

# THE YEAR BOOK *of* OBSTETRICS *and* GYNECOLOGY

(1960-1961 YEAR BOOK Series)

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EDITED BY

J. P. GREENHILL, B.S., M.D., F.A.C.S., F.I.C.S. (Honorary)

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**Dentistry**

## TABLE OF CONTENTS

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### OBSTETRICS

PROBLEMS IN EVOLUTION OF OBSTETRICS . . . . .	5
PREGNANCY . . . . .	8
Physiology . . . . .	8
Abortion . . . . .	22
Ectopic Pregnancy . . . . .	56
Complications . . . . .	65
The Toxemias . . . . .	107
LABOR . . . . .	126
General . . . . .	126
Analgesia and Anesthesia . . . . .	135
Complications . . . . .	143
Operative Obstetrics . . . . .	169
Hemorrhage . . . . .	206
PUERPERIUM . . . . .	233
THE NEWBORN . . . . .	245

## GYNECOLOGY

GENERAL PRINCIPLES AND DIAGNOSIS . . . . .	305
INFERTILITY . . . . .	323
OPERATIVE GYNECOLOGY . . . . .	366
INFECTIONS . . . . .	390
BENIGN TUMORS . . . . .	411
MALIGNANT TUMORS . . . . .	425
MENSTRUAL DISORDERS . . . . .	504
ENDOCRINOLOGY . . . . .	524

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Complications . . . . .	65
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Complications . . . . .	143
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## OBSTETRICS

**Problems in Evolution of Obstetrics** are reviewed by Nicholson J. Eastman\* (Johns Hopkins Univ.). The major problems and challenges for obstetrics in the United States are in premature birth, fetal physiology, toxemias of pregnancy and individualized care of mothers. The cause and prevention of premature births is the most important problem, especially those which have no explanation (about 60%). Whatever the cause of premature labor may be, its elucidation and prevention would be a great boon. The field of fetal physiology and its derangements encompasses the science of genetics and all that the genes contribute to fetal normalcy and abnormalcy, physical and mental, and the many-sided problem of fetal environment—the oxygen supply of the fetus, its nutritional needs, its immunologic relation to the mother, etc. Toxemias of pregnancy cause deaths primarily because of self-neglect by the patient or negligence on the part of the doctor. Most of the deaths could be prevented by the timely application of existing knowledge.

The problem in individualized care of mothers is: how, with a diminishing personnel and a soaring birth rate, can doctors hope to give to the mothers of 1970 the meticulous, individualized care they deserve? Authoritative estimates indicate 6,000,000 births in the United States during 1970, a 50% increase over the number in 1958. Who is going to care for this stupendous number of births? Authoritative forecasts for medical personnel in the 1960's indicate a decrease in the number of physicians in relation to population.

Two programs that might alleviate the shortage in obstetric personnel are (1) greater use of group practice and (2) training of nurses as obstetric assistants. The most practical and realistic way of meeting the problem is through group practice. Obstetric patients are cared for by 4 or 5 obstetricians who work interchangeably as a unit. There would be no night calls, except for the man on 24-hour duty in the delivery suite, and every 4th day each man would be entirely free. This type of practice is not new and has worked

\*J.A.M.A. 171:1292-1295, Nov. 7, 1959.

successfully for patients and physicians in many localities. Little by little, expectant mothers must be led to understand that any competent obstetrician who is alert is safer and more trustworthy than the best obstetrician in the world who is harassed by overwork and groggy from lack of sleep.

The work output of a group of obstetricians could be increased in quantity and quality if they had round-the-clock assistance of a few graduate nurses with special training in the conduct of normal pregnancy, labor and the puerperium. This training would include at least 8 months' full-time clinical tutelage under the supervision, control and accreditation of obstetricians. With proper training, such nurses could, if need be, take histories, determine blood pressure, perform venipunctures, abdominal palpation, fetal heart observations and give attention to the more common complaints, such as nausea, heartburn, constipation and excessive weight gain. In labor, they would be available to carry out rectal examinations, emotional support of the parturient and, if necessary, nearly the entire conduct of labor except actual delivery.

► [Eastman's chairman's address read before the Section on Obstetrics and Gynecology at the 108th Annual Meeting of the American Medical Association is very important and thought provoking. The leading obstetric and gynecologic societies will have to do something about the problems which will face obstetricians and general practitioners in the future.

Meigs (Am. J. Obst. & Gynec. 79:625, 1960) chose as his presidential address for the American Association of Obstetricians and Gynecologists the title, "An Interest in Endometriosis and Its Consequences." He emphasized that Sampson's reflux or implantation theory of the etiology of the endometriosis has been proved. Conservative treatment of this condition is safe and important and sterility can be cured in a satisfactory percentage of patients. Early marriage and frequent childbearing are important to prevent onset of endometriosis and its subsequent sterility. There is a marked difference in the incidence of endometriosis in private and ward patients and college graduates are woefully behind in fulfilling their obligations in the production of children. Education of the masses is the only way the problem of overpopulation can be solved. Financial aid to our young in their early married years is important and often necessary.

Scheffey (ibid. 78:929, 1959), in his presidential address before the American Gynecological Society, chose as his subject "Albert Holmes Smith: A Study in Courage." Scheffey informs us that in 1867, at the age of 32, Albert Smith took a step that became a symbol of the courage that was to exemplify his career for all time. He accepted the post of consultant to the Woman's Hospital in Philadelphia. In that day of the so-called emancipation of women this was treason indeed and the wrath of most of his colleagues descended on him. Tradition was so ingrained that 64 years passed before a woman physician became a Fellow of the College of Physicians of Philadelphia. This occurred in 1932 when Dr. Catherine Mac-

farlane was the first woman to be thus elected. Smith devised several instruments, but apart from the pessary that bears his name and still maintains its usefulness, other inventions and modifications remain only in the archives. He did not live to see the victory of the causes he fought for, but in 1888, 3 years after his death, the first woman physician, Dr. Mary Willetts, was elected to membership in the Philadelphia County Medical Society.

Arneson, in his presidential address before the Central Association of Obstetricians and Gynecologists (*ibid.* 79:833, 1960), spoke of the responsibilities of the obstetrician-gynecologist in treating uterine cancer. He proposed establishment of a joint authority, representing at the national level both obstetrics and gynecology and radiology, with specific assignment in the following areas. (1) The first duty should be the collation of data on all funds now available for graduate education in cancer of the female reproductive tract. The authority should seek additional resources and, whenever agreeable, act as agent for their allotment. (2) The authority should develop specific fellowship grants with financial attractiveness and suitable tenure for a specific period of years. By making grants directly to carefully selected candidates rather than by annual disbursements through institutional appointments, they will lessen the risk of dissipating sums on individuals only temporarily interested in cancer during their regular residency program. (3) The authority should prepare itself to aid candidates in the preparation of an educational program best suited to their individual requirements. They should be free to utilize any available appointments in accredited institutions at any acceptable preceptorships. The stated aim should be the development of specialists qualified in their chosen discipline as well as in the zone of interest overlapping obstetrics and gynecology and radiology and not the development of specialists in cancer alone. The candidate must be free to identify himself with either discipline, but the authorities should encourage the possibility for an individual to identify himself with both specialties if he is so qualified.

King (M. J. Australia 1:561, 1960) said that obstetrics entered the 20th century in the full flush of pride at its newly acquired surgical skill. Cesarean section, long regarded as a hazardous operation, had at last become relatively safe. The days of the high forceps operation were passing, as also were some of the traumatic mutilations that often attended such operations. The attitude of mind which allowed every primigravida to pass through a trial of labor on the first occasion, even at the expense of a dead baby and possibly a craniotomy, was also passing.

During King's student days at the London Hospital in the early 1920's, a significant change in the status of the honorary obstetrician took place. It was solemnly decided that he should no longer be called an obstetric physician, but should be elevated (or demoted, if you will) to the rank of obstetric surgeon. Today one wonders whether the time has not come to reverse the role again, since so many of the present day problems in obstetrics are essentially medical, involving a physiologic and biochemical approach to disordered metabolic processes. The physical process of delivery has come to occupy a less dominating place on the obstetric horizon. The present day tendency is for safe delivery for both mother and child to resolve itself into either a relatively simple and uncomplicated vaginal procedure or an abdominal delivery.

The art of obstetrics may change, but the basic principles remain firm, and the obstetrician of the future will be not only one well versed in the manipulations and technics passed on to us by the masters of our art, but one who has had sound training in the wider fields of knowledge so essential to present day understanding of our specialty.

Speert (*Am. J. Obst. & Gynec.* 78:212, 1959) says that the protracted betrothal of gynecology to obstetrics has culminated in a union that now appears so firm as to no longer justify retention of the maiden name or the cumbersome composite of both. He suggests the word "gyniatrics" (from the Greek "gyne" meaning "woman" and "iatros" physician or medicine, "iatrikos" healing or "iatrike" treatment of disease) as a modern English language replacement for the honorable but tired double name of obstetrics and gynecology (compare, e.g., pediatrics and geriatrics) and "gyniatrician" for the combined obstetrician and gynecologist. Obstetrics and gynecology have been joined, in fact. Speert asks "Does not this union merit a proper name?—Ed.]

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## PREGNANCY

### PHYSIOLOGY

#### **Glandular Structures of Cervix Uteri during Pregnancy.**

The cervical mucosa is composed of a complicated system of compound clefts. C. Frederic Fluhmann<sup>1</sup> (Stanford Univ.) studied the nature of the glandular structures of the cervix during various stages of gestation by photographic technics, plastic reconstructions and serial microscopic sections in 39 specimens of pregnant uteri.

During gestation, the cervix undergoes striking changes that affect all its individual components and result in the transformation with which all clinicians are familiar. As term approaches, it becomes shorter, broader and extremely soft; the external os, at least in multigravidas, readily admits the examining finger. The tremendous increase in vascularity due to the formation of many new blood and lymph vessels and dilatation of arteries and veins is greatly responsible for these alterations, but there is likewise a profound modification of the character of the lining mucosa.

The columnar cells lining the cervical canal and its clefts and tunnels show signs of tremendous activity in growth and secretory function. The individual cells increase in size, becoming taller and broader, and as they increase in number, they are heaped up and stratified. A direct result is the formation of irregular projections on the surface and along the walls of the clefts.

The active secretion of the cervical cells results in changes that are apparent on gross examination. The canal is filled

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(1) *Am. J. Obst. & Gynec.* 78:990-1004, November, 1959.

with clear, jelly-like, mucoid substance that corresponds to the mucous plug noted in many species. The surface markings are prominent and the larger rugae and depressions not only can be seen readily with the naked eye, but they are easily photographed. The classic longitudinal folds with

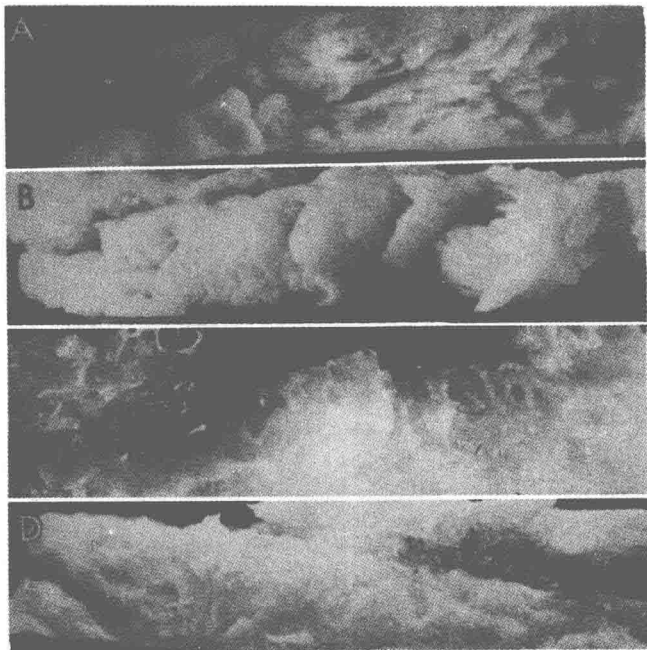


Fig. 1.—Strips of cervical canal after fixation in formalin and clearing in alcohol. There is no pattern of arborization, but many irregular prominences and grooves course in all directions. In pregnancy at term (*C, D*), characteristic findings are circular or oval compartments that appear in the photographs as small pits. Section *A* is from pregnancy of about 5 weeks; *B, C* and *D*, from term gestations. *A, B* and *C*,  $\times 4$ ; *D*,  $\times 3$ ; reduced one-third. (Courtesy of Fluhmann, C. F.: *Am. J. Obst. & Gynec.* 78:990-1004, November, 1959.)

smaller accessory folds running obliquely or transversely to form a regular arrangement of plicae palmatae or arbor vitae are nonexistent, as in the nonpregnant. There is no attempt at arborization, but instead, there are many folds and grooves of varying size that course in a great many directions (Fig. 1).

The transformation of the epithelium of the cervical canal into the complicated arrangement found in pregnancy at

term follows an evolutionary trend that begins early in fetal life.

Because it has been accepted that the cervical mucosa is composed of tubular glands that descend from the surface and branch in a racemose arrangement, it was inevitable that Stieve and his successors should explain the pregnancy changes as resulting from hypertrophy and dilatation of such

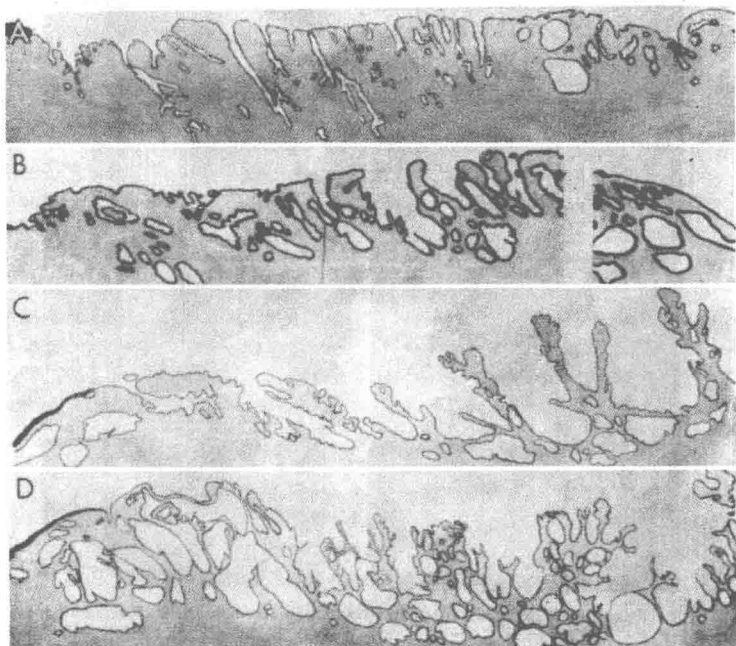


Fig. 2.—Panoramic views of cervix uteri obtained by making tracings from photographs of microscopic sections reduced from  $\times 15$ . Width of each diagram is 1 in. in original slide. *A*, from nonpregnant patient; *B*, from pregnancy at 13 weeks; *C*, from pregnancy at 35 weeks; and *D*, from pregnancy at term. (Courtesy of Fluhmann, C. F.: *Am. J. Obst. & Gynec.* 78:990-1004, November, 1959.)

glands. There are, however, no tubular glands of this type in the cervix at any age period.

The modifications that the basic clefts undergo cause the appearance of the cervical epithelium in a term pregnancy.

The author's series is representative of all the months of pregnancy. However, it was impossible to establish definite criteria that could be used to recognize any particular stage

beyond the wide variations of early and late gestation. This is due not only to the great variations and degrees of changes seen in the cervix at comparable periods, but also to the pronounced differences found in sections from the same specimen. Figure 2 shows panoramic outlines from four specimens.

**Metabolism of Progesterone and Its Related Compounds in Human Pregnancy** is discussed by M. Edward Davis, E. Jürgen Plotz, Charles I. Lupu and Peter M. Ejarque<sup>2</sup> (Univ. of Chicago). Radioactive progesterone and 17 $\alpha$ -hydroxyprogesterone caproate were administered to women during the reproductive life span. An average of almost 60% of the administered radioactivity was excreted in the urine and feces during 6-9 days after administration of progesterone labeled with carbon 14 at carbon atom 4. Excretion also occurred via the respiratory tract.

Determinations of radioactivity in the blood plasma after intravenous and intramuscular administration of labeled progesterone demonstrated extremely rapid disappearance of the free steroid from the circulation due to (1) speedy conjugation and inactivation, presumably in the liver and kidneys and (2) rapid diffusion into body tissues, mainly into the fat compartment. Although urinary excretion of metabolites begins soon after intravenous administration of the hormone, this fact does not account significantly for the disappearance of almost 92% of an administered dose within 25 minutes after injection. The rapid diffusion of the hormone and/or its metabolites into the fat compartment of the body could be regarded as a mechanism by which a more prolonged hormone supply is provided for the target cells from a storage place.

Comparison of the metabolism of tagged progesterone with that of 17 $\alpha$ -hydroxyprogesterone caproate labeled with carbon 14 showed greater and more prolonged activity of the steroid ester, probably due to retarded absorption from the injection site and not to temporary storage in the fat compartment.

It is entirely possible that the effectiveness of progesterone on the myometrium depends largely on direct diffusion of progesterone from the placenta to provide sufficient concen-

(2) Fertil. & Steril. 11:18-48, Jan.-Feb., 1960.



tration of hormone substance. Then, the generalized effect of progesterone via the blood stream would play a less important role.

The preliminary investigation of the urinary and fecal metabolites of  $17\alpha$ -hydroxyprogesterone caproate revealed a distinct difference between mode of conjugation of its metabolites and that observed in the end products of progesterone. Other findings also indicate that the metabolism of  $17\alpha$ -hydroxyprogesterone caproate differs considerably from that observed in progesterone,  $17\alpha$ -hydroxyprogesterone and other steroid hormones.

► [Russell and associates (Am. J. Obst. & Gynec. 79:718, 1960) carried out determinations of the thyroxin-binding capacity (TBC) of simultaneously drawn maternal and cord blood specimens at term in normal pregnancy. Protein-bound iodine (PBI) estimations were performed on the same specimens. Although both maternal and cord readings were consistently elevated above normal nonpregnant levels, the maternal readings were regularly greater than those of the newborn infant as regards both TBC and PBI. The explanation of the increased PBI in pregnancy as being due to increased binding-capacity for thyroxin of the specific alpha globulin moiety in serum is confirmed. Binding-capacity commonly increased in greater proportion than hormone-iodine levels. The authors emphasize the value of matched maternal and cord specimens in these studies.

MacLaren and associates (ibid. 78:939, 1959) demonstrated an immunospecific characteristic of normal pregnancy serum. They say that the presence of two antigenic substances is not excluded by the evidence of a single line of precipitation. In preinhibition, the two discrete lines of precipitation should probably be interpreted as evidence of the presence of at least two antigenic substances in the serum of normal pregnancy. However, a single antigenic substance reacting to form two discrete lines has been acknowledged as a possibility in the method they used. Thus, the evidence gained by the three methods of antibody absorption is interpreted to mean the presence of at least one, and perhaps two substances, peculiar to the serum of normal pregnancy which by virtue of their antigenicity in the rabbit can be demonstrated by serologic methods. Considering the lack of reactivity of chorionic gonadotropin in the gel, it is unlikely that it is one of the antigenic substances. Further, the reaction is not due to blood group A or B isoagglutinin. Thus, the identification and significance of the substance or substances demonstrated in pregnancy serum remain to be established.

Hilton and Johnson (ibid., p. 479) determined the changes which occur in blood oxytocinase from 2 weeks ante partum to 24 hours post partum. The results of these studies have been stated in terms of the per cent added oxytocin destroyed by 1 cc. plasma. The mean value obtained for antepartum plasma was 24.7%, for plasma obtained during false labor 1.7%, for stage I labor 3.9%, for 1 hour postpartum 17.8% and for 24 hours postpartum 3.1%. In all patients there was a marked decrease in the oxytocinase activity concomitant with the beginning of increased uterine contractions. All but 1 patient showed an increase in blood oxytocinase activity when this activity was measured 1 hour post partum. By 24 hours post partum, this activity had decreased markedly to low levels. The authors conclude that these changes in blood oxytocinase may play some part in beginning uterine contractions in labor.—Ed.]