, there is no adequate reason for doubting /
3. THERAPEUTIC ABORTION (CONTD.)

(d) Optimum Period for Operative Interference (Contd.)

doubting that abortion at, say, the fourth or even the fifth month, may in suitably selected cases give an increased protection."

Judging from the literature most authorities prolong the interval during which intervention is possible to the end of the fifth month. These include Norris and Murphy (1922), Morse (1923), Haig Ferguson (1931), Marshall (1931), Brindeau (1934), and Jameson (1935). Winter (1927), however, has advocated the interruption of pregnancy in active tuberculosis up to the seventh month. In the cases of this survey, in which intervention was decided to be necessary, abortion was limited to the end of the fourth month, and the majority (85 percent.) were performed at the end of the first trimester. This period of four months seemed to allow the maximum period for supervision of the patient and estimation of the probably course of the disease, combined with the optimum time for performance of abortion without causing too much upset for the patient.

(e) The Beneficial Results of Therapeutic Abortion.
3. THERAPEUTIC ABORTION (CONTD.)

(e) The Beneficial Results of Therapeutic Abortion.

The beneficial effect of abortion has also proved a further cause for discussion. Stewart (1922) has stated "While an operation can undo the pregnancy, it cannot by any means undo all its evil effects, and too often the flare-up of disease due to pregnancy goes on unchecked, although the pregnancy has been ended." He admits, however, that undoubtedly in some cases it does save life. Rist (1927) has emphasised the fact that it has not been sufficiently proved at the present time abortion is really effective in correcting the course of tuberculosis, determined or aggravated by pregnancy. Cohen (1936) has concluded from a review of the literature that available statistics throw considerable doubt on its efficacy in preventing the spread of active disease.

The majority of authorities, on the other hand, have been convinced of the therapeutic value of abortion. Norris and Murphy have found that 65 to 70 per cent. of suitable cases are benefitted by the treatment. Haig Ferguson, Marshall, Brindeau, and Young have all reached a similar conclusion from their experience of the method.
3. THERAPEUTIC ABORTION (CONT'D.)

(e) The Beneficial Results of Therapeutic Abortion (Contd.)

Before any conclusions can be formulated regarding this procedure, two factors must be taken into consideration; the period of pregnancy at which intervention is carried out, and the progressive tendency of the local lung condition. As has been pointed out above, the longer gestation has been allowed to continue, the greater the operative interference necessary. If this is undertaken before the end of the third or the fourth month, very little reaction occurs in the clinical course of the disease. Brindeau has written emphatically on this point, and blames the disasters noted by other authors as due to the advanced stage of the pregnancy, and the deplorable conditions under which abortion has been carried out. If operative interference is carried out swiftly, as it may be in the early months, the temperature curve is little modified, and intervention is mild.

Moreover, if abortion is advised in patients with advanced, progressive disease, against which our therapeutic armamentarium is useless, the sequel of the intervention is unlikely to be satisfactory. All that can be expected is that interruption /
3. THERAPEUTIC ABORTION (CONTD.)

(e) The Beneficial Results of Therapeutic Abortion (Contd.)

interruption of pregnancy will be followed by the arrest of any progressive exacerbation, which must then be treated to the best of our ability. It seems hardly logical to doubt the efficacy of abortion in these cases, who have died after this procedure, but who would have succumbed to their phthisis in any event, whether operative interference had been undertaken or not. Bridgman and Norwood (1926) have quoted statistics, in which 9 patients with active tuberculosis followed for one year, and in whom therapeutic abortion was performed, 5 were dead at the end of the year. No mention is made of the extent or progressive disposition of the disease, or is a control series of cases given. It can therefore hardly be concluded that abortion proved ineffective in these patients.

The efficacy of this measure performed at the proper stage of pregnancy, and in suitable types of cases is shown by the following illustrative examples:

CASE NO. 169. Mrs. J.S. (Age 33 yrs.) Para. 1.

HISTORY.

3. 9. '29. /
3. THERAPEUTIC ABORTION (CONTD.)

(e) The Beneficial Results of Therapeutic Abortion (Contd.)

CASE No. 169 (Contd.)

HISTORY.

3. 9. '29. Patient caught a severe cold twelve weeks ago, and has had a severe cough and copious sputum ever since. Has also been losing weight.

DIAGNOSIS.

Bacteriological. Sputum positive, 6.9.'29.


TREATMENT.

Dispensary supervision. Patient refused hospitalisation.

PROGRESS.

24. 5. '31. Patient has been going downhill slowly. Now suffering from bilateral progressive fibro-caseous tuberculosis with small cavity in right second interspace.

2. 9. '32. Patient has continued to lose ground slowly. Now three months pregnant.

10. 9. '32. Owing to the deterioration of the pulmonary condition of the patient and the fact that the domestic circumstances were far from satisfactory, abortion was undertaken.

3. 10. '32. Patient has undergone operation without any deterioration locally. Active disease still present both upper lobes.

4. 6. '33. Very little change to note. Local condition has remained stationary. Slight gain in weight.

22. 11. '33. Slight improvement locally. Very few complaints. Cough only troublesome at night.
3. THERAPEUTIC ABORTION (CONTD.)

(e) The Beneficial Results of Therapeutic Abortion (Contd.)

CASE NO. 170. Mrs. E.S. (Age 28 yrs.) Para. 1.

HISTORY.

29. 11. '33. Patient developed pleurisy after a severe chill two months ago. Is now complaining of a pain in the right side of four days duration. Has a cough, and is breathless on slight exertion. Husband died of tuberculosis, and her child is a notified case.

DIAGNOSIS.

Radiological. Infiltration right upper lobe, and to lesser extent left upper lobe. Opacity right base, with obliteration of costo-phrenic sinus.

Bacteriological. Sputum positive 10.12.'33.


TREATMENT.


PROGRESS.

3. 1. '34. Patient left hospital at own request. Very little change to note in local or general condition.

25. 6. '35. Patient's condition shows very little change from first visit. Small cavity now present in right upper lobe.

28. 4. '36. Patient's condition deteriorating. Losing weight rapidly and looking somewhat toxic. Is two and a half months pregnant.

2. 5. '36. Owing to the progressive nature of the pulmonary condition, and the patient's social and financial condition, it was decided to recommend abortion.

16. 5. '36. /
3. THERAPEUTIC ABORTION (CONTD.).  

(e) The Beneficial Results of Therapeutic Abortion (Contd.)

CASE No. 170 - PROGRESS (Contd.)

16. 5. '36. Abdominal hysterotomy and sterilisation.  
27. 12. '37. Deterioration more evident during the last year. Cavity right upper lobe growing in size with slow spread of disease towards bases.

It would appear, therefore, that therapeutic abortion can be established to have a definite place in the treatment of certain pregnant tuberculous women, and the sacrifice of the child is not always in vain.

The various indications and contraindications, and its exact position with regard to the general management of a tuberculous woman, whose history includes pregnancy as a complication will now receive consideration.

4. THE GENERAL MANAGEMENT OF THE TUBERCULOUS PREGNANT WOMAN.

When pregnancy therefore supervenes during the treatment of a tuberculous pregnant woman, or a pregnant woman is found to be suffering from tuberculosis, the anatomic-pathological type of the pulmonary lesion, its extent and progressive tendency /
tendency, must be immediately estimated, for each particular individual.

(a) In the Fibroid Forms.

In the fibroid types, it is generally conceded that gestation will cause little dislocation in the benign course pursued by the disease, and the management of these cases consists of constant out-patient supervision and serial radiological control by a competent phthisiologist, and adequate antenatal care by an obstetrician. After delivery, the patient should continued to attend the dispensary for observation for at least six months.

(b) In the Ulcero-Caseous Forms.

In the rapidly progressive ulcero-caseous types, or in the generalised form, acute miliary tuberculosis, or in those in whom meningitis or peritonitis develop, the sombre prognosis would contra-indicate abortion. These cases should be admitted to hospital, where every precaution should be taken, and assistance directed towards conserving the strength of the patient, and helping her resistance to attain its maximum before the strain of delivery and the puerperium are undergone. As pregnancy /
4. **THE GENERAL MANAGEMENT OF THE TUBERCULOUS PREGNANT WOMAN (CONTD.)**

(b) **In the Ulcero-Caseous Forms (Contd.)**

pregnancy proceeds, the therapeutic procedures of the physician will be reinforced by the amelioration observed in the concluding months of pregnancy. After confinement the patient should return to the sanatorium for further treatment, but generally little can be accomplished, and the prognosis is hopeless.

In certain of these cases, provided the lesions are not sufficiently widespread, artificial pneumothorax may be successful in combatting the progressive exacerbation of the disease, and even bilateral collapse may be possible. If this method of treatment appears to have some success, and eventual cure of the pulmonary condition can be anticipated, then abortion may be considered, if the pregnancy has not advanced further than the fourth or fifth month.

(c) **In the Healing Fibro-Caseous Forms.**

In the healing fibro-caseous types, the problem becomes more complicated, and the subsidiary factors already mentioned, which have some bearing on the prognosis of the disease, assume greater significance. In this form of the disease /
In the Healing Fibro-Caseous Forms (Contd.)

disease, the amount of fibrosis present in the lung lesions is of paramount importance, especially the extent of its domination over the caseous, necrotic process, and its duration, for the longer it has been in existence the more likely is it to withstand the stress of labour. In addition, this resistance will be strengthened during the latter months of pregnancy.

These patients should be admitted to a sanatorium as soon as the diagnosis of pregnancy has been established, or that of tuberculosis in the case of the illness appearing in a gravid woman. There, before the fourth month has elapsed the durability and the amount of reliance to be placed on this fibrotic barrier must be judged, and strengthened by every available therapeutic means. The more closely pregnancy supervenes to the last progressive process, and the more extensive the lesions, the more likely is the caseating element to predominate. If constitutional and functional symptoms disappear or grow less during this period of observation, and serial radiographic control verifies the ascendancy of the fibrotic element, pregnancy may be allowed to proceed, as this /
4. THE GENERAL MANAGEMENT OF THE TUBERCULOUS PREGNANT WOMAN (CONTD.)

(c) In the Healing Fibro-Caseous Forms (Contd.)
this satisfactory state of affairs will in all probability continue during the remaining months of gestation.

If, however, uncertainty arises whether the improvement observed will sustain the patient during the trials of delivery and the post-partum, the secondary factors must be taken into consideration, such as the desire for the child by its mother, or the hardship or inconvenience it may impose on an already overburdened household. Multiparity is also important, for if the woman has several children, the loss of this unborn infant may be to the advantage of those at present requiring the mother's attention and care, and will not be noticed to the same extent as it would be in a childless family. Financial considerations and any deprivation of the mother of necessary food-stuffs and nursing consequent upon the new arrival, must also be gauged. If these subsidiary factors enhance the woman's prospects, the pregnancy may still be allowed to continue. Three cases falling into this category are given below, Cases Nos. 100, 101 and 114.
CASE NO. 100. Mrs. A.P. (Age 29 yrs.) Para. 3.

HISTORY.

5. 9. '32. Referred to the Dispensary by her own doctor on account of a brisk haemoptysis two weeks ago.

DIAGNOSIS.

Radiological. Vomication right upper lobe, with infiltrate mid-zone left lung.

Bacteriological. Sputum positive, 2.8. '39.


TREATMENT.


PROGRESS.

25. 4. '33. Discharged. Local condition greatly improved.
26. 7. '35. Feels very well. X-ray shows increase in inter-cleido-hilar regions, with non-homogenous opacity left base. Scattered small calcified foci throughout right lung with disappearance of cavity noted on admission to hospital.
3. 12. '35. Reports four months pregnancy. Entirely symptom free. As the fibrotic reaction seemed sufficiently in the ascendancy, and the patient was able to make arrangements for the child to be brought up by her sister, the pregnancy was allowed to continue.
16. 5. '36. Confined two weeks ago. Feels very well.
24. 5. '37. Local and general condition very satisfactory. X-ray shows interstitial fibrosis both upper lobes, with non-homogeneous opacity left base. Very little change from previous X-ray on 26. 7. '35.
CASE NO. 101.  Mrs. S.A. (Age 22 yrs.)  Para. 0.

HISTORY.

13. 10. '37.  Patient has had a troublesome cough for some weeks, accompanied by thick yellowish sputum.  Has been losing weight rapidly recently.

DIAGNOSIS.

Radiological.  Fibro-caseous changes both upper lobes, with scattered calcareous foci right lung.

Bacteriological.  Sputum positive, 10.10.'37.

Clinical.  Healing Fibro-caseous Tuberculosis.

TREATMENT.


PROGRESS.

20. 12. '37.  Left hospital at own request to be married.
17. 10. '38.  Cough persists, otherwise no complaints.  X-ray shows fibrotic changes right apical and subapical zones.  Recent changes in left inter-cleido-hilar zone with parahilar fibrotic change.
6. 3. '39.  Reports two months pregnancy.  Feels very well.  As patient was very desirous of having a child, and the financial and social conditions of her household were satisfactory, it was decided to allow the pregnancy to continue.  Moreover, X-ray showed that no deterioration had occurred since the previous X-ray, which also gave reason for satisfaction.
24. 9. '39.  Confined two weeks ago.  No change to note in local or general condition compared with state before pregnancy.
16. 9. '40.  No pulmonary symptoms.  X-ray shows fibrotic changes apical and subapical zones right lung, with perihilar fibrotic changes left lung.
CASE NO. 114. Mrs. L.H. (Age 28 yrs.) Para. 2.

HISTORY.

31. 1. '30. Patient developed severe pain in the left side five days ago. Has had a cough for the last few weeks, but has no sputum. Sweating occasionally at night.

DIAGNOSIS.

Radiological. Infiltrative changes left upper lobe to second interspace. Loss of clarity left base with obliteration of costo-phrenic sinus.

Bacteriological. Sputum positive, 3.2. '30.

Clinical. Progressive Fibro-Caseous Tuberculosis.

TREATMENT.

Admitted to sanatorium. Hygieno-dietetic treatment. Full course of Sanocrysin given in addition.

PROGRESS.

12. 10. '30. Discharged from hospital. Feeling very well. General condition greatly improved, patient having put on two stones in weight. Locally, lesions have undergone fibrosis satisfactorily.

15. 3. '33. Patient has maintained general condition. Pulmonary lesions still undergoing fibrosis, but sputum positive, 2. 3. '33.

5. 7. '33. Reports three months pregnancy. Feels well. No change to note in local or general condition. Owing to the length of time which had elapsed since the last progressing process, and the satisfactory financial conditions of the household, it was decided to allow the pregnancy to continue.

15. 1. '34. Patient confined three weeks ago. X-ray shows no deterioration in local condition.

27. 12. '34. Patient well and working as tailoress. Local and general condition very satisfactory with no deterioration to be noted compared with 15. 3. '33.
4. THE GENERAL MANAGEMENT OF THE TUBERCULOUS PREGNANT WOMAN (CONT'D.)

(c) In the Healing Fibro-Caseous Forms (Contd.).

Unfortunately, these factors may have a pernicious influence on the prognosis, when abortion will require to be undertaken, provided the pregnancy has not passed the fifth month.

CASE NO. 115. Mrs. R.E. (Age 33 yrs.) Para. 4.

HISTORY.

10. 5. '34. Patient has been feeling tired and losing weight for the last six weeks. Cough commenced ten days ago, but patient has only a slight expectoration in the morning.

DIAGNOSIS.

Radiological. Fibro-caseous changes both upper lobes, more extensive left side with small cavity in the infraclavicular region.

Bacteriological. Sputum positive, 15.5.'34.

Clinical. Progressive fibro-caseous tuberculosis.

TREATMENT.

Admitted to sanatorium. Hygieno-dietetic treatment with full course of gold therapy.

PROGRESS.

12. 3. '35. Discharged from sanatorium. Marked improvement in local and general condition. Lesions fibrosing satisfactorily with disappearance of cavity in left upper lobe.

8. 8. '35. /
CASE No. 115 (Contd.)

PROGRESS (Contd.)

8. 3. '35. General condition shows some deterioration compared with state on discharge from hospital. Locally little change to note.
15. 12. '35. X-ray shows some fresh deposits in right mid zone. Fibrosis still marked both upper lobes. Sputum positive.
6. 3. '36. Feels well. X-ray shows little change from previous. Patient reported two months pregnant.
19. 3. '36. As patient's financial condition was rather precarious, and she already had four children, it was decided to carry out a therapeutic abortion. Patient's sputum was positive on 4. 2. '36.
31. 3. '36. Abdominal hysterotomy and sterilisation performed.
4. 3. '37. Patient well and attending to household duties, which are rather arduous. No deterioration in local condition on X-ray; if anything slight improvement.

CASE No. 116. Mrs. R.O. (Age 32 yrs.) Para. 1.

HISTORY.

16. 4. '35. Patient had a small haemoptysis two weeks ago, with slight staining of her sputum for five days following. Has been losing weight recently. Brother died of pulmonary tuberculosis two years ago.

DIAGNOSIS.

Radiological. Fibro-caseous changes both upper lobes. Increased markings both bases.

Bacteriological. Sputum positive, 20.4. '35.

Clinical. Progressive fibro-caseous tuberculosis.

TREATMENT. /
CASE No. 116 (Contd.)

TREATMENT.


PROGRESS.

3. 12. '35. Discharged from sanatorium. Very satisfactory improvement in local and general condition. Sputum still positive. 14. 2. '36. Patient reports eight weeks amenorrhoea with slight morning sickness. No deterioration in local or general condition. 1. 4. '36. Patient definitely pregnant. Feeling very well. Local condition in status quo. 15. 4. '36. As patient's social and financial conditions were not satisfactory, and it was not considered that treatment had had sufficient time to establish a satisfactory barrier against any possible flare-up in the pulmonary lesions, therapeutic abortion was recommended and carried out on 28. 4. '36. 5. 3. '37. Patient well and working in a drapery store. No deterioration in local or general condition compared with 14. 2. '36.

CASE NO. 117. Mrs. R.K. (Age 33 yrs.) Para. 3.

HISTORY.

4. 11. '35. Patient had an attack of pleurisy three months ago, with a recurrence two weeks ago. Has a cough, which developed some months previously, but has never been troublesome.

DIAGNOSIS.

Radiological. Fibro-caseous changes left upper lobe extending to third rib. Early deposits second interspace right side.

Bacteriological. /
CASE No. 117 (Contd.)

DIAGNOSIS (CONTD.)

Bacteriological.  Sputum positive,  11. 4. '35.


TREATMENT.


PROGRESS.


3. 9. '36.  Patient reports amenorrhoea for six weeks.  No other symptoms of early pregnancy.  No change to note in local or general condition.

16. 10. '36.  Patient undoubtedly pregnant.  Owing to the short time which had elapsed since the local condition had been progressive, and the patient already had three children, it was decided to carry out therapeutic abortion.


28. 12. '36.  Patient feeling no ill effects from operation.  Some activity still present left apex, but no deterioration to be noted.  Some deterioration in general condition.  No increase in cough or sputum.


(d) In the Progressive Fibrocaseous Forms.

It /
4. **THE GENERAL MANAGEMENT OF THE TUBERCULOUS PREGNANT WOMAN (CONTD.)**

(d) **In the Progressive Fibrocaseous Forms.**

It is in the progressive fibro-caseous types that the skill and ingenuity of the physician is demanded for a correct solution of the problem presented by pregnancy supervening in these cases or this form becoming apparent in a woman not yet four to five months pregnant.

These patients should be hospitalised as soon as possible and collapse therapy commenced, unless contra-indicated, and any other therapeutic procedure, which will combat the progressive tendency of their disease, and establish fibrosis. At the end of the fourth month of pregnancy, a sufficiently accurate prognosis can be given, and the possibility of the patient being able to undergo confinement without aggravation of her pulmonary condition estimated. Again the subsidiary factors multiparity, etc., must be taken into consideration in reaching this decision. Moreover it must be borne in mind that statistics have proved that in these cases, diagnosed before the fourth month of pregnancy, the prognosis shows very little difference compared with cases, which are not complicated by the intervention of pregnancy. If confinement can be anticipated with equanimity after these considerations have been taken into account, then the /
4. **THE GENERAL MANAGEMENT OF THE TUBERCULOUS PREGNANT WOMAN** (Contd.)

(d) **In the Progressive Fibro-Caseous Forms** (Contd.)

the pregnancy can be allowed to proceed.

**CASE NO. 162.** Mrs. J.M. (Age 32 yrs.) Para. 1.

**HISTORY.**

6. 12. '29. Patient has been ailing for the last two months. Had a haemoptysis two weeks ago and has been confined to bed since. Cough at present very troublesome.

**DIAGNOSIS.**

Radiological. Dense deposits right upper lobe with small cavity in second inter-space. Increased markings left inter-cléido hilar zone.

Bacteriological. Sputum positive, 7. 12. '29.

Clinical. Progressive fibro-caseous tuberculosis.

**TREATMENT.**

Admitted to sanatorium. Hygieno-dietetic regime.

**PROGRESS.**

26. 4. '30. Discharged from hospital. Disease shows satisfactory healing locally. General condition very good.

23. 7. '35. Patient returned to Edinburgh after four years absence. Progressive fibro-caseous tuberculosis both upper lobes. Looks cyanosed and toxic.

22. 3. '36. Slight improvement in local and general condition.

4. 9. '36. Reports four months pregnancy. Local condition continues to improve slowly.
CASE No. 162 (Contd.)

PROGRESS (Contd.)

As patient's condition was beginning to improve, and the social and financial conditions were satisfactory, abortion was not carried out.

14. 2. '37. Confined three weeks ago. Feels quite well, but cough and sputum troublesome. Local condition shows slight extension of disease.

26. 3. '38. Local condition continued to deteriorate during past year. Now looking ill. Has lost 12 lbs. during the last year.

CASE NO. 165. Mrs. J.G. (Age 27 yrs.) Para. 0.

HISTORY.

10. 8. '31. Patient has not felt well for the last nine weeks. Developed a cough two months ago, which has gradually become more troublesome and is now accompanied by a thick sputum. Sister is a notified case of pulmonary tuberculosis.

DIAGNOSIS.

Bacteriological. Sputum positive, 6.4. '34.


TREATMENT.


PROGRESS.

19. 3. '32. Discharged from hospital.

Very great improvement in local and general condition.

28. 11. '33. Patient's condition beginning to deteriorate. Losing weight.

2. 5. '34. /
CASE No. 165 (Contd.)

PROGRESS (Contd.)

2. 5. '34. Deterioration continues. Progressive fibro-caseous tuberculosis both upper lobes, more extensive than on first visit.
15. 11. '34. Reports four months pregnancy. Very little change since last report. Owing to patient's strong desire to have a baby, and fibrosis being radiologically evident to a satisfactory extent, it was decided to allow the pregnancy to continue.
28. 4. '35. Confined eight days ago. Feels quite well. No deterioration to be noted in local condition.
2. 6. '35. Had a small haemoptysis this morning.
24. 6. '35. Admitted to hospital.
30. 1. '36. Discharged from hospital. General and local improvement marked.
2. 5. '36. Improvement generally maintained.

CASE NO. 166. Mrs. A. McM. (Age 28 yrs.) Para. 1.

HISTORY.

21. 12. '31. Patient has been ailing for the last month. Caught a chill three weeks ago and has had a cough and a spit since, with a sore throat, which developed six days ago.

DIAGNOSIS.

Radiological. Infiltrative with appearance of small vomica below left clavicle. Small deposit below right clavicle.


TREATMENT. /
CASE No. 166 (Cont'd.)

TREATMENT.


PROGRESS.

23. 7. '32. Discharged from hospital.
Lesions have undergone satisfactory fibrosis.
22. 1. '34. Not doing well. Confined to bed. Disease very active and progressing.
6. 4. '34. Feels much better. Disease advancing slowly. General condition only fair.
26. 7. '34. Pulmonary condition continues much in status quo. Is five months pregnant.
Owing to the slow progress of the disease, the advanced state of gestation, and the satisfactory home conditions, and the possibility of admitting the patient to hospital after confinement, the pregnancy was allowed to continue.
28. 12. '34. Admitted to hospital.
4. 6. '35. Discharged from hospital. Satisfactory improvement in local condition. Lesions now undergoing fibrosis.
3. 1. '36. Very little change in local condition. General condition has been maintained also.

In other women, however, the progress of the pulmonary lesions may cause anxiety, and the probability of exacerbation occurring at delivery or in the puerperium may appear certain. In these cases, abortion can then be undertaken, provided the prognosis for the mother is not hopeless. If so, attention should be directed to saving the child, as /
4. THE GENERAL MANAGEMENT OF THE TUBERCULOUS PREGNANT WOMAN (CONTD.)

(d) In the Progressive Fibro-Caseous Forms (Contd.) as in extensive ulcero-caseous disease. Interference cannot be countenanced unless the life of the mother can be saved.

CASE NO. 167.  Mrs. J.W. (Age 27 yrs.) Para. 3.

HISTORY.

11. 4. '37. Patient was admitted to a general hospital suffering from an acute attack of pleurisy, one week ago. Now has slight cough and sputum.

DIAGNOSIS.

Radiological. Early infiltrative changes left upper lobe with diffuse loss of clarity left base with obliteration of costo-phrenic sinus. Early deposits right infraclavicular region.

Bacteriological. Sputum positive, 15.4.'39.

Clinical. Progressive fibro-caseous tuberculosis.

TREATMENT.

Admitted to hospital. Hygieno-dietetic regime.

PROGRESS.

4. 1. '38. Not doing well. Lung symptoms increasing in severity. X-ray shows apical and sub-apical zones clear. Infiltrative changes extending from the third rib to the base on right side. Diffuse opacity left base with obliteration of costo-phrenic sinus.
3. 4. '38. /
CASE No. 167 (Contd.)

PROGRESS (Contd.)

3. 4.'38. Little change to note in local or general condition. Patient two months pregnant.
22. 4. '38. As the patient was suffering from progressive fibro-caseous tuberculosis and was averse to coming into hospital, therapeutic abortion was advised. In addition, it was noted that she already had three children, and the addition of another would probably have imposed some financial strain on the family resources.
29. 4. '38. Uterus evacuated.
23. 5. '38. Patient feels well. Apart from occasional colds, she has kept in reasonable good health. Local condition shows little deterioration from patient's condition previous to onset of pregnancy.

CASE NO. 168. Mrs. N.C. (Age 24 yrs.) Para. 0.

HISTORY.

23. 1. '32. Has a very troublesome cough with thick yellowish sputum. Both have been present for the last three months. No other complaints except recent loss of weight.

DIAGNOSIS.

Bacteriological. Sputum positive, 27.1. '32.

TREATMENT.


PROGRESS.
CASE No. 168 (Contd.)

PROGRESS.

23. 1. '33. Improvement not maintained. Lesions beginning to break down. Small cavity now present at left apex with progressive fibro-caseous tuberculosis at both upper lobes. Patient reports three months amenorrhoea.
4. 2. '33. Owing to the progressive nature of the pulmonary condition, it was felt that the patient would be unable to undertake the strain and physical exertion of labour, and therapeutic abortion was advocated. If satisfactory progress resulted in the local condition, it was felt pregnancy might be allowed later.
4. 2. '33. Therapeutic abortion performed.
23. 10. '33. Little change to note in local condition.
3. 2. '34. Local condition shows very little change during the past year. Some slight progress in general condition with improvement in patient's cough and sputum.

CASE No. 171. Mrs. M.K. (Age 29 yrs.) Para. 2.

HISTORY.

11. 11. '32. Patient has had a troublesome cough for some time. Has been losing weight lately, since she commenced nursing her father, who died from pulmonary tuberculosis.

DIAGNOSIS.

Bacteriological. Sputum positive, 21.11. '32.

CASE No. 171 (Contd.)

TREATMENT.


PROGRESS.

20. 5. '33. Discharged from hospital. Very satisfactory improvement in local and general condition. Healing fibro-caseous changes both upper lobes with disappearance of small cavity in right upper lobe.

4. 10. '34. Slight deterioration in pulmonary condition. Caseation occurring in both upper lobes. Losing weight.

25. 11. '35. Patient has gone downhill during the last year. Infiltrative changes both upper lobes of a progressive nature, with appearances suggestive of multiple cavities right upper lobe. Is two months pregnant.

29. 11. '35. Owing to the progressive nature of the pulmonary lesions and the very unsatisfactory conditions of the patient's home, it was decided to carry out abortion.

26. 5. '36. Very little change to note in pulmonary lesions. Slight deterioration in patient's general condition.

22. 12. '36. Patient's pulmonary condition has remained stationary for the last six months. General condition only fair.
SUMMARY and CONCLUSIONS.
SUMMARY AND CONCLUSIONS.

A detailed historical survey of the literature with regard to the influence of pregnancy on tuberculosis has been undertaken, demonstrating its protracted and controversial nature. From the time of the Hippocratic axiom on this subject until the nineteenth century scepticism, an optimistic outlook was maintained with regard to the combination generally. Thereafter, disapproval was expressed by the majority of physicians until the first Great War, when circumstances allowed a more favourable viewpoint to attempt to prohibit pessimism from governing the current opinion. To-day, both theories have their protagonists.

Explanations for this chaotic conflict of opinion are next examined, particular stress being directed towards the inadequate consideration of the anatomo-pathological type of disease presented by the patient by previous investigators. The suitability of the statistical material, and the method of compilation adopted in this survey to avoid the reasons for the existing diversity of opinion are then outlined, special attention being paid to the anatomo-pathological type of tuberculosis, from which the patient suffered.
The necessity for attempting to group and separate the factors concerned in the relationship of pregnancy and tuberculosis according to the clinical forms of tuberculosis instead of grouping them altogether in a combined view was demonstrated by Dumarest and Brette (1922), and Bernard, Even, and Contini (1933). This differentiation of the various forms of tuberculosis has been carried out to an even greater extent than visualised by the above observers in this thesis, and even greater reliability in estimating the prognosis attained.

To accomplish this, the 295 women comprising this survey were divided into three groups according to the progressive nature of their disease, the healing fibroid forms, the acute caseating progressive forms, and the intermediate, fibro-caseous forms. This latter group was further sub-divided according to whether the fibrotic or caseous element predominated.

The statistical results of this work with regard to prognosis, when pregnancy is associated with tuberculosis, from the study of 230 women, selected from the above 295 women, and for whom a similar number of carefully selected controls could be apportioned, showed that pregnancy has no deleterious effect on the prognosis of the disease. The /
The mortality rates existing among these women were also found to vary according to the time of the diagnosis of their disease with relation to their pregnancy, being 17.5 per cent. in those diagnosed before conception, 49 per cent. in those diagnosed during pregnancy, and 57.6 per cent. in those diagnosed six months after confinement.

A more detailed investigation of this important consideration of the effects of pregnancy on the healing and destructive forms of tuberculosis is then undertaken in the following chapter, and the manner in which these forms may be recognised, detailed. It was found that clinical and statistical evidence showed that pregnancy was almost universally well supported in the fibroid forms. In the healing fibro-caseous forms, if the sclerotic process was undoubtedly in the ascendency, and of sufficient duration, pregnancy was also well tolerated. In the destructive forms, however, aggravation became apparent at certain intervals during and after the gestation, but as the control group showed a similar mortality, and, as several authors have pointed out, every aggravation appearing in pregnancy cannot be blamed on that gestation, pregnancy would appear to have as little influence in the progressive types as it did in the healing fibroid forms.
The prognostic importance of the time of diagnosis of tuberculosis in relation to pregnancy is next examined, and reasons tendered for the difference noted in the mortality of the tuberculous women according to whether they were diagnosed before, during, or after pregnancy. Any exacerbation, amelioration, or modification of the usual course pursued by the disease and caused by the intervention of pregnancy are also described at this juncture. The influence of gestation on the appearance of tuberculosis during pregnancy, and the period of occurrence of tuberculosis after confinement with the probably causes (labour, breast-feeding, and social and financial factors), and their proportionate involvement in this appearance, also receive comment in this chapter.

Other factors of a more minor nature concerned in the estimation of the prognosis in pregnant tuberculous women, such as age, multiparity, et cetera are then investigated. Their importance was found to be mainly concerned with the influence they exerted on the anatomo-pathological type of phthisis, from which the patient was suffering.

Attention is next directed to the extremely varied pathologico-physiological and mechanical theories put forward by the various authors to explain the clinical observations of the effect of pregnancy on /
on pulmonary tuberculosis. It was found that the causes of amelioration or aggravation in the course of the disease are far from established, and that the authors have merely contributed certain hypotheses, which may account for their own observations, but which do not always agree with the clinical data of others. Pregnancy, from a review of the literature, has not yet been proved to influence the "soil" in any more specific manner than any other deliberating cause for lowering the resistance of the patient.

The treatment of the pregnant tuberculous woman is thereafter studied, and the importance of sanatorium care before and after confinement stressed. During her sojourn under these ideal conditions, calcium and gold therapy may be instituted if indicated, and the question of the necessity of collapse therapy discussed. The modifications imposed on the indications and the technique of this mode of treatment in these women, and the satisfactory results recorded universally in the literature, and in the cases of this survey, are then given.

The thorny question of therapeutic abortion in the treatment of pregnant, phthisical women is now considered in detail. An exhaustive survey of the literature is undertaken, demonstrating the prevailing viewpoints, systematic abstention, systematic intervention,
intervention, and selective intervention. The evidence for the adoption of these policies by their protagonists is studied, and reasons given for the adherence to the last-mentioned line of conduct during this survey, and the satisfactory results, which ensued from it under specifically defined, optimum conditions.

The general management of the pregnant tuberculous woman is next outlined, illustrating the various problems, which will arise and how they are attacked. The importance of the anatomo-pathological type of tuberculosis from which the patient is suffering, again becomes apparent. In the fibroid forms, no treatment is usually required regarding the pulmonary lesions, apart from dispensary supervision. In the rapidly progressive caseous forms, attention should be mainly directed towards saving the child. In the more chronic fibro-caseous forms, the method of procedure requires more skill and ingenuity on the part of the physician so that he may decide on the proper indications and contra-indications for sanatorium care, collapse therapy, and therapeutic abortion, in the various cases he will meet. The latter are then described, and the methods of applying the above therapeutic procedures indicated. The treatment of the pregnant tuberculous woman is thus summarised in this section on the general management.
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