Syphilis and pregnancy

Albert M. Harris
University of Nebraska Medical Center

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SYphilis and Pregnancy

by

Albert M. Harris

Senior Thesis, presented to the College of Medicine, University of Nebraska, Omaha, Nebr., 1939
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</table>
METHODS OF INVESTIGATION

In the November, 1928, issue of the Nebraska State Medical Journal, there appeared an article by Earl C. Sage, M. D., a member of the staff of the University of Nebraska, College of Medicine. This article was entitled "Incidence of Syphilis in the Obstetrical Clinic at the University of Nebraska College of Medicine". Later Dr. Sage wrote a hand-book for the use of the junior medical students in their studies in obstetrics. The article on syphilis was included in this hand-book.

The article deals with a statistical study of the incidence of syphilis together with some reports on the causation of stillbirths at the University Hospital. Twelve hundred charts from the prenatal clinic of the dispensary of the University of Nebraska were gone through to determine the percentage of positive Wassermanns. This covered a considerable period, starting in 1926 and ending in 1928. (The dates used were the dates of delivery of the individual patients.) The results of this study showed the clinic to be running about 5.5% positive Wassermanns.

It has now been eleven years since this work, and it was suggested by Dr. Sage to one of his junior classes of last year that a further study of syphilis in relation to pregnancy, bringing material from the old article up to date, would make an interesting and profitable thesis project. The author has accordingly undertaken this work. It was, however, deemed advisable to go into somewhat greater detail, especially concerning syphilis, than in
In the dispensary there is a file listing the numbers of charts in the various common diagnoses, together with the date of the patient's first appearance at the clinic. From this file it was possible to obtain the numbers of all the charts of the obstetrical patients, but the date was of their first visit to the clinic rather than their date of delivery. Work sheets were first made of all the chart numbers of the obstetrical patients who had appeared at the clinic since January 1, 1928. An attempt was then made to make a survey of each one of these charts, however, after looking at something over four hundred of the charts, it was apparent that there would not be sufficient time to study all of the charts listed. Nor would a survey of this type be profitable from the standpoint of instruction. The idea of covering the obstetrical clinic for a ten-year period was accordingly abandoned in favor of a series of charts from 1928 and a similar comparable series from 1938. The 1928 series was completed first. However, the 1938 series required much less time because it was possible to obtain the Wassermann results on all the new entries in the prenatal clinic from a Wassermann book kept at the dispensary. The later series is accordingly less comprehensive, but serves the purpose of comparison quite well. The 1928 series was, so to speak, obtained by brute force, just a matter of spending long hours in the files pulling out various charts and reading each individual case history.

The earlier series discloses some very interesting facts, in
addition to the incidence of syphilis. There were, in the 485 cases studied, thirteen in which the Wassermann was not reported. This is a percentage of 2.68% of the total, or almost as great as the actual percentage of positive serology for the series. The thirteen cases undoubtedly represent an oversight. However, such an oversight should be guarded against, particularly in a free clinic, (as will be shown later) and in a teaching institution.

There is considerable discussion as to just how records should be kept. One group maintains that records which are too voluminous will accrue until one no longer has room for anything but records. There is undoubtedly some basis for this belief. However, it does seem as though the reporting of a Wassermann, if it is taken, should be recorded. Also, if one makes a study of a woman's condition through her period of gestation, with notes on her pelvic measurements, general physical condition, and a history of her previous pregnancies, etc., it does seem as though it would be a nice thing to have a record of the results of the gestation other than just the condition of the perineum six weeks postpartum. In many instances it was impossible to find any record on the chart of a delivery. In other cases, the record consisted of two words, "Normal Delivery". In others, the record went into some detail with regard to repairing the perineum, and made no mention whatsoever of the baby. Many of the charts, however, contained one or two paragraph writeups of the delivery, which covered the situation very adequately. These were often written by nurses following an
out-call delivery. Frequently the charts have inadequate recording of the treatment. It is probable that the little cards which were formerly used to record this type of therapy could have been lost. On the first page of every chart there is a space for recording the race of the individual. This space is usually filled in with the word "American". It thus becomes impossible to determine, except by surmise, whether the patient was white, negro, Indian or oriental. The surmise is made by the fact that occasionally the space is filled with the word "Colored", and if the word "American" is used, it is probable that the individual was white. Records probably should contain only essential facts, and these facts recorded in a manner so as to leave no doubt.

Recently there has been some discussion as to the efficiency of the Wassermann and other serological methods for diagnosing syphilis. It is interesting in this regard to note that there were, in the series of 1928, a good many patients with a one- or two-plus Wassermann. In these instances the Wassermann was usually repeated, and on the repeat a week or more later the results would be negative. There were, however, in the series, twelve individuals with two-plus Wassernamns, in which no treatment was given. Of these twelve, eleven had normal deliveries, and one aborted at five and one-half months. It is, therefore, probably wise to attach little diagnostic importance to a one- or two-plus Wassermann unless it has been repeatedly positive over a considerable period of time or unless there is clinical evidence of syphilis in the indi-
individual. On the other hand, the same doubt can probably not be cast upon three- and four-plus serological reactions. Because of this, the one- and two-plus reactions which were encountered in the 1938 series were disregarded.

In a study of certain conditions, notably syphilis, tuberculosis, diabetes, etc., it would seem advisable to have some correlation between a mother who suffers from one of these conditions and her offspring. There is the possibility that the disease may be transmitted to the young, and where a mother has one of the diseases with a known tendency to occur in succeeding generations, one should be very watchful for the first signs of the disease in the children. Obtaining this correlation, however, is not a very easy matter, for each patient must be dealt with as an individual, and it is not possible to have the complete history of the parents of an individual on the individual's record, nor is it possible to keep a child's record as part of the history of its mother and father. In consequence, the follow-up records on children born of syphilitic mothers becomes a difficult undertaking. These children are perhaps more closely checked than the records would indicate, but from our present chart system, it would be literally impossible to make anything like an adequate study of the incidence of syphilis among them. That the incidence is relatively high, especially in untreated mothers, will be shown later in reviewing some of the more important studies on this subject.

The following pages contain the tabulated results of the study
made of the case histories of luetic mothers found in the survey, together with a discussion of these results.
# Obstetrical Patients with Positive Serology Series of 1928

<table>
<thead>
<tr>
<th>Chart No.</th>
<th>Age</th>
<th>Race</th>
<th>Former Preg.</th>
<th>Remarks</th>
<th>Serology</th>
<th>Date Delivered</th>
<th>Treatment</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>18119</td>
<td>15</td>
<td>Col.</td>
<td>2</td>
<td>2 Normal deliveries</td>
<td>4 plus</td>
<td>5-4-29 Normal</td>
<td>2 Neo.</td>
<td>Patient uncooperative. Does not live with husband.</td>
</tr>
<tr>
<td>25583</td>
<td>22</td>
<td>White</td>
<td>7</td>
<td>7 Normal deliveries</td>
<td>4 plus</td>
<td>1-23-30 Normal</td>
<td>23 Bismuth</td>
<td>Received continuous treatment since '34.</td>
</tr>
<tr>
<td>34418</td>
<td>17</td>
<td>White</td>
<td>6</td>
<td>5 Normal deliveries</td>
<td>4 plus</td>
<td>1-2-38 Normal</td>
<td>2 Bismuth</td>
<td>Repeated of serologic tests were negative.</td>
</tr>
<tr>
<td>29144</td>
<td>34</td>
<td>Amer.</td>
<td>5</td>
<td>3 Normal deliveries</td>
<td>4 plus</td>
<td>Hypertensive. Would induce labor as advised. Was dismissed. No further record.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>33588</td>
<td>23</td>
<td>White</td>
<td>3</td>
<td>3 Normal deliveries</td>
<td>3 plus</td>
<td>5-18-36 Normal</td>
<td>None</td>
<td>No repeat of serologic test, no treatment recorded.</td>
</tr>
<tr>
<td>36256</td>
<td>20</td>
<td>Col.</td>
<td>2</td>
<td>2 Normal deliveries</td>
<td>4 plus</td>
<td>4-18-30 Normal</td>
<td>None before 1931</td>
<td>No treatment in spite of positive serology with all three pregnancies.</td>
</tr>
<tr>
<td>37974</td>
<td>35</td>
<td>Col.</td>
<td>2</td>
<td>1 Normal delivery, 1928</td>
<td>4 plus</td>
<td>3-27-35 Normal</td>
<td>8 Neo.</td>
<td>Received further treatment in 1935 and 1937.</td>
</tr>
<tr>
<td>Chart No.</td>
<td>Age</td>
<td>Race</td>
<td>Former Preg.</td>
<td>Remarks</td>
<td>Serology</td>
<td>Date Delivered</td>
<td>Treatment</td>
<td>Remarks</td>
</tr>
<tr>
<td>-----------</td>
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<td>---------</td>
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<td>----------------</td>
<td>-----------</td>
<td>---------</td>
</tr>
<tr>
<td>36558</td>
<td>21</td>
<td>Col.</td>
<td>2</td>
<td>2 Apparently normal deliveries, 1927 and 1929.</td>
<td>4 plus</td>
<td>3-18-30</td>
<td>1 Neo. '27</td>
<td>Patient has received considerable antiluetic treatment since 1930.</td>
</tr>
<tr>
<td>37714</td>
<td>19</td>
<td>Col.</td>
<td>4</td>
<td>4 Normal deliveries with negative serology.</td>
<td>4 plus</td>
<td>12-15-35 Normal</td>
<td>9 Neo. 3 Bismuth</td>
<td>Also received some treatment in 1931, 1932, 1933.</td>
</tr>
<tr>
<td>39147</td>
<td>17</td>
<td>Col.</td>
<td>1</td>
<td>Normal delivery. Patient is illegitimate and so are both of her children.</td>
<td>4 plus</td>
<td>1-15-33 Normal</td>
<td>6 Neo.</td>
<td>Diagnosis of latent syphilis.</td>
</tr>
<tr>
<td>40052</td>
<td>23</td>
<td>Col.</td>
<td>4</td>
<td>3 Normal deliveries. 1 Unrecorded.</td>
<td>4 plus</td>
<td>2-20-28 Normal</td>
<td>1 Neo.</td>
<td>Uncooperative. Dismissed.</td>
</tr>
<tr>
<td>17188</td>
<td>32</td>
<td>Amer.</td>
<td>3</td>
<td>2 Normal deliveries. 1 Unrecorded.</td>
<td>4 plus</td>
<td>4-20-28 19 Neo.</td>
<td>Stillbirth.</td>
<td></td>
</tr>
<tr>
<td>31867</td>
<td>22</td>
<td>Col.</td>
<td>5</td>
<td>4 Living children. Husband in jail.</td>
<td>4 plus</td>
<td>Patient says own doctor is going to deliver her. No further record.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>40701</td>
<td>16</td>
<td>Col.</td>
<td>0</td>
<td>Patient says own doctor is going to deliver her. No further record.</td>
<td>4 plus</td>
<td>6-13-28 Normal</td>
<td>3 Neo. Delivery at County. Husband in jail.</td>
<td></td>
</tr>
<tr>
<td>Chart No.</td>
<td>Age</td>
<td>Race</td>
<td>Preg.</td>
<td>Remarks</td>
<td>Serology</td>
<td>Date Delivered</td>
<td>Treatment</td>
<td>Remarks</td>
</tr>
<tr>
<td>-----------</td>
<td>-----</td>
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<td>----------</td>
<td>---------------</td>
<td>-----------</td>
<td>---------</td>
</tr>
<tr>
<td>13562</td>
<td>15</td>
<td>Col.</td>
<td>3</td>
<td>2 Normal deliveries 1 Miscarriage.</td>
<td>4 plus</td>
<td>1-29-30</td>
<td>1 Neo. 1928 2 Neo. 1930</td>
<td>Miscarriage.</td>
</tr>
<tr>
<td>26830</td>
<td>25</td>
<td>Amer.</td>
<td>4</td>
<td>4 Normal deliveries</td>
<td>4 plus</td>
<td>1-30-29</td>
<td>9 Neo. 1 Bismuth 1927</td>
<td>Serology was negative with pregnancy, but positive again 8-26-39.</td>
</tr>
<tr>
<td>42033</td>
<td>22</td>
<td>Amer.</td>
<td>1</td>
<td>Apparently normal delivery. Gunshot wound in left side at 9 years.</td>
<td>3 plus</td>
<td>10-29-28</td>
<td>Normal</td>
<td>None recorded.  First entrance when 8 months pregnant. Nothing done for lues.</td>
</tr>
<tr>
<td>43478</td>
<td>16</td>
<td>Col.</td>
<td>3</td>
<td>Normal delivery, 1929; Stillbirth, 1931 (Premature separation.)</td>
<td>3-13-33</td>
<td>Normal</td>
<td>6 Neo. 1929</td>
<td>Positive dark field one week before first delivery. Also had G. C.</td>
</tr>
</tbody>
</table>
DISCUSSION

In this Series of 1928, there were four hundred eighty-five histories of women who had been in to the prenatal clinic. Of these 485, there were seventeen with a history of positive serology subsequent to 1928. This is a percentage of 3.5% of patients with positive serology. These 485 patients have a history of seven hundred fifty-five pregnancies since January 1, 1928. If one were to figure the percentage on the basis of the number of pregnancies, there would be little change from the figure of 3.5%. This is due to the fact that the patients with the positive serology often had more than one pregnancy in the history. The figure of 3.5%, will, however, be varied somewhat, as will be shown in the next chart.

Of the seventeen women with positive serology, there are eleven in which the history definitely states that the patient was colored. Four of the patients were described as being "American", and the rest white. This leaves a ratio of eleven to seventeen colored individuals to white. The exact percentage of colored patients to white in the prenatal clinic is not known by this author, but considerably less than one-half the patients are colored.

This series is particularly remarkable because the patients with positive serology were oftentimes not closely followed or treated for the suspected lues. For example, Patient No. 33588 had a 3-plus Wassermann which was never repeated, and as far as could be determined from the chart, there was no treatment given or advised for the lues. Again, Patient No. 36256 had three pregnancies
with positive serology in all three instances, but there was no record of treatment. Several of the patients exhibited no previous luetic history, either clinical or serological, and repeats of a positive Wassermann were all negative. Such a patient is No. 34418. In this instance, one might question the validity of the one positive reaction, and draw the conclusion that without clinical evidence of syphilis, it is probably wise to repeat even a strong positive serological reaction before one comes to a definite conclusion.

Another interesting case in this regard is Patient No. 43478, in which there is the record of a positive dark field. However, the child was apparently normal, even though the patient did not receive treatment during her last pregnancy.

In viewing this series as a whole, one is struck with the frequency of miscarriages, stillbirths, and the frequency in the histories of such things as illegitimate offspring, uncooperative patients, etc. This would seem to be in line with the belief that syphilis, while it may attack any class of people, is more predominant in the lower classes.
OBSTETRICAL PATIENTS WITH NEGATIVE SEROLOGY, BUT WITH PREVIOUS LUEVIC HISTORY. SERIES OF 1928

<table>
<thead>
<tr>
<th>Chart No.</th>
<th>Age</th>
<th>Race</th>
<th>Date of Positive Serology</th>
<th>Subsequent Pregnancies</th>
<th>Luetic Treatment</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>4 Miscarriages</td>
<td>9 Hg. ) in 1927</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5 Living babies</td>
<td>16 Bis. )</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>29203</td>
<td>22</td>
<td>Col.</td>
<td>11-13-24</td>
<td>Miscarriages,</td>
<td>3 Neo., 1924</td>
<td>Serology negative since '26.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1932, 1932.</td>
<td>5 Neo., 1926</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 Stillbirth</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>before 1931.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5 Normal.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Normal, 1930</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Normal, 1931</td>
<td></td>
<td></td>
</tr>
<tr>
<td>36501</td>
<td>21</td>
<td>Amer.</td>
<td>11-11-26</td>
<td>2 Miscarriages,</td>
<td>3 Neo. )</td>
<td>Bad reaction to Neo. Cause of miscarriages given as lues.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1926, 1927.</td>
<td>7 Bis. ) in 1926</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>1 Normal, 1928.</td>
<td>14 Bis. in 1927</td>
<td></td>
</tr>
<tr>
<td>6286</td>
<td>13</td>
<td></td>
<td>5-29-26</td>
<td>1 Normal</td>
<td>10 Neo. in 1926</td>
<td>Serology negative since '26.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Suggestive history back to 1921.</td>
<td>8 Bis. in 1926</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
DISCUSSION

This is a chart of patients from the series of 1928, who, on the basis of serology in 1928, could not be included in the foregoing series. However, they are patients with a luetic history which antedated 1928.

There were, in this series, six cases, of which five were included in the chart. The sixth was omitted because of a birth of material in the history.

If one considers the change which the six patients will bring about in the per cent of luetic patients in the whole series of 485 patients, the percentage is increased from 3.5% to 4.74%. This figure closely approximates the figure of 5.5% which was obtained in the first survey by Dr. Sage mentioned in the opening remarks of this paper.

Of the five patients in the chart, all received some antiluetic treatment. But the number of unfortunate results is truly striking. In this chart is the record of twenty-six pregnancies. Of these, fifteen were normal, and eleven were described as either miscarriages or stillbirths. This gives one the percentage of 57.6% normal deliveries for this series, or a fetal mortality of 42.4%. It would hardly be possible to find a more striking argument for the proper care of the luetic mother during pregnancy.

In this series, the preponderance of the colored race over the white is again noted. It should be mentioned, in regard to this series, that although every one of the five patients received treat-
ment, in most cases that treatment might be described as "spotty". That is to say, the patient might have received three treatments one year, an intervening period of two years, and then five more treatments—as in the case of Patient No. 29203. This treatment, even if given regularly, would have been entirely inadequate, and in the divided doses with the long intervening periods, the treatment probably accomplished little, if anything. As evidence of this, one reads in the history that although the patient has exhibited a negative serology since 1928, there is a record of two miscarriages and one stillbirth since that time.

In contrast to this, Patient No. 32592 received eight treatments of neoarsphenamine in regular sequence during the latter part of 1927 and the early part of 1928, and since this intensive though short treatment, has had three normal deliveries, with serology negative since 1928.

From this chart, one could draw the lesson that even though a patient's serology be negative at the time she presents herself to the prenatal clinic, if there is a previous luetic history the patient should receive antiluetic treatment.

Every patient with a luetic history should receive antiluetic treatment during each subsequent pregnancy, regardless of serology.
### OBSTETRICAL PATIENTS WITH POSITIVE SEROLOGY

#### SERIES OF 1938

<table>
<thead>
<tr>
<th>Chart No.</th>
<th>Age</th>
<th>Race</th>
<th>Former Preg.</th>
<th>Remarks</th>
<th>Serology</th>
<th>Date Delivered</th>
<th>Treatment</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>75429</td>
<td>29</td>
<td>Col.</td>
<td>3</td>
<td>1 Normal Del. 1930 1 Miscarriage 1931 1 No record</td>
<td>3 plus</td>
<td>12-4-38 Normal</td>
<td>7 Bismuth 7 Neo.</td>
<td>Diagnosis of latent syphilis, 10-3-38</td>
</tr>
<tr>
<td>73821</td>
<td>20</td>
<td>White</td>
<td>0</td>
<td>No lueric history</td>
<td>4 plus</td>
<td>5-14-38 Normal</td>
<td>1 Bismuth 2 Neo.</td>
<td>Local doctor advised to give intensive treatment, Probably did.</td>
</tr>
<tr>
<td>74336</td>
<td>20</td>
<td>White</td>
<td>0</td>
<td>No lueric history</td>
<td>4 plus</td>
<td>3-24-38 Normal</td>
<td>None</td>
<td>Serology negative on recheck. No treatment advised.</td>
</tr>
<tr>
<td>54569</td>
<td>31</td>
<td>Col.</td>
<td>5</td>
<td>Normal deliveries</td>
<td>3 plus</td>
<td>9-23-38 Normal</td>
<td>5 &amp; Bismuth 5 &amp; Neopid</td>
<td>Record of 4 pregnancies with pos. serology and treatment. All normal.</td>
</tr>
<tr>
<td>40087</td>
<td>9</td>
<td>White</td>
<td>0</td>
<td></td>
<td>3 plus</td>
<td>10-11-38 Normal</td>
<td>None Recorded</td>
<td>Repeat of serologic test was negative. Nothing advised for lues.</td>
</tr>
<tr>
<td>Chart No.</td>
<td>Age</td>
<td>Race</td>
<td>Preg.</td>
<td>Remarks</td>
<td>Serology</td>
<td>Date Delivered</td>
<td>Treatment</td>
<td>Remarks</td>
</tr>
<tr>
<td>----------</td>
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<td>--------------------------------</td>
<td>----------</td>
<td>----------------</td>
<td>-----------</td>
<td>------------------------------------------------------------------------</td>
</tr>
<tr>
<td>69790</td>
<td>20</td>
<td>White</td>
<td>1</td>
<td>Normal delivery 1936 No luetic history</td>
<td>3 plus</td>
<td>10-9-38</td>
<td>Normal</td>
<td>2 repeats of serologic tests were negative. Nothing was advised.</td>
</tr>
<tr>
<td>60814</td>
<td>15</td>
<td>Col.</td>
<td>0</td>
<td>Primary lesion with positive dark field</td>
<td>4 plus</td>
<td>7-4-38</td>
<td>Normal</td>
<td>In custody of Juvenile Court, 1937.</td>
</tr>
<tr>
<td>32853</td>
<td>32</td>
<td>White</td>
<td>4</td>
<td>Normal delivery'14 3 Miscarriages. Husband luetic.</td>
<td>4 plus</td>
<td></td>
<td>Patient apparently went to private doctor for antiluetic treatment and delivery.</td>
<td>No further record.</td>
</tr>
<tr>
<td>75035</td>
<td>32</td>
<td>White</td>
<td>2</td>
<td>Normal deliveries, 1933 and 1935.</td>
<td>4 plus</td>
<td>5 Bismuth</td>
<td>3 Neo.</td>
<td>No luetic history. No history of delivery.</td>
</tr>
<tr>
<td>44397</td>
<td>10</td>
<td>Amer.</td>
<td>0</td>
<td>Delivery in 1938 premature. Mother had symptoms of toxemia.</td>
<td>4 plus</td>
<td>6-30-38</td>
<td>None</td>
<td>Serology repeated in one week with negative results.</td>
</tr>
<tr>
<td>75097</td>
<td>33</td>
<td>White</td>
<td>1</td>
<td>Normal delivery '35.</td>
<td>4 plus</td>
<td>6-7-38</td>
<td>20 Bismuth</td>
<td>No luetic history in chart. No evidence of neurosyphilis.</td>
</tr>
<tr>
<td>Chart No.</td>
<td>Age</td>
<td>Race</td>
<td>Former Preg.</td>
<td>Remarks</td>
<td>Serology</td>
<td>Date Delivered</td>
<td>Treatment</td>
<td>Remarks</td>
</tr>
<tr>
<td>-----------</td>
<td>-----</td>
<td>------</td>
<td>--------------</td>
<td>---------</td>
<td>----------</td>
<td>----------------</td>
<td>-----------</td>
<td>---------</td>
</tr>
<tr>
<td>53922</td>
<td>23</td>
<td>Col.</td>
<td>3</td>
<td>2 Normal deliveries 1 Miscarriage Serology positive since 1931.</td>
<td>4 plus</td>
<td>10-5-38 Normal</td>
<td>2 Bismuth 2 Noe.</td>
<td>8 Bismuth with normal delivery in 1936. Miscarriage in 1933.</td>
</tr>
<tr>
<td>30301</td>
<td>18</td>
<td>Amer.</td>
<td>0</td>
<td>Entered prenatal clinic 7-7-38</td>
<td>3 plus</td>
<td>7-30-38 Normal</td>
<td>None</td>
<td>Cord serology was negative.</td>
</tr>
<tr>
<td>73960</td>
<td>32</td>
<td>White</td>
<td>5</td>
<td>5 apparently normal deliveries</td>
<td>3 plus</td>
<td>3-16-38 Normal</td>
<td>None</td>
<td>Repeats of serologic tests have been negative. Patient is now eight mo. pregnant.</td>
</tr>
</tbody>
</table>
DISCUSSION

As has been noted above, this series was taken for the purpose of comparison with the 1928 series. That is, it seemed logical to determine if the percentage of luetic patients in the prenatal clinic was remaining about the same, markedly increasing, or decreasing.

There is a span of ten years between the two series, and a comparison of the two should give a pretty fair idea of the expectancy as regards lues in the prenatal clinic.

This series is taken directly from the Wassermann book of the obstetrical clinic, and is accordingly subject to greater possibility of error than the former series. There are two reasons for this. In the first place, the individual charts were not surveyed unless the patient exhibited a positive Wassermann, and consequently those patients with a negative serology, but with a previous luetic history were not picked up. Secondly, occasionally the Wassermanns are repeated, and if these repeats were separated by more than a week or two, it would be unlikely that one would notice the fact that the case was a repeat. This latter factor probably introduces little error, for the positives were repeated as well as negatives.

In this series, which was started January 1, 1938, and extended to October 1, 1938, there were a total of four hundred forty-two patients. Of these 442, there were sixteen with a positive serology, or a percentage of 3.62%. This figure is very close to the corresponding figure of 3.5% for the series of 1928. The probabilities are that the percentage is running fairly constant.
There were several patients in this series, such as Nos. 74356 and 44391, who at some time exhibited a positive Wassermann, but the serology upon repeats of these tests was negative. No treatment was advised in these cases, and the patients had normal deliveries. This fact again emphasizes the importance of repeated tests of the serology.

Because the individual charts were not all surveyed, it was impossible to determine the number of patients with a negative serology but a previous luetic history. If one were to do this, one would find a similar picture to that drawn in the series of 1928. In this regard, Miss Brown, head nurse of the prenatal clinic at the University of Nebraska Dispensary, stated that all of the patients were closely checked for previous luetic history, and that at present those patients with a previous luetic history are receiving treatment for lues with each subsequent pregnancy, regardless of the serology which they may exhibit.

In this series, as in the previous one, the number of colored patients, the number of illegitimate children, etc., is again worthy of note. The preponderance of syphilis among the lower classes is again illustrated. Perhaps a criticism might be brought that the University of Nebraska Dispensary, being a free clinic, handles mostly, if not lower, at least poorer classes of patients. This criticism is probably justifiable, but the higher classes of patients, those in private practice, will exhibit a lower percentage of syphilis, as will be shown in the next chart.
## COMPARATIVE STUDY OF THE INCIDENCE OF SYPHILIS IN PREGNANT WOMEN

<table>
<thead>
<tr>
<th>Source</th>
<th>Number of Patients</th>
<th>Race</th>
<th>Number with Positive Serology</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>McCord (9)</td>
<td>15,011</td>
<td>Colored</td>
<td>2,492</td>
<td>16.6</td>
</tr>
<tr>
<td>Exner (2)</td>
<td>62,516</td>
<td>White</td>
<td>3,783</td>
<td>6.0</td>
</tr>
<tr>
<td></td>
<td>1,708</td>
<td>Colored</td>
<td>308</td>
<td>18.0</td>
</tr>
<tr>
<td></td>
<td>44,855</td>
<td>Mixed</td>
<td>2,460</td>
<td>5.5</td>
</tr>
<tr>
<td></td>
<td>4,955</td>
<td>White</td>
<td>3</td>
<td>0.6</td>
</tr>
<tr>
<td>Woods (22)</td>
<td>5,358</td>
<td>Mixed</td>
<td>420</td>
<td>9.7</td>
</tr>
<tr>
<td>Gammeltoft (3)</td>
<td>23,383</td>
<td>White</td>
<td>1,290</td>
<td>5.5</td>
</tr>
<tr>
<td>U. of N. 1928</td>
<td>485</td>
<td>Mixed</td>
<td>17</td>
<td>3.5</td>
</tr>
<tr>
<td>U. of N. 1938</td>
<td>442</td>
<td>Mixed</td>
<td>16</td>
<td>3.6</td>
</tr>
<tr>
<td>TOTAL</td>
<td>158,713</td>
<td></td>
<td>14,789</td>
<td>9.3</td>
</tr>
</tbody>
</table>

## RANGE OF PERCENTAGE AMONG THE VARIOUS CLASSES OF PATIENTS

<table>
<thead>
<tr>
<th>Class</th>
<th>Percentage Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>White Charity</td>
<td>5.0 - 6.0</td>
</tr>
<tr>
<td>Colored Charity</td>
<td>15.0 - 20.0</td>
</tr>
<tr>
<td>U. of N. Dispensary</td>
<td>3.5 - 5.5</td>
</tr>
<tr>
<td>Private Practice (White)</td>
<td>0.6 - 3.5</td>
</tr>
<tr>
<td>TOTAL AVERAGE</td>
<td>9.3</td>
</tr>
</tbody>
</table>
DISCUSSION

This chart furnishes interesting data with regard to the comparison of the figures obtained at the University of Nebraska Dispensary with those of other clinics throughout the world.

Some of the studies—for example, that of Enner—represent composit pictures from many clinics, while others are figures from one clinic only. McCord, of Atlanta, Georgia, reports a very good series of patients which was limited entirely to the colored race, while Gammeltoft, of Copenhagen, Denmark, has an even longer series which is practically entirely of the white race. (Gammeltoft reported his work in 1928, which was soon after the Danish law with regard to venereal diseases was passed. It would be interesting to determine if that law has had any marked effect upon the incidence of syphilis. Gammeltoft outlines the essential features of the law in his article. The Danish law is that everyone infected with a venereal disease must report for treatment, which treatment is provided in free clinics. If the individual fails to report, he is placed in an institution where he is as much a prisoner as if he were in jail, and kept there until he is cured. It is also a criminal offense, punishable by imprisonment, for a person who is infected with a venereal disease to have intercourse. It is probable that this law has brought about a marked decrease in the incidence of syphilis in Denmark.)

In the comparative study, one is again struck with the high incidence of syphilis among members of the colored race. There is also quite a marked difference between the charity patients in the
white race and those in private practice. This would again illustrate the fact that syphilis is more common in the lower classes.

It should be mentioned that even though the percentage of luetic patients in private practice is quite small, (in some cases less than 1%) the serology should always be checked in every pregnant woman. If one were to meet only one patient in a thousand who had syphilis, but could give that one patient a live, healthy, baby instead of subjecting her to the pain of a labor for naught, it would be worth the trouble of taking the serology in the other nine hundred and ninety-nine cases.
ORIGIN OF SYPHILIS

The exact origin of syphilis has been subject to considerable controversy during the last few centuries. There are two divergent opinions on this subject. For the lay mind, one of these is represented by quotations from the Bible, such as "sins of the fathers being visited on some of the third and fourth generation", which would tend to indicate the great antiquity of syphilis among European and Asiatic peoples. The other viewpoint is satirically put forth by Voltaire in his "Candide", in which he traces the path of syphilis through numerous individuals to one of Columbus' sailors.

For more scientific evidences there is, first of all, the extreme severity of the outbreak of syphilis which occurred in Europe during the fifty years following 1493. The severity of the outbreak of syphilis is well illustrated in this translation of a quotation from Johannis de Vigio (6) in his "Practica in Arte Chirurgica Copiosa", which first appeared in 1514: "The first symptoms of this malady appear almost invariably upon the genital organs, that is, upon the penis or the vulva. They consist of small ulcerated pimples of a color especially brownish and livid, sometimes black, sometimes slightly pale. These pimples are circumscribed by a ridge of callous-like hardness. These first lesions have been combatted by all sorts of tonics and internal remedies, but one succeeds only rarely in preventing them from scattering their venom throughout the organism. There then appears a series of new ulcerations on the genitalia, which are just as difficult to cure and quite as prompt
to reappear after cure. Then the skin becomes covered with scabby pimples or with elevated papules resembling small warts. These eruptions appear especially on the forehead, the skull, the neck, the arms, the legs, and they spread sometimes over the entire surface of the body. Such was the course which the disease pursued at the time of its first appearance, and such it is still to those it affects today.

"That is not all. A month and a half, about, after the appearance of the first symptoms, the patients are afflicted with pains sufficiently severe to draw from them cries of anguish. These pains are situated particularly in the frontal region, then in the shoulder blades, shoulders and arms, often the tibias, thighs and hips.

"Still very much later (a year or even longer after the above complication) there appear certain tumors of a scirrhus hardness, which provoke terrible suffering. The pain which they produce is characteristic in being aggravated during the night and diminishing during the day. Then, in vain the entire armament of sedatives and remedies with an old reputation are given these patients, with no sedative effect upon the pains of the patient. In the end, these horrible sufferings terminate most commonly in lesions of the bones or the enveloping membranes of the bones, such as are produced in spina ventosa. Very often, too, the healed members remain retracted."

The outstanding features of the early disease were the extreme pain described above in all the stages of syphilis and the high
mortality early in the disease, for which there is much evidence contained in the documents of the time. In pathology it is almost axiomatic that if one of a particular race of people encounter a disease for the first time, that disease will exhibit a higher mortality and a more severe form than a disease which has been known to them. We have examples of this in the terrible outbreaks of measles among the primitive tribes upon their first encounter with white men. This fact would seem to indicate that syphilis was known for the first time in 1493 in Europe. However, those who believe in the opposing theory will claim that perhaps Columbus took syphilis to the new world, gave it to the Indians, and acquired it back from them in a new and more virulent form, due to its transmission through susceptible individuals.

For more conclusive evidence as to the origin of syphilis, there are two lines of investigation open to us. The first of these is the documentary evidence. Careful study of medical writings from the time of the Papyrs Ebrus down to the time of Columbus reveal no description of the disease that is unquestionable. We have a very prolific literature in much of the early writings which are what today would be described as pornographic, such as "Thousand and One Nights", and the works of Ovid, Petronius, etc. In none of these is a disease described which is unmistakably syphilis. The first writings which describe the disease of syphilis typically appeared following 1493. In 1494, Charles VIII of France collected an army of mercenaries from a number of the countries of Western
Europe and invaded Italy for the purpose of capturing Naples and establishing his right to that throne. The Italians offered very poor resistance to this invasion. However, Charles VIII met a more serious obstacle in an outbreak of syphilis which occurred in his army, reducing it to a fraction of its former strength. King Charles was forced to retreat from Italy because of this. Upon his return to France his army was disbanded and the soldiers returned to their several countries, carrying with them the malady they had acquired, which malady then spread like a great scourge over all of Europe and into Africa and Asia. Its spread was, no doubt, facilitated by the licentious type of living which was common in those days. The spread of this disease from city to city and from country to country can be very easily traced by documentary evidence of the times. (18) The disease being new, people had no name for it, and usually gave it the name of the country from which they acquired it. Thus, the French called it the Italian Disease, the Italians called it the French Sickness, and so forth. This documentary evidence would all seem to indicate that Columbus brought syphilis to Europe from the new world. We have even stronger proof of this among Spanish writings which occurred at the time Columbus returned from his first trip to the Americas. Among these, the following quotation from Las Casas, (6) whose father accompanied Columbus on his second voyage, and who himself spent many years in Haiti:

"There were, and still are, two things which at the beginning
were very dangerous to the Spaniards. One is the disease syphilis, which in Italy is known as the French malady. This, let it be known in truth, was taken from this island, either when the first Indians left at the time when the Admiral D. Christobal Colon returned with the news of the discovery of the Indies, which men I saw myself soon afterwards in Seville, and these were in a position to communicate it to Spain, by infecting the air or in other ways (what a pointed warning); or when some Spaniards having already contracted the disease went on the first return voyage to Castile, and this could have happened between the years 1494 to 1496; and because at this time King Charles of France, whom they call the Big-head, passed with a great army into Italy, to take Naples, and that contagious malady was in that army—for this reason the Italians thought that they had caught it from them, and from then on they called it the French disease. I myself sometimes endeavored to inquire of the Indians of this island if this malady were very ancient in it, and they answered yes,. . . . It is a thing well verified that all the incontinent Spaniards that did not have the virtue of chastity on this island were contaminated by it (recall, gentlemen, the clear warning that I brought to your attention a few moments ago), and out of a hundred perhaps not one escaped except when the other party never had had it.

"The Indians, men or women, that had it were little affected by it, almost as little as if they only had smallpox."

The other scientific line of investigation, which will show
the origin of syphilis, is in the matter of bones found in graves and ruins. The archaelogists have taken considerable interest in the matter of syphilis and have investigated all the available bones. Syphilis leaves lesions in the long bones which are fairly typical, but are capable of being confused with such things as deficiency diseases and bone tumors. However, the syphilitic lesions in the skull are absolutely typical and diagnostic. If one finds one of these skulls it is only necessary to establish its date to prove that syphilis existed at that place at that time.

One author, Elliot Smith, (18) states: "As a matter of fact, after examining the remains of something like 30,000 bodies of ancient Egyptians and Nubians representing every period of history of the last sixty centuries, and from every part of the country, it can be stated quite confidently that no trace whatever even suggesting syphilitic injuries to bones or teeth was revealed in Egypt before modern times".

This is typical of the reports one finds from investigation of bones found in the Eastern Hemisphere. Of all the bones investigated by numerous authorities there are only five which are considered to be totally typical of syphilis. These five are long bones, and in consequence considerable question is cast upon them. From the Western Hemisphere the reversal of this is true. Williams, (21) has investigated numerous finds of osseous remains of American Indians. Of these, he chose six skulls which exhibited unmistakable syphilitic lesions and which antedate 1492. These skulls were found
in various parts of North and South America; New Mexico, Tennessee, Ohio, Peru and the Argentine.

In conclusion, he states: "The aforementioned cases have been selected because they are as nearly free from suspicion as any that can be found. It is proper to repeat in this summary the fact that many long bones of Indians showing evidence of disease resembling syphilis have been found in numerous places, both in North and in South America. In contrast with the small number of bones from the Eastern Hemisphere that are suspected of showing ancient syphilis, the amount of material in America is almost embarrassing..... It seems to me that the evidence from bones points clearly to the conclusion that the Indians were afflicted with syphilis in a number of parts of America before the arrival of white men."

From the evidence presented by way of bones, documents, and epidemiology, there seems little doubt but that syphilis was an American disease which the sailors of Columbus brought back to Europe upon their return.
HISTORY OF SYPHILIS

Following the appearance of syphilis in Europe in 1493, the disease spread, as has been mentioned elsewhere, in a mighty plague which swept all Europe as well as Africa and Asia. The disease being new, the people of the time had no definite name for the condition, so it was called by the name of the country or district from which it was thought to arise. This continued until 1530, when an Italian physician, Hieronymus Fracastorius, wrote a pastoral poem in which the chief character received the disease and was later cured by bathing in a stream of quick-silver. The hero of this poem was a shepherd. The author gave him the name of Syphilus, probably deriving the name from two Greek words meaning "swine lover". This poem became exceedingly popular and was widely read. Quotations given below from a translation of this poem illustrate the nature of it. (6)

"A shepherd once (distrust not ancient Fame)
Possest these Downs, and Syphilus his name.....
Th' all-seeing Sun no longer could sustain
These practices, but with enrag'd Disdain
Darts forth such pestilent malignant Beams,
As shed Infection on Air, Earth and Streams;
From whence this Malady its birth received,
And first th' offending Syphilus was griev'd,
Who rais's forbidden Altars on the Hill,
And Victims blood with impious Hands did spill;
He first wore Buboes dreadful to the sight,
First felt strange Pains and sleepless past the Night...

Being a new disease, the people of the post-Columbian period were at a loss to know how to treat the disease, and had rather erroneous ideas as to the cause. The close connection between syphilis and sexual intercourse was very early discovered. In general the doctors of the time concluded that there were two methods of transmission of the disease, as shown below:

"There is a twofold kind of causes, because some are first, some corporall: and those of two sorts, partly antecedent, partly conjoyed. That which is first, or originall in this disease, is twofold, whereof the first is the only influence or corruption of the aire, from whence we must charitably thinkes, that it infected those which were religious. The second is conversation, as by kissing and sucking, as appeareth in children, or by carnall copulation, as it hath happened to many & very often, but by other meanes, and chiefly by the influence or corruption of the aire, very seldome." ...John Almenar, Spanish Physician (6).

The people of the time felt that the disease arose from wrath of God (for ill living), having sexual intercourse with a woman during the time of menses, the proximity of the planets Mars and Saturn, carnal intercourse with animals, etc. In general, one might say that there were as many ideas as to this as there were creeds or beliefs. The only person of this time who even came close to the true idea was Hieronyius Fracastorius. Fracastorius propounded a theory of infection of which we might draw an analogy, and say
that his ideas correspond to those which Oliver Wendell Holmes had regarding the nature of puerperal sepsis and which was later borne out by the works of Simmelweiss and Pasteur.

As to the treatment of the disease, an exceedingly wide variety of therapy has been tried at times. One of the earliest forms of treatment was a strict dietary regime, which included mostly broths, for which there was a specific manner of preparation and appropriate incantations. The dietary regime was combined with a system of steam baths. The patients were plastered with foliage of various plants and ointments and placed in these small sheds for their steam baths, which lasted for hours and left them exceedingly weak. This treatment approaches very close of modern fever therapy. In one of the old books there is an early print showing a patient in one of these cabinets. Under this print there is a caption which, when translated, reads: "One pleasure; a thousand pains".

That mercury had been used for skin diseases we know from very ancient times. It was to be expected that this remedy would be tried. The following quotation from Francisco Lopez de Villalobos, a Spanish physician, printed at Salamónica in 1498, shows the early use of mercury:

"If one wishes a salve of greatest efficiency, it can be made in the following way: take equal parts of the two arsenics, citrated sulphur, black hellebore, pine resin, ashes of garlic, mix with Myrrh, frankincense, aloes, rose-campion, with divided
mercury, swine fat, quice of cedrat and of lemon; add some oil and apply to the crusts."

As syphilis was very common in armies at this time, they developed a means of treatment for soldiers in which the mercury was put in the soldier's boots. Marching then produced the friction necessary to rub the medicine into the skin. (16)

Shortly following the turn of the sixteenth century, guaiac, an American drug, was introduced for the treatment of syphilis. The early physicians discovered that the Indians were using it for the treatment of syphilis, and they accordingly followed suit. However, the action of this drug is not effective in the cure of syphilis. As mercury began to be used more, it was found to be the most effective available remedy. It was generally given in such a manner as to produce extreme salivation, as will be shown later.

Syphilis has assumed a tremendous importance with regard to the history of the world. There were in the old days numerous edicts against the disease, and the course of empires has been changed by it. King Henry VIII of England had a number of wives, and beheaded most of them. Usually the reason for this was that they failed to provide him with an heir. Most of his wives became pregnant, but were delivered with dead babies; so that in the end his throne had to be passed on, not to a son, but rather to a daughter whose mother was a mistress of King Henry, Queen Elizabeth. It is believed that King Henry VIII had syphilis, and that he affected each of his wives in turn, leading to the succession of still-
births. (5) If this be true, the queens were beheaded for something which was the King's fault. At any rate, King Henry VIII and Queen Elizabeth have had a profound effect upon the British nation, and the effect would certainly have been different had the King not had syphilis.

The early observers compiled a remarkable amount of material relative to syphilis. There were quite accurate descriptions of the new disease, together with complications even down to descriptions of syphilis of the nervous system. One of these early works is here quoted because of its bearing on our present topic: (23)

"I know very well that many will not easily be persuaded, but that either it is impossible to cure a woman of the Pox whilst she is with Child, or that she and her Child cannot undergo the remedies without inevitable danger of death. However, the experience I have had of it myself, makes me to be of another opinion, which I am willing to communicate for an example in the like case. In the year 1660, when I practic'd Midwifery in the Hostal de Dieu at Paris, a young wench not above twenty years old, came thither to lie-in of her second child, that had the Pox before ever she conceived the first time, and after miscarried of a dead child, rotten with the Pox; therefore being big this second time, and perceiving the accidents of her disease to augment more and more, she concluded there was no hopes this great-belly would succeed any better than the first, because she had all over her body, especially upon both her breasts, very many malignant ulcers, which encreased daily;
and fearing it might turn to a Cancer before her reckoning was compleat, being but three months gone, she resolved to submit to a thorough cure then, and to hazard her life in that condition to save her child's, having no other hopes to effect it, nor being able herself to resist the growing disease. She acquainted three or four chirurgeons both with her disease and design, not at all concealing her great-belly; who for that cause would not undertake her, (altho' she was fully resolved upon it, and promised to pay them well) telling her that their conscience would not suffer them to do it in the condition she was in, and that it would be better she would aptly submit to it as well as she could, till she was brought to bed, and then they would very willingly undertake her, unless she concealed her great-belly, which was not hard to be done, being but 3 months gone, and believing there was no better an expedient; she met with another (to whom she mentioned nothing of her great-belly) that put her into the ordinary course, as if there had been no conception: and besides the common remedies used in this disease, gave her a Salivation by five or six reiterated frictions of the ointment, which followed her very plentifully five whole weeks, so that she was well and perfectly cured, without leaving the least ill accident behind of her disease. When she was almost recovered, and that all had succeeded well, she told her chirurgeon she was 4 months and a half gone with child, (for she was 3 months when she came to him, where she lodged six weeks intire, without having it in the least perceived) which at first he could
hardly believe, but perceiving her belly rather grown bigger than less, during the evacuation the physick had made, he was immediately assured of the truth of it: She informed him, that the reason why she had concealed her great-belly, was the refusal of four chirurgeons (to whom she confessed it) made to take her in hand. From the time she was cured she suffered not the least inconvenience during the remainder of her time, except a little want, because all the money she had was given the chirurgeon for her cure, which made her come to the Hostel de Dieu to lie in, where I delivered her of a child at the full time, as big, fat and healthy, as if the Mother never had had the least touch of that disease in her whole body; and which was very remarkable, the burden (which is a part very susceptible of the least impression of a woman's corrupt humors) was as neat, fair and ruddy as could be imagined." ....Francois Mauriceau, 1637-1709.

One of the difficulties which people of early times had in the treatment of the disease was that it was difficult to make an accurate diagnosis. Even today diagnosis still remains one of the most important problems of medicine. Consider what a problem it must have been when the various diseases were not even clearly differentiated. It is generally agreed that the term "leprosy", as used in the Bible and early medical writings even up into the Middle Ages, was used to cover several diseases, such as true leprosy, some forms of tuberculosis, probably certain types of tumors, certain metabolic disturbances, ergotism, etc. The differentiation
between the general diseases, i.e., syphilis, chancroid, and gonorrhea, was difficult because of the common method of transmission. At the time the above quotation was written, (1700) chancroid complicated the picture, but the difference between gonorrhea and syphilis was fairly well understood. Shortly following this, John Hunter was doing a tremendous amount of work in England. He was, undoubtedly, a very wonderful physician and has contributed much to the sum total of medical knowledge. However, he gave this science one big setback. He tried an experiment in which he inoculated himself with what he thought was just syphilis alone, and got both diseases (gonorrhea and syphilis). He accordingly said that the two diseases were merely variations of the same condition. He believed that syphilis was a skin manifestation, while gonorrhea was the disease as it affected the mucous membranes. Inoculating himself certainly gave rather striking evidence; this, together with his position as a great authority, led to the common acceptance of his theory; and it was not for more than a hundred years that his theory was disproved.

In 1836, William Wallace (4) first introduced the use of potassium iodide in the treatment of syphilis. During the latter part of the last century, a tremendous amount of work was done from clinical aspects of this disease. As an example of this work we might mention the publications of Hutchinson, including the often-mentioned Hutchinsonian teeth, etc., so that by 1900 the clinical aspects of the disease were fairly well understood.
However, the causative organism had not been demonstrated. No method of transmitting the disease to animals had been found, and there was no very satisfactory method of treatment. In the last few years these problems were all solved. Hoffman and Schaudinn (4) discovered the spirocheta pallida, which is the causative agent of syphilis. Metchnikoff (4) was able to transmit the disease to certain orders of apes, thus permitting animal experimentation with the disease. Paul Ehrlich, (4) after a tremendous amount of work, brought his Salvarsan, or 606, which remains today one of the best therapeutic agents for syphilis.

With reference to the origin and history of the other condition (Pregnancy) mentioned in the title, it is believed to have originated with Eve, and has been more or less common in women ever since.
THE PROBLEM OF SYPHILIS AND PREGNANCY

This discussion is not meant to serve as an exhaustive study of all of the problems which have to be met in connection with pregnancy complicated by the presence of syphilis. It is meant, rather, to serve as an outline of the more generally accepted facts, with stepping-stones to more detailed information, if that is desired.

Where syphilis is encountered in a pregnant woman, there are in reality two individuals to be considered—the woman and her unborn child. In considering the effects of the complication to the pregnancy upon the mother, McCord (14) states that syphilis does not increase the maternal hazard, and he further states that syphilis does not produce hypertension in the mother. In another article, McCord (9) discusses the outcome of 2,150 cases of pregnant women in which the pregnancy was complicated with syphilis. In this whole series, there was a maternal mortality of only three cases. This is far below the maternal mortality for the country as a whole.

From these remarks it becomes apparent that if an expectant mother has syphilis, she is in no immediate danger of mortality or morbidity from that disease.

The second individual in the picture—the unborn child—presents a completely different problem. McCord's series mentioned just above had the following results insofar as fetal mortality was concerned:
RESULTS OF 2,150 CASES OF SYPHILIS IN PREGNANT WOMEN

Antiluetic Treatments | Term | Late Abortion | Early Abortion | Stillborn or Died
None | 47.3% | 28.7% | 13.2% | 10.3% | 49.4%
10 or more | 87.6% | 12.1% | - | .3% | 5.4%

Figures compiled by H. N. Cole (1) in his "Co-operative Clinical Studies" give us the following data:

FETAL MORTALITY IN SYPHILITIC MOTHERS

<table>
<thead>
<tr>
<th></th>
<th>Untreated Cases</th>
<th>Treated Cases</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early Syphilis</td>
<td>46.0%</td>
<td>7.5%</td>
</tr>
<tr>
<td>Late Syphilis</td>
<td>40.0%</td>
<td>12.0%</td>
</tr>
</tbody>
</table>

Gammeltoft (3) states that a non-treated luetic mother will have a luetic child in 96.5% of the cases. McCord (13) believes that the percentage of syphilis in stillbirths is higher than 40%. E. B. Woods (22) states that before modern methods of treatment were introduced, syphilis was the commonest cause of stillbirths and macerated fetuses. He goes on to state that if the mother has late or latent syphilis, the fetus may escape. If the primary infection takes place near the time of conception, the fetus is almost always involved. If the infection occurs after the sixth month of pregnancy, the fetus may escape syphilitic involvement. The effect of syphilis upon the fetus is strikingly illustrated by another author, C. H. Marshall (7), in the following table:
PATIENTS HAVING SYPHILIS LESS THAN FIVE YEARS

<table>
<thead>
<tr>
<th></th>
<th>Untreated</th>
<th>Treated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abortions and Miscarriages</td>
<td>23.0%</td>
<td>5.9%</td>
</tr>
<tr>
<td>Stillbirths</td>
<td>25.0%</td>
<td>8.4%</td>
</tr>
<tr>
<td>Syphilitic Children</td>
<td>22.0%</td>
<td>20.7%</td>
</tr>
<tr>
<td>Normal Children</td>
<td>30.0%</td>
<td>65.0%</td>
</tr>
</tbody>
</table>

From the three tables above, and the other figures mentioned, it is very evident that syphilis in the mother is a very important problem with regard to the prospective child. This is true not only from a standpoint of the possible mortality of that child, but also from the standpoint of his having to bear the stigma of congenital syphilis. In consequence, the problem of syphilis and pregnancy is one of preventing infection in the fetus, if possible.

Gammeltoft (3) states that the transplacentary transmission is the mode of fetal infection. This is the generally accepted viewpoint. McCord (15), who has made a histological study of many placentas, states that syphilis causes the villi to be crowded and enlarged, thus shutting off the blood supply to the placenta. This, he believes, accounts for the large percentage of stillbirths among luetic mothers. Accordingly, the problem broadens from one of prevention of infection in the fetus to prevention of infection in the placenta with consequent stillbirth.

The first problem to be met in the treatment of any disease is to make a correct diagnosis of that disease. The standard procedure
in this regard is to use one of the serologic tests for the presence of syphilis. Gammeltoft (3) states that the Wassermann is reliable during pregnancy. McCord (8) believes that a positive Wassermann from a good laboratory means syphilis. He goes on to add that a negative Wassermann does not always eliminate the possibility of syphilis. H. N. Cole (1) affirms that congenital syphilis is practically preventable by the use of routine Wassermanns and early, adequate antiluetic treatment where indicated. Syphilis in women oftentimes presents no clinical evidence. The primary stage—chancre—may even be absent. For this reason, it is necessary to rely on the serology for a diagnosis. The Wassermann has been the test most commonly used, but more recently other tests, such as the Kahn and Kline have been replacing it in some institutions. At the present time, the University of Nebraska Dispensary is using the Kahn and Kline reactions, the change from the Wassermann having been made during 1938. The serological reaction should be determined on every woman who presents herself for prenatal attention. This fact is so important, and so commonly accepted among teaching institutions, that most of the charity hospitals and other similar institutions throughout the country are using this practice. However, the doctors in private practice, particularly in the smaller, more isolated communities, are prone to minimize its importance. The incidence of syphilis in the larger centers of population is greater than in the smaller towns, and a doctor in a small town in general practice might deliver quite a few babies each year for several years before he encounters the one case which will make
him regret his failure to take adequate precautions. All of the authorities agree that every pregnant woman should be thoroughly examined to eliminate the possibility of overlooking syphilis which does not display clinical evidence.

The mother who has syphilis should be treated for that condition to prevent the development of the tertiary manifestations of the disease in herself. Sage (19) and others have stated that treatment during pregnancy gives better results to the mother than treatment at any other time. However, the first great principle of treatment is prophylaxis, and we have here two individuals to be concerned with. The one already has the disease. Treatment should be given to effect a cure in the one who has the disease—that is, the mother. The next problem is how to prevent the disease, if possible, in the second individual—the baby. McCord (8) points the way to do this when he states that luetic mothers who receive early and adequate treatment for syphilis have a 95% chance of having a living, healthy baby. Exner (2) reports the same results. Just how the antiluetic treatment given the mother affects the baby can be shown by reference to the three tables given in the first part of this discussion, which show the marked decrease in fetal mortality where treatment was administered. In another article, McCord (12) shows that in mothers with 4 plus Wassermanns, who receive no treatment, the outcome of the pregnancy was a stillbirth in 70% of the cases, while 11% of the babies died in a few days.
Of the babies who lived, 57% showed evidences of congenital syphilis. In mothers with 4 plus Wassermanns who received less than six treatments, the outcome of the pregnancy was a stillbirth in 21% of the cases, and 13% died in the first few days. Of the remainder, 30% were luetic. In mothers with 4 plus Wassermanns who received more than six treatments, the outcome of the pregnancy was a stillbirth in 5% of the cases; 4% died in a few days, and only 3% of the remainder were luetic.

In order to be most effective, according to Marshall (7), the treatment should be begun before the fifth month of pregnancy. Cole (1), McCord (15), and others, have pointed out the fact that treatment given late in a pregnancy, while it may not prevent congenital syphilis, will decrease the incidence of stillbirths.

The question now arises as to just what the treatment should be. Gammeltoft (3) states that every luetic woman should be treated during pregnancy with salvarsan and a heavy metal, regardless of the time of the initial infection, previous treatment, or serologic reaction. Cole (1) says that early (before the fifth month), adequate (ten to fifteen neoarsphenamine and a heavy metal), treatment gives the best results. McCord (9) feels that the pregnant woman who has syphilis should have at least ten treatments with arsenic and a heavy metal. He further states that the treatment should be mild and continuous, and not controlled by the serology. If the diagnosis of syphilis is made early in pregnancy, use alternating arsenic and a heavy metal, starting and ending with arsenic. If the diagnosis is made late in
the pregnancy, use the arsenic and the heavy metal concurrently. The older authorities (for example, Gammeltoft) used mercury with their arsenic. More recently, bismuth has come to be the drug of preference. Sage has stated that the exact treatment is not as important as the fact that the individual does receive treatment.

With regard to the dangers which the treatment may present, Cole (1) states that the pregnant woman will tolerate treatment better than a non-pregnant woman. However, adverse reactions do occur. Gammeltoft (3) advises that one watch for the presence of albuminurea as a danger signal. Woods (22) brings forth the point that the placenta acts as a storage center for the injected arsenic, setting it free over long periods of time. He offers this as an explanation for the observation that treatment has a greater therapeuetic effect during pregnancy. It may also serve as an explanation for the adverse reactions. That is, the arsenic being stored may build up a cumulative effect. It does seem unusual that an individual who has the strain of pregnancy placed on the whole organism, more particularly the liver and kidneys, can withstand the treatment with fewer adverse reactions than an individual who is not pregnant. Those reactions should, however, be closely watched for because of the danger to the fetus as well as the mother. Woods (22) lists the following adverse reactions:

1. Bismuth Stomatitis  
2. Bismuth Enteritis  
3. Bismuth Dermatitis  
4. Nitritoid Reaction  
5. Arsenic Stomatitis  
6. Arsenic Dermatitis  
7. Arsenic (hemorrhagic) Encephalitis
Among the signs and symptoms to be watched for as denoting toxicity are: albuminurea, convulsions and coma, signs of central nervous system involvement, delirium, fever, headache, tachycardia, vomiting, shock, prostration, nervousness, backache, congestion of the throat and eyes, diarrhea, and severe abdominal pain. Of these, the more important from a diagnostic standpoint are the first three. Most of these signs, while not diagnostic by themselves, are suggestive and should put one on guard for a possible bad reaction. Of the seven reactions listed, the last (Arsenic encephalitis) is the most severe and most rapidly fatal. Autopsy findings in these cases are edema and small hemorrhages in the brain and spinal cord. Little can be done in the treatment of this condition, the best prognosis lying in the early detection of a sensitivity in the patient to the arsenic. If an adverse reaction occurs, the arsenic should be discontinued and sodium thiosulphate may be administered to counteract the effect of the arsenic. Further treatment of the syphilis should be with bismuth alone.

Exner (2) emphasizes the importance of a careful followup of the cases of the babies in which the mother had a luetic history. He makes an appeal for better records and closer check-ups between the mother and the child. Here the problem of diagnosing syphilis in the offspring arises. In this problem, as in other medical problems, it is important to make a diagnosis as early as possible in order to secure the best prognosis. For the purpose of diagnosing syphilis in the new-born, McCord (9) suggests that the characteristic
picture of osteochondritis in the newborn is pathognomonic of congenital syphilis. In another article, McCord (14) states that if the placenta gives the histological picture which is typical of syphilis, the baby will be syphilitic. A negative histological picture does not exclude syphilis. Also, if a Wassermann be taken of the blood from the umbilical cord, and this be positive, the child will have syphilis, while if it is negative, the possibility of syphilis is not excluded.

This discussion may be summarized by quoting the summary and conclusions from a very fine article by McKelvie and Turner (17):

"SUMMARY"

"Nine hundred and forty-three pregnancies occurring in syphilitic women were analyzed with regard to the presence or absence of congenital syphilis in the offspring, particular attention being paid to the effect of maternal antisypililitic treatment on the outcome of the pregnancy. In addition, the relative value of the diagnosis of congenital syphilis of such signs as the cord Wassermann test, placental histology, and roentgen examination of the infant's bones for syphilitic epiphysitis were considered. Among cases showing a negative cord Wassermann reaction, the infant was non-syphilitic in 86.2 per cent, and among those giving a positive reaction the infant was normal in only 18.6 per cent.

"Among cases in which the placenta was normal on macroscopic and microscopie examination the infant proved to be nonsyphilitic in 79.9 per cent, while among cases showing syphilitic changes in the
placenta the offspring was syphilitic in all but 12.1 per cent. When these two diagnostic aids were considered together, the information was of more value than when each was considered alone. Infants presenting evidences of syphilitic epiphysitis invariably exhibited other evidences of congenital syphilis. However, among children showing no abnormalities on roentgen examination, 20.5 per cent were subsequently shown to have congenital syphilis.

"The striking beneficial effect of antenatal arsphenamine therapy is shown by the fact that among pregnancies occurring in untreated syphilitic mothers the infant was born alive in only 54.1 per cent and 64.5 per cent of living offspring were syphilitic, while the administration of as little as 1 Gm. or less of arsphenamine changed these figures to 89 and 27 per cent, respectively. Administration of larger amounts of arsphenamine or related products brought about a further reduction in fetal mortality and in the percentage of syphilitic offspring, until when as much as 4 Gm. (from twelve to fourteen injections) was given no syphilitic offspring was observed.

The administration of heavy metals, mercury or bismuth compounds, in addition to arsphenamine, enhanced the good results achieved with the latter alone. Better results were obtained when maternal treatment was started in the first half of pregnancy than when treatment begun in the latter half. It was found particularly important, however, that the arsenicals be given in the two months immediately preceding delivery."
"The results in cases treated before pregnancy and not during pregnancy, were in general, quite as good as when the mother was treated during pregnancy alone. Here, however, the status of the syphilitic infection in the mother is probably the important factor.

"Antisyphilitic treatment both before and during pregnancy yielded results superior to treatment during either period alone.

CONCLUSIONS

"1. The Wassermann test on the blood of the umbilical cord and study of the placental histology are important aids in the diagnosis of congenital syphilis, and should be carried out on all patients not proved during pregnancy to be free from syphilis. Of the two, the former is the more reliable.

"2. The presence of characteristic changes in the epiphyses of the long bones during the first two weeks of life is diagnostic of congenital syphilis, but the absence of epiphyseal abnormalities does not rule out congenital infection.

"3. Antenatal treatment of pregnant syphilitic patients with arsphenamine reduces the percentage of fetal deaths and the percentage of syphilitic infants in a striking manner. The good results are roughly proportional to the amount of treatment given and the time at which it is started; even a few treatments in the last weeks of pregnancy, however, will materially alter the outcome."
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