HANDBOOK of OBSTETRICS and DIAGNOSTIC GYNECOLOGY

Second Edition

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HANDBOOK of OBSTETRICS and Diagnostic Gynecology

by

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Second Edition

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NORMAL HEMATOLOGICAL VALUES

White Blood Cells, 5,000-10,000 per cu. mm.

Myelocytes	= 0 %	Lymphocytes	= 20-[illegible]%
Juvenile Neutrophils	= 0 %	Eosinophils	= [illegible] %
Band Neutrophils	= 0-5 %	Basophils	= 0-1 %
Segmented Neutrophils	= 40-60%	Monocytes	= [illegible]-8 %

Platelets: 200,000 to 500,000 per cu. mm.

Red Blood Cells, in million per cu. mm.:
Men = 5.0 (4.5 to 6.0) Women = 4.5 (4.3 to [illegible].5)
Reticulocytes = Less than 1%

Hemoglobin in Gm./100 cc.:
Men = 15-16 Gm. (13.5-18) Women = 13-15 ([illegible]5-16.5)

Hematocrit (packed cell volume):
Men = 45-47% (38-54%) Women = 40-42% ([illegible]-47%)

Cellular Measurements of r.b.c.: Average diam. = 7.3 ([illegible]-8.[illegible]μ)
Mean Corpuscular Volume = 87 c.μ (80-94 c.μ)
Mean Corpuscular Hb. = 30 γγ (28-32 γγ)
Mean Corpuscular Hb. Conc. = 35% (33-38%)
Color, Saturation and Volume Indices, each = 1.0 (0.9-1.1)

Bleeding Time (Duke) = 1-4 minutes. (Ivy) = Less than 4 mi[illegible].
Coagulation Time (Lee and White) = 5-15 minutes.

NORMAL BLOOD CHEMISTRY VALUES

	Constituent	Value/100 cc.	mEq./Liter
Serum or Plasma	Sodium	310-340 mg.	136-145
	Chloride (as Cl^-)	350-375 mg.	100-106
	Total Chlorides (as NaCl)	580-620 mg.	[illegible]-106
	Potassium	14-20 mg.	3.5-[illegible]
	Phosphorus	3-4.5 mg.	0.9-[illegible].5 (mM)
	Magnesium	1-3 mg.	
	Calcium, total	9-11 mg.	4.[illegible]
	CO_2 Combining Power	55-75 Vol.%	[illegible]-28
	Cholesterol	150-240 mg.	
	Cholesterol, esters	65 % of the to[illegible] Cholesterol	
	Amylase	80-180 Units	
	Phosphatase, alkaline	2.0-4.5 Units (Bodansky)	
	Phosphatase, acid	0.5-2 Units (Bodansky)	
	Protein Bound Iodine	4-8 micrograms	
	Serum Albumin	4.5-5.5 Gm.	Total: 6.0-8.0 Gm. per 100 cc.
	Serum Globulin	1.5-3.0 Gm.	
	Fibrinogen (plasma)	0.2-0.6 Gm.	
Blood	Glucose	60-100 mg. (true); 80-120 mg. (Folin-Wu)	
	Total Non-Protein Nitrogen	15-35	
	Urea Nitrogen	10-20	
	Uric Acid	3-6	
	Creatinine	1-2	

NORMAL RENAL FUNCTION AND URINE VALUES

Phenol Red Test (P.S.P.): 15 minutes = over 25%; 2 hours = over 55%
Urea Clearance: 75-120% of A.N.F. or 40-100 cc./minute
Addis Urine Sediment Count (Values for 12-hour period):
pH = acid Sp. Gr. = 1.025-1.030 Albumin = 0-30 mg.
r.b.c. = 0-1,000,000 Casts, hyaline = 0-100,000
w.b.c. and small epithelial cells = 0-2,000,000

HEMATOLOGICAL CHANGES DURING NORMAL PREGNANCY*

White Blood Cells	- Range from 8,000 to 13,000 throughout pregnancy with normal differential count.
Platelets	- Show slight decline.
Red Blood Cells and Hemoglobin	- Average decrease of 2 Gm. in hemoglobin and 750,000 r.b.c. count (dilution effect). 11 to 12 Gm. normal Hgb. in last trimester. Anemia borderline = 10 Gm. Hgb.
Bleeding, Coagulation, and Prothrombin times - Normal.	

BLOOD CHEMISTRY VALUES DURING PREGNANCY*

	Increase of	Decrease of
Non-Protein Nitrogen		15%
Urea Nitrogen: Blood		50%
Plasma		30%
Ratio $\frac{\text{Urea Nitrogen}}{\text{Non-Protein Nitrogen}}$		50%
Free Amino Acid Nitrogen		25%
Total Amino Nitrogen		25%
Plasma Lipids		
Free Cholesterol	20%	
Ester Cholesterol	8%	
Neutral Fat	200%	
Electrolytes		
pH	(less than 1% change)	
Cl^-	(no change)	
HCO_3^-		9%
Proteinate$^-$		13.5%
$HPO_4^=$		4%
$SO_4^=$	17%	
Total Acid		3%
Na^+		3%
K^+	4%	
Ca^{++}		5%
Mg^{++}		4%
Total Base		3%
Alkali Reserve in Mols		9%

MISCELLANEOUS LABORATORY VALUES*

B.M.R.	Increases 4 to 30% (B.M.R. of mother plus baby).
Gastric Acidity - Lowered, especially in first trimester.	

CARDIOVASCULAR CHANGES DURING PREGNANCY*

	Increase of	Decrease of
Pulse Rate	10%	
Total Blood Volume	30%	
Plasma Volume	40%	
Red Cell Volume	20%	
Hematocrit		15%
Viscosity		12%
Extracellular Water (maternal)	25%	
Cardiac Output	55%	
Venous Pressure: Arm	1% or less	
Leg	65 to 105%	

*Average or approximate values.

PREFACE TO THE SECOND EDITION

The purpose of this handbook is to present as concisely as possible the essential features of obstetrics and diagnostic gynecology. It is not designed as a textbook, but is intended to serve as a compendium of essential information so presented as to be readily available to the practitioner and student. Controversial matters have been avoided wherever possible; in certain instances in which the physiology involved is not clearly understood, alternative hypotheses have been presented, and specific treatment has been indicated by a consideration of the probable change in the normal physiology. Descriptions of surgical technics have been avoided because it is impossible to present them adequately in a handbook.

Obstetric and gynecologic problems are among the most common encountered in the general practice of medicine. Therapeutics in this special branch of medicine constantly changes on the basis of new investigations and better understanding of physiology. A publication of this kind must undergo frequent revision and keep pace with the inevitable changes. The revisions involved in this second edition have been minor in nature. Our colleagues have been generous enough to call our attention to certain errors (not only of detail but of omissions and emphasis as well) of which the first edition was not entirely free. These have been corrected. Certain sections have been expanded, especially in regard to treatment. Other sections have been modified, and in many instances treatments have been changed to conform with present-day concepts of therapy.

I should like once again to express my thanks and indebtedness to the many people who have helped with advice and criticism in the preparation of the manuscript: Dr. Ralph Benson, Dr. E. W. Overstreet, and Dr. Ernest Page of the University of California; Dr. Charles McLennan of Stanford University; Dr. Emery Page; and my secretary, Mrs. Dorothy Pickett. I should like also to express to Mr. Ralph Sweet my admiring gratitude for his excellent drawings; and to my publisher, Dr. Jack D. Lange, my sincere thanks for his help in all matters.

Leo Doyle

Berkeley, California

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Chapter 1

DIAGNOSIS AND LENGTH OF PREGNANCY

DIAGNOSIS OF PREGNANCY

The diagnosis of pregnancy is rarely based on one observation or finding, but rather, on a combination of factors. These factors may be symptoms, signs, or laboratory tests. A symptom, sign or test may be designated as presumptive, probable, or positive, as the case may be. *Intervals of time (in parentheses) refer to the time of probable onset of sign or symptom.*

Subjective Symptoms:

A. Presumptive Evidence of Pregnancy:
   1. Amenorrhea - Cessation of previously normal menses is presumptive evidence of pregnancy. Cessation of abnormal menses may or may not indicate pregnancy depending on the abnormality and the associated symptoms and findings.
   2. Morning sickness - Nausea and occasional vomiting in the absence of dietary indiscretion or change in dietary habits. (From 6th to 12th weeks).
   3. Enlargement and tenderness of breasts - Fullness, tingling and soreness of the breasts are frequent subjective manifestations of pregnancy. (From 6th week).
   4. Bladder irritability - Frequency, nocturia, and urgency may be early symptoms of pregnancy. (From 6th week).

B. Probable Evidence of Pregnancy:
   Quickening - The feeling of fetal movements is often regarded as positive evidence, but this must be distinguished from increased intestinal motility. (Between 16th and 20th weeks).

Objective Signs:

A. Pelvic Examination:
   The following findings are presumptive evidence of pregnancy. (See page 13 for technic of examination).
   1. Softening of the cervix. (From 6th week).
   2. Cyanotic appearance of the cervix and vagina. (Chadwick's sign). (From 6th week).

3. Irregular softening of the uterine fundus. (From 6th week).
4. Increased softening and compressibility of the uterine isthmus. (Hegar's sign. See pages 15 and 16). (From 8th to 10th weeks).
5. Change of size and consistency of the uterine fundus. (From 8th to 10th weeks).

B. Breast Signs:
The following findings are presumptive evidence of pregnancy.
1. Enlargement with fullness. (At 6th to 10th weeks).
2. Increased pigmentation of areola. (At 6th to 10th weeks).
3. Montgomery's tubercles, increased vein prominence, increased erectibility of nipples. (At 6th to 10th weeks).
4. Colostrum - Milk-like secretion. (From 12th to 20th weeks).
5. Secondary increase of areolar pigmentation. (At 20th week).

C. Abdominal Signs:
1. Probable evidence of pregnancy -
   a. Enlargement of the uterus. (From 6th week).
   b. Uterine souffle. (From 16th week).
2. Positive evidence of pregnancy -
   a. Fetal movements *felt by the examiner*. (Between 16th to 20th weeks).
   b. Fetal heart tones heard by examiner and discerned from the mother's heart beat. (From 1[illegible] 20th weeks).
   c. External ballottement. (From 22nd w[illegible]).
   d. Fetal outline felt by examiner. (From 24th week).

Laboratory Evidence:

A. Biologic Tests for Pregnancy:
(See Table page 3). Probable evidence of pregnancy.
These tests are based on the principle that the increased gonadotrophic hormone produced by the placenta of a pregnant woman and excreted in urine will precipitate ovulation in the test animal. After the injection of urine, if ovulation occurs, the test is positive; if not, it is negative. (See Table page 3). These tests are subject to the errors of all biologic tests and are, at best, about 98% accurate.
A false positive test means ovulation is precipitated when the patient is not pregnant.
A false negative test means ovulation does not occur when the patient is pregnant.
1. Positive Aschheim-Zondek (mice). (From 4th to 5th weeks).
2. Positive Friedman-Lapham (rabbit). (From 4th to 6th weeks).
3. Positive Xenopus (frog). (From 4th to 5th weeks).

PREGNANCY TESTS

Name	Animal Used	Substance Used, Amount, and Method of Injection	Time Required	Type of Reaction	Accuracy Per Cent	Practicability
Aschheim-Zondek	5 mice, 3 wks. old.	Urine (acid); 6 subcut. injections of 0.2 to 0.4 cc. each.	96 hrs.	Ovulation = pregnancy.	98-100	Requires large mouse colony; numerous injections.
A. * Friedman-Lapham	Rabbit (virgin, 17 wks. old or more).	Urine; 2 I.V. injections (ear vein) of 10-12 cc. each 24 hrs. apart.	48 hrs.	Ovulation = pregnancy.	96-98	Most practical and easily run test for the majority of clinical laboratories.
B. * Hoffman	Rabbit (10 wks. to 3 mo. old).	Serum; 1 I.V. injection (ear vein) of 2.5 cc.	24 hrs.	Ovulation = pregnancy.	96-98	
Hogben (female)	*Xenopus laevis* (So. African toad).	5 cc. of blood serum or 5 cc. urine, (concentrated, acidified, protein precipitated and extracted). Injected into dorsal lymph sac.	8-12 hrs.	Ovulation (eggs in bottom of tank) = pregnancy.	96-98	Easy to run, can use toads over; inexpensive.
Male (female test more accurate).	*Rana pipiens or Bufo arenurum*	As for female test above	4 hrs.	Examine urine for motile sperm.	94-95	Fast and inexpensive.
Basal Body Temperature	Patient herself.	When a patient has been taking basal body temperatures and the rise after ovulation continues through and beyond the expected menses, the patient is presumably pregnant. (See pages 226 and 227).			98-99	No expense and quite accurate, especially in early pregnancy.

*If animal dies, test should be repeated. Make sure patient is not taking any medication at time of test.

B. X-ray showing fetal outline is positive evidence of pregnancy. (From 12th to 20th weeks).

"PITFALLS" IN THE DIAGNOSIS OF PREGNANCY

Misleading Symptoms:

A. Cessation of Menses Due to Causes Other than Pregnancy:
   1. Hypothyroidism and occasionally, hyperthyroidism.
   2. Psychic factors - Shock, worry, fear.
   3. Travel - Change of climate or altitude.
   4. Pseudocyesis.
   5. Chronic illness - Tuberculosis, diabetes, anemia.
   6. Acute infectious diseases - Influenza, streptococcus sore throat, poliomyelitis.

B. Nausea and Vomiting Caused by:
   1. Gastro-intestinal disturbances - Toxins (food), infections.
   2. Pseudocyesis.
   3. Emotional upset.

C. Enlargement and Tenderness of Breasts Caused by:
   1. Premenstrual tension.
   2. Low-grade chronic fibrous mastitis.
   3. Pseudocyesis.

D. Bladder Irritability Caused by:
   1. Urinary tract infection - Cystitis, pyelitis.
   2. "Spasm" of bladder neck.

E. "Quickening" May Actually be:
   1. Increased peristalsis.
   2. Abdominal muscle spasm.

Misleading Signs:

A. Softening and Discoloration of Cervix and Vagina are Sometimes Caused by:
   1. Physiologic changes prior to menstruation.
   2. Previous child bearing or any type of pelvic disease causing frequent bleeding.

B. Changes in Size and Consistency of Uterus Caused by:
   1. Uterine tumors (myomas most frequently).
   2. Uterine hypertrophy.
   3. Ovarian cysts closely attached to uterus.
   4. Multiparity (large and irregular uterus).

C. Vaginal Bleeding after Conception Caused by:
   1. Cervical polyps and uterine myomas.
   2. "Placental sign" (Hartman) - Bleeding at time of implantation.
   3. Cervical disease (erosion usually).
   4. Uterine bleeding indistinguishable from menses and probably occurring in an area other than the implantation site.
   5. Rupture of a varix of the vagina.

D. Increased Vaginal Secretion.

E. Endocervicitis and cervical disease.
F. Enlargement of Abdomen Caused by:
   1. Obesity.
   2. Uterine tumor.
   3. Ovarian cysts.
   4. Tympanites and ascites.
   5. Pseudocyesis.

Misleading Laboratory Evidence:

A. Occasionally Abdominal Pregnancy will Provide a Pitfall.
B. Biologic Tests for Pregnancy:
   (See Table page 3). The most common errors (may be false negative or false positive) are due to:
   1. Precipitation of ovulation in the test animal by some cause other than an increase of patient's gonadotropin. May result from sexual stimulation of animal.
   2. Faulty interpretation of test by an inexperienced observer.
   3. Too early in pregnancy to have increased excretion of gonadotrophic hormone.
   4. Inability of animal to ovulate (a negative test) because of age or illness of the animal.
   5. Human errors, e.g., injection of wrong specimen, failure to make injection, loss of records, examination of wrong animal, etc.

   (If animal dies from any cause, test should be repeated).

LENGTH OF PREGNANCY

There is no accurate method for determining the length of pregnancy. In 629 cases in which the date of fertilization was known, (temperature graphs and single exposures), the average duration was 269 days from the date of fertilization. In 1220 other cases the average duration was 280 days from the beginning of the last menstrual period. The standard deviation was 10.5 days.

A. To Calculate the Expected Date of Confinement (EDC):
   (See calendar on inside of back cover).
   1. Obtain date of onset of the last menstrual period (LMP).
   2. Add 7 days.
   3. Count back 3 months, add 1 year, and the date determined is the expected date of confinement (EDC).
   4. If the LMP is in January, February, or March, simply add 9 months in addition to the 7 days.

Example:

LMP - April 3, 1949	4/3/49	
	+ 7 days and subtract 3 months	
EDC - January 10, 1950	1/10/50	(plus 1 year)

LMP - February 2, 1949 2/2/49
+ 7 days and add 9 months
EDC - November 9, 1949 11/9/49

B. Uterine Measurement:
Measurement of the height of the uterus is the procedure used most frequently in obstetrics to determine the age of the pregnancy, but is reliable only after the 6th month. The McDonald maneuver is the most practical method, and by this means the age of the pregnancy in lunar months can be determined by dividing the height of the uterus (in centimeters) above the superior border of the symphysis by 3.5.

Example: $\frac{35 \text{ cm.}^*}{3.5} = 10$ lunar months

In a primigravida at term, the height of the uterus usually measures about 35 cm.; in a multigravida it is a little less. This method gives only approximate age. Hydramnios, breech positions, obesity, twins, and coexisting tumors will give misleading results.

C. Age of Embryo or Fetus:
The age of the embryo may be calculated by measuring it. The following formulae are used:

1. The length (crown-rump) of the fetus in centimeters equals the square of the number of months of age for the first 5 lunar months. Five centimeters are added for each lunar month thereafter.

   Examples: Second month - 2 x 2 = 4 cm.
   Fifth month - 5 x 5 = 25 cm.
   Sixth month - (5 x 5) + 5 = 30 cm.

2. Standing height (cm.) x 0.2 = age in months.
   Sitting height (cm.) x 0.3 = age in months.
   If the embryo is less than 10 cm. long, add 1 month to the result.

*(Height of uterine fundus)

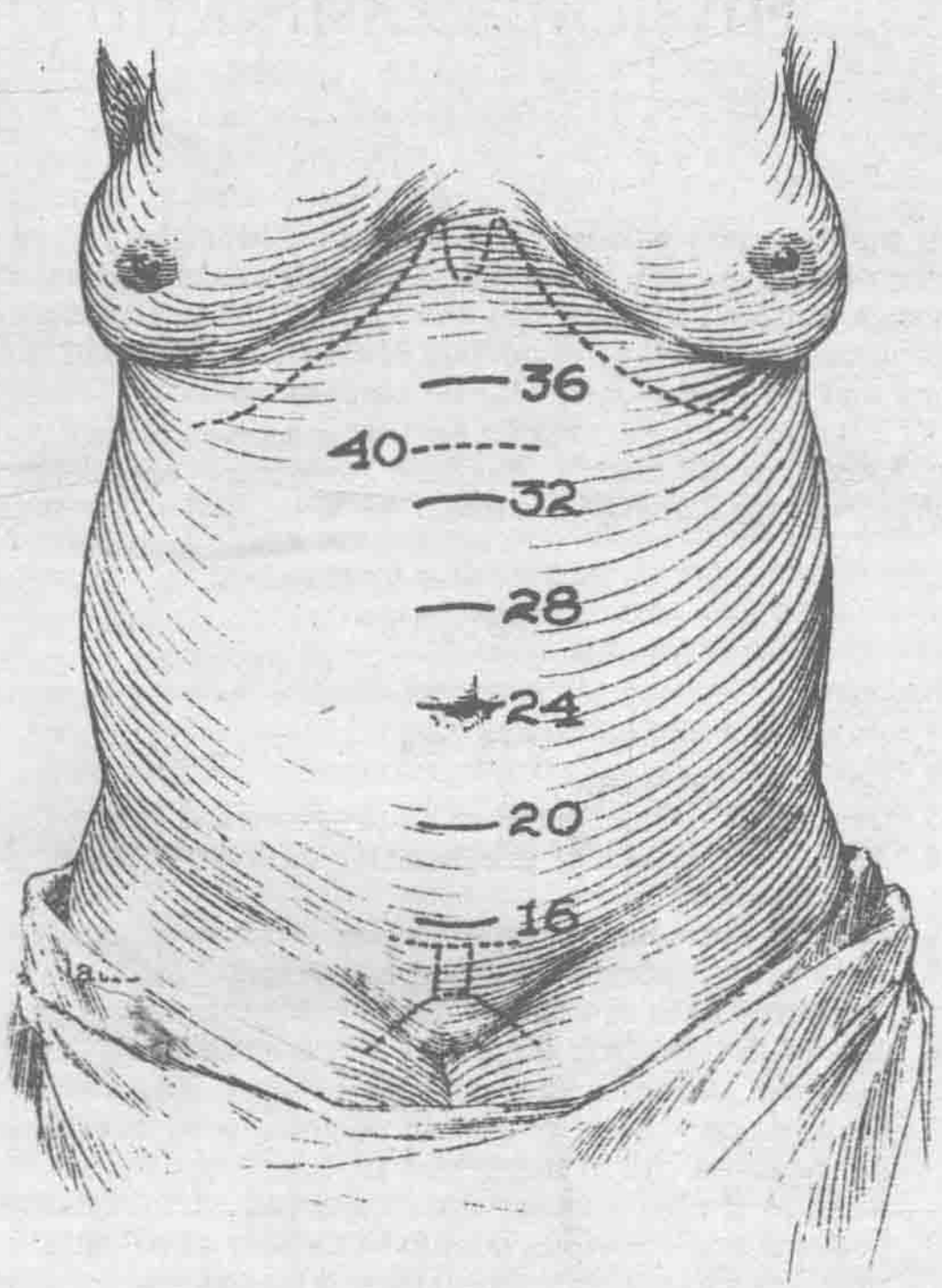

Fig. 1 - Weeks of Gestation. (From Beck, Obstetrical Practice, The Williams and Wilkins Co.)

Chapter 2

HISTORY AND PHYSICAL EXAMINATION

If the pregnant patient is to have the fullest benefit of modern obstetric care and adequate prophylaxis against complications, a detailed history and a complete physical examination are necessary. Certain important, relevant aspects of the history and examination should be emphasized.

Printed forms are usually desirable to record the history and physical examination. Standard forms are available, or the physician may design his own.

HISTORY

A. Statistics:
   1. Name and address of patient.
   2. Date of first visit.
   3. Gravidity - Total number of pregnancies.
   4. Parity - Number of pregnancies carried through to the 7th month or more.
   5. Date of marriage or marriages.
   6. Date of last normal menstrual period.
   7. Expected date of confinement.
   8. Age of patient (the incidence of complications increases with the patient's age, especially after 30).
   9. Occupation - Most obstetric patients are, of course, housewives. It is important from the standpoint of care to know if she is otherwise employed. Information about present and previous occupations may also indicate how much responsibility the patient will assume for her own care throughout her pregnancy.
   10. Education - This will give a clue to the method and the need for teaching the patient about her pregnancy and to the amount she can be expected to learn.

B. Family History:
   Pertinent data regarding parents and siblings should be obtained. Some conditions as uterine inertia and borderline cephalopelvic disproportion tend to be familial and might be anticipated on the basis of information about pregnancies of the patient's mother or sisters.

C. Past History:
   Childhood diseases and other illnesses are significant in some instances; special attention should be paid to sequelae.

The following are of particular importance:

1. German measles - The incidence of certain congenital defects has been reported to be high among children born of mothers who had German measles during the first 6 weeks of pregnancy. These include cataracts, deafness, and heart lesions. The danger after the 8th week is slight. The patient should be warned to avoid exposure.
2. Scarlet fever - Glomerular nephritis is an extremely serious complication of scarlet fever from an obstetrical standpoint. In fact, it is one of the most severe complications of pregnancy, as is any kidney disease.
3. Rheumatic fever - A pregnant patient with the cardiac sequelae of rheumatic fever may require additional care and if there have been any indications of decompensation, she will need special attention during labor and at the time of delivery. Any recent recurrence of joint pain, nose bleeds or fever should serve as a warning and indicate the necessity of a thorough cardiac evaluation.
4. Chronic chest disease - Tuberculosis, residues of pleurisy or pneumonia, or a history of pleural effusion requires a chest x-ray and evaluation as to activity. These conditions, if active during pregnancy, require additional treatment and constant observation throughout pregnancy. At the time of delivery the decision between inhalation and regional anesthesia may depend on the presence or absence of chest disease.
5. Allergy and drug sensitivity - These have importance in relation to medications. Such drugs as iron, barbiturates, and opiates have been the principle offenders, but sulfonamides and penicillin are becoming more common. History of previous blood transfusions should be recorded and any reaction noted.
6. Metabolic diseases - Diabetes requires special management during pregnancy, labor, and the puerperium. Diabetic women tend to have large babies (9 to 11 lbs.), and the infant requires close observation and management at birth. Pre-diabetics also have a predisposition toward large babies. *All women who have babies over 9 lbs. in weight should be examined for diabetes.* Thyroid disturbance in the pregnant patient is of little concern unless it is toxic. In such cases, the disease must be treated regardless of the pregnancy. True hypothyroids do not usually become pregnant, and the borderline hypothyroids require careful study before diagnosis is made. Diagnosis of thyroid disease during pregnancy is uncertain because the B.M.R. may normally increase as much as 20 points at that time, and, paradoxically, the blood cholesterol also rises. *Any patients who are taking thyroid extract without adequate cause should stop taking medication.*
7. Venereal diseases - Syphilis or gonorrhea may leave residues of infection that may recur during pregnancy.

Most states require by law a blood serology test. If either disease is at all active, immediate treatment should be instituted. Congenital syphilis is still high on the list of causes of neonatal death and morbidity.

8. Disease of the nervous system - Organic diseases such as poliomyelitis, multiple sclerosis, cord injuries, or diseases of the brain may interfere with pregnancy and delivery, and must be evaluated and treated whenever possible. Functional disease is not as serious, but may be far more annoying and is certainly more frequent. Manifestations of neuroses and some psychoses are often called "nervous breakdowns" by the patient. A history of these are usually indicative of emotional lability.
9. Diseases of the genito-urinary tract - Specific inquiry should be made concerning these. A history of pyelitis is important because it tends to recur during pregnancy. Patients with kidney disease are more likely to have complications associated with toxemias of pregnancy.
10. Surgical history - Any surgical operation should be recorded and the date should be noted, the name of the surgeon and, as accurately as possible, exactly what the operation was. In cases of past abdominal operation, the patient may experience abdominal pain as the uterus enlarges. It is necessary to know if organs have been removed, so that symptoms originating in the area can be better understood.

D. Review by Systems:

A review by systems will serve as a check on the past history. Ask the patient if she has had any serious illness or major operation. Also elicit complaints the patient has at the time. Further questioning and examination may then be necessary. A review by systems is a double check and an efficient way to cover all symptoms. It helps the patient recall information that she has forgotten or overlooked.

E. Menstrual History:

Technically this comes under the heading of past history, but in obstetrical and gynecological histories it deserves special attention. The following are recorded:

1. Menarche (onset of menses).
2. Regularity of cycle (days between onset of periods).
3. Duration and amount of flow (number of days of flow).
4. Pain if present, amount, duration, and relation to onset of flow.

Menstrual aberrations may alter the expected date of confinement. Menstrual disorders may indicate disturbances of the endocrine system and should be recorded carefully.

F. Obstetrical History:

All previous pregnancies should be recorded. The information is necessary, for frequently some clue may help to predict a complication. Histories of previous labors are valuable in suggesting cephalopelvic disproportion, long labors, or very short ones.