

OBSTETRICS

PREGNANCY

PHYSIOLOGY

In Vitro Fertilization and Cleavage of Human Ovarian Eggs was induced in three experiments by Miriam F. Menkin and John Rock¹ (Brookline, Mass.). Eggs were obtained from ovarian follicles recovered from patients immediately after oophorectomy. After being washed in Locke's solution, the ova were cultured at 37.5 C. in the patients' serum, again washed in Locke's solution and exposed in vitro for one to two hours at room temperature to a washed concentration of human spermatozoa in Locke's solution. They were then transferred to human serum and incubated. Two eggs were found to be in the two cell stage after 40½ and 45 hours respectively.

Two eggs, after 46 hours' incubation, were found to be in the three cell stage. The more normal of the two specimens consisted of three round, regular blastomeres, two of nearly equal size and one definitely larger. In each was a round vesicular body believed to be a nucleus. Within the next two hours, the egg, kept at room temperature, appeared distorted. Lewis and Hartman noted such distortion in the dividing monkey egg during each of several early cleavages. A photograph of the egg (Fig. 1) taken about two hours after it was removed from the incubator, strikingly resembles the monkey egg and the mouse egg in a similar stage. In the human egg, as in the others, the second cleavage plane is at right angles to the first. The bulge at 5 o'clock is believed

(1) Am. J. Obst. & Gynec. 55:440-452, March, 1948.

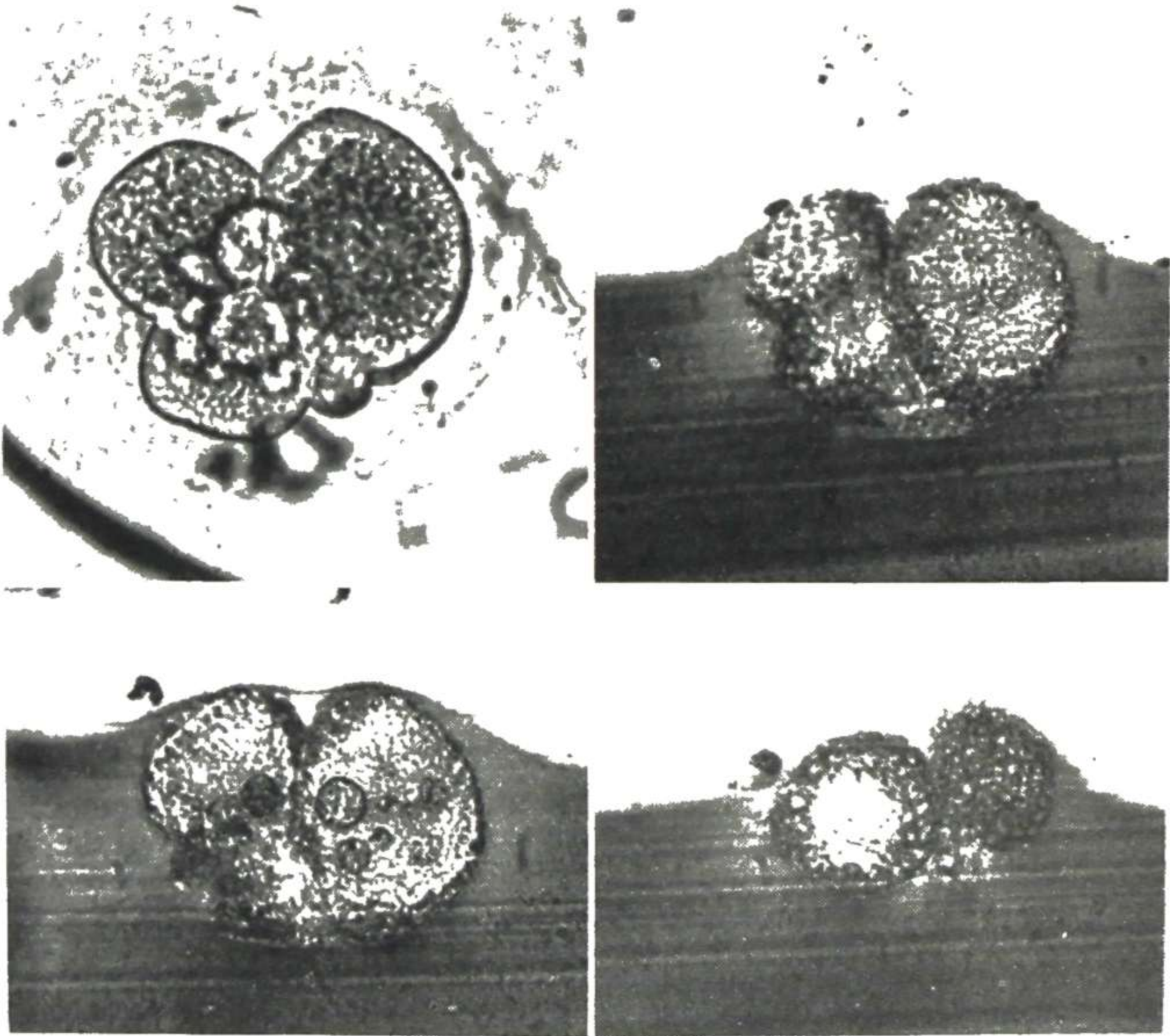


Fig. 1 (top left).—Human egg in three cell stage (after 46 hours' culture and 2 hours at room temperature) has shrunk and been distorted in shape, and cytoplasm has become vacuolated since it was first seen in cleavage. Several dark bodies within zona pellucida suggest spermatozoa. Reduced 30 per cent from $\times 300$.

Fig. 2 (top right).—Section through middle of same egg, showing three well defined blastomeres, the two smaller ones being of nearly equal size. Round bodies in largest blastomere are probably nucleoli. Reduced 30 per cent from $\times 400$.

Fig. 3 (bottom left).—Another section of same egg, showing nucleoli more clearly. Here these appear in each of three blastomeres. Reduced 30 per cent from $\times 500$.

Fig. 4 (bottom right).—Third section of same egg. Only two blastomeres present. Ovoid body, measuring 14×9 microns and strongly suggesting polar body is seen at 11 o'clock. Reduced 30 per cent from $\times 500$.

(Courtesy of Menkin, Miriam F., and Rock, John: *Am. J. Obst. & Gynec.* 55:440-452, March, 1948.)

to represent a polar body. The two pale round formations in the center of the egg may also be polar bodies. At least five dark objects assumed to be spermatozoa may be identified in the zona pellucida.

The ovum was fixed, serially sectioned and stained.

Figure 2 is a section through the middle of the egg. Several round bodies are noted in the largest blastomere. These are shown more clearly in Figure 3, in which they are seen in each of the three blastomeres. They are probably nucleoli, similar to those observed in the corresponding stage of the mouse egg fertilized in vivo.

In the third section (Fig. 4) there is a structure at 11 o'clock which strongly suggests a polar body. Nowhere in preparation is there any sign of zona pellucida; this had evidently been dissolved by the fixative.

[Prof. R. Moricard of Paris, in discussing this work, maintained that a parthenogenetic or asexual reproduction cannot be excluded. He mentioned the research of Farris (personal communication), who attempted fertilization of 200 human ova without success. In vitro, Moricard proved that ovocytes of the first order are not capable of fecundation. He showed that this was true for mice in 1937 and probably also for human ovocytes in 1946-47.—Ed.]

Vagaries in Implantation Site of Zygote are reviewed by J. M. Munro Kerr² (Glasgow Univ.). Abnormal sites of implantation from the vagina upward are considered.

Kerr has not discovered any authentic case of vaginal implantation, though this might be possible in presence of endometrial tissue.

Cervical implantation is also rare. In Studdiford's review of such cases early abortion was the rule, although in a few cases pregnancy advanced to the latter half of gestation. Rupture of the cervix toward the paracervical tissue or vaginal vault occurred in some cases. In all, hemorrhage was severe when the gravid sac was removed.

Isthmus implantation is common, being designated clinically placenta previa. A common figure for incidence of placenta previa is 1 in 1,000, but it is probably much more frequent, as many cases of abortion are caused by this faulty implantation.

Implantation directly over the tubal orifice, termed **angular implantation**, is a clinical entity. Abortion is

(2) Clin. J. 77:58-62, Mar.-Apr., 1948.

common. There is abdominal pain and tenderness and local bulging of the angle affected.

Implantation in the interstitial portion of the tube commonly terminates in rupture of the sac in the tenth to sixteenth week of pregnancy. Intra-abdominal hemorrhage is profuse, and generally hysterectomy is necessary.

Implantation in the isthmus of the tube is accompanied by early rupture, sometimes in the third or fourth week of pregnancy. Often there are no warning signals.

Implantation in the tube ampulla is the second commonest site of irregular nidation. Tubal abortion or rupture is usually preceded by warning signals such as spasms of abdominal pain often followed by slight vaginal hemorrhages. These attacks may occur and subside several times before rupture or abortion, when the patient collapses from internal hemorrhage and shock.

Ovarian implantation and primary peritoneal pregnancy are rare.

Mechanism of Reception of Ovum Seen in Laparoscope. Reinhold Elert³ (Berlin) had an opportunity to study this mechanism when a 20 year old girl was referred to him because of suspected extrauterine pregnancy, which could not be established by palpation and yet could not be excluded. The last period had occurred 16 days previously.

In the laparoscope the abdominal organs could be clearly seen. Both tubes were free from changes of any kind, especially from anything suspicious of tubal pregnancy. The left tube was extended, its fimbriated end having no relation to the ovary. The right ovary lay deep in the Douglas pouch. The right tube ran along and close to the ovarian border. While under observation, the tube, with its extremely hyperemic fimbriated end and ampulla, glided past the ovary, which the ampulla and infundibulum now hid from sight. After a short time the fimbriae again came into view; they had grasped

(3) Zentralbl. f. Gynak. 69:38-43, 1947.

the entire ovary from below, so that it sat as though in an egg cup. Unfortunately, in this position the ampulla could not be seen, so that possible presence of perceptible peristalsis could not be ascertained. To the observer's surprise, the fimbriate end soon drew back from the surface of the ovary and the tube returned to its old position. The entire process took less than two minutes.

After laparoscopy, curettage was performed; histologic examination showed proliferated mucosa. Fifteen days after this observation, menstruation began.

Elert's observation, confirmed by several colleagues, would indicate that the process of taking up the ovum, in which the fimbriated end of the tube grasps the pole of the ovary, is not an extended one but a matter of only a few minutes and probably is repeated several times during ovulation.

[The process observed by Elert has been noted in animals in which grasping of the ovary by the fimbriated end of a tube is the common way in which an ovum reaches the fallopian tube. If this procedure is normal for humans it may be a factor in sterility in some women in whom the fimbriated end, for some reason such as adhesions, is prevented from reaching the ovary. Also, it is conceivable that if an ovary is enlarged, as by cystic formation, the fimbriated end cannot grasp the ovary. Poor results after some plastic operations on the tubes might thus be explained. For example, if the retained portion of tube is too short to reach the ovary, particularly if there is no fimbriated end, conception may not occur. Clinical experience, however, proves that it is not necessary for the fimbriated end of the tube to surround the ovary for conception to take place. There are numerous instances of pregnancy in the presence of large cysts in ovaries which contain the corpus luteum of pregnancy. Likewise, conception has followed plastic operations where only a small portion of the tube is left. There are occasional pregnancies in which no part of a tube is present and the ovary is separated from the uterine cornu by a considerable distance.—Ed.]

Human Conceptus during First Two Weeks of Gestation is described by John Rock and Arthur T. Hertig⁴ (Brookline, Mass.) on the basis of observations made on human ova obtained from unruptured follicles, fertil-

(4) *Am. J. Obst. & Gynec.* 55:6-17, January, 1948.

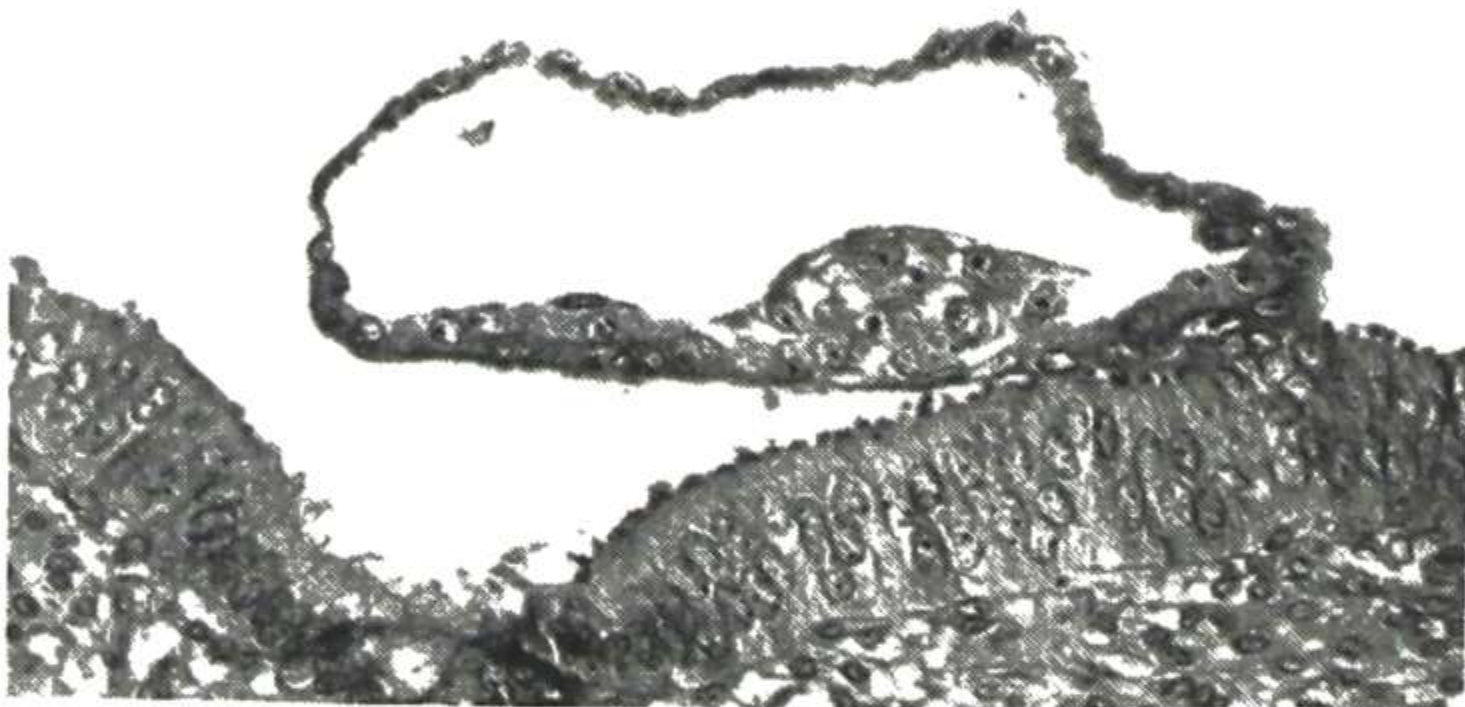
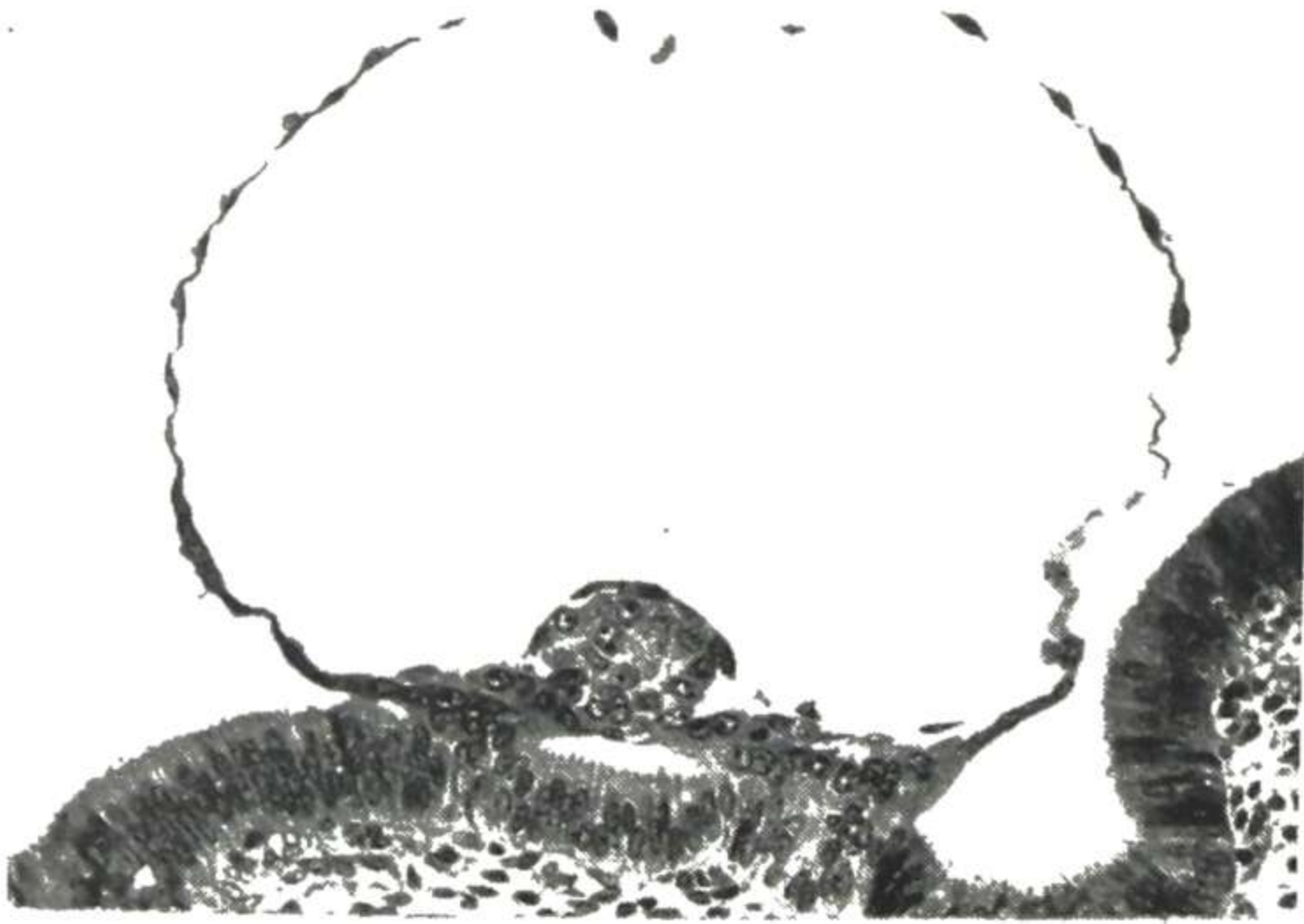
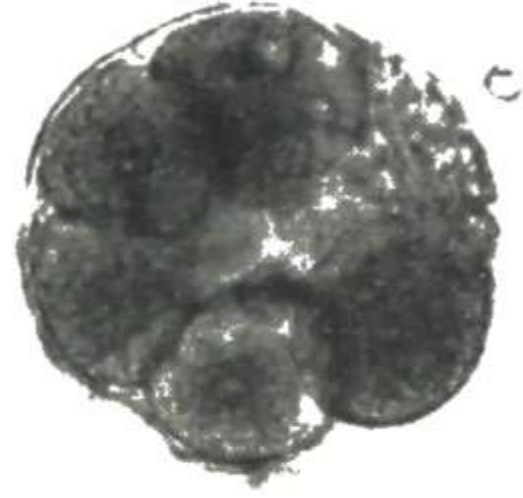
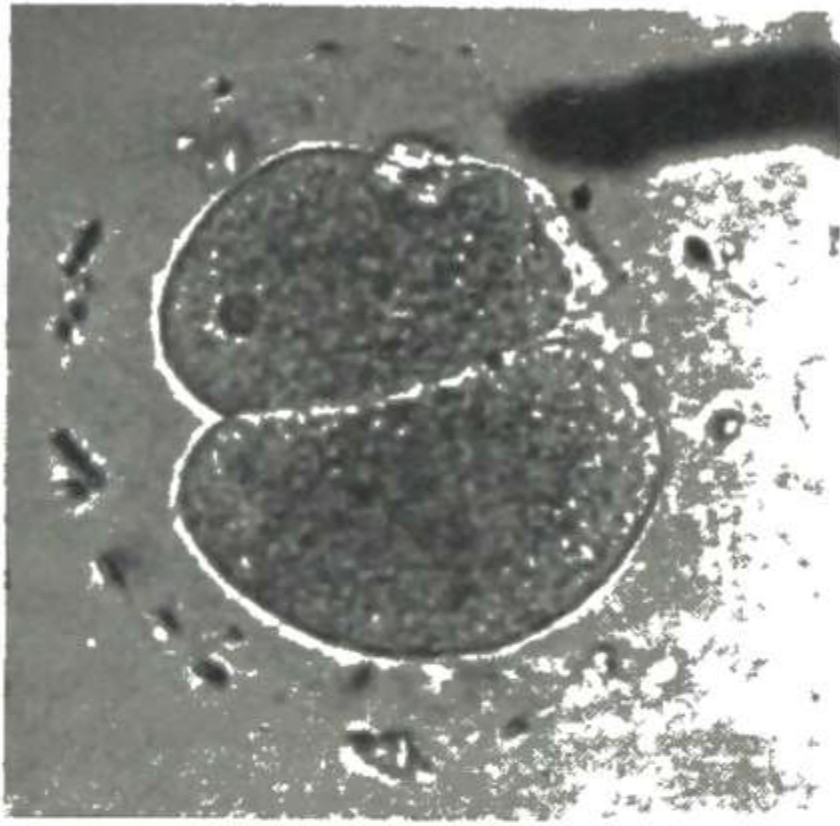


Fig. 5 (top left).—Two cell human conceptus; reduced from $\times 300$. Ovum fertilized in vitro. Two blastomeres, not quite of equal size, each containing single nucleus. One polar body. Several spermatozoa in zona pellucida.

Fig. 6 (top right).—Eight cell human morula; reduced from $\times 300$. Probably abnormal. Carnegie no. 8450.

Fig. 7 (center).—Blastocyst of rhesus monkey, in contact with endometrium;

ized in the laboratory and cultured to the three cell stage, and on 26 specimens collected from uteri removed for various therapeutic reasons.

During the first 48 hours after ovulation the mature egg enters the tube, conjugates therein with the spermatozoon and achieves segmentation into at least two blastomeres (Figs. 5-8). During the next two days division progresses to the eight cell stage, and the egg may reach the uterine cavity on the third day. It does not increase perceptibly in size through the three cell stage. At the eight cell stage the unfixed morula is about one-half again as big as the unfertilized ovum. On about the sixth day, as a blastocyst comprising three differentiated tissues, primitive trophoblast, ectoderm, and endoderm, it makes contact with and begins ingestion of the maternal endometrium.

When nine days old the ovum has become interstitial in the endometrium and has an average diameter of about 0.5 mm. (Figs. 9-11). The embryonic disk, comprising ectoderm and endoderm, is well defined. The amnion is in formation. The larger part of the trophoblast consists of syncytium in which many communicating lacunae have appeared. Entrance has already been made by the syncytium into a maternal sinusoid, thus permitting maternal blood to flood the lacunar system.

When 12 days old the conceptus is almost 1 mm. in diameter; the embryo is about one-tenth as wide and lies in a cavity about five times bigger than itself. This extraembryonic coelom is lined by a network of a fifth tissue, derived from the cytotrophoblast, the extraembryonic mesoblast or mesoderm (not to be confused with

reduced from $\times 200$. Ventral surface of inner cell mass uppermost. Carnegie no. 610.

Fig. 8 (bottom).—Nine day blastocyst of rhesus monkey, beginning its attachment to endometrium; reduced from $\times 300$. Ventral surface of inner cell mass uppermost. Carnegie no. 520.

(Courtesy of Rock, John, and Hertig, Arthur T.: *Am. J. Obst. & Gynec.* 55:6-17, January, 1948; from Chester H. Heuser and George L. Streeter.)

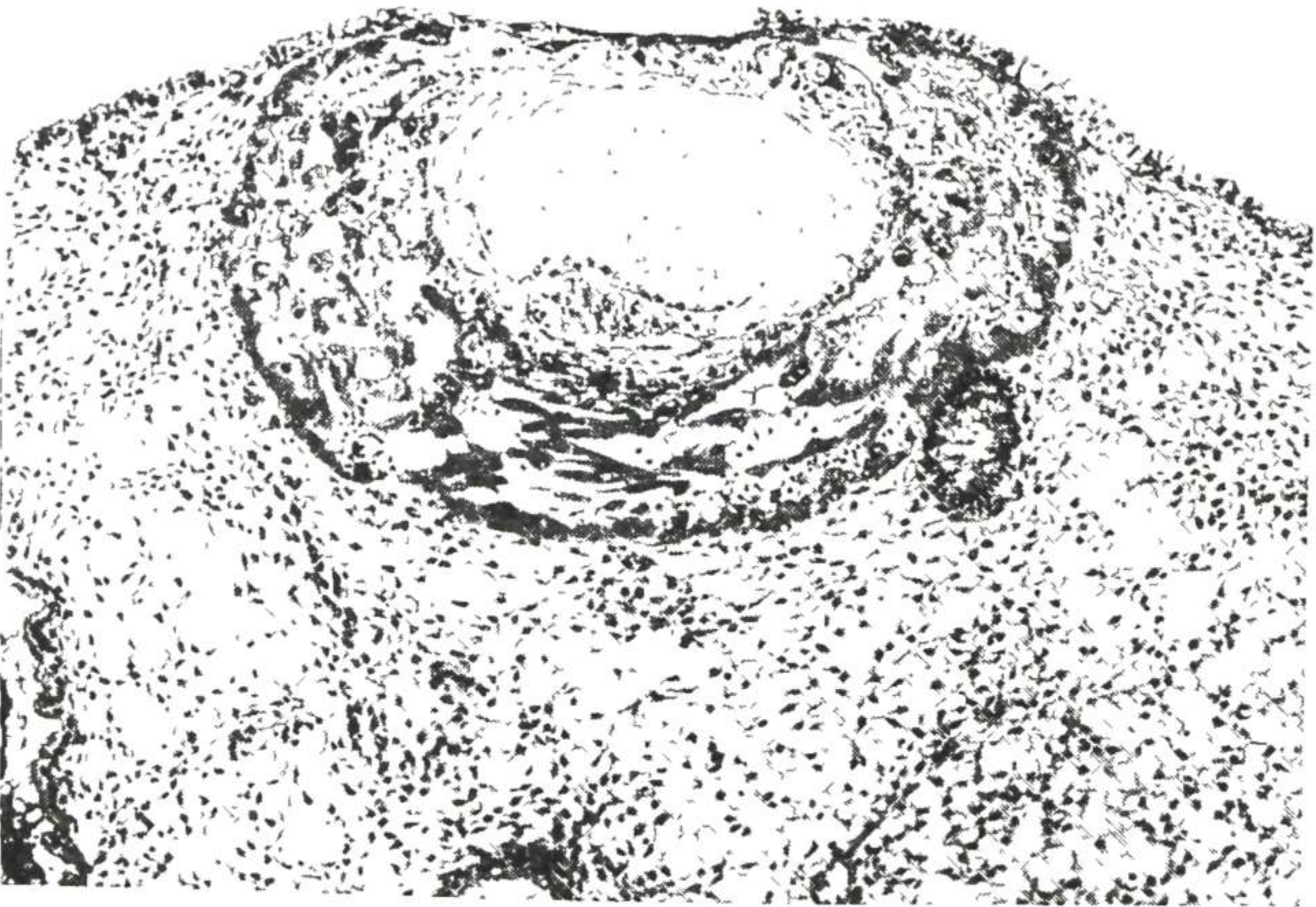
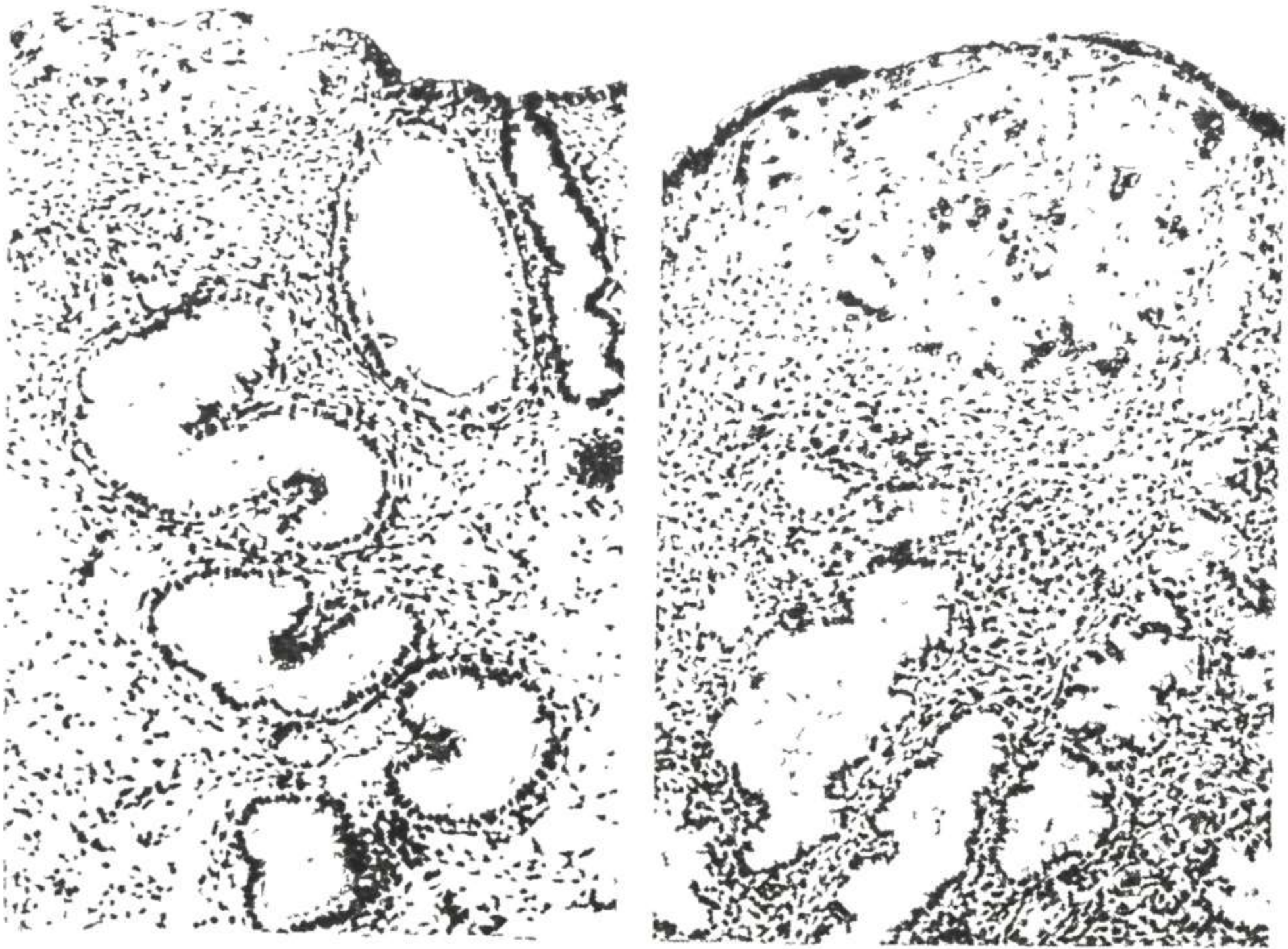


Fig. 9 (top left).—Seven day human conceptus; reduced from $\times 100$. Carnegie no. 8020.
 Fig. 10 (top right).—Nine day human conceptus; reduced from $\times 100$. Carnegie no. 8004.
 Fig. 11 (bottom).—Twelve day human conceptus; reduced from $\times 100$. Carnegie no. 7950.
 (Courtesy of Rock, John, and Hertig, Arthur T.: Am. J. Obst. & Gynec. 55:6-17, January, 1948.)

the actual mesoderm of the embryo, which appears later).

By the fourteenth day the amniotic sac has covered the ectoderm. The mesoblast has formed many extensions from the cavity into the cytotrophoblastic mass and has stretched the proportionately diminishing syncytiotrophoblast into a thin covering layer that then lines the lacunae. In these papillary outgrowths the extraembryonic mesoderm extends to form a supporting structure. Maternal blood fills the lacunar spaces. Endodermal cells have proliferated to form the definitive yolk sac. The conceptus after fixation is from 2 to 3 mm. in diameter.

By the sixteenth day branched villi of mature appearance but without a completed vascular structure are formed. The primitive streak appears on the ventral surface of the ectoderm.

[Before the investigations of Rock and Hertig it was generally believed that the fertilized ovum did not begin to attach itself to the endometrium until the end of the ninth day. We now know that on about the sixth day the ovum makes contact with and begins ingestion of the maternal endometrium. Here I wish to correct another misconception. It has hitherto been believed that the cytotrophoblast or the Langhans cell layer disappears around the sixth or seventh month. G. B. Wislocki and H. S. Bennett (*Am. J. Anat.* 73:335, 1943) found that some of the cytotrophoblast persists until term; this may explain the occurrence of chorionic gonadotrophin at the end of pregnancy. By means of tissue culture studies of human placentas, H. L. Stewart, M. E. Sano and T. L. Montgomery (*J. Clin. Endocrinol.* 8:175, 1948) found that the Langhans cells are the source of chorionic gonadotrophin.—Ed.]

Sterilization Failure with External Migration of Ovum.
Irving F. Stein, Melvin R. Cohen and Ralph Elson⁵
(Michael Reese Hosp., Chicago) report a case.

Woman, 40, gravida III, was first seen in 1938. Appendectomy and right salpingo-oophorectomy had been performed in 1933. On Mar. 17, 1939, her third pregnancy was terminated by low cervical cesarean section, with delivery of her first living child. She again became pregnant in 1943, and a second elective low cervical cesarean section was performed.

(5) *Am. J. Obst. & Gynec.* 55:875-879, May, 1948.

Sterilization was done at this time by catgut ligation of two small loops of the left tube, according to the method of Norman Miller.

The patient was again seen in 1945 complaining of amenorrhea. She was found to be pregnant. Contrary to advice, she had an induced abortion. Subsequently, she returned for repair of a rectovaginal fistula and resterilization. The entire left adnexa were removed because of an ovarian cyst with adhesions to the tube, and the uterus was extirpated.

Examination of the excised tube revealed that it was not patent. Serial sections through the right cornu of the uterus proved the interstitial portion of the right tube to be patent. The ovum, therefore, either before or after fertilization, entered the uterine cavity through the patent interstitial portion of the right tube, arriving there by means of external migration.

[Here is another case in which grasping of the ovary by the fimbriated end of the tube was impossible and yet conception took place. Cases of external migration of the ovum are difficult to explain.—Ed.]

Problem of Innervation of Uterus. Hans Sauter⁶ (Univ. of Zurich) refutes the arguments advanced in support of the hypothesis that the uterine body is innervated by the sympathetic and the cervix by the parasympathetic system. On the basis of investigations with drugs which influence the vegetative nervous system, Sauter demonstrated that the entire uterus, body as well as cervix, receives impulses over both sympathetic systems and that the effect is similar in both segments. The sympathetic system raises the uterine tonus and the parasympathetic decreases it. This suggests that the tonus of the uterus is regulated by the peripheral nerves, whereas the actual pain-producing capacity probably is an autonomous function of the uterus. Sauter emphasizes that it is senseless to use parasympathetic-inhibiting atropine preparations in spasm during the dilatation period, because they will further increase uterine tonus and thus make spasm more severe.

[In a paper read at the Conference of the Committee on Human Reproduction of the National Research Council in New York, on

(6) Schweiz. med. Wchnschr. 78:512-517, May 29, 1948.

Jan. 30-31, 1948, S. R. M. Reynolds, L. M. Hellman and P. Bruns (Obst. & Gynec. Surv. 3:629, 1948) reported that patterns of uterine contractility in women were recorded during the first stage of labor by means of a multichannel tokodynamometer. With this instrument activity in the fundus, midzone of the uterus and lower uterine segment was recorded. These authors found that dilatation of the cervix is associated with a gradient of diminishing physiologic activity from the fundus to the lower uterine segment. Deviation from this pattern was associated with prolongation of labor or prevention of dilatation. It was found that tension in the fundus exceeds that in the cervix by about 3 to 1. Like the effect of tension in skeletal and cardiac tissues, increased force of contraction in the fundus relative to that in the lower uterine segment and in the cervix is favored. The net effect of rupture of the membranes (spontaneous or artificial) is to increase relative tension within the fundus. Reynolds reported one case in which the cervix did not dilate because the entire uterus, including the lower segment, was contracting, whereas only the upper segment should have contracted. In a second case, duration of the contraction in the midzone of the uterus exceeded that of contractions in any other part of the uterus. Hence a functional contraction ring developed every time this portion of the uterus contracted. Reynolds emphasized that the cervix fails to dilate because activity in the fundus does not exceed that in the rest of the uterus.—Ed.]

Clinical and Histopathologic Study of Lesions of Cervix Uteri during Pregnancy is reported by C. F. Fluhmann⁷ (Stanford Univ.) on the basis of 89 specimens obtained from the cervix uteri of women at all stages of gestation. Four were obtained by hysterectomy and the others by removal of a lesion recognized grossly or by biopsy of the cervix.

Gross and histopathologic examination revealed mucous polyps of the cervix in 37, erosion in 32, carcinoma in 10, condyloma acuminata in 5, endometrial polyps in 3 and leukoplakia in 2.

Adenomatous proliferation of the glands was the most striking change in cervical erosion during pregnancy and is probably the basic structure of this lesion. The second characteristic feature was extensive papillary outgrowth (Figs. 12 and 13). Although some of these

(7) Am. J. Obst. & Gynec. 55:133-150, January, 1948.

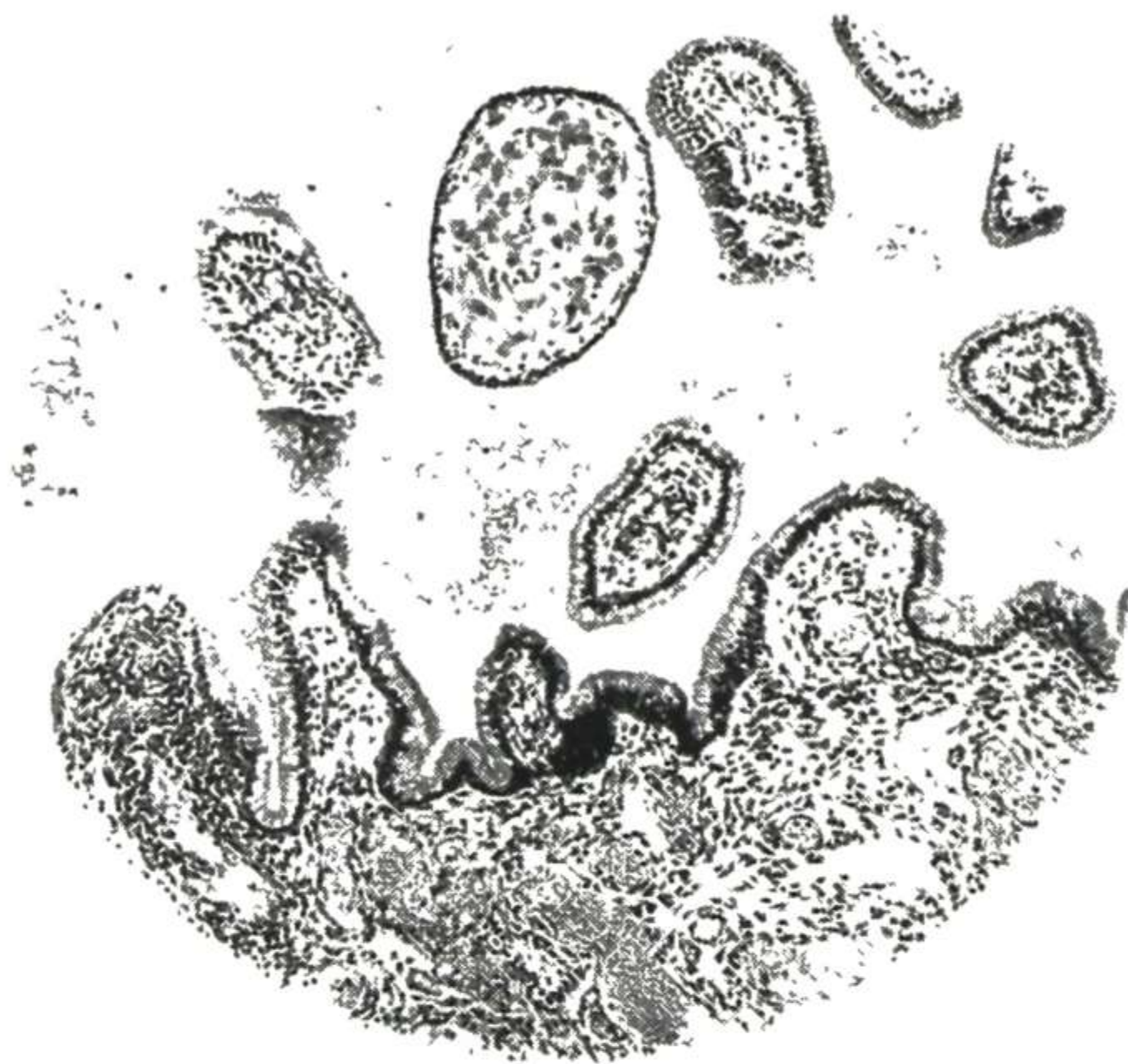


Fig. 12 (top).—Papillary outgrowth in cervical erosion during pregnancy.
Fig. 13 (bottom).—Papillary proliferation in cervical erosion during pregnancy with marked decidual reactions in one projection at upper center.
(Courtesy of Fluhmann, C. F.: *Am. J. Obst. & Gynec.* 55:133-150, January, 1948.)

lesions probably result from an inflammatory condition which may have antedated pregnancy, most cervical erosions during gestation do not result from cervicitis, but are a type of adenoma. There is thus extension of proliferating glands either from the cervical canal or from glands which normally open onto the squamous epithelium of the portio vaginalis.

The evidence is not conclusive, but certain points are considered worthy of emphasis. (1) In a small series, half the patients had a cervical erosion at some time during pregnancy, a proportion much greater than normal. (2) Only one third of patients seen during the first 12 weeks had an erosion, but after this time 59 per cent did have. This observation suggests that erosions appear at about the same time that maximal normal proliferation of the cervical mucosa occurs. (3) Histologic examination of 32 erosions, all of which (except the 4 obtained by hysterectomy) were extensive enough to warrant biopsy, showed extensive cervicitis in only 9 instances.

[In all of Fluhmann's cases there was a definite reason for the removal of a piece of cervix or the entire uterus. The occurrence of 10 carcinomas in these cases reveals the importance of careful study of all abnormal tissue during pregnancy as well as at other times. In contrast to Fluhmann's study is that of McIlrath and Hellestrand (p. 223), who removed pieces of cervix from 77 women at various times during pregnancy, the puerperium and postpartum period. They observed cervical lesions which they believe constituted a definite danger to the mother and increased chances of development of low grade pelvic infection after delivery. They believe that every patient should be inspected at each antepartum visit as faithfully as the blood pressure is taken. With this I do not agree. I believe inspection of the cervix two, or at most three, times during gestation is sufficient. There is no excuse whatever for not exposing the cervix with a speculum at the time of the patient's first visit.—Ed.]

Demonstration by Infra-Red Photography of Superficial Veins in Pregnant and Nonpregnant Woman. Kenneth Bowes, S. H. Riterband and J. E. Andrews⁸ (Lon-

(8) *J. Obst. & Gynaec. Brit. Emp.* 55:285-292, June, 1948.

don) took infra-red photographs of 40 primigravidas, 42 multigravidas and 33 nonpregnant controls. Breast, abdomen, legs and vulva were photographed. Venous changes appeared first and were most marked in the breasts. They occurred as early as the third week of pregnancy and were usually striking by the eighth week. In nonpregnant women no changes were demonstrable during phases of the menstrual cycle. In a typical pregnancy, breast veins increase in number, the main radicles become thicker and photograph with increased density, anastomoses develop between the veins, and in many cases the circumareolar plexus becomes very marked. In general, changes were less marked in patients in whom abortion threatened than in those with normal pregnancy.

The authors used infra-red photographs of the breasts for diagnosis of pregnancy in a group of women. Of the positive results, 53 were correct and 1 incorrect. Of 17 negative results, 12 were correct and 5 incorrect. Infra-red photographs are not accurate enough at present to be used for diagnosis of pregnancy.

Blood Volume in Pregnancy: Critical Review and Preliminary Report of Results with New Technic. Chas. E. McLennan and L. G. Thouin⁹ (Univ. of Utah) used a chromatographic technic for extraction of Evans blue from plasma, and from this value calculated total blood volume by use of the hematocrit reading. Determinations were made on 20 normal pregnant women at term and on the same women seven days after delivery. Ten normal nonpregnant women were used as controls.

At term average value for plasma volume was about 40 per cent greater than plasma volume in controls; total blood volume was 32 per cent greater. Red cell volume rose about 20 per cent, but this change was less significant than that in plasma and total blood volume. A week after delivery blood volume had returned virtually to normal. However, individual variations in blood vol-

(9) Am. J. Obst. & Gynec. 55:189-200, February, 1948.

ume during pregnancy were enormous. Standard deviations were relatively much greater for pregnant women than for controls or postpartum patients.

Seven other women were given Evans blue dye from 25 minutes to 48 hours before delivery of the placenta. Observations indicated that results were not invalidated by transfer of dye across the placental barrier, but the question whether dye might be trapped in the placenta and removed from maternal circulation was not settled.

Ureter in Pregnancy as Tonus Problem in Hormonal Phenomena of Urogenital System. Kurt Stürmer¹ (Univ. of Bonn) calls attention to Hoff's experiments showing that the morphologic changes in the ureteral wall of the pregnant rabbit are caused by female sex hormones. Stürmer's experiments on rabbits showed that follicular and corpus luteum hormones decrease ureteral response to vasopressin. This change in reaction demonstrates the capacity of female sex hormones to reduce tonus. Thus animal experiments confirm Stoeckel's hypothesis that dilatation and hypotony of the human ureter during pregnancy are based on hormonal action.

Present knowledge of the reaction of the urogenital system and the intestines to posterior pituitary extracts is incomplete. Whole pituitary extracts chiefly increase the contractility of hollow muscular organs, depending on their content of oxytocic and vasopressor substances. Antagonism between the two components of the posterior lobe hormone cannot be demonstrated in organs of the urogenital system and intestines. However, urogenital tract organs are more exposed to action of reproductive glands because they are nearer to them. The female sex hormones prepare the ground in organs which respond to them, morphologically and functionally, for the purpose of reproduction. Degree and direction of this change are often only indirectly recognizable in the reaction to stimuli.

(1) Zentralbl. f. Gynak. 69:460-484, 1947.

Best insight into hormonal activity is provided by the ureter: both ovarian hormones decrease tonus of the rabbit ureter and thereby alter its motility and its response to posterior lobe hormones. Clinical and experimental findings justify application of these concepts to human subjects, to explain the origin of pregnancy ureter. However, this possible explanation should not be used to disclaim the influence of gonadotrophic anterior lobe hormone or chorionic gonadotrophin on these phenomena; nature often provides double insurance for important life processes.

Decrease in tonus of the ureteral musculature prepares the ureter for greatly increased urine flow in pregnancy and furnishes protection against eventual mechanical obstructions. This mechanism is also responsible for transition from the physiologic changes of pregnancy to pyelitis.

[I do not agree that hormonal changes constitute the whole or even the chief factor in dilatation of the ureter during pregnancy. If hormones are causative they play only a minor role.

Intravenous urograms made during pregnancy have revealed certain facts. Changes take place in the urinary tract of every pregnant woman. The most constant modifications are dilatation of the pelvis and calices of one or both kidneys, dilatation, tortuosity and kinking of one or both ureters and lateral displacement of these structures. Every gravid woman shows some deviation from the normal, ranging from slight dilatation to a high degree of hydronephrosis and hydroureter; because of this there is stasis of the urine in the dilated portions. The right kidney and ureter are affected more often than the left. The probable reason for this, according to H. Martius (*Zentralbl. f. Gynak.* 65:812, 1941), is that the right kidney is in direct contact with the intestines, whereas the left kidney is separated from the bowel by peritoneum. Furthermore, there is direct lymphatic connection between the right kidney and the colon. Hence, there is a direct path for colon bacilli from the hypotonic bowel to the kidneys; this occurs particularly in constipated women. H. E. Robertson (*Hydronephrosis and Pyelitis of Pregnancy* [Philadelphia: W. B. Saunders Company, 1944]) believes, however, that the more frequent involvement of the right ureter and right renal pelvis may be due to the fact that there is definite inclination of the pregnant uterus to the right side and that the left ureter is

protected by the rectosigmoid. Dilatation occurs later in primiparas than in multiparas but is more pronounced in the former. Dilatation of the ureter always begins at the pelvic brim, never in the pelvic portion of the ureter. Histologic study by J. Hofbauer (Bull. Johns Hopkins Hosp. 42:118, March, 1928) revealed that the most striking change in the urinary tract during pregnancy is decided hypertrophy of the external longitudinal sheath of muscle bundles which encases the lower end of the ureters, the sheath of Waldeyer. As pregnancy progresses, dilatation of the upper urinary tract increases and persists until a few weeks after delivery.—Ed.]

Influences of Posture on Urinary Tract in Pregnancy were studied by John Parks and Michael A. Puzak² (George Washington Univ.). Skiodan was injected into

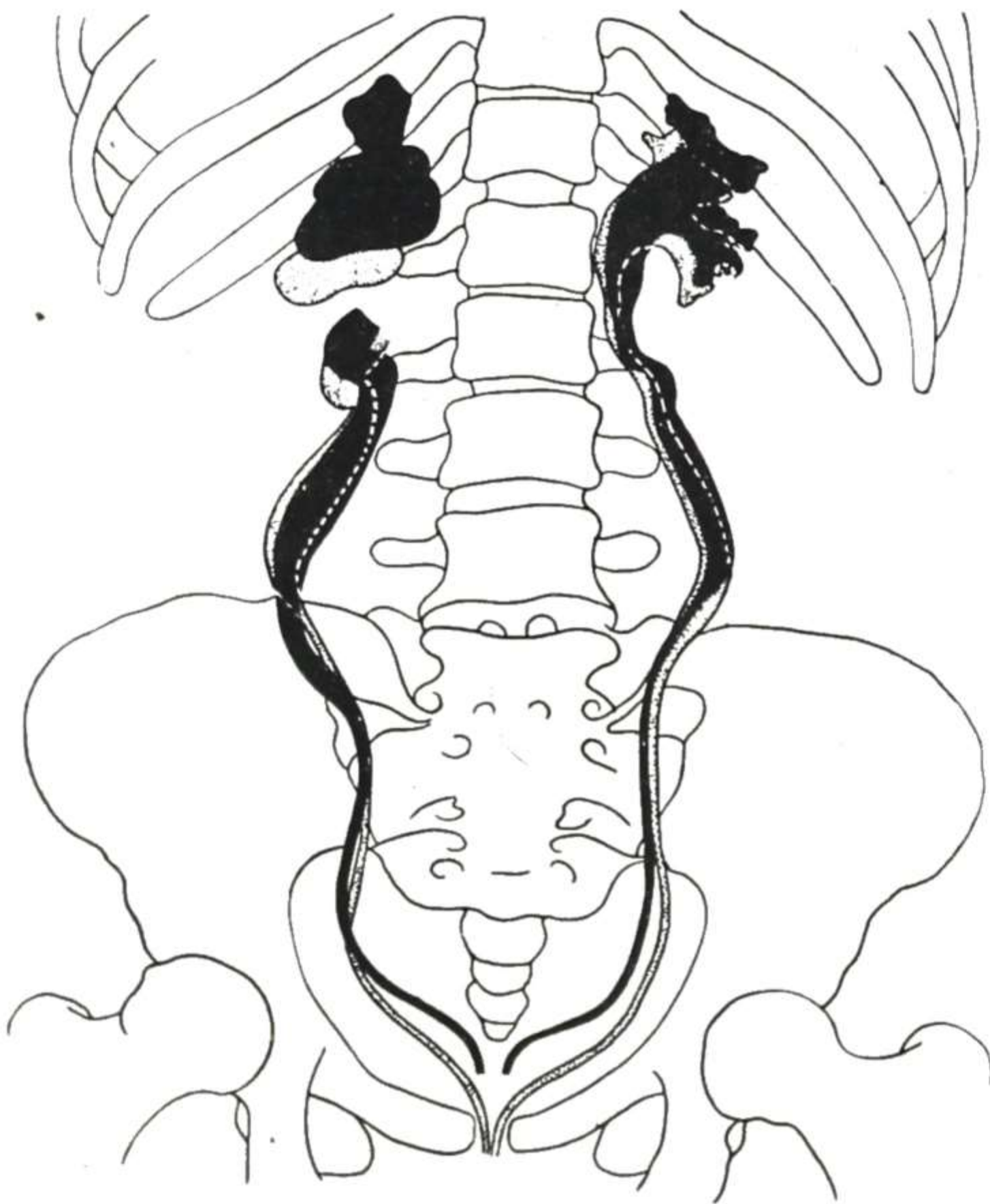


Fig. 14.—Drawing of superimposed pyeloureterograms. Position of kidney pelves and ureters with head of table elevated 15 degrees is shown by dotted outline. Upward movement of ureters brought about by 15 degree elevation of foot of table is illustrated in black. (Courtesy of Parks, John, and Puzak, Michael A.: *Am. J. Obst. & Gynec.* 55:636-645, April, 1948.)

(2) *Am. J. Obst. & Gynec.* 55:636-645, April, 1948.

ureters of pregnant women with pyelonephritis. Pyeloureterograms, taken with the patients in various positions, showed that position of the kidneys and contour of the abdominal ureters were not influenced by posture. Intrauterine attitude of the fetus was not a factor in ureteral dilatation. The pelvic portion of the ureters showed great mobility; upward movement with feet elevated and downward motion with elevation of the head is shown in Figure 14.

A greater degree of dilatation of the right ureter in pyeloureteritis is explained by rotation of the uterus to the right, carrying with it the uterine vessels and Mackenrodt's ligaments and compressing the right ureter. Skiodan in the ureters was eliminated more rapidly when the uterus was displaced upward by elevation of the foot of the bed than when the patient was upright. The authors advise generous fluid intake plus bed rest for 20-45 minutes once or twice daily with hips elevated to avoid prolonged urinary stasis and prevent infection. Patients with pyelonephritis are relieved of much of the pain if the foot of the bed is elevated.

Diagnosis of Pregnancy by Cytologic Criteria in Catheterized Urine. George N. Papanicolaou³ (Cornell Univ.) finds that pregnancy causes distinct morphologic changes in urinary tract epithelium which are reflected in the cytologic picture of a urinary sediment smear. Characteristic cells of the navicular type correspond to those described in the vaginal smear of pregnancy. The vaginal smear method of diagnosing pregnancy did not prove to be of great practical value as a routine diagnostic procedure. The urinary smear is superior in that its cytologic changes show greater uniformity and are more distinctive.

Papanicolaou examined 350 catheterized urine specimens, 38 of which were from pregnant women. All 38 showed changes characteristic of pregnancy. The earli-

(3) Proc. Soc. Exper. Biol. & Med. 67:247-249, February, 1948.

est specimen was from a woman pregnant for 14 weeks and the latest from one pregnant for 7 months. Value of the urinary smear for early diagnosis of pregnancy is still to be determined.

Treatment of Amenorrhea with Progesterone and Its Possible Utilization in Diagnosis of Pregnancy. P. Caffier⁴ (Berlin) used progesterone in 30 cases of amenorrhea. In most, the result was a single episode of menstrual type bleeding. Further bleeding did not occur until another treatment was given. In four cases bleeding recurred spontaneously about four weeks after that produced by progesterone, and in one it recurred twice spontaneously. In only two patients was cyclic bleeding restored after a long interval. In one the bleeding was true menstruation; in the other (amenorrhea from change of climate and environment) there was some question about its nature. These observations led Caffier to regard the effect of progesterone as substitution rather than stimulation. He believes the treatment worth while for all patients in whom amenorrhea causes definite disturbances. These disturbances often disappear with onset of bleeding, even if it is not true menstruation. When amenorrhea causes only psychic depression, he considers the treatment justified. If amenorrhea causes no disturbance, progesterone is not worth while.

Progesterone was administered in 30 cases of normal pregnancy in the second to the fifth month. In no case did bleeding follow. Since in amenorrhea not due to pregnancy, bleeding generally begins within the first five days after injection, it is assumed that the patient is pregnant if bleeding has not appeared by the evening of the fifth day.

Progesterone was administered in three other cases of pregnancy in which bleeding was already present—one of threatened abortion, one of incomplete abortion and one of extrauterine pregnancy. In the first case, in which

(4) Zentralbl. f. Gynak. 69:10-25, 1947.

progesterone was given after cessation of bleeding, no further bleeding ensued. In the second and third cases bleeding followed progesterone administration. Although definite conclusions could not be drawn from two cases, it would appear that in interrupted pregnancy, in contradistinction to intact pregnancy, progesterone causes bleeding or an increase of bleeding.

Pregnancy Test Using Male Batrachia. Studies made on the male toad indicate that gonadotrophin administration stimulates the interstitial cells and spermatogenesis, producing detachment of spermatozoa from the Sertoli cells. Free spermatozoa migrate to the bladder and can be obtained by means of a pipet introduced into the cloaca. This phenomenon has practical application in diagnosis of pregnancy. Carlos Galli-Mainini⁵ (Rivadavia Hosp., Buenos Aires) describes a test using normal male batrachia. Presence of spermatozoa in a drop of toad's urine a few hours after subcutaneous injection of 10 cc. urine from a pregnant woman is considered a positive result.

Reports by various authors using this test in a total of 2,661 cases of suspected pregnancy show 98-100 per cent correct results. Among 1,166 control tests made with urine from nonpregnant subjects, all results were negative. A high percentage of positive reactions occurs within three hours after the injection. If the toad is kept at low temperature, however, it should be observed for 24 hours before the reaction is called negative. Incidence of positive reactions decreases between the sixth and ninth month of pregnancy. The author obtained a positive reaction in two cases of chorioepithelioma and in two of hydatiform mole. The toad's reaction to gonadotrophin stimulation is, to some extent, influenced by the dose, route of administration, temperature and illumination. About 40 I.U. of chorionic gonadotrophin is the minimal dose. A modification of the pregnancy test has

(5) J. A. M. A. 138:121-125, Sept. 11, 1948.

proved useful for quantitative gonadotrophin determinations.

[This paper is a follow-up report of an article published last year (1947 YEAR BOOK OF OBSTETRICS AND GYNECOLOGY, p. 20). In South America there is considerable enthusiasm for the use of frogs, particularly the male, for the diagnosis of pregnancy (O. R. Lima and O. G. Pereira: *An. brasil. de ginec.* 24:245, 1947; M. I. Mello: *Hospital, Rio de Janeiro* 33:57, 1948). F. R. Merchante (*Semana méd.* 55:285, 1948) reviewed 13 biologic methods of determining pregnancy and gave the Galli-Mainini test the highest percentage of accuracy (99.4). In South America recently Galli-Mainini convinced me of the dependability and simplicity of his test. On two occasions I saw sperm in the urine of a male frog one hour after urine from a pregnant woman had been injected.

In the United States there have appeared two reports on the use of the North American male frog, *Rana pipiens*, one by P. B. Wiltberger and D. F. Miller (*Science* 107:198, 1948) and the other by S. L. Robbins and F. A. Parker, Jr. (*Endocrinology* 42:237, 1948), both favorable. In a personal communication A. I. Weisman says that both male and female frogs in all species found in the United States have a breeding season during which the female lays eggs spontaneously and the male extrudes spermatozoa when subjected to any simple manipulation, for example, handling. The animals are reliable as pregnancy indicators only at certain times of the year and at other times give direct false positives. Weisman and C. W. Coates, working at the New York Zoological Garden, are attempting to evaluate amphibians as pregnancy indicators.

G. M. Riley, M. H. Smith and P. Brown (*J. Clin. Endocrinol.* 8:233, 1948) describe a rapid pregnancy test based on hyperemia of the ovaries. Its accuracy was 97.9 per cent. Contrary to several authors, K. J. Karnaky (*Am. J. Obst. & Gynec.* 56:553, 1948) found that stilbestrol, even in large doses, did not produce false negative Friedman tests. S. Bender (*Brit. M. J.* 1:683, 1948) reported that in 105 patients on whom he performed Guterman pregnandiol tests there were 67 correct diagnoses, 34 false negative results and 4 false positive results. He questions whether any test based on pregnandiol excretion is useful in diagnosis of early pregnancy. S. Kullander (*J. Obst. & Gynaec. Brit. Emp.* 55:159, 1948) says that the Guterman test for pregnancy is unreliable as a guide to prognosis in threatened miscarriage.

M. E. Davis and N. W. Fugo (*Proc. Soc. Exper. Biol. & Med.* 66:39, 1947) report a rapid, accurate colorimetric method for quantitative determination of pregnandiol based on the methods of Venning, Talbot and Guterman. They maintain that preg-

nandiol excretion in the last 28 weeks of gestation can be used as a quantitative measure of uteroplacental circulation.

N. Clemetsen (*Acta obst. et gynec. Scandinav.* 27:402, 1948) reports a case of corpus luteum cyst in the ovary of a woman with a positive Aschheim-Zondek test and a clinical picture of ectopic pregnancy. Laparotomy revealed no pregnancy.—Ed.]

Hormonal Test for Fetal Death in Disturbed Pregnancy is described by Bernhard Zondek, Felix Sulman and Ryvka Black⁶ (Rothschild-Hadassah-Univ. Hosp., Jerusalem). With fetal death the first organ to die is the placenta, which ceases to produce gonadotrophin. Cessation of placental function may be established by titration of the patient's urine for presence of the factor producing hyperemia in the rat ovary (hyperemia titration test).

TECHNIC.—Rats must be tested for sensitivity to chorionic gonadotrophin, since rats differ in response. According to sensitivity of the strain, greater or smaller amounts of urine are used. The authors use four infantile rats (Jerusalem strain). All injections are given subcutaneously. Rat 1 receives two injections of 2 cc. urine at one hour intervals; rat 2, two injections of 1 cc.; rat 3, two injections of 0.5 cc., and rat 4, two injections of 0.1 cc. Thus the four rats receive 4, 2, 1 and 0.2 cc. urine, respectively, corresponding to titers of 250, 500, 1,000 and 5,000 hyperemia units per L. The test must be read not less than eight hours after injections. The rats are killed with ether, chloroform or illuminating gas. In opening the rats, internal bleeding must be carefully avoided. Color of the positive ovaries should be red and resemble that of the kidney, liver or spleen. A control reading must be made a few minutes after the first reading.

If all four rats show a positive reaction, the fetus is alive. If rat 4 shows a negative reaction, the life of the fetus is in danger. A negative reaction in rat 3 usually denotes fetal death, and a negative reaction in rat 2 indicates with certainty that the fetus is dead. In all cases the tests should be repeated at weekly intervals. The margin of error is only 1 per cent.

In the 40-80 days after implantation of the ovum, during which there is increased hormone production (peak

(6) *J. A. M. A.* 136:965-969, Apr. 10, 1948.

period), the fetus may be dead even though all four rats react positively. A negative reaction, therefore, in any rat indicates certain fetal death.

During the last months of pregnancy the gonadotrophin titer is less constant. In case of a negative Aschheim-Zondek test, the authors recommend that the blood estrone level be determined before fetal death is diagnosed. In absence of fetal heart tones in the final months of pregnancy, laboratory procedures may be useful in diagnosis of fetal death.

Failure of Prostigmine to Affect Uterine Bleeding in Rhesus Monkey. The efficacy of Prostigmine as an emmenagogue and as a presumptive test for pregnancy is without experimental or critical clinical verification, according to Irwin H. Kaiser⁷ (Carnegie Inst. of Washington). He performed 70 experiments on castrate rhesus monkeys receiving hormone stimulation. Prostigmine was given in doses of 0.38 mg. (0.75 cc. of 1:2,000 solution), which corresponds to 10-12 times the recommended dose for humans. Prostigmine did not induce bleeding during Amniotin administration. When given after courses of Amniotin or Amniotin and progesterone it did not accelerate or delay the expected hormone withdrawal bleeding. When given during courses of large doses of Amniotin which had followed Amniotin-progesterone priming, Prostigmine did not induce bleeding, and when given after these large doses of estrogen were stopped, it did not accelerate or delay onset of bleeding. At no time did administration of Prostigmine prolong or shorten the bleeding period.

Administration of Prostigmine to a group of healthy female monkeys during the usual summer period of spontaneous amenorrhea did not produce bleeding, except in those treated in July after brief periods of delay in menstruating. Two animals with longer periods of amenorrhea bled the day after the first dose of Prostigmine.

(7) Am. J. Obst. & Gynec. 56:664-672, October, 1948.

[Kaiser concludes that the supposed theoretical basis for the use of Prostigmine in human amenorrhea cannot be accepted. Its efficacy as an emmenagogue and as a presumptive test for pregnancy is without experimental or clinical verification. However, inasmuch as there is reason to believe that this drug has some effect in the human being there is a need for critical study of its effect on human amenorrhea.—Ed.]

Nutrition of Pregnant Women in Relation to Malformations of Newborn. From reported clinical and experimental data and from his own observations, S. van Creveld⁸ (Amsterdam) concludes that there is a relation between prenatal diet and congenital malformations.

As a possible instance he cites the case of a baby with partial cleft palate, micrognathia and partial syntarsalia of the second and third toes on both sides. The parents and an older child were normal, and there were no congenital malformations in the family. During pregnancy with the malformed child the mother's diet had been deficient in protein, fruit, butter and fat.

The effect of insufficient diet during the occupation in Holland cannot yet be evaluated, but Creveld stresses the following facts: (1) the high mortality rate of full term and premature children, which might be ascribed partly to congenital inferiority; (2) the large number of premature births; (3) the impression that cases of certain congenital malformations have increased, especially of fibrosis of the pancreas and of rachischisis.

Indications are that certain noxious consequences of malnutrition may occur especially during the latter part of pregnancy.

[J. Warkany (Conference of Committee on Human Reproduction, Obst. & Gynec. Surv. 3:693, 1948) emphasizes that until recently it was believed that mammalian fetuses and embryos grow and develop as parasites in the maternal organism and obtain the required nutritional elements from the mother's body. If the maternal tissues are completely exhausted the fetus dies, but as long as the mother is in a good nutritional state her diet should not influence the unborn young. Is this thesis tenable in the

(8) *Gynaecologia* 124:299-312, November, 1947.

light of recent experimental and clinical observations? Observations on animals demonstrate that different species react in different ways to nutritional deficiency. We therefore should not take it for granted that results of animal experiments necessarily apply to human beings. Maternal nutrition is only one factor influencing human reproduction, and we are not justified in making it responsible for all forms of failure. The fact that in rats a malformation can be produced under certain conditions by a dietary deficiency of the mother does not mean that this malformation is always caused by a maternal nutritional deficiency. For example, J. Warkany and C. B. Roth (*J. Nutrition* 35:1, 1948) induced congenital abnormalities in the offspring of female rats reared and bred on diets deficient in vitamin A. The abnormalities are different from those induced by maternal riboflavin deficiency. Warkany emphasizes that the same results may be due to different causes. Animal experiments have shown that it is dangerous to make general positive statements about the relationship of maternal nutrition to reproductive failure, but it is equally dangerous to make sweeping negative statements. Warkany cites the familiar statement that dietary deficiency of the mother leads either to intrauterine death or to the birth of normal young, and that injury to the offspring or malformations cannot be produced by dietary restriction in the mother. We have learned that the young of deficient mothers may appear normal, but that does not mean that they are normal. Visualization of the skeletons or histologic examination may show anomalies which evade superficial observation.—Ed.]

Reduction of Maternal and Infant Morbidity and Mortality through Controlled Nutrition. According to Ralph Luikart⁹ (Creighton Univ.) a direct relation exists between incidence of toxemia of pregnancy and weight increase during this period. In 1946 he reported that of 1,000 obstetric patients who controlled their weight, none had toxemia. There was no maternal mortality, and fetal mortality was 0.6 per cent. Since then he has placed over 400 obstetric patients on controlled nutrition. In this series fetal mortality was 0.23 per cent; the only fetal death occurred in a breech delivery.

The most important foods are the proteins, which repair the mother's waste tissue and contribute to forma-

(9) *Texas State J. Med.* 44:295-298, August, 1948.

tion of new tissue for fetal growth. Clinical and experimental reports indicate that during pregnancy the additional protein requirement is 20-30 Gm. daily. In addition to supplying essential amino acids, proteins are needed to maintain a serum protein level consistent with normal osmotic pressure to prevent edema. Among Luikart's last 61 patients with Rh-negative blood, all of whom were on high protein diet, there was no fetal or maternal mortality and no erythroblastosis. He believes that the protein had a protecting influence on the livers of the babies which prevented damage from Rh agglutinins.

Weight gain may indicate excessive caloric intake or may be due to an electrolyte disturbance, resulting in fluid retention. A sudden weight increase may call for further dietary reduction, thyroid medication or sodium restriction. To dull a voracious appetite, Dexedrine Sulfate, 5 mg. three times daily, is given. Vitamins and minerals are included in the diet to prevent anemia and secure absorption of the necessary elements for growth.

Nutrition in Pregnancy, according to Dugald Baird¹ (Univ. of Aberdeen), influences wastage of maternal and fetal life. A good mixed diet of meat, fish, eggs, milk, vegetables and fruit will supply all that is required during pregnancy. When the diet is deficient in quality or quantity or both there will be a high incidence of maternal ill health during pregnancy, including pre-eclamptic toxemia, and more premature labors, stillbirths and infants of poor vitality. There will also be less chance of lactation's being sustained.

Weight gain varies within wide limits—some women gain nothing or "lose" 40 lb. or more. The expected gain is almost 30 lb., which includes 7 lb. dry matter and 23 lb. water, of which 60 per cent is free fluid. Great differences in weight gain are possibly due to differences in the amount of water retained.

There is no justification for reducing diet during preg-

(1) Practitioner 160:34-40, January, 1948.

nancy in an attempt to produce a smaller baby. Harm may be done by undermining the mother's strength and causing devitalization of the child.

The striking fall in the stillbirth rate in Britain during the war years affected all age groups and parities except elderly multiparas. Evidence suggests that the fall was largely the result of improvement in the quality of expectant mothers' diet, i.e., more milk, national bread, more vitamins and an increased awareness of the importance of good nutrition during pregnancy.

Nutritional Requirements during Pregnancy and Lactation are summarized by Bertha S. Burke and Harold C. Stuart² (Harvard Univ.). The earliest report of a large series of cases which demonstrated a relationship between maternal diet and the course and outcome of pregnancy was published in 1942. This and subsequent studies have shown significant reduction in incidence of abortions, premature births, stillbirths and neonatal deaths among patients given dietary supplements. During the recent period of starvation in Holland, 50 per cent of women had amenorrhea and birth rates dropped greatly.

Presence or absence of adequate riboflavin between the thirteenth and fifteenth days of gestation in the rat has been shown to be a decisive factor in development of the embryo skeleton. Vitamin D deficiency results in entirely different malformations. In the rat certain congenital defects of the eye result when maternal diet is deficient in vitamin A. Thus far, however, no one has proved a relationship between congenital malformations in man and maternal nutritional deficiency. However, if experimental observations can be applied to man, it is important that diet be adequate during early weeks of pregnancy, even before diagnosis of pregnancy is established.

As pregnancy advances, requirements for protein, minerals, and vitamins increase in some instances 100 per

(2) J. A. M. A. 137:119-128, May 8, 1948.

cent, whereas at no time does calorie requirement increase more than about 20 per cent. It is estimated that the pregnant woman should gain 20-25 lb. above her ideal weight. Though large weight gains in pregnancy are associated with high birth weights, the child's weight does not affect duration of labor.

During pregnancy a woman stores 1,250-2,500 Gm. protein (200-400 Gm. nitrogen) in addition to that necessary if she were not pregnant. These figures represent a 10-20 Gm. increase in daily protein requirement during the late months of pregnancy. During lactation 1-1.5 Gm. nitrogen is lost daily in milk. Diets containing less than 75 Gm. protein during the latter part of pregnancy result in infants who are short and light weight. Some evidence suggests that toxemia is more frequent among chronically malnourished than among well nourished women and that protein is one of the factors most often deficient.

Milk should be depended on to supply calcium and phosphorus needed during pregnancy. Iron tablets should be given if hypochromic anemia exists, but iron is supplied in small quantities by most meats, vegetables, fruits and grains. Vitamin A is supplied by dairy products and yellow and green vegetables. Vitamin B deficiency, which may be induced by dietary deficiency of meat, vegetables and grains or by vomiting, may lead to polyneuritis of pregnancy. The 100 mg. ascorbic acid recommended for daily consumption during pregnancy is supplied by 8 oz. orange juice or by other citrus fruits or vegetables. It has yet to be proved that vitamin E is necessary for man. Since vitamin K is synthesized by intestinal bacteria it is doubtful that vitamin K deficiency is common in man. If vitamin K deficiency existed in the mother, however, it might be expected to exist in the fetus and to predispose to intracranial hemorrhage at birth.

The Food and Nutrition Board of the National Research Council recommends that daily diet during preg-

nancy include 1 qt. milk, 4 oz. meat, 1 egg, 2 oranges, 2 vegetables, 4 slices of bread, 2 tablespoons of butter and 400 I.U. vitamin D. Throughout lactation another pint of milk should be added daily to the diet used during pregnancy.

Clinical Significance of Nutritional Deficiencies in Pregnancy. Winslow T. Tompkins³ (Pennsylvania Hosp.) administered a 2,200 calorie diet containing 110 Gm. protein, 85 Gm. fat and 300 Gm. carbohydrate to 593 women during pregnancy. Intensive and persistent dietary instructions were given. Food intake was divided into six small meals daily. Constant effort was directed to provide adequate protein. Fruits, fruit juices, pastry, ice cream and nuts were restricted and were permitted only after essential nutrients had been taken, never in place of them. Fluid intake was restricted to 8 glasses a day. Tompkins found that fluid intake had exceeded this amount by 50 per cent in every pregnant patient with persistent edema. Except when excessive salt intake was demonstrated, salt was not restricted, because low salt diets are unpalatable. Basic diet outlined was altered, of course, for very large or very small patients.

Symptoms and/or signs attributed to vitamin deficiency were common. Glossitis was found in 98 per cent and polyneuritis (pain and weakness in legs) in 54 per cent. Gingivitis was found in 82 per cent and was attributed to subclinical scurvy. Vitamin A deficiency was common. Parenteral administration of vitamin B complex rapidly alleviated a syndrome characterized by fatigue, lassitude, mild depression and hypotonia seen in the middle and latter part of the second trimester. It was thought that this syndrome resulted from absorptive failure in the gastrointestinal tract. Pregnancy thus demonstrates that adequate intake of food in no way guarantees optimal absorption, utilization or storage. These observations also clearly indicate that during pregnancy requirements

(3) Bull. New York Acad. Med. 24:376-388, June, 1948.

for the known vitamins are comparatively high. Importance of vitamin supplementation with a relatively high potency polyvitamin concentrate is apparent.

Iron alone was rarely of value in the anemias of pregnancy. Anemia usually responded to adequate diet plus whole liver with or without iron. Most of the anemias of pregnancy are typically nutritional anemias. Folic acid was of value only in the uncommon macrocytic anemia of pregnancy. Hemoglobin levels correlated directly with protein intake. So-called physiologic hydremia of pregnancy is a manifestation of hypoproteinemia and is abolished by adequate protein intake.

Tompkins believes that so-called toxemias of pregnancy represent a nutritional deficiency state. Although pre-eclampsia occurred in 1.56 per cent of 772 control patients and eclampsia in 0.13 per cent, neither pre-eclampsia nor eclampsia was seen in the 593 patients in the research group. In the control group total infant mortality was 26 per cent higher than in the research group. Stillbirth rate was 38 per cent higher in the control group, neonatal death rate 15 per cent higher and prematurity rate 70 per cent higher. These figures suggest that adequate nutrition plays a major role in prevention of infant mortality.

Relation of Mothers' Diets to Status of Infants at Birth and in Infancy was studied by L. W. Sontag and Janet Wines¹ (Antioch College).

METHOD.—Dietary records were obtained for 205 mothers, each pregnant woman being asked to record daily the exact foods she had consumed and as nearly as possible the exact amounts. The mothers were divided into five groups according to average daily protein intake: 85 Gm. or more; 70-85 Gm.; 55-70 Gm. and under 45 Gm. per day.

Measurements of infants were taken at birth and at 1, 6 and 12 months as follows: weight, crown-heel length and number of ossification centers. Infants' mean birth weights and birth lengths were calculated for each protein group. Significance of the difference between the means for the highest and low-

(1) *Am. J. Obst. & Gynec.* 54:994-1003, December, 1947.

est protein groups was tested. This same procedure was applied to weight and length at 1, 6 and 12 months. Number of ossification centers for each protein group at each age was similarly studied.

No relationship could be demonstrated unequivocally between infants' length, weight or ossification and mothers' protein intake during pregnancy. The authors do not conclude that protein intake has no effect on the infant's status at birth or during the first year, but rather that protein intake must fall below the levels found in their groups before the effect is clearly demonstrable.

[A large amount of literature has been devoted to the effect of maternal malnutrition on offspring. H. Vignes (*Rev. de path. comparée* 46:159, 1946) has summarized his experiences in Paris during the war and maintains that undernourishment favored abortion and premature labor, increased the number of babies with less than average weight and shortened duration of labor. Contrary to experiences in Germany during World War I, the number of cases of toxemia increased. M. Repetti (*Folia gynaec.* 42:21, 1947) studied 6,000 patients before, during and after the war and found a considerable increase during the war in complications of labor, such as obstetric interventions, prolonged second stage and uterine inertia, and complications in delivery of the placenta. There was a pronounced increase of premature labors, of babies weighing less than 3 kg. and of puerperal disturbances. Incidence of toxemia and fetal gigantism decreased. The author believes that increased frequency of complications was due to nutritional disturbances and factors such as heightened emotion and overwork. He maintains that maternal undernutrition is a vital factor in the baby's health not only immediately after birth but for four or five years afterward. On the other hand, C. A. Smith and H. C. Stuart (*Am. J. Pub. Health* 38:369, 1948) say: "Our experience indicates that no satisfactory methods are yet available for the exact appraisal of nutritional status in individual pregnant and puerperal women and in individual newborn infants." Likewise, E. Obermer (*J. Obst. & Gynaec. Brit. Emp.* 55:142, 1948) presents evidence against the validity of claims that calcium and phosphorus deficiency during pregnancy results in prematurity and that the feeding of calcium and/or phosphorus supplements results in post-maturity, premature calcification and excessive size of fetal head with inadequate molding and increased density of fetal bones. W. J. Dieckmann and his 11 associates (*Conference of Committee on Human Reproduction, Obst. & Gynec. Surv.* 3:731, 1948) main-

tain that reports of the value of an adequate amount of proper foods in pregnancy show major inconsistency. They say that no one questions the fact that a healthy mother is more likely to give birth to a healthy infant. Good health is associated with a sufficient diet, but there is a difference of opinion as to what constitutes such a diet. If a proper diet is found to be important in pregnancy, it will be necessary to instruct the pregnant woman and supply the actual food supplement in many cases. Methods of determining whether the patient is following dietary instructions will be required.—Ed.]

Travel in Pregnancy. William B. Beach, Jr.² (Univ. of Chicago) studied 719 pregnancies to determine whether traveling had a harmful effect.

Among 361 women who had done no traveling in pregnancy, abortion occurred in 24 and was threatened in 10 others. Among 358 women who had traveled during pregnancy, abortion occurred in 17. In two others threatened abortions were probably the result of a trip, but the pregnancies went on to term. In the 17 abortions, only six of the patients had traveled near enough to time of onset of symptoms for travel to be a possible factor. Hence, in only 8 (2.2 per cent) of 358 patients who traveled could the trip have been a factor in threatening or producing abortion. In only four (1.1 per cent) could the trip be considered the immediate precipitating factor. Two of the four (0.6 per cent) actually aborted, the other two going on to term.

From the extent of traveling done in all stages of pregnancy without complications, Beach concludes that travel is not harmful in most cases.

[During the last war women in all stages of pregnancy traveled in airplanes, trains, buses, old automobiles and other conveyances. Many trips were distinctly rugged, yet there was no apparent effect on pregnancy.—Ed.]

Fear, an Important Etiologic Factor in Obstetric Problems, is discussed by Howard C. Walser³ (Detroit). Fear leading to tension can disrupt the reproductive

(2) *Am. J. Obst. & Gynec.* 54:1054-1057, December, 1947.

(3) *Ibid.* 55:799-805, May, 1948.

function in various ways. It has been shown that many women are unconsciously aware of the time of ovulation. This, combined with fears of pregnancy, cause certain women to abstain from coitus during ovulation, with resulting infertility. Habitual abortion is a type of infertility often due to this same mechanism. At times of great disaster there is an increased rate of miscarriage and premature labor. It has been observed that if a physician announces his vacation in advance, certain patients will go into premature labor. These instances well illustrate the effect of neurogenic impulses on pregnancy.

Walser suggests a possible mechanism for production of toxemia. Fear and anxiety may produce angiospasm, vagal depression and hypertension. The anxious patient may overeat, gain weight and develop a full blown toxemia. Some cases of rigid cervix may be of psychogenic origin. Many times, with frequent strong contractions, cervical dilatation is at a standstill. Under small doses of hypnotics, however, the cervix seems to melt away. The obstetrician should thwart the effects of fear by establishing rapport with his patient. He should answer all questions simply and encouragingly.

[The effect of the mind on human afflictions has been known from time immemorial. The term psychosomatic appears in the literature on all branches of medicine. Walser mentions patients who go into premature labor when they learn that their obstetrician is about to leave town. I have observed this and also the reverse, namely, that occasionally a patient determines to hold on to a pregnancy until her obstetrician returns, and goes into labor the day he comes back. Of course, all of this may be fortuitous. I do believe, however, that fear plays a great role in preventing adequate dilatation of the cervix in some instances.—Ed.]

ABORTION

Decidual Bleeding in Pregnancy. Bleeding during early pregnancy frequently presents a puzzling diagnostic problem. Tentative diagnoses are usually those of threatened abortion, premature separation, low implan-

tation of the placenta or placenta previa. H. A. Power⁴ (Univ. of Pittsburgh) reports 13 cases in which bleeding occurred during the first four to five months of pregnancy, but the presence of none of these disease conditions could be confirmed. However, gross evidence of an unhealthy decidua was found in all cases. The pathologic involvement consisted of degeneration with leukocytic infiltration of portions of the decidua vera, and often a plaque of decidua was found intimately adherent to the maternal surface of the membranes. Seven patients were in the second and six in the third decade; there were five primigravidas and eight multigravidas. Menstrual history was abnormal in 50 per cent of cases. Bleeding occurred in varying amounts, from slight to moderately profuse, in all patients, and was accompanied by cramps and definite uterine contractions in four instances. Onset of the latter symptoms was a poor prognostic sign; the four patients so afflicted aborted in four to six weeks thereafter. Onset of symptoms began at 4-10 weeks in 11 patients and at 12 weeks in 2. There were three stillbirths in the series, a fetal mortality of 33 per cent.

One patient was fully ambulatory without any therapy, five were on bed rest alone, and the remaining seven were kept in bed and given estrogen and progesterone therapy. However, final outcome of the pregnancies depended on extent of decidual degeneration. The value of endocrine therapy is questionable.

[Slight bleeding at the time of the first missed menstrual period is not infrequent. This is most probably associated with implantation of the fertilized ovum. Nevertheless, patients who have such bleeding should be put to bed. It is at this time that an abortion can readily occur because the connection between the young ovum and the decidua is not firm. Power speaks of "unhealthy" decidua. I wonder whether the leukocytic infiltration of the pieces of decidua which he examined did not occur after rather than before some disturbance arose. If the decidua had been unhealthy for some

(4) Am. J. Obst. & Gynec. 56:743-750, October, 1948.

time, the pregnancy would almost certainly have been interrupted. We must remember that placenta previa not infrequently causes spontaneous abortion.—Ed.]

Preservation of Threatened Pregnancy with Particular Reference to Use of Diethylstilbestrol. Gordon Rosenblum and Eugene Melinkoff⁵ (Cedars of Lebanon Hosp., Los Angeles) studied 96 cases of threatened abortion, habitual abortion or threatened premature labor.

At onset of symptoms of threatened abortion the patient was ordered to bed and given 5-25 mg. diethylstilbestrol by mouth. While symptoms persisted 25 mg. was given every hour; some patients received as much as 200 mg. in 24 hours. As soon as cramps and bleeding

CONDITION	STILBESTROL		PROGESTOGENS	
	No.	Carried, %	No.	Carried, %
Threatened abortion	81	86.6	86	65.1
Habitual abortion	10	50.0	7	28.6
Threatened premature labor	4	75.0	1	0

were controlled, dosage was gradually dropped to 5 mg. three times a day. Early in the study this was continued to the thirty-sixth week of gestation; later it was stopped about the twentieth week in the belief that under normal circumstances the placenta was well developed and functioning at that time.

In treatment of threatened premature labor 25 mg. was given initially and every hour until contractions ceased. Diethylstilbestrol, 5 mg. three times a day, was continued up to 36 weeks.

Habitual abortion was treated by administration of stilbestrol 5 mg. three times a day from early pregnancy to the twentieth week, at which time dosage was raised 5 mg. each week to the thirty-sixth week and then discontinued. Physical activities were not restricted.

No ill effects were noted from dosages as high as 150-200 mg. daily. On the contrary, many patients reported a feeling of well-being.

(5) West. J. Surg. 55:597-603, November, 1947.

Results in this group are compared with results in 94 patients treated with progestogens and bed rest just before this study was begun (see Table).

Results were more favorable with stilbestrol than with any type of treatment used previously. No harmful effects were encountered.

[The basis for diethylstilbestrol therapy in threatened abortion is the investigation of O. W. Smith, G. V. Smith and S. Schiller (J. Clin. Endocrinol. 1:461, 1941), who claimed that stilbestrol causes increased secretion of progesterone in human pregnancy, probably by the placental syncytium, as a result of increased utilization of chorionic gonadotrophin. Stilbestrol is given in cases of threatened abortion, not because it is estrogenic, but because it stimulates secretion of estrogen and progesterone. Not everyone agrees that stilbestrol stimulates secretion of progesterone.—Ed.]

Some Aspects of Habitual Abortion. E. Delfs and G. E. Seegar Jones⁶ (Johns Hopkins Univ.) studied 39 patients (43 pregnancies) who had had three or more consecutive abortions. Various deficiencies were encountered. The most common was low thyroid function, present in 31 (72 per cent) of the 43 cases and the sole factor in 19 (44 per cent). Progesterone deficiency was found in 12 and vitamin E deficiency in 7, these deficiencies usually being associated with others.

Treatment was based on the demonstrated deficiencies in each case, thyroid, Progesterol or vitamin E being given as indicated. Most of the women were under supervision before or very early in pregnancy. Whereas before treatment only 12 of 155 pregnancies had been successful (7.7 per cent), after treatment 29 of 43 (67.4 per cent) were successful.

[In treatment of habitual abortion I use stilbestrol and thyroid but not vitamin E. O. W. Smith obtained excellent results with stilbestrol therapy in cases of habitual, or, as she calls them, chronic, abortion. Habitual aborters may be given small doses of stilbestrol during the cycle of conception as recommended by G. V. Smith (New England J. Med. 230:339, 1944) for the purpose of stimulating better luteal secretion and thereby providing a more normal

(6) South. M. J. 41:809-819, September, 1948.

maternal environment from the start. In all cases of habitual abortion both the woman and her husband should have basal metabolism tests. If the rates are low, thyroid extract should be prescribed before and after conception. E. Sachs (*Therapeutic Problems of Today* [Jerusalem: Teva Ltd., 1948]) believes that in some women delay in onset of cyclic bleeding means not delayed menstruation but very early abortion. Often such women are not sterile but belong to the group of habitual aborters who cannot carry a fertilized ovum to the end of gestation. Sachs calls this condition "pseudosterility." He has cured several patients by prescribing progestin on the day bleeding was supposed to begin. I hope that Sachs will try to determine whether these women lack progesterone before he institutes this therapy.—Ed.]

Cervical Pregnancy. Daniel Dougal⁷ (Manchester, England) reports a case.

Woman, 39, had had hemorrhagic vaginal discharge for eight weeks beginning on expected date of menstruation. She did not appear to have lost much blood. On palpation, the cervix was found to be the seat of a friable "proliferative" growth, which bled freely. The body of the uterus was of normal size, firm and in anteverted position. Diagnosis was carcinoma of the vaginal cervix, stage 1. The uterus, both uterine appendages and a number of lymph nodes were removed by Wertheim operation.

Examination of the specimen showed a dark red or black mass of tissue in the cervix attached mainly to the anterior and left lateral aspects of the cervical canal and protruding between the separated and somewhat thinned out anterior and posterior lips. The mass was friable, necrotic and grossly infected. Microscopic examination showed fibrinous deposits, leukocytic infiltration, invasion by large trophoblastic cells and scattered decidual cells. The mass had the typical structure of a blood mole, and here and there chorionic villi were still in organic union with the cervical tissues. There was a large corpus luteum of pregnancy in the left ovary.

A possible diagnosis of incomplete corporeal abortion with dislocation or implantation of chorionic tissue was ruled out, as the pregnancy was evidently recent and early and had terminated without leaving any evidence of having been present anywhere but in the cervix. Another possibility, that of chorioepithelioma, was not sup-

(7) J. Mt. Sinai Hosp. 14:184-189, Sept.-Oct., 1947.

ported by histologic evidence, all appearances being consistent with a diagnosis of retained products of conception following cervical abortion. It is suggested that the gestation sac developed in the wall of the upper part of the cervix, that hemorrhage into and around it then occurred from imperfect decidualization and that the resulting blood mole then protruded and finally ruptured into the cervical canal, from which it was incompletely expelled. This interpretation would lend support to the view that true cervical pregnancy is not, as was formerly considered, a variety of placenta previa, but one of ectopic gestation.

Concerning Technic of Therapeutic Abortion. L. Portes, M. Mayer, A. Granjon and M. Bommelaer⁸ (Paris) state that emptying of the uterus by curettage in the first two months of pregnancy and abdominal cesarean section under local anesthesia in the five subsequent months are the technics used in cardiac patients of the Paris area. These technics are not always satisfactory and danger free in women whose condition is precarious. Dilatation of the cervix by any forcible procedure is always dangerous, and insertion of laminaria, especially if it has to be repeated, carries the risk of infection.

In practice, the authors distinguish two types of cases: those in which interruption is indicated because accidents are imminent which endanger the woman's life but in which possibility of subsequent pregnancy must be considered; and those in which it is indicated for a grave and permanent lesion, most often cardiac, which prohibits subsequent pregnancy and must be followed by sterilization. Two technics for these two types of cases have been adopted at the Port-Royal Maternity Hospital: amniotic puncture and hysterotomy with tubal ligation by the vaginal route.

Vaginal hysterotomy, when technically possible, is

(8) *Gynec. et obst.* 47:185-192, 1948.

always preferable to abdominal hysterotomy, and particularly in women with a failing heart. The authors limit its use to cases of therapeutic abortion in multiparas not over three months pregnant; exteriorization of the uterus and secondary ligation-resection of the tubes is then easy and safe. The day before operation the authors insert into the vaginal cavity a compress soaked with a solution of 100,000 units of penicillin. Type of anesthesia varies with the indication for interruption, high epidural or spinal anesthesia being most usual. With administration of 200,000 units of penicillin daily for five days after operation, there have been no unfortunate sequelae or temperature rise.

[During the past year the abortion problem has occupied the attention of physicians in Scandinavian countries. G. Inghe (*Human Fertil.* 12:40, 1947) mentions that in Sweden since 1939 abortions have been permitted by law for medical and certain humanitarian and eugenic reasons. In 1945, 1,600 legal abortions were performed. However, the number of illegal abortions performed in Sweden is estimated to be 10,000 each year. The number of births per year is about 130,000. R. Wetterdal of Stockholm (*Nord. med.* 34:1221, 1947) examined the records of 14,407 abortions treated at his hospital from 1930 to 1944. He compared spontaneous with induced abortions and found an evident decrease in incidence of criminal abortions in Sweden during 1930 to 1944. In Finland, according to H. Pitkanen (*Duodecim* 63:531, 1947), abortions vary each year from 4,315 to 9,206 cases. About 13 per cent of the abortions are febrile.

C. Clemmesen and G. Kirkegaard (*J. A. M. A.* 137:210, 1948) report that 125 abortions were performed in Denmark for psychiatric reasons. The main indications were ill health in 42 per cent and the risk of suicide in 16 per cent. These authors mention, however, that 400 other patients were refused abortion on psychiatric grounds. In the United States, few therapeutic abortions are done for psychiatric reasons and, in my opinion, are rarely necessary.

I. Hirschler, O. Reich and I. Zemplenyi (*Orvosok lapja* 3:108, 1947) state that in Budapest there are 214 criminal abortions for every 100 deliveries. Because of this, they advocate that methods of contraception be taught. Induced abortion is also common in Brazil. A. Campos da Paz Filho (*Med. cir. farm.* 88:367, July, 1943) found that among 482 cases of parametritis, 320 followed induced abortion; among 1,164 cases of salpingitis, the cause in

50 per cent was induced abortion; among 61 cases of pelvic peritonitis 35 were due to provoked abortion and in 350 cases of secondary sterility the cause was induced abortion.—Ed.]

Psychiatric Aspects of Therapeutic Abortion are discussed by Franklin G. Ebaugh and Keith D. Heuser¹ (Univ. of Colorado), who believe that emotionally, as well as physiologically, the pregnant woman is prepared for motherhood. If for any reason therapeutic abortion is carried out, psychosomatic processes must correlate with previous nonpregnant hormonal levels. These changes, coupled with ideas of guilt, self-depreciation and recurrent preoccupation centering around infanticide might well disturb a poorly integrated personality to psychotic degree.

Low hormone levels and psychologic changes resulting from therapeutic abortion may be characterized by behavior ranging from regression of the sexual urge to less well organized tendencies such as depression, withdrawal from social contacts, self-destructive ideas, hostility toward masculine objects or a recurrent desire to become pregnant.

[There is no doubt that induced abortion causes psychic trauma to many women, whether they are married or not. On the other hand, many women have repeated abortions without any apparent psychic trauma. However, emotional disturbances may result long afterward.

It is generally believed that shock sometimes induces abortion and sometimes premature labor. On the other hand, Th. Heynemann (*Zentralbl. f. Gynak.* 69:219, 1947) reports that during the war, despite bombs and other alarms, abortions and premature labor did not increase.—Ed.]

COMPLICATIONS

Anemias of Pregnancy. All of 250 patients treated by Peter J. Talso and William J. Dieckmann² (Univ. of Chicago) received iron in adequate doses and, in certain instances, accessory hematopoietic substances such as

(1) *Postgrad. Med.* 2:325-332, November, 1947.

(2) *Am. J. Obst. & Gynec.* 55:518-523, March, 1948.

B complex vitamins, desiccated hog's stomach and liver extract. In some cases whole blood transfusions were the principal therapy or supplement to other treatment.

Treatment was evaluated during a 21 day period. At the beginning of this period treated patients showed no significant differences from controls. The number of patients showing the expected gain in hemoglobin during the observation period (1.6 Gm. in 21 days) was slightly greater in the treated group than in controls; on the basis of mean values the difference between controls and treated patients was not statistically significant. Comparison of the hemoglobin values of the two groups at term failed to reveal any significant differences.

The authors conclude that during pregnancy rate of hemoglobin formation is not significantly altered by administration of iron alone or in combination with accessory substances. This suggests that these anemias are not due to simple iron deficiency, but that some other factor is lacking or that the defect lies in the mechanism of postabsorptive iron utilization.

[I should like to emphasize that the condition of the blood in pregnancy cannot be judged by the standards used in the nonpregnant state. In pregnancy, instead of using 12 Gm. hemoglobin per 100 cc. blood, a hematocrit reading of 36 per cent and an erythrocyte count of 4,200,000 cells per cubic millimeter as normal, we use 10 Gm. hemoglobin, hematocrit reading of 33 per cent and an erythrocyte count of 3,360,000. This physiologic anemia is a normal condition and is due to hydremia. No treatment is needed in cases of physiologic anemia designated as normocytic normochromic. Spontaneous recovery usually occurs by the sixth week of the puerperium and treatment with ferrous or ferric iron, liver and vitamins seems to make no difference. However, a diet rich in protein may help. As Dieckmann has emphasized, hemoglobin determination should always be made four weeks before term; if it is less than 10 Gm. per 100 cc. the patient should be placed on a high protein diet and closely watched in the third stage of labor. Patients with less than 9 Gm. hemoglobin per 100 cc. should receive a transfusion before or after delivery, and blood should be tested not only for compatibility but also for the Rh factor.

There is a great deal of controversy as to the value of blood platelet determinations. C. V. Ward and J. L. MacArthur (*Am. J. Obst. & Gynec.* 55:600, 1948) found that the average platelet count in nonpregnant patients was 182,000 but during pregnancy was definitely below normal, averaging 141,000. In severe eclampsia and pre-eclampsia the platelet count averaged 97,000. E. Obermer (*J. Obst. & Gynaec. Brit. Emp.* 55:464, 1948) found that in most normal pregnant women the sedimentation rate increased slightly as early as week 5 or 6. From week 8 on there is a regular increase in velocity to a maximum at week 40. After labor velocity falls steeply. Four weeks postpartum it is almost normal and by eight weeks definitely normal for the nonpregnant state. In a case of intrauterine death at about week 34, sedimentation rate fell steeply to the normal level of the nonpregnant state at week 37. There were no clinical grounds for suspecting any abnormality in the pregnancy.—Ed.]

Maternal Congenital Heart Disease as Obstetric Problem. In 29 pregnancies in 25 patients with congenital heart disease, Curtis J. Lund³ (Univ. of Minnesota) found that in general pregnancy was not adversely affected.

Toxemia was rather frequent and was a serious complication. Labor and delivery were never difficult and in about half the cases were described as easy and rapid. Eight deliveries were premature, an incidence of 27.5 per cent. All deliveries but two were vaginal under local anesthesia. One mother, who had patent ductus arteriosus and severe pre-eclampsia, died, and there was one neonatal death in an infant with a ventricular septal defect whose mother had the same type of lesion.

The effect of pregnancy on congenital heart disease differed in many cases from its effect on rheumatic heart disease and varied considerably with the type of congenital defect. As a group, patients with patent ductus arteriosus were most seriously affected. Also serious, but to a lesser degree, were ventricular septal defects. Auricular septal defects and pulmonary stenosis caused little difficulty.

(3) *Am. J. Obst. & Gynec.* 55:244-261, February, 1948.

The New York Heart Association's classification of functional capacity was used in each case. All patients in whom the prepregnancy class changed to a higher one in early pregnancy went on to an even higher class in later pregnancy. All patients in whom failure developed showed such change.

Tests of vital capacity, venous pressure and circulation time were of some value in predicting the development of congestive failure. Bizarre changes in blood pressure at the time of delivery appeared in eight patients. In general, the reaction consisted of hypertension, reaching its peak at delivery, followed by sudden shock after delivery. One patient died after this reaction. The most likely explanation is sudden shunt of blood from the right side of the circulation to the left because of drop in peripheral pressure.

Pregnancy and Subacute Bacterial Endocarditis. There have been 10 cases of subacute bacterial endocarditis complicating pregnancy among 50,000 patients at New York Lying-In Hospital over 15 years, an incidence of 0.02 per cent. Three cases occurred before use of penicillin and all ended fatally during pregnancy or the puerperium. Seven patients treated with penicillin survived pregnancy and delivered normal living children.

Curtis L. Mendelson⁴ (Cornell Univ.) reviews data on five of the penicillin-treated patients whose diagnosis was proved by positive blood cultures. Three had recently recovered from the disease before pregnancy, and in two the disease developed during pregnancy. On the basis of these cases and those in the literature, Mendelson concludes that a past history of subacute bacterial endocarditis is not a contraindication to subsequent pregnancy. It is advisable, however, to defer pregnancy for at least six months after the disease has been cured to allow for resolution of the valvular pathology. The advisability of childbearing should then be determined by

(4) Am. J. Obst. & Gynec. 56:645-654, October, 1948.

the current cardiac status and the accepted concepts of management of the underlying cardiac pathology.

Development of subacute bacterial endocarditis during pregnancy should not alter the management of the pregnancy, nor should pregnancy alter the treatment of the disease. The anticipation of delayed valvular damage may in some cases justify interruption of early pregnancy despite current adequate cardiac reserve. Prophylactic use of antibiotics during labor and the puerperium may prevent development of the disease in patients with rheumatic or congenital heart disease.

[Another case of acute puerperal endocarditis cured by penicillin was reported by Mahon, Saric and Chastrusse (*Gynec. et obst.* 47:240, 1948). On the other hand, acute rheumatic heart disease may be fatal, as shown by two cases reported by F. McKeown (*J. Obst. & Gynaec. Brit. Emp.* 55:50, 1948). In these patients acute obstetric shock developed following delivery. R. Mowbray and C. C. Bowley (*J. Obst. & Gynaec. Brit. Emp.* 55:438, 1948) report three cases of congenital heart block complicating pregnancy. Mowbray (*J. Obst. & Gynaec. Brit. Emp.* 55:432, 1948) analyzed the 35 cases of heart block associated with pregnancy reported in the literature. Twenty were acquired and 15 congenital. Prognosis in cases of congenital heart block in pregnancy is good unless complicated by toxemia. Cases of acquired heart block carry a high maternal mortality and require considerable skill and judgment on the part of both obstetrician and cardiologist if termination is to be favorable.

Several important papers have appeared dealing with the prognosis and treatment of heart disease in pregnancy. J. J. Bunim and J. Rubricius (*Am. Heart J.* 35:282, 1948) studied 142 women with rheumatic heart disease during pregnancy. They found heart failure to be the governing feature in prognosis; this was the commonest cause of death in pregnancy complicated by rheumatic heart disease. Furthermore, mortality rate of infants of patients with congestive heart failure was three times as high as that of patients who had heart disease without failure and four times as high as of normal pregnant women delivered on the same service. The authors found that pregnancy per se does not alter course of the disease. Pregnancy was interrupted only 11 times in the 142 cases and in all through the vagina. No hysterotomies were performed after the first trimester. There were no deaths from congestive heart failure among the 129 patients who remained under

care through pregnancy and parturition. These observations bear out what most obstetricians now believe, namely, that cesarean section is rarely indicated for heart disease. Bunim and Rubricius had five patients who went into cardiac failure during the last month of pregnancy. This is unusual because most cardiologists and obstetricians have observed that heart failure occurs before this time. Generally there is improvement in cardiac status during the last month. An exception to this rule is seen in cases of kyphoscoliosis. C. L. Mendelson (*Am. J. Obst. & Gynec.* 56:457, 1948), who reports seven cases of kyphoscoliosis in 50,000 women at the New York Lying-In Hospital from 1932 to 1947, emphasizes that in kyphoscoliosis the increasing size of the pregnant uterus may impair vital capacity so seriously that the cardiac burden may increase progressively throughout pregnancy without the late physiologic amelioration seen in other forms of heart disorder. In these patients cardiac strain may be reduced by performing delivery as soon as feasible after full cervical dilatation to avoid the bearing down efforts of the second stage of labor. Respiratory depression from analgesia and anesthesia should be avoided. Local anesthesia at the time of delivery will decrease blood loss and help prevent pulmonary infection which may result from inhalation anesthesia. This advice holds true for all women with heart disease.

D. J. MacRae (*J. Obst. & Gynaec. Brit. Emp.* 55:184, 1948) reports an incidence of heart disease of 0.8 per cent among 29,713 patients at the Queen Charlotte Maternity Hospital. Maternal mortality rate in this series was 3.1 per cent, stillbirth rate 3 per cent and neonatal deaths 2 per cent. S. Lesse (*Am. J. Obst. & Gynec.* 56:477, 1948) reports an incidence of cardiac disease of 3.2 per cent at the Jefferson Medical College Hospital. Among 203 women, 26.6 per cent were decompensated at one time or another during the course of pregnancy. There were three deaths.

G. A. Lindeboom (*Nederl. tijdschr. v. geneesk.* 91:3686, 1947) reports on seven women with mitral stenosis in whom auricular fibrillation developed during pregnancy or the puerperium. The literature revealed that fibrillation seldom occurs in young women with mitral stenosis and that the death rate is high when it does. He emphasizes that cesarean section is not advisable for these women.

Despite increased means of detecting heart disease and treating it and increased obstetric skill, women with heart disease continue to die. The death rate, of course, has been considerably reduced. We can further decrease fatality by carefully observing our patients with heart disease and by always calling a cardiologist for consultation. Pregnant women with cardiac disease should have ade-

quate rest, antianemic therapy, restriction of sodium and fluids and avoidance of respiratory infections, overwork and worry. Interruption of pregnancy for cardiac disease is rarely necessary. Labor should be made as painless and as short as possible. Delivery should usually be through the vagina, rarely by cesarean section. As much relief from pain as possible should be given and as soon as the cervix is completely dilated the baby should be delivered, if this can be done without harm to mother or baby. Local, pudendal and caudal anesthesia are the safest; if the patient must be put to sleep, ether is probably the safest of all inhalation anesthetics. There is great danger of cardiac decompensation in the early puerperium; hence the patient must be carefully watched for many days after delivery. All women with heart disease should be followed up for the rest of their lives by a competent internist or cardiologist.—Ed.]

Childbearing and Pulmonary Tuberculosis. Charles J. Stewart and F. A. H. Simmonds⁵ investigated influence of childbearing on the course of pulmonary tuberculosis.

Fifty pregnant women and 114 married women of childbearing age with active disease were studied for 12-15 months. The two groups were not significantly different in age, social class, number of previous pregnancies or duration of disease. At the end of the study the disease had become quiescent in approximately 35 per cent of all patients. In the same period 30-40 per cent in each group had become worse or died.

Similarly studied were 166 pregnant and 125 nonpregnant women with quiescent or arrested disease. There was a significant difference in age composition of these two groups. In both, physical state of 8-12 per cent deteriorated during the study. There were no deaths in either group.

Whether the disease was active or arrested, patients whose pregnancy was terminated fared no better than those going to term or control patients who had no pregnancies in the observation period.

These findings suggest that pregnancy should not be routinely terminated but the necessity of this measure established in each patient.

(5) Brit. M. J. 2:726-729, Nov. 8, 1947.

[The statement, "Pregnancy should not be routinely terminated," at the present time sounds strange in a discussion of treatment of gravid tuberculous women. The consensus among specialists in tuberculosis and obstetrics is that interruption of pregnancy for pulmonary tuberculosis is rarely indicated, because proper care will enable nearly all women with pulmonary tuberculosis to go through pregnancy unharmed. During gestation women with tuberculosis must have sufficient rest, sunlight, proper food, freedom from worry, etc. Labor should be made as painless as possible by sufficient sedation. The second stage should be as nearly eliminated as possible by means of a low forceps operation under direct local infiltration. In the early puerperium the patient must be watched closely. From a study of 12 patients with thoracoplasty in pregnancy J. P. McIntyre (J. Obst. & Gynaec. Brit. Emp. 55:445, 1948) concludes that in a patient with a tuberculous lung lesion adequately and anatomically collapsed by thoracoplasty, coexisting pregnancy need not be regarded as a severe imposition on the maternal organism.

The following letter appeared in the *New York Times* and was sent to the editor of the *Journal of the American Medical Association* by Dr. Esmond R. Long (J. A. M. A. 138:529, 1948):

"The Editor

"The New York Times

"Dear Sir,

"Two months ago, five weeks after the birth of my second baby, I was found to be suffering from 'moderately advanced' pulmonary tuberculosis. I should not consider this a matter of general interest did I not feel that my experience might serve as a warning and possibly save some other mother from a similar disaster. From what we have now learned about the disease it is apparent to my husband and me that I had been displaying obvious symptoms for some months. Yet, although I had a competent general practitioner as family doctor, was under the care of a good obstetrician and had visited an ear, nose and throat specialist, these symptoms were not correctly diagnosed. I complained to all three doctors of constant tiredness and a persistent cough. In fact, I spent some weeks in bed taking that modern cure-all, penicillin, for an infected sinus, which was judged to be the cause of my cough. It now appears that each doctor thought that one of the others would have taken up with me the possibility of tuberculosis, with the result that in the end none of them mentioned it to me or suggested that I should have an x-ray. Consequently, not only has my own life been endangered, but I have unknowingly exposed my babies to the appalling risks of miliary tuberculosis and tuberculous meningitis.

"Since my illness I have heard of many cases of women breaking down with tuberculosis immediately after childbirth. My experience, and theirs, shows that, despite the magnificent work of the National Tuberculosis Association, much remains to be done. It is not only the general public which needs to be alerted to the dangers of tuberculosis, but the doctors themselves, and particularly the 'specialists' in other branches of medicine, who tend to ignore the possibility of any illness outside their own field. In particular, I feel that the Tuberculosis Association should work to have the chest x-ray made as much a part of standard prenatal care as the blood test is now. And I would urge all prospective mothers to insist on an x-ray, for only thus can they be sure of safeguarding the health of themselves and their families at a time when they are apparently especially susceptible to the tubercle bacillus."

I reprint the letter because I think it is extremely important. For some time I have, at the time of the patient's first visit, given her written instructions to have an x-ray of the chest, complete blood count, Rh determination, blood type and Kahn test. Arrangements have been made with a laboratory where all of these tests are performed at one time. I cannot urge too strongly that the chest of every pregnant woman be x-rayed. I hope the day is not far distant when every state health department will insist not only on a Wassermann, Kahn or other test for syphilis but on a routine x-ray of the chest and a routine Rh determination of every pregnant woman.—Ed.]

Pregnancy and the Thyroid Gland is discussed by John P. Peters, Evelyn B. Man and Martin Heinemann.⁶ The thyroid gland undergoes hyperplasia during pregnancy. Though basal metabolism rises in the latter months of pregnancy, there is no evidence that this rise is due to thyroid hyperactivity. Actually, there is increased serum cholesterol during pregnancy. Clinical hyperthyroidism may begin during pregnancy, but this is infrequent and does not prevent conception or influence pregnancy. Complete absence of the thyroid produces sterility, but once pregnancy has been established, it is not interrupted. Nevertheless, miscarriages are still attributed to hypothyroidism. Thyroid deficiency is said to be responsible for toxemias and other disorders of pregnancy.

(6) Yale J. Biol. & Med. 20:449-463, May, 1948.

In thyroid disorders the serum-precipitable iodine reflects glandular activity with great accuracy. It is uninfluenced by extraneous factors affecting metabolism. The authors made 38 observations on 22 women from the second month to delivery. Precipitable iodine was elevated in the early weeks of pregnancy and tended to remain at a constant level throughout pregnancy. Basal metabolism, on the other hand, rose gradually after the fourth month. Shortly after delivery, iodine fell to normal levels. In patients with abortions or threatened abortion, precipitable iodine values early in pregnancy were below those found in normal pregnancy. Most patients in the interpregnant state had normal iodine values. Therefore, failure of the iodine to rise normally during pregnancy does not point to antecedent thyroid deficiency but to an improper reaction to the state of pregnancy. There is evidence that administration of active thyroid substance may be beneficial in these cases. Serum iodine levels were normal in four cases of severe toxemia and two of pyelitis in pregnancy. It is logical to assume that toxemias would not be accompanied by low serum iodine values, since such a state leads to miscarriage in early pregnancy.

Hyperthyroidism and Pregnancy. Robert D. Mussey, Samuel F. Haines and Emmerson Ward⁷ (Mayo Clinic) reviewed the recent literature and note that reports on use of thiouracil and related drugs during pregnancy are few but that the occurrence of hyperplastic thyroids in a few fetuses suggests caution. Propylthiouracil seems to be the safest of these drugs for the mother.

Thirty instances of hyperthyroidism in pregnancy were observed at the Mayo Clinic in 14 years. There were 29 patients, 1 having a recurrence during a second pregnancy. Nine had adenomatous and 20 exophthalmic goiter. In five instances onset of pregnancy preceded hyperthyroidism. Course of the disease was usually little influ-

(7) Am. J. Obst. & Gynec. 55:609-619, April, 1948.

enced by the pregnancy. Treatment consisted of Lugol's solution orally and thyroidectomy for hyperfunctioning adenomatous goiter, and Lugol's solution, plus thyroidectomy, if needed, for exophthalmic goiter. This treatment can be carried out safely in most cases.

Results of pregnancy are known in 20 instances; 16 normal infants were born. There were two spontaneous abortions before treatment was started and one eight days after thyroidectomy. One premature infant died.

[R. W. King and M. F. Collen (*J. Clin. Endocrinol.* 7:469, 1947) report two cases in which thiouracil was given for hyperthyroidism complicating pregnancy. Both patients responded to treatment and had a normal pregnancy and uneventful delivery of normal infants. However, in the immediate postpartum period both manifested thiouracil toxicity which necessitated cessation of drug therapy. The first patient had fever and conjunctivitis, probably caused by thiouracil, and in the second patient leukemia developed. Both had infants who appeared normal at birth, without palpable thyroid enlargement or evidence of disturbed thyroid state. M. J. Whitelaw (*J. Clin. Endocrinol.* 7:767, 1947) gave thiouracil for hyperthyroidism to one patient and had an opportunity to study the stillborn fetus. He found that thiouracil does not exert enough injurious effect on the thyroid of the human fetus to be detected either microscopically or chemically. This agrees with the experimental findings in rats reported by E. Freiesleben and K. Kjerulf-Jensen (*J. Clin. Endocrinol.* 7:47, 1947).

R. Kopf, A. Loeser and G. Meyer (*Klin. Wchnschr.* 26:202, 1948) found that thiouracil and methylthiouracil in rats caused changes in maturation of the ovum manifested as irregularity in the estrus cycle. Estrus is less frequent. These experiments on animals were corroborated by observations on human subjects. Women also reveal changes in the menstrual cycle under the influence of anti-thyroid substances. Menstruation is less frequent during treatment with methylthiouracil, but cases have been observed in which menstrual disturbances were regulated under this therapy.—Ed.]

Diabetes in Pregnancy, according to Ralph A. Reis⁸ (Chicago) occurs in 1 of every 350 women delivered at Michael Reese Hospital. Successful management of these patients requires extremely carefully prepartum care, both the effect of diabetes on pregnancy and the effect

(8) *J. Iowa M. Soc.* 38:41-45, February, 1948.

of pregnancy on diabetes being taken into consideration.

Patients are kept on a diet as nearly normal as possible except for low fat and concentrated carbohydrate intake. Single doses of protamine-zinc insulin appear to be most effective until two to three weeks before the pregnancy is terminated. Then regular insulin given in small doses throughout the day is substituted for protamine-zinc. During labor patients are given liquids and carbohydrates in solution by mouth, and the amount of insulin required is determined by examining every voided specimen during labor.

Salvage of the babies of diabetic mothers is one of two major problems in management. Simply controlling the diabetes does not accomplish this, since 40-50 per cent will be lost just before delivery, intrapartum or in the first 24 hours after delivery.

Pregnancy should be terminated about the thirty-fourth to the thirty-sixth week. At this time almost every baby will weigh between 3,200 and 3,500 Gm. Nevertheless the baby is premature and should be handled as such. The method of terminating pregnancy should be decided in each case, depending on the condition of the cervix at the time when pregnancy is to be terminated.

It has been shown at Michael Reese Hospital that blood sugar in the baby of a diabetic mother drops to as low as 10 and even 5 mg. per 100 cc. within an hour after birth, and that, unlike in the normal newborn baby, it does not increase unless treatment is given. When it fails to increase the baby dies within four to eight hours of birth. The minute the child is born 10 drops of 50 per cent glucose solution is placed in the back of the mouth with a medicine dropper. This is repeated every 30 minutes for five doses. Then $\frac{1}{2}$ -1 oz. glucose is given every two hours, alternating with $\frac{1}{2}$ -1 oz. breast milk. The first 24 hours is important, but the first eight hours is crucial. Following this regimen, no baby of the last 40 diabetic patients delivered has been lost.

Pregnancy in the Diabetic. Lester J. Palmer, Joseph H. Crampton and Robert H. Barnes⁹ (Seattle) report results of substitutional hormone therapy in 39 diabetic pregnancies. From the sixteenth to the twentieth week progesterone, 10 mg., was given twice a week intramuscularly. The interval was shortened every four weeks to the thirty-second week. Then the dose was increased to 15 mg. daily and continued to delivery. Diethylstilbestrol was started during the sixteenth week with 12.5 mg. daily by mouth and increased to 25 mg. after one week, this dose being maintained until delivery.

Over-all fetal survival rate was 76.9 per cent. For fetuses reaching the period of viability, survival rate was 83.3 per cent. Among 23 nonjuvenile diabetics, there were three fetal deaths (13 per cent). Among 16 juvenile diabetics fetal death rate was 37.5 per cent. Seven patients had mild toxemia, 11 moderate toxemia and 19 no manifestations of toxemia. The authors believe that all diabetics should be delivered by the end of the thirty-sixth week following the first day of the last menstrual period. If labor does not begin spontaneously, cesarean section is the procedure of choice; it was performed in 29 cases.

The authors contrast results in this study with a 60 per cent fetal survival obtained in a previous study of 68 pregnancies in 41 diabetics not treated with hormones and conclude that use of hormones is definitely beneficial.

Diabetic Maternity Patient and Her Baby, according to W. Pelton Tew¹ (London, Ont.), present problems best met by shared responsibility of obstetrician and internist. When pregnancy is determined, the patient should be hospitalized for a few days so that proper treatment may be started, and she should be readmitted at least every two months thereafter for check-up. Final-

(9) West. J. Surg. 56:175-177, March, 1948.

(1) Canad. M. A. J. 57:441-445, November, 1947.

ly, she should be hospitalized three weeks before term so that the best mode of delivery may be decided. Throughout pregnancy the patient should visit the physician every two weeks.

Mode of delivery depends on factors in each patient. Patients with mild diabetes may be permitted to go into labor spontaneously at term. Those with moderate diabetes may be delivered by cesarean section about three weeks before term or by rupture of the membranes about a week before term (if circumstances permit) or may be allowed to go to term when the disease is well controlled and adequate use of hormones has been possible. Tew favors cesarean section. Patients with severe diabetes should receive special preparation and control for four weeks before hospitalization one month before term. After one week's good control in the hospital, delivery should be carried out by cesarean section. The anesthetic of choice for patients delivered by cesarean section is spinal or local infiltration.

During the puerperium, daily blood sugar determinations should be made for the first week. Tew prefers three or four daily injections of ordinary insulin with food to cover. Usually it is better not to permit the mother to nurse her baby.

The chief problems in management of the baby are prematurity, hypoglycemia and anoxia. The baby should be placed in a heated crib (temperature 80-85 F.) and a supply of oxygen kept ready. Small quantities of glucose should be given by mouth every three hours for the first 24 hours and regular feedings begun thereafter.

Relation between Infant Birth Weight and Subsequent Development of Maternal Diabetes Mellitus was studied by Joseph P. Kriss and Palmer H. Futcher² (Washington Univ.). Information was obtained from 100 parous, diabetic women with an average age of 55.3 years and from an equal number of parous, nondiabetic women

(2) J. Clin. Endocrinol. 8:380-389, May, 1948.

with an average age of 51.2. Any infant weighing 10 lb. or more at birth was termed big. None of the babies considered in this study was born to a mother clinically diabetic at the time of childbirth. There were 360 children born to the 100 prediabetic mothers and 315 born to the control women. Of 144 infants weighing 10 lb. or more, 77.1 per cent were born to women destined to develop diabetes. An additional 6.9 per cent were born to control mothers with a positive family history of diabetes. Many prediabetic women gave birth to more than one big infant; thus, 111 big babies were born to 58 women. Children of prediabetic mothers averaged 0.9 lb. more than children of nondiabetic mothers. In the prediabetic group, diabetes was diagnosed at an average age of 47.1 years, and the latent period between birth of the big baby and development of clinical diabetes averaged 24.2 years.

Four of the 144 big babies are known to have developed diabetes at an average age of 18.8 years. In addition, 4 of the 100 prediabetic mothers were themselves known to have been big babies. On the basis of birth weight figures, certain predictions may be made regarding the possibility of developing diabetes. The prediction accuracy increases steadily with increased birth weight. The prediction accuracy figures for mothers bearing a single big infant, correlated with birth weight, are as follows: 10-11 lb., 10.7 per cent; 11-12 lb., 13 per cent; 12-13 lb., 45.2 per cent; over 13 lb., 100 per cent. Thus, a mother giving birth to a 13 lb. infant is certain to develop diabetes.

The authors suggest a possible mechanism for production of fetal giants. They postulate an inherited defect which makes the fetus unusually susceptible to normal stimulation by the maternal pituitary.

[In confirmation of Kriss and Futcher's ideas I should like to cite studies by H. H. Fouracre Barns and M. E. Morgans (*J. Obst. & Gynaec. Brit. Emp.* 55:449, 1948), who found that the

birth weight of infants born of mothers in whom diabetes subsequently developed tends to be greater than normal and that total fetal mortality rate is higher than is usual in nondiabetic pregnancies. This rate increases as the onset of diabetes is approached. Barns and Morgans found that the abortion rate in pregnancies before and after onset of diabetes is not significantly different from normal. Overproduction by the anterior pituitary lobe plays a possible role in both prediabetic and diabetic stages. D. M. Paton (*Am. J. Obst. & Gynec.* 56:558, 1948) also shows that incidences of miscarriage, prematurity, large babies, stillbirths and neonatal deaths were higher among women with diabetes in the years before the disease was clinically evident. This study is based on 122 known diabetic patients, who had 454 pregnancies, an average of 4.54 per patient. J. W. Grott (*Acta med. Scandinav.* 130:283, 1948) examined 50 women with diabetes and found that 12 had chronic pancreatitis. In 18 others symptoms of chronic pancreatitis were detected only in later examinations; hence 60 per cent of women with diabetes had chronic pancreatitis. Grott believes this figure is high because he studied only 50 cases. He further found that in 80 per cent of women who had glycosuria in pregnancy and in whom chronic pancreatitis was later detected, glycosuria was renal. It appears, therefore, that renal glycosuria not only may occur during pregnancy but is an important symptom in the course of chronic pancreatitis.—Ed.]

Results of Three Five Year Studies of Hydatid Mole and Chorioepithelioma on Pacific Coast were tabulated by Albert W. Holman and Elizabeth H. Schirmer³ (Portland, Ore.). There were 426 moles and 107 chorioepitheliomas, 69 of which followed mole.

Fifty-four per cent of patients with mole were in the third decade and only 24 per cent in the fourth and fifth decades. In the whole series four patients had recurrent moles; one patient having three. Over 80 per cent of the moles were found, and the rest undoubtedly started, during the first half of pregnancy. Jeffreys has suggested that curettage should be done within 24 hours of abortion occurring before the third month unless infection is present.

Bleeding, either alone or in combination with other symptoms, was the most constant symptom. Many pa-

(3) *West. J. Surg.* 55:525-537, October, 1947.

tients spotted only occasionally and passed the mole without much blood loss; others had frank hemorrhage. Only 2 per cent had associated toxemia of pregnancy.

Diagnosis was made clinically in only 54 per cent. The uterus was reported enlarged in only 36 per cent, being normal or smaller than normal for duration of pregnancy in 47 per cent. Size of the uterus depends on condition of the mole, and less emphasis should be placed on excessive uterine enlargement as an outstanding symptom.

The Friedman test usually becomes negative within two months after passage of a mole if chorioepithelioma does not develop. However, the likelihood of laboratory errors should be considered, and both positive and negative tests should always be repeated.

Curettage proved preferable to hysterotomy in treatment of hydatid mole. Hysterectomy and/or oophorectomy has no place in treatment.

Seventy-two patients (17 per cent) became pregnant again and delivered normal full term infants.

Chorioepitheliomas followed mole in 69 cases (16 per cent). Of the 107 cases of chorioepithelioma, 64 per cent were associated with mole. Chorioepithelioma occurring later than two months after diagnosis of mole was made was considered to be related to intervening abortion.

Bleeding was the only common symptom. Diagnosis was made from scrapings in 46 patients, but in 6 only after the second curettage, and 3 patients required three curettages each. In these nine cases moles preceded chorioepithelioma.

The authors urge use of repeated biologic pregnancy tests to avoid needless operation. Bilateral oophorotomy is needless in cases in which there are no metastases. Contents of lutein cysts of the ovaries should be evacuated with a syringe so that continued absorption of cyst

contents will not confuse reactions to subsequent biologic tests.

[We should be grateful to Holman and Schirmer for their continued thorough study of chorioepithelioma.—Ed.]

Factors in Treatment of Chorioepithelioma are discussed by Albert W. Holman and Elizabeth H. Schirmer⁴ (Portland, Ore.). Classification of chorioepithelioma should be clarified and the word itself discarded in favor of choriocarcinoma, grades I to IV. About 1-2 per cent of hydatid moles are followed by choriocarcinoma. In the authors' studies most patients with mole did not have excessive uterine enlargement. Curettage should be performed immediately after passage of a mole, but negative findings mean nothing. The Friedman test is the most valuable diagnostic aid. A test should be performed 10 days after the mole is passed and then every two weeks for two months. After this period, a monthly test is made until a year after the mole's passage. A positive report must be confirmed and a new pregnancy ruled out. Normal pregnancies have a high peak of urinary hormone one month after the first missed period. An increasing or constant hormone content after this time strongly suggests hydatid mole or choriocarcinoma.

Choriocarcinoma may also follow full term pregnancy or abortion. These cases are more often fatal than those following mole, since the diagnosis is usually unsuspected. The cardinal symptom of choriocarcinoma and hydatid mole is bleeding. When bleeding occurs during pregnancy, hydatid mole should be thought of. Any bleeding following miscarriage or pregnancy should raise the suspicion of choriocarcinoma.

Early hysterectomy, total or subtotal, is the best treatment. X-ray of the lungs should always precede hysterectomy, since pulmonary metastases, if present, may be treated by x-ray if recognized early. The vulva and vagina should be carefully examined for metastases. The

(4) *Am. J. Obst. & Gynec.* 55:629-635, April, 1948.

ovaries should be removed only when involved by tumor.

[Hydatid moles may occur not only in the uterus but in the fallopian tubes. J. A. Chalmers (*J. Obst. & Gynaec. Brit Emp.* 55:322, 1948) studied the literature and adds the fifteenth such case. Strangely enough, the prognosis is good and relatively better than in uterine moles.

A positive Aschheim-Zondek test within three months following removal of a hydatid mole does not necessarily indicate presence of a chorioepithelioma. H. Husslein (*Klin. med.* 2:1097, 1947) reported a case of hydatid mole in which lutein cysts the size of a child's head were found within five days after removal of the mole. Contents of the cysts were aspirated and their gonadotrophin content determined. Four weeks after removal of the mole, hormone content of the urine rose. The Aschheim-Zondek tests remained positive for three months in a hundredfold dilution. The ovaries did not return to normal until four months after removal of the mole.

We must remember that occasionally a negative Aschheim-Zondek test will be obtained in the presence of hydatid mole or even chorioepithelioma. P. Schugt (*Zentralbl. f. Gynak.* 69:361, 1947) reports a case of malignant chorioepithelioma of the uterus with pulmonary metastases in which the Aschheim-Zondek reaction was negative. In this patient the chorioepithelioma developed after full term delivery. The patient was operated on and subsequently given x-ray treatments; apparent cure resulted. Schugt cites at least 10 other reports of a negative biologic test in the presence of a definite chorioepithelioma. Many theories have been advanced to explain these negative tests but none has been satisfactory.

A chorioepithelioma in which the malignant process is situated within the uterine muscle instead of the endometrium is difficult to diagnose. H. Acosta-Sison (*Philippine J. Surg.* 2:240, 1947) reports that in 46 cases of chorioepithelioma seen at the Philippine General Hospital from 1942 to 1945, 8 had a primary growth within the myometrium. In five cases abnormal uterine bleeding did not begin until one to three years after the products of conception had been expelled. Diagnostic curettage in these cases was negative for chorioepithelioma, as was to be expected. In three cases the uterus was perforated by the growth; the patients died of intraperitoneal hemorrhage resulting from the perforation. Of the remaining five patients three were saved by what the author calls the HBE method: H represents a history of having expelled a product of conception; B, bleeding from the uterus and E, enlargement and softening of the uterine corpus. Two of the patients who

were saved had diagnoses of cancer of the uterus and adenoma malignum. S. Kullander (*Lancet* 1:944, 1948) reports treatment of chorioepithelioma with stilbestrol. The patient had metastases. There was temporary improvement when the dose was increased from 3 mg. to 1,000 mg. a day, but the patient died after one month.

The American Association of Obstetricians, Gynecologists and Abdominal Surgeons now has the Albert Mathieu Memorial Chorioepithelioma Registry. I sincerely hope that all physicians will report their cases of chorioepithelioma to this Registry so that we may learn additional facts. The secretary of the Association is Leroy A. Calkins, Kansas University Hospital, Kansas City, Kan.—Ed.]

Retreatment of Pregnant Woman for Syphilis Following Penicillin: Is Additional Therapy Necessary When Effective Treatment Has Been Given Prior to Conception? To obtain a partial answer to this question Norman R. Ingraham, Jr., Elizabeth Kirk Rose, John H. Stokes and Herman Beerman, Virgene S. Wammock, S. Herbert Handler and O. M. Carrozzino⁵ (Philadelphia) refrained from treating pregnant women who had previously received penicillin for syphilis, when treatment had been for: (1) symptomatic early syphilis, with normal clinical and serologic response, (2) latent syphilis, with no evidence of progression of disease, and (3) symptomatic late syphilis, with sustained normal response, depending on the type of disease present.

Of 52 women observed, 46 gave birth to apparently normal nonsyphilitic infants. Three abortions, one miscarriage, one stillbirth and one neonatal death occurred in the remaining 6 cases, but in none could the outcome be attributed to syphilis.

So far as can be judged from a limited series, under ideal antepartum care (monthly physical examination and blood serologic test for the woman once syphilitic) it is apparently safe to permit the mother to go untreated during pregnancy, assuming normal response to previous treatment. In this study, however, duration of observation after treatment was a more important

(5) *Am. J. Obst. & Gynec.* 56:340-346, August, 1948.

factor in determining serologic status at time of delivery than was stage of disease or size of the dose of penicillin.

The great effectiveness and relative safety of penicillin in preventing congenital syphilis make retreatment of the pregnant woman desirable when the clinical or laboratory response is not normal, or under circumstances in which there is some risk of infection of the fetus and anticipated antepartum care may fall below the optimum.

[This is safe advice. When women are not treated during pregnancy because they received satisfactory treatment before conception, penicillin will give good results for the infant if treatment is begun after a positive reaction appears some time during pregnancy.

The Council on Pharmacy and Chemistry of the American Medical Association (J. A. M. A. 136:873, 1948) issued the Report of the Syphilis Study Section of the National Institute of Health in which it was pointed out that penicillin is nearly 100 per cent effective in prevention of prenatal syphilis. It is preferable to conventional arsenic and bismuth therapy, which is unnecessary and undesirable. In maternal early syphilis penicillin protects the fetus regardless of the trimester of pregnancy in which treatment is given (certainly up to the eighth month). Penicillin should be given as soon as syphilis is diagnosed, whatever the stage of pregnancy. Penicillin in aqueous solution is probably superior to the suspension in oil and wax in this special circumstance. Successful schedules for pregnant women have provided total doses of 4.8-6 million units of penicillin in aqueous solution administered at two to three hour intervals for 8-15 days. Following completion of treatment, the mother must be followed clinically and have quantitatively titered serologic tests at least once a month until delivery. After delivery, follow-up examinations should be based on the stage of the mother's infection.

Retreatment with penicillin should be given during pregnancy if there is evidence of clinical or serologic relapse, or if the woman has previously untreated or inadequately treated syphilis of less than four years' duration and the original serologic titer does not significantly decline within three months after treatment. After delivery the infant must be followed for at least four months by means of frequently repeated physical inspections, quantitatively titered blood serologic tests (preferably every two weeks) and roentgenograms of the long bones taken preferably at the first and sixth weeks of life.—Ed.]

Appendicitis Complicating Pregnancy, Labor and Puerperium is discussed by Richard L. Meiling⁶ (Columbus, O.).

In the Cleveland University Hospitals 26 such cases occurred in 1934-46. In 84.6 per cent of these, acute appendicitis developed during the first six months of gestation. Abortion rate was 26.1 per cent, fetal and neonatal mortality rate (including abortions) 34.6 per cent and maternal mortality rate 7.69 per cent. Incidence of appendicitis complicating pregnancy, labor or the puerperium was 1 to 1,910 deliveries.

During the first 7½ months of pregnancy, optimum treatment is well timed and properly executed appendectomy with the least possible manipulation of the uterus, gastrointestinal decompression, intravenous administration of blood, plasma and fluids, and adequate chemo- and antibiotic therapy. Some authors report that postoperative administration of estrogen-progesterone helps prevent abortion or premature labor.

The difficult problem occurs in the last 2½ months. Four cases of acute appendicitis complicating labor or the puerperium occurred in the Cleveland University Hospitals in 1946-47. On the basis of these cases, as well as others' experience, Meiling suggests the following treatment: cesarean section by low transverse laparotrachelotomy, followed by appendectomy, intraperitoneal implantation of 5-10 Gm. sulfanilamide or sulfathiazole crystals, massive postoperative doses of penicillin for several days, gastrointestinal decompression, blood and plasma transfusions and intravenous nutrition.

[I strongly disagree with Meiling's recommendation that cesarean section be done before the appendix is removed in cases of acute appendicitis. Despite his good results and our wonder drugs, I still believe it is dangerous to expose the open uterus to the peritoneal cavity when there is acute appendicitis. I do not see how anyone is willing to open the uterus, with its numerous blood vessels, when there is frank pus in the peritoneal cavity.

(6) Surg., Gynec. & Obst. 85:512-522, October, 1947.

I believe that whenever an operation for acute appendicitis is performed the uterus should be manipulated as little as possible and the rule "get in and get out quickly" should be observed. After operation every effort should be made to prevent premature labor by means of sedatives and stilbestrol or progesterone. Should the pregnancy be naturally terminated it should be allowed to run as normal a course as possible. During labor all intrauterine manipulation should be avoided within the limits of safety.—Ed.]

Icterus in Pregnancy: Clinicopathologic Study Including Liver Biopsy. W. C. W. Nixon, Ekrem S. Egeli, W. Laqueur and Osman Yahya⁷ (Istanbul) studied 12 icteric and 9 nonicteric pregnant women by means of liver biopsy. Two types of jaundice were revealed: one etiologically related to the state of pregnancy without striking histologic changes in the liver, and concomitant jaundice, the result of infectious hepatitis.

Inversion of the albumin-globulin ratio is an important diagnostic finding and serves to differentiate types of jaundice in pregnancy. In infectious hepatitis serum protein levels are more or less normal; however, inversion of the albumin-globulin ratio indicates that the process is becoming chronic and scarring. In jaundice of short duration inversion indicates "jaundice of pregnancy."

Until more is known about the etiology of jaundice of pregnancy, termination of pregnancy, which results in rapid return to normal health, is the only treatment. On the other hand, infectious hepatitis in pregnancy has a specific etiology quite unrelated to pregnancy. Termination of pregnancy should be considered only if hepatitis is so severe that the mother's life is in danger. Prognosis depends on the nutritional state. The better it is, the less is the risk of progression to acute atrophy. If in the early stages of jaundice malnutrition is obvious, termination of pregnancy must be seriously considered. If nutritional level is high, interruption of pregnancy is less urgent, and medical measures should be taken.

(7) J. Obst. & Gynaec. Brit. Emp. 54:642-652, October, 1947.

[Last year I had a patient with acute infectious hepatitis in pregnancy. She went downhill rapidly and after consultation with two internists I emptied the uterus in the third month of pregnancy. She made a quick and uneventful recovery. She is again pregnant, and up to the eighth month pregnancy has been entirely uneventful.—Ed.]

Acute Anterior Poliomyelitis in Pregnancy is discussed by E. Stewart Taylor and Jack M. Simmons, Jr.⁸ (Univ. of Colorado). During Colorado's 1946 poliomyelitis epidemic, 25 cases of pregnancy with acute poliomyelitis were observed. Pregnant women seem to be predisposed to the disease, there being twice as many pregnant as nonpregnant women infected in the same age group. Of 19 patients infected during the first and second trimesters, none died and only 2 had significant residual paralysis. But among six patients who fell ill during the last trimester, three died from bulbar paralysis, one almost died and is still in a respirator, and two have severe residual extremity paralysis. Although the series is small, the 50 per cent mortality rate in the last trimester greatly exceeds that of 6 per cent for the entire epidemic and 8 per cent for 88 nonpregnant women in the same age group. It is possible that estrogen and progesterone protect the pregnant poliomyelitis victim early in pregnancy. However, in the last trimester they may be so strongly virucidal that a Herxheimer-like reaction is created, causing irreversible tissue damage. Increased incidence of the disease in pregnancy may be explained by hyperemia and congestion of the upper respiratory and upper digestive tracts and fatigue accompanying pregnancy. There were no cases of poliomyelitis in the newborn, or congenital deformities. There were no ill effects on the progress of labor except that an occasional forceps procedure was necessary.

[H. Gifford and R. L. Hullinghorst (Am. J. Obst. & Gynec. 55:1030, 1948) summarize all available reports of poliomyelitis in pregnancy in American, French, English, German and Scandinavian

(8) Am. J. Obst. & Gynec. 56:143-151, July, 1948.

diagnosis was not made until the later months of pregnancy when a routine blood count revealed 50,200 white cells. During gestation the patient lost 8 lb. but showed no other symptoms. The spleen seemed to be moderately enlarged to percussion. A living infant weighing 6 lb. 2 oz. was delivered by elective cesarean section. Both mother and child are well one year after delivery.

The second case was one of monocytic leukemia associated with pregnancy. The patient was hospitalized dur-

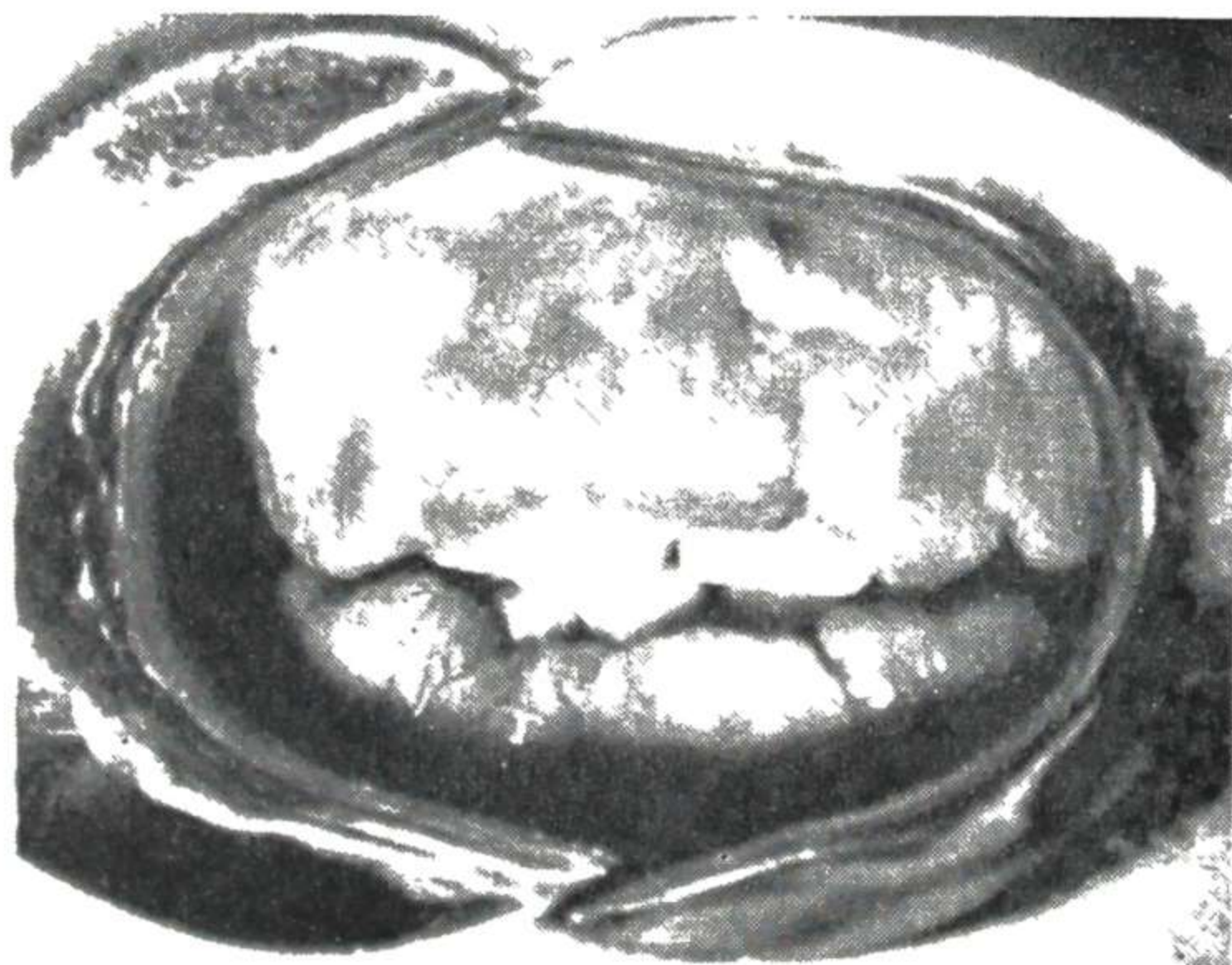


Fig. 15.—Marked generalized hypertrophy of gums. (Courtesy of Williams, John A.: *Am. J. Obst. & Gynec.* 55:967-978, June, 1948.)

ing the seventh month because of hypertrophied gums (Fig. 15), swelling of the neck and mild sore throat. On cesarean section a living normal boy weighing 5 lb. 12 oz. was delivered. No difficulty was encountered in obtaining hemostasis. The patient went rapidly downhill and died 12 days after operation. Necropsy verified the diagnosis. It is likely that in this case leukemia developed during pregnancy.

Neither patient had an unusual amount of bleeding, and pregnancy had no effect on the course of leukemia.

literature. Among 170 cases which they were able to collect, maternal mortality was 19 per cent and the fetal 26 per cent. One third of the fetal deaths were intrauterine and undelivered, associated with maternal deaths. Cesarean section offers a good opportunity to obtain a viable child when death of the mother is imminent. Poliomyelitis may be transmitted to the newborn, but there is no definite clinical, histologic or virologic evidence of its transmission in utero. Poliomyelitis occurred in the first trimester in 22 per cent, the second in 35 per cent, the third in 40 per cent and postpartum in only 3 per cent.—Ed.]

Pregnancy and Multiple Sclerosis. Louis H. Douglass and C. Louis Jorgensen⁹ (Univ. of Maryland) report that at the University Hospital in Baltimore since 1939 there have been five cases of multiple sclerosis associated with pregnancy.

In one case pregnancy was interrupted in the authors' own clinic, and in another abortion was performed elsewhere, against the authors' advice. With present knowledge pregnancy might have been allowed to continue in the former case.

In the other three cases pregnancy proceeded more or less normally. There were no major obstetric complications and labor was without incident. All three infants were in good condition at birth and did well. The puerperium was uneventful.

The authors conclude that multiple sclerosis has no ill effects on pregnancy or offspring, and that pregnancy does not appear to accelerate the progress of multiple sclerosis or to cause exacerbation. They do not consider multiple sclerosis an indication for therapeutic abortion, though there may be exceptions when the disease is particularly severe.

Leukemia and Pregnancy. John A. Williams¹ (Philadelphia Lying-In Hosp.) reviews the recent literature on this subject and reports two cases. The first case was one of chronic myelogenous leukemia complicating pregnancy. Although leukemia probably antedated pregnancy,

(9) *Am. J. Obst. & Gynec.* 55:332-336, February, 1948.

(1) *Ibid.*, pp. 967-978, June, 1948.

stump and high voltage x-ray therapy. In the sixth month of pregnancy, when the patient greatly desires a child, a minimal dose of x-rays to the cervix may be given first. When viability is attained, the Porro operation is done, followed by deep x-ray therapy.

[L. Machado (An. Serv. de obst. d. Hosp. Cosme Argerich 1:22, 1947) reports that among 500 cases of cancer 6 occurred during pregnancy. In one the tumor probably developed after gestation began. In the five cases observed by Machado during pregnancy he found no influence of pregnancy on evolution of malignancy. Nor did carcinoma have any effect on progress of gestation. In the three operable cases the Wertheim operation was performed with living fetuses.

Several complications of pregnancy have not been included this year. One of them is anemia. R. F. Chesley and J. E. Anitto (Bull. Margaret Hague Mat. Hosp. 1:68, 1948) report on the use of molybdenized ferrous sulfate in treatment of hypochromic anemia of pregnancy. The incidence of hypochromic anemia was 6.6 per cent. Diagnosis was based on at least three weekly hemoglobin estimations of 10 Gm. per 100 ml. or less and mean corpuscular hemoglobin concentration of 30 per cent or less. The authors found that molybdenized ferrous sulfate produced a substantially more rapid therapeutic response than ferrous sulfate. Addition to ferrous sulfate of either liver extracts or folic acid did not potentiate the action of the iron salt. None of the patients treated with molybdenized ferrous sulfate complained of more than mild digestive symptoms, whereas 8 per cent of patients treated with ferrous sulfate had to stop therapy because of digestive upsets.

H. Vermelin (Rev. franc. de gynec. et obst. 42:261, 1947) reports that five of six patients in whom the cervix was electrocoagulated during pregnancy aborted. Of 21 women who became pregnant after electrocoagulation, 6 were delivered without difficulty, 9 had labors lasting more than 24 hours and in 15 manual dilatation of the cervix was necessary. In three cases there was total occlusion of the cervix requiring cesarean section; in one of these a hysterectomy had to be done. May I warn physicians against cauterizing the cervix and especially against removing cervical polyps during pregnancy? There are a few instances in which serious infection has followed removal of polyps during pregnancy. If, however, a polyp is the cause of bleeding it must be removed; the base of the polyp should be cauterized with great gentleness, preferably by medicinal means, such as use of Negatan. Of course all polyps should be studied microscopically.

Pyelonephritis in pregnancy is not uncommon. J. de Rezende

Chorea Gravidarum. Thomas W. McElin, Sim B. Lovelady and Henry W. Woltman² (Mayo Clinic) review the cases in the recent literature and report five additional ones. Average age of their patients was 21.4. Two were primigravidas and three multigravidas. Chorea began in the first half of pregnancy and lasted for 2½ weeks to 5 months. All pregnancies were terminated spontaneously at term, and six normal babies were born (one twin pregnancy). Two patients required hospitalization. Therapy was nonspecific.

Other than nausea and vomiting in two cases, there was no evidence to support a toxemic etiology of this condition. A past history of chorea was given by three patients and of rheumatic fever by two. Three patients had heart disease. One patient had had scarlet fever and several episodes of tonsillitis as a child. A suggestion of psychogenic "color" was noted in four patients.

Treatment of Carcinoma of Cervix Complicated by Pregnancy. George Gray Ward³ (New York City) reports 10 cases of malignancy of the cervix among 36,274 obstetric cases at Woman's Hospital in 19 years. Of five patients with nonviable fetuses, only one (who died subsequently of cancer) lived five years. Of the five women with viable fetuses, three lived, one over 4 years and one over 17 years; one was treated only recently. Four of the infants lived.

Ward believes that in early pregnancy when viability of the child is out of the question, high cervical hysterectomy and bilateral salpingo-oophorectomy should first be done. This removes the fetus without trauma to the cervix or dissemination of cancer cells. In about two weeks irradiation of the cervix stump and high voltage x-ray therapy should be given. In the last three months of pregnancy with a viable child, a Porro cesarean section should be done, followed by irradiation of the cervix

(2) *Am. J. Obst. & Gynec.* 55:992-1006, June, 1948.

(3) *J. Mt. Sinai Hosp.* 14:674-678, Sept.-Oct., 1947.

drome had appeared the level had no prognostic significance, since in one case that went on to severe pre-eclampsia and another to eclampsia there was no elevation. During the puerperium the concentration fell rapidly in all cases, except for slight rise on the fourth to sixth days. Patients with hypertensive toxemia usually had levels within normal range. Of the five eclamptics, only two had an elevated enzyme level.

In 45 unselected patients with abnormal weight gain after the twenty-eighth week of pregnancy, enzyme levels were usually in excess of the mean curve for normal pregnancy, suggesting that beta-glucuronidase levels are closely allied with water retention. Six patients went on to clinical pre-eclampsia; all had had consistently high levels before development of pre-eclampsia, most of them being over 20 μ g. The authors conclude that serum beta-glucuronidase levels could be used to differentiate pre-eclampsia from hypertensive toxemia and to warn of impending pre-eclampsia.

Serologic Observations in Toxemias of Pregnancy.

R. T. La Vake⁵ (Minneapolis) advances the hypothesis that toxemia may be due to cell substances from the products of conception that are toxic to the mother. The potentially toxic elements are the A, B, Rh and M and N factors. Thus, a group O, Rh-positive woman may have an almost fatal toxemia with a group A, Rh-positive child. Since the A factor is not present in the maternal blood, if fetal cell substances gain entrance, anti-A antitoxins will be produced within the mother. The toxin-antitoxin reaction which then occurs produces the toxemia. Furthermore, if a high antitoxin titer develops in the mother in her first A cell substance toxemia and she again becomes pregnant with a group A child before her antitoxin titer has diminished, she will have no signs of toxemia. However, this same mother may have several pregnancies with group O children and no toxemia.

(5) *Minnesota Med.* 31:372-375, April, 1948.

(*Obst. y ginec. latino-am.* 1:53, 1945) reviewed the literature and found that its incidence varied from 0.6 to 16.3 per cent. A. J. Guiroy and F. A. Uranga Imaz (*Prensa méd. argent.* 34:97, 1947) reviewed 250 cases of pyelonephritis among 111,773 pregnancies. There was one maternal death. The authors believe the basic etiologic factors are dilatation and infection. Colon bacillus was found in 86 per cent, staphylococcus in 7 per cent, streptococcus and enterococcus each in 2.8 per cent. Formerly treatment was with mandelic acid, vaccines and bacteriophage. Incidence of cure was low. Recently the sulfonamides have been used with considerable success. Penicillin has not been effective in cases of urinary infection, but streptomycin has been of great help. For example, W. S. Priest and J. B. O'Neill (*Am. J. Med.* 4:355, 1948) gave streptomycin to 19 patients with urinary infection due to gram-negative organisms. In 16 results were good. There was no recurrence in 14 patients followed from one to six months.

Mental disorders associated with pregnancy are not uncommon. A. M. Plenter (*Nederl. tijdschr. v. geneesk.* 92:1079, 1948) reports electroshock treatment of three patients with psychosis during pregnancy. Two recovered and gave birth to healthy living infants. One patient aborted after the sixth treatment; she recovered from the psychosis. J. L. Simon (*J. Nerv. & Ment. Dis.* 107:579, 1948) gave electroshock to three women in pregnancy, in two during the last month of pregnancy. D. A. Boyd, Jr., and DeW. W. Brown (*J. Missouri M. A.* 45:573, 1948) urge early utilization of electroshock in puerperal manic depression and schizophrenic psychosis because it will shorten duration of illness, reduce medical and nursing problems and produce a better recovery rate than any other treatment. In gestational psychosis shock therapy often makes it possible to carry the pregnancy to term and simultaneously improve the mother's physical condition.—Ed.]

THE TOXEMIAS

Serum Beta-Glucuronidase Levels during Toxemia of Pregnancy. Mean serum beta-glucuronidase level during normal pregnancy increases from 3 μ g at three months to 13.5 μ g near term. Lester D. Odell and Donald F. McDonald⁴ (Univ. of Chicago) studied the levels of 33 pre-eclamptic patients, 5 eclamptics and 42 patients with hypertensive toxemia. With few exceptions, levels were above 20 μ g in pre-eclamptic patients, but after the syn-

(4) *Am. J. Obst. & Gynec.* 56:74-85, July, 1948.

of five such patients. These facts suggest an altered filtration rate, possibly the result of vasospasm, as an underlying mechanism.

Elevated Blood Pressure in Pregnancy: Report of 1,800 Cases is presented by Walter F. Dillon and Herbert E. Schmitz⁷ (Chicago). Of 28,263 mothers delivered at Lewis Memorial Maternity Hospital in 1931-45, 1,800 (6.36 per cent) had blood pressure of, or over, 140/90 during all or part of pregnancy. Of the 1,800, 1,454 (5.14 per cent) had pre-eclampsia; 51 (0.18 per cent), eclampsia; 12 (0.04 per cent), nephritis, and 283 (1 per cent), hypertension.

Incidence of stillbirths and neonatal deaths in pre-eclampsia was 3.1 per cent and 1.5 per cent; in eclampsia, 18.1 per cent and 7.2 per cent; in nephritis, 33.3 and 8.3 per cent; in hypertension, 4.7 and 1.4 per cent. Fetal salvage of only 7 of 12 infants born of nephritic mothers shows the seriousness of this complication. Incidence of twins in the pre-eclamptic and eclamptic groups was increased, being 1:36 in the former and 1:13 in the latter, as compared with the normal ratio of 1:86.

There were five maternal deaths in the pre-eclamptic group, an incidence of 0.34 per cent. In eclampsia maternal mortality was 7.86 per cent, and in nephritis, 8.3 per cent. There were no deaths in the hypertensive group, but 5 of the 283 patients had cardiac decompensation, 2 with hydrothorax and one with acute pulmonary edema.

Maternal mortality associated with elevated blood pressure declined from 1:1,489 for 1931-35 to 1:7,755 for 1941-45. Improvement was due to such factors as close observation during pregnancy, labor and puerperium; institution of treatment on first appearance of toxemia, and individualization of treatment.

[In the discussion of Dillon and Schmitz's paper, W. J. Dieckmann (*Am. J. Obst. & Gynec.* 54:956, 1947) states that since 1933 he has favored the concept that patients who develop hyperten-

(7) *Am. J. Obst. & Gynec.* 54:948-957, December, 1947.

The importance of this hypothesis lies in the possible development of specific antitoxins for treatment of toxemia. Premarital blood grouping may also be useful prognostically.

Cold Pressor Test and Kidney Function. Lester D. Odell and Gloria T. Aragon⁶ (Univ. of Chicago) report results of prolonged (6½ minute) cold pressor tests on blood pressure and renal function in 14 pregnant and nonpregnant women. All but one of the former had evidence of pregnancy toxemia, and all of the latter had a history of hypertension. Constant conditions of water intake and urine excretion were observed.

In four patients serving as controls the rate of urine excretion, urea clearance rate, U:B (urine urea nitrogen: blood urea nitrogen ratio) and chloride and protein excretion remained relatively constant during four consecutive half-hour periods.

In 6 of 10 patients given the cold pressor test the amount of urine decreased significantly. The decrease was reflected in a sharp decline in urea clearance rate and chloride excretion per minute and in an increased U:B ratio. In four of this group proteinuria followed immersion. Blood pressure rose appreciably in five patients, and in only one was there no significant change in blood pressure.

In the four remaining patients no changes were observed in urine collected after exposure to ice water. This group was characterized by an initially low urea clearance rate, and in two patients by relatively low urinary output. Blood pressure, however, increased.

Whether the suppression and decline (per minute) in urinary chloride excretion following ice water immersion involves pituitary action requires further investigation. A higher maximal increase in systolic and diastolic blood pressure was noted in patients showing urine suppression, and proteinuria followed immersion in three

(6) Am. J. Obst. & Gynec. 54:867-871, November, 1947.

duration of pre-eclampsia and incidence of persistent hypertension shows a fairly rising line is hard to interpret on any other basis.

The foregoing reports indicate that a fairly high proportion of women with eclampsia and pre-eclampsia will be toxemic in subsequent pregnancies. This is no reason to prevent subsequent gestations, but women should be advised to wait at least two, and preferably three, years following an attack of toxemia before conceiving again. In pregnancies subsequent to toxemia the patients should be much more carefully watched than in normal pregnancies. Despite one article which condemns use of a salt-free diet, I believe that a very low salt content is important in prevention of toxemias of pregnancy. Whereas antepartum care is of the utmost importance in the prevention of toxemia, proper care during labor is also essential. Of great importance is the avoidance of inhalation anesthesia. Anesthesia should be by direct infiltration.—Ed.]

Effectiveness of Various Diuretic Agents in Causing Sodium Excretion in Pregnant Women was studied by Willis E. Brown and J. T. Bradbury⁸ (State Univ. of Iowa). The following substances were studied for their effect on sodium excretion: water, dextrose, aminophylline, mercurial diuretics, ammonium chloride and urea. A simplified method of sodium determination was used in the experiments. Pregnant, nontoxemic women were maintained on a known sodium intake, and the effect of the experimental substances on urinary sodium excretion was noted. Forcing fluids (6,000 cc. orally in two to three hours) resulted in decreased sodium concentration and diminished 24 hour sodium output. Fluid by vein slightly increased total sodium excretion. Use of isotonic and hypertonic dextrose solutions or urea did not alter 24 hour sodium excretion.

Aminophylline, 7½ gr. three times daily intramuscularly, produced vomiting, but despite this loss of water and sodium, urinary volume and urinary sodium concentration greatly increased. Mercurial compounds were the most effective in mobilizing sodium. Salyrgan, Salyrgan-Theophylline and Mercuhydrin considerably increased urinary sodium excretion by increasing sodium

(8) Am. J. Obst. & Gynec. 56:1-22, July, 1948.

sion early in pregnancy or who develop it late in pregnancy without abnormal weight gain and little or no edema or in whom systolic blood pressure is over 200 have essential hypertension. A follow-up of 600 patients who had had two or more pregnancies at the Chicago Lying-In Hospital, the first of which was complicated by toxemia, showed that 37 per cent had a recurrence of toxemia in the next pregnancy and three years later toxemia had recurred in 51 per cent. As more time elapsed, incidence of recurrent toxemia and of hypertension increased progressively. Among 1,700 toxemic patients Dieckmann found that 42 per cent had eclampsia or pre-eclampsia, 53 per cent had hypertensive disease, 3 per cent had glomerulonephritis and 3 per cent had nephrosclerosis.

F. P. Light (*Am. J. Obst. & Gynec.* 55:321, 1948) studied the records of 530 patients seen in the Toxemia Clinic of the Long Island College Hospital. There were 968 pregnancies, of which 685 were associated with toxemia or vascular-renal disease; 283 were normal. Duration of toxemia had little bearing on the incidence of residual damage. Age was a more important factor, incidence of residual damage progressively increasing with age of the patient. Light questions the validity of the assumption that hypertension occurring after toxemia is due to residual damage. Evidence is given that in some cases such hypertension would have occurred had the patient never become pregnant.

J. L. Mastboon in a monograph (Amsterdam: N. V. Noord-Hollandsche Uitgevers Maatschappij, 1948) dealing with the cases of toxemia observed at the University of Amsterdam reports on a follow-up of eclamptic patients from 1938 to 1946. In 25 per cent of eclamptic patients and in 52 per cent of the pre-eclamptic he found residual hypertension, i.e., blood pressure over 140/90. Residual renal disease with and without hypertension was found in 12.7 and 16.2 per cent, respectively, of eclamptic and pre-eclamptic patients. A study of succeeding pregnancies revealed that 30 per cent of the women who had eclampsia had a recurrence and 56 per cent of those who had pre-eclampsia had a recurrence of toxemia. Hence he believes that to forbid subsequent pregnancies because of previous eclampsia is unjustifiable. Seventy per cent of all the eclamptics had subsequently normal pregnancies. M. A. Van B. Bastiaanse (*Belg. tijdschr. geneesk.* 3:193, 1947) maintains that permanent hypertension may result from toxemia of pregnancy and the longer the duration of toxemia the greater the chance for permanent hypertension. The stage at which toxemia begins is not important. It seems to L. C. Chesley (*Bull. Margaret Hague Mat. Hosp.* 1:81, 1948) that prolonged toxemia probably causes chronic hypertension. The fact that the relationship between

Admission diastolic blood pressure was 90-141 or above; 25 patients had diastolic pressure of 100-120 and 11 of 141 or above. Thirty-eight patients had definite ocular changes: thinning of the vessels, increased light reflex, tortuosity of the vessels and arteriovenous nicking. Enlarged hearts were found in 25. Of 46 patients whose nutritional status was recorded 33 were obese. Albuminuria was an almost constant finding and connoted a serious prognosis. Blood uric acid values were high in 35 patients. These findings suggested the presence of hypertensive cardiovascular renal disease and superimposed pre-eclampsia. Seven deaths followed therapeutic abortion. Shock accounted for 12 deaths. No explanation could be found for this high incidence.

Observations on Pre-eclampsia, Eclampsia and Hypertensive Vascular Disease in Pregnancy. At Duke Hospital from 1931 to 1946 in 11,000 deliveries there were 206 maternal deaths. Of these deaths, 54 were in pregnant patients with hypertension and 35 in eclamptic patients, a total of 89 from these two causes (43.2 per cent of total deaths). R. A. Ross, F. Bayard Carter, S. S. Lambeth and Robert N. Creadick¹ (Durham, N. C.) compared these patients with 53 pre-eclamptic, eclamptic and hypertensive patients who survived.

The bad effect of increasing age on prognosis was seen from the fact that 40 of the hypertensive patients who died, but only 20 of the survivors, were over 30. Repeated pregnancies also had an unfavorable effect on the hypertensive woman. Only 9 of the 54 hypertensive patients who died had had no previous pregnancies, as compared with 21 of those who survived; 30 who died had had six or more previous pregnancies. The ratio of white to Negro patients was 25:29 in the hypertensive death group, 14:21 in the eclamptic death group and 21:32 in the surviving group. Inasmuch as the delivery ratio of white to Negro at Duke Hospital is 8:5, it is

(1) South. M. J. 41:803-809, September, 1948.

concentration and urinary volume. Ammonium chloride, 12 Gm., increased urinary sodium excretion by increasing urinary volume, but the increase was of short duration and not maintained by continued drug administration. Three toxemic patients responded to aminophylline and mercurials in the same manner as women with normal pregnancies.

Diuretic agents increase sodium excretion by: (1) a "wash-out" mechanism induced by giving hypotonic fluids intravenously; (2) production of acidosis, as in the case of ammonium chloride, which results in increased sodium mobilization and urinary volume; and (3) changing renal function so that sodium concentration in the urine increases, as in the case of the mercurial and xanthine diuretics. The evidence suggests clinical trial of the mercurials and xanthines in management of toxemic patients.

[L. R. L. de Gouvea (Arch. brasil. de med. 38:152, 1948) extols the virtues of vasodilators in the treatment of eclampsia. He particularly* favors theophylline which he uses in conjunction with digitalis, morphine, magnesium sulfate and oxygen.—Ed.]

Fifty-Four Deaths Occurring in Pregnant Patients Who Had Hypertension are analyzed by Robert A. Ross, S. S. Lambeth, W. L. Thomas and F. B. Carter⁹ (Duke Univ.). Deaths from eclampsia were excluded. A steady increase in the importance of hypertension as a cause of maternal mortality was noted in a review of the Duke Hospital records from 1931 to 1946. Although most of the 54 patients were first seen in the last trimester of pregnancy and records were therefore incomplete, it was believed that most, if not all, had pre-existing hypertension. The majority were aged 30 or over; 45 were multiparas. Average number of previous pregnancies was 5.8, average number of living children, 4.6. Although the delivery ratio of white to Negro patients is eight to five, 29 of the 54 were Negroes. Only 17 of 58 infants born survived the neonatal period.

(9) Am. J. Obst. & Gynec. 55:591-599, April, 1948.

203 had convulsions and 106 did not. Mortality was 11.1 per cent in the whole group and 15.2 per cent in those with convulsions. Twenty-one Negro and 14 white patients died. The inverse ratio of white and Negro patients is significant. Whereas total deliveries were in a ratio of 8 white to 5 Negro, deaths among eclamptics were in a ratio of 3 Negro to 2 white. Lack of prenatal care was significant in this connection: 19 patients had not seen a doctor during pregnancy until convulsions occurred; 5 had made one visit to a doctor, 9 had made three visits, 1 had "fair" prenatal care and only 1 had good care.

On checking the localities from which toxemic patients were referred it was found that in the areas in which eclampsia occurred most often there was likely to be a high percentage of pellagra and similar diseases. The diet was grossly deficient in all vitamins, especially A, C and D, as well as being inadequate in minerals and proteins. Energy-producing elements were adequate as a whole, although the diet was likely to have been deficient both quantitatively and qualitatively.

With no sharp demarcation there are three dietary groups of patients: (1) the intelligent, economically capable, (2) the fairly co-operative, adequately nourished and (3) the uninformed, improperly nourished, medically inarticulate. Toxemia was rarely found in the first two, but it is the prime factor in maternal mortality in the last.

Heart in Toxemia of Pregnancy. Paul Szekely and Linton Snaith³ (Newcastle Gen'l Hosp., Newcastle-upon-Tyne) studied 19 unselected cases clinically and cardiographically; 9 were also studied roentgenographically.

Seven patients showed significant cardiac involvement. Left ventricular failure with T wave changes in the cardiogram similar to those seen in anterior myocardial infarction developed in one. Two had left ventricular fail-

(3) Brit. Heart J. 9:128-137, April, 1947.

apparent that hypertensive disease and eclampsia affect Negro women more often and more severely. Prepartum care of most patients in all groups was poor.

Among the significant laboratory data was elevated uric acid level in all groups having hypertension in the last trimester of pregnancy. Urine albumin was noted in 46 of 53 patients. In the hypertensive death group urine albumin was found in 44 of 51 patients. The tendency toward uremia, as manifested by elevated nonprotein nitrogen value and decreased urine output, was strikingly absent in the 53 patients who survived.

For many years at Duke Hospital fluid intake of pre-eclamptic, eclamptic and hypertensive pregnant patients had been restricted. During this study fluids were forced (3,000-4,000 cc. daily) in 41 patients and restricted (1,000-1,500 cc.) in 12. Although no conclusions could be drawn from this limited survey, liberal fluid intake was usually well tolerated, and in view of the occurrence of uremic tendencies among patients with restricted fluid intake, the authors were inclined to consider more favorably ingestion of large amounts of water.

They make a plea for discontinuance of morphine in convulsive or pre-eclamptic states and for use of Demerol instead. Demerol is rapidly dissipated, usually produces some fall in blood pressure, gives no evidence of cardiac depression and is less of a respiratory depressant than morphine.

Among the 53 surviving patients, labor was induced in 26 and spontaneous in 25; abdominal section was used in 2. Of the infants, 21 were stillborn. Most patients had residual hypertension, only 15 of the 53 having normal blood pressure four weeks after delivery.

Late Toxemias of Pregnancy: Number One Obstetrical Problem of the South are discussed by Robert A. Ross² (Duke Univ.) on the basis of analysis of 309 cases of eclampsia occurring in 11,000 deliveries. Of the patients,

(2) *Am. J. Obst. & Gynec.* 54:723-730, November, 1947.

Fatal Eclampsia: Clinical and Anatomic Correlative Study. George T. C. Way⁴ (Duke Univ.) summarizes 33 fatal cases of eclampsia studied at autopsy.

Age range was 13-41 (mean 24.1). Average age of the primiparas was 19.7, as compared with 29 for the multiparas. Seventeen patients (51.5 per cent) were primiparas, whereas 16 (48.5 per cent) were multiparas—a much lower ratio than that usually given.

Ten patients (30 per cent) had some prenatal care. Seven (21 per cent) had a family history of hypertension. One patient had three sisters who died of eclampsia.

Of the 16 multiparas, 11 had shown signs and symptoms of pre-eclamptic toxemia in at least one previous pregnancy; 5 of the 11 had had clinically recognized eclampsia.

Headache, edema and convulsions were the most outstanding symptoms before admission. Twenty patients had had at least one generalized seizure; five others had seizures in the hospital; the other eight had no convulsions.

Hypertension was present in all 33 patients, except one who was in shock when admitted. Generalized edema was demonstrated in 25 (78 per cent); 19 (69 per cent) were in coma; 20 had tachycardia of 100 or more; 11 had pulmonary edema; 9 had temperature of 100.4 F. or higher; 8 had hyperpnea with 30 respirations per minute or more; 4 were cyanotic.

Increase in nonprotein nitrogen was slight, but values for uric acid were definitely increased (mean value 5.88 mg. per cent). Total plasma protein was 4.97 per cent and albumin-globulin ratio 0.84.

Average duration of pregnancy was 7.6 months. Stay in the hospital averaged 2.88 days, but two patients lived 10 and 11 days.

Hepatic lesions consisted of focal fibrinoid necrosis,

(4) *Am. J. Obst. & Gynec.* 54:928-947, December, 1947.

ure with normal cardiographic tracings. Four others showed no clinical evidence of cardiac failure, but their cardiograms showed T wave changes interpreted as indicating myocardial damage, and one of these had postpartum vascular collapse. Six patients showed cardiographic changes of doubtful significance, and in six both clinical and cardiographic findings were normal.

Changes in the heart appear to be temporary, but their duration varies considerably. Changes may not only persist some time after delivery, but may become greater post partum. Gross cardiac enlargement does not appear to be a feature of cardiac lesions of pure toxemia, irrespective of presence or absence of cardiac failure. Only one patient (with possible antecedent hypertension) showed enlargement of the left ventricle.

Toxemia of pregnancy is an acute vascular disorder, and in this respect closely resembles acute glomerulonephritis. Cardiographic changes in toxemia of pregnancy are similar to those seen occasionally in acute glomerulonephritis. However, that the changes in toxemia may consist of focal myocardial necrosis cannot be disregarded. Although convincing proof of direct damage to the myocardial vessels is lacking, possibility of structural damage to the small coronary branches cannot be excluded.

There appeared to be no close correlation between severity of toxemia and degree of cardiac damage. Duration of toxemia may be more important in producing cardiac damage.

These observations indicate that cardiac involvement is not uncommon in toxemia of pregnancy. Some cases of acute antepartum or postpartum cardiac failure of undetermined cause may be consequent to toxemia, even though signs of toxemia are not convincing at onset of cardiac failure, and some cases of vascular collapse (obstetric shock) may be instances of true toxemia.

patients were moribund on entrance and died soon after.

Of 33 infants in this group, 18 (54.5 per cent) were discharged alive; 13 (39.2 per cent) were stillborn, and 2 (6.3 per cent) died. Nine of the 13 stillborn infants weighed under 4 lb. Total fetal mortality was 45.5 per cent.

General routine treatment followed in the main that of Bryant and Fleming. The patient is placed in a quiet, darkened room with a nurse in constant attendance. Morphine, $\frac{1}{4}$ gr., Demerol 100 mg. subcutaneously or 3 drachms paraldehyde in 2 oz. mineral oil are used to control restlessness, but are not given routinely. Five minims of veratrone is given hypodermically on admission. Veratrone is repeated as necessary in 5-10 minim doses at 20 minute intervals to keep systolic blood pressure below 150 and pulse rate below 80, or if there is a convulsion. Magnesium sulfate in 50 per cent solution is given intramuscularly into the buttocks in 10-20 cc. amounts every four to six hours. Two hundred and fifty cc. of 25 per cent glucose in buffered sterile water is given slowly every four hours if the patient is unconscious. If conscious, it is given every six hours. Fluid is given parenterally in amounts sufficient to prevent dehydration but insufficient to cause edema. If the patient is conscious she is given 2,000-2,500 cc. water every 24 hours.

Pregnancy is terminated only after convulsions have ceased and an interval of 24-72 hours has elapsed. If the cervix is partially effaced and dilated enough to admit one or more fingers, the membranes are artificially ruptured; if not, a Voorhees bag is introduced. Cesarean sections are performed only on strictly obstetric indications. Once induced, labor is allowed to proceed normally and to terminate, if the presentation is vertex, either by normal delivery or low forceps. Ether with oxygen is usually given in normal deliveries and low spinal anesthesia in operative deliveries.

usually of recent origin, with or without hemorrhage. Renal lesions were divided into three stages of development: (1) with glomerular but no arteriolar alterations, typical in 33 per cent of cases; (2) characterized by thickening of the arteriolar wall, observed in 48 per cent of cases; (3) with lesions similar to those of arteriolo-nephrosclerosis, in 18 per cent. Hemorrhage and necrosis in the adrenals were seen in 11 cases, in 5 of which they were classified as severe. Additional lesions found were: pneumonia; focal necrosis of myocardium, pancreas and brain; acute endometritis; cerebral hemorrhage; cystitis; acute mastitis, and cerebral arteritis and arteriolitis. Aside from their immediate effects, these lesions reflect tissue changes resulting from the profoundly altered physiology of the vascular system.

[As emphasized by W. J. Dieckmann (Am. J. Obst. & Gynec. 55:541, 1948), there is no pathologic lesion in the liver or in the kidney which is characteristic of eclampsia. Since liver and kidney lesions are not peculiar to eclampsia and pre-eclampsia and since the Goldblatt kidney does not produce eclampsia, it seems that animal experiments are of little value in determining the etiology of eclampsia. Furthermore, since eclampsia and pre-eclampsia are entities peculiar to the human race, studies concerned with etiology and treatment must be made on pregnant women and not on animals. According to Dieckmann, high spinal anesthesia, especially with a catheter technic, seems of proved value in the treatment of cardiac failure with pulmonary edema, a serious complication of eclampsia. If this work is confirmed it is the most important contribution to the treatment of eclampsia and pre-eclampsia in the past decade.—Ed.]

Treatment of Eclampsia and Pre-eclampsia with Veratrum Viride and Magnesium Sulfate has given better results than treatment with magnesium sulfate alone, according to Frederick C. Irving⁵ (Boston Lying-in Hosp.). From 1940 to 1946, 32 patients were treated with both drugs, with 2 deaths, a maternal mortality of 6.2 per cent. Both deaths occurred in neglected emergency cases referred from small outside hospitals; the

(5) Am. J. Obst. & Gynec. 54:731-737, November, 1947.

not be attempted until the cervix is completely dilated.

[This brief paragraph is an excellent summary of the treatment of eclampsia.—Ed.]

One important advantage of the Stroganoff method is its simplicity. It can be carried out in the home if necessary, and if the patient's improvement warrants it, treatment may be suspended at any point.

Sedation with Rectal Tri-brom-ethanol (Avertin, Bromethol) in Management of Eclampsia was used in 44 consecutive unselected cases by J. Bruce Dewar and W. I. C. Morris.⁷ The drug was administered by slow rectal injection in a 3 per cent solution in water, dosage being calculated in relation to body weight. Repeated doses were administered three hours apart, when necessary. Little difficulty was encountered in making the injection.

Convulsions recurred in only 3 of the 44 patients, and in only 1 was there more than a single recurrent seizure. Within 20 minutes of the first injection the patient became quiet, with tranquil breathing; color remained good, and respiratory embarrassment was restricted to palatal stridor. No patient vomited. When blood pressure was seriously elevated, a sharp fall invariably occurred. Apart from poor use of abdominal muscles, there was no interference with the normal course. Serious apnea was rare in babies whose hearts were still beating on delivery. No case of neonatal death could be attributed to the method of sedation.

There was no clinical evidence of liver damage, nor of undesirable side-effects other than bronchitis. No case was alarming, and incidence appears to be no higher than after other methods of managing eclampsia. No case of anuria occurred. However, since the drug is excreted by the kidneys, prolonged effect from a single dose given to a patient in established anuria might be anticipated.

The only contraindication observed was presence in

(7) J. Obst. & Gynaec. Brit. Emp. 54:417-425, August, 1947.

Treatment of patients with severe pre-eclampsia follows the same principles in a modified form.

Detailed study by Tower of 18 of these cases showed that average fall in blood pressure was 86/52 with an average dose of 10 minims of Veratrone in an average time of 42 minutes. These patients received an average of 11-12 doses, with an average total of 62 minims (about 4 cc.).

Irving believes that results of treatment since adoption of Bryant's method are so much more satisfactory than those obtained by previous methods that it will continue to be used until something better appears.

[Two years ago J. R. Willson (1946 YEAR BOOK OF OBSTETRICS AND GYNECOLOGY, p. 114) reported that although *Veratrum viride* consistently reduces blood pressure and pulse rate in pre-eclamptic patients, it causes an undesirable suppression of renal function and its good results can be duplicated in patients not given this drug.—Ed.]

Conservative Treatment of Eclampsia with Emphasis on Stroganoff Method. Karl M. Wilson⁶ (Univ. of Rochester) reports results in 66 cases of eclampsia in which a modification of the Stroganoff method was used. These cases occurred in 20,940 deliveries, an incidence of 1 case in 317 deliveries. Gross maternal mortality was 9.9 per cent, and fetal and neonatal mortality, 37.3 per cent. All 6 maternal deaths occurred among 35 women with antepartum eclampsia. The fact that many of these patients had no prenatal care and came to the hospital only after the attack began possibly contributed to the mortality in this group. Eighteen of 25 infant deaths occurred in this group; only 3 of the 18 infants were full term.

Results with any reliable conservative method of therapy are far superior to those with radical intervention. Cesarean section and other major operative procedures have no place in treatment of eclampsia, unless associated factors indicate such intervention. Delivery should

(6) New York State J. Med. 48:79-81, Jan. 1, 1948.

the war. However, in 1946 the number of eclamptic cases was fairly large in proportion to the size of the population and the number of deliveries. The author believes that the cause for this increase was the consumption of salt, not the greater amount of albumin in the food. He believes that the only simple means of preventing eclampsia is regular weight check to detect possible edema, check of blood pressure and urine and adherence to a saltless diet, if pregnancy toxemia appears. On the other hand, H. A. Viet (*Nederl. tijdschr. v. geneesk.* 92:1380, 1948) presents four cases which indicate that deficiency in sodium chloride may lead to uremia in pregnant or puerperal women. Hence a salt-free diet, though helpful in some cases, is not entirely without danger, particularly if it is continued over long periods. B. S. Ten Berge (*Nederl. tijdschr. v. geneesk.* 92:2378, 1948) treated six women with severe toxemia by means of intravenous injections of concentrated plasma. Favorable results were observed in women with brain edema, pulmonary edema and shock. J. Van S. Mæck and H. Zilliacus (*Am. J. Obst. & Gynec.* 55:326, 1948) report the use of heparin in a case of toxemia of pregnancy. Abrupt, striking and continuing improvement was observed nine hours after treatment with 150 mg. heparin intravenously. Three additional cases of toxemia treated by heparin in Finland are mentioned. M. B. Rodriguez Lopez (*Obst. y ginec. latino-am.* 6:44, 1948) treated two women with eclamptic anuria by means of intravenous injection of 10 cc. of 1 per cent Novocain every six hours. A few hours after the first injection flow of urine began, and after the second injection flow became normal. The author believes that anuria was due to a spasm of the renal artery.

H. Jost (*Am. J. M. Sc.* 216:57, 1948) obtained 33 electroencephalographic records before, during and after convulsions in nine women. He showed that these changes were associated with drop in blood pressure. When blood pressure did not change, the encephalogram did not improve. Convulsions were controlled by the drop in blood pressure. It is suggested that perhaps angio-spasms played an important role in the eclamptic convulsions.—Ed.]

Further Follow-Up Study of Eclampsia was made by Leon C. Chesley, Willard H. Somers and Felix H. Vann⁹ (Margaret Hague Maternity Hosp.) on the basis of repeated re-examination of post-eclamptic patients after periods varying up to eight years. Incidence of persistent hypertension after an eclamptic pregnancy found in a similar study in 1940 was 19.30 per cent, whereas that

(9) *Am. J. Obst. & Gynec.* 56:409-421, September, 1948.

one patient of concealed accidental hemorrhage with marked shock.

Second and subsequent doses were delayed in the presence of moist sounds in the respiratory passages, until the cough reflex was active. Even this consideration was overridden when the patient's appearance suggested that a seizure might be imminent.

Maternal mortality was 4.5 per cent and fetal mortality 30.6 per cent.

Overtreatment of Eclampsia. In four years, 461 toxemic patients were treated at Parkland Hospital, with 6 deaths. Five deaths occurred within nine months, and pulmonary edema resulting from excessive fluid administration accounted for or was a feature in all of them. As a consequence, a policy of limitation of fluids was adopted. William F. Mengert and Richard L. Hermes⁸ (Southwestern Med. College) report use of this regimen in 21 eclamptic patients, without a maternal death. Eight women were severely eclamptic by Eden's criteria. The current treatment at Parkland Hospital follows.

METHOD.—On admission, or after the initial convulsion, $\frac{1}{4}$ gr. morphine is injected intravenously and $\frac{1}{4}$ gr. subcutaneously. Additional drug is administered with 30 minutes' observation between treatments so that respiratory rate is reduced below 14, but not below 10 per minute. Occasionally, an enema of 20-30 gr. chloral hydrate in 200 cc. water is substituted to avoid excessive morphinization. External stimuli are avoided. A medical student remains in constant attendance. Fluid intake is limited to replacement of the daily insensible loss, calculated as 1,500 cc., plus the amount of previous 24 hour urinary output. No hypertonic solution is given; 5 per cent glucose in distilled water is the standard infusion material. Obstetric status is ignored during the convulsive phase and treatment conducted without regard for the pregnancy. After convulsions are controlled, sedation is achieved with 3 gr. phenobarbital daily. Labor is induced preferably three days after the last convulsion.

[W. Van Essen (Nederl. tijdschr. v. geneesk. 91:3629, 1947) reports that eclampsia was almost nonexistent in Deventer during

(8) J. Missouri M. A. 45:643-646, September, 1948.

sult from great anomalies in the processes developing in the different systems and apparatus of the mother, fetus and chorionic villosities and depend on various factors, among which the psychic factor is perhaps predominant. León therefore considers the term gravidic toxemia, pregnancy toxicosis and gestosis improper since they suggest presence of a circulating toxin which so far has not been isolated. He proposes the term gravidic psycho-organic disequilibrium and suggests that the anomalies which appear during pregnancy and are intimately connected with it be grouped according to distribution of the manifestations in the various systems and apparatus. This classification is interesting because it promotes in concrete form psychophysical unity. León accords a special place to what he calls the edemourinary and eclamptic hypertensive complex. Under this he lists the following subdivisions, based on whether disequilibrium manifestations are isolated or associated: gravidic hypertension, gravidic albuminuria, gravidic edema, gravidic nephrosis, gravidic glomerulonephrosis, and glomerulonephritis with slight pre-eclamptic and eclamptic phases, the latter with convulsive, comatose and hemorrhagic forms. Finally he includes bilateral cortical necrosis of the kidneys and gravidic pyelonephritis.

[J. Leon (An. Serv. de obst. d. Hosp. Cosme Argerich 1:51, 1947) presented a paper on the same subject before the New York Obstetrical Society on Feb. 11, 1947. He reiterated his position that in the so-called toxemias of pregnancy the mental factor played the primary role.—Ed.]

found in the present study (1946) was 7.80 per cent. The two series did not differ materially in severity of toxemia or interval between convulsions and delivery. The authors suggest, therefore, that at least a partial explanation for the lowered incidence of persistent hypertension is to be found in their management of pre-eclampsia. Recently, treatment has been more radical. One fourth of the eclamptic patients of the older series were carried with toxemia for over three weeks; only 3.4 per cent of the newer series were allowed to continue with toxemia for over three weeks.

Prognosis in future pregnancies for the eclamptic patient is important. On the basis of these studies it appears that there is one chance in three that any pregnancy following eclampsia may be toxic. Unfavorable prognostic criteria are: (1) initial systolic pressure above 120 mm. Hg, (2) average blood pressure in eclampsia above 160 mm. Hg, (3) duration of toxemia of more than one week, (4) failure of blood pressure and urine to return to normal by the tenth postpartum day and (5) a weight-height ratio, at follow-up, greater than 2.2 lb. per in.

The authors believe that toxemia of pregnancy may cause later hypertension. Longer duration of toxemia and its equivalent in recurrent toxemia seem to have an effect in increasing the incidence of later hypertension. Post-eclamptic patients examined in 1940 and again in 1946 have not shown an increasing incidence of hypertension, as might be expected if eclampsia were merely a stigma of later hypertensive disease.

Pregnancy Toxemia. Juan León¹ (Buenos Aires) agrees with the theory that the so-called toxemias of pregnancy are not due to toxic substances of ovular origin. Instead of the equilibrium typical of pregnancy, there is marked neurovegetative, glandular, ionic and colloidal disequilibrium. The morbid manifestations re-

(1) An. Serv. obst. d. Hosp. Cosme Argerich 1:25-41, December, 1947.

beyond that distance. Among the former, especially those capable of short labor, patients are given 3 gr. Nembutal and instructed to take the capsules after onset of labor when uterine contractions are occurring at 8-10 minute intervals. Those presenting evidence of short labors or impending labor and living over 50 miles away are advised to establish residence near or to enter the hospital for an attempt at elective induction of labor. For patients living over 50 miles from the hospital and unable to establish residence nearby a slightly increased degree of responsibility must be assumed by the physician and the patient admitted for trial induction of labor.

In determining the optimal time for trial induction of labor, observation of changes occurring in the cervix and lower uterine segment during the terminal weeks of pregnancy is essential. These are consistent and, at present, offer the most valuable information as to the time of onset and type of labor to be expected. Vaginal examination under sterile precautions at the end of 36 and 38 weeks of pregnancy does not increase the incidence of infection at the time of delivery.

If vaginal examination at the end of 36 weeks reveals that the cervix still has some length or that the rim is thick, firm, not universally softened, not dilated more than 2 cm. and accompanied by a high station of the presenting part, the patient is permitted to return to her home for 7-10 days rather than attempt induction. If induction is attempted, administration of castor oil followed by series of Pitocin drops intranasally offers a highly effective, safe method. When not effective additional stripping of the membranes insures a higher degree of success without danger to mother or fetus. Artificial rupture of the sac should be reserved until labor has been initiated by conservative measures or reserved for cases in which the cervix is well effaced, soft, partially dilated and in close contact with the presenting part.

[This paper is important. Many women live in communities

LABOR

GENERAL

Duration of Labor: Mean, Median and Mode. Trent Busby² reviewed 14,775 parturitions at Johns Hopkins Hospital to determine the mean, medial and modal duration of labor. Median and modal durations are more statistically significant than mean or average and certainly more in keeping with obstetrical experience.

In white primiparas, the mean was 13.04 hours, the median 10.59 and the mode 7; in white multiparas, the mean was 8.15 hours, the median 6.21 and the mode 4. In Negro primiparas, the mean was calculated as 15.15 hours, the median as 12.37 and the mode as 7; in Negro multiparas, corresponding findings were 10.27, 7.31 and 4.5 hours. Average duration of labor is longer in Negro than in white patients because of the greater incidence of prolonged labors in the former, a fact which distorts frequency distribution.

Problem of Delivery of Nonresident Patient is reviewed by E. D. Colvin, R. A. Bartholomew and W. H. Grimes, Jr.³ (Emory Univ.). Patients living within a radius of 25-250 miles who register for care in the maternity section of a hospital at delivery present a serious problem for adequate and satisfactory obstetric management. Three choices in management of labor in these patients are (1) to await spontaneous onset of labor at home, (2) to advise establishment of residence in the vicinity of the hospital within a short time of the expected date of confinement and (3) to arrange admission to the hospital for elective induction of labor.

Management of patients living within a 50 mile radius of the hospital differs from that of patients who live

(2) *Am. J. Obst. & Gynec.* 55:846-851, May, 1948.

(3) *Ibid.* 54:755-765, November, 1947.

who use rupture of the membranes to induce labor and properly choose their cases seldom have cause for regret that a great deal of the liquor amnii escaped during early labor. I intend to use the Drew-Smythe catheter more frequently to see if it is a better means of inducing labor than rupture of the membranes in front of the head.—Ed.]

Prophylactic Induction of Labor in Prolonged Pregnancy. Josue A. Beruti and Carlos Roust⁴ are convinced, on the basis of 1,712 cases of prolonged pregnancy selected from a series of 50,000 deliveries at Ramos Mejía hospital since 1918, that prophylactic induction of labor is being used excessively in cases of prolonged pregnancy.

The predominance of male infants in the series of prolonged pregnancy was associated with a higher death rate, which confirms but does not explain observations of others. In many cases fetal death was the inevitable result of induction of labor, whatever the method. Danger of waiting probably does not outweigh danger of the procedure.

Since fetal risk in this series did not exceed 5.9 per cent (as compared with 4.5 per cent in the entire series of 50,000 from which this group was selected), induction of labor in cases of prolonged pregnancy would have been unnecessary in 94.1 per cent.

In the presence of formal indications for induction of labor, such as a dead fetus or obvious disproportion, whether or not the pregnancy is prolonged, induction of labor is not condemned. Only its routine use in cases of prolonged pregnancy is criticized.

[True prolongation of pregnancy is rare. In most instances in which gestation continues after the estimated date of confinement there is a miscalculation either because the patient's memory of the date of the last menses was fallacious or the menstrual intervals were five or six weeks apart instead of the usual four. Calculation of the expected date of delivery from the beginning of the last menses can be erroneous. The way to decide whether a pregnancy is at or beyond term is to make a sterile vaginal exam-

(4) *Semana med.* 55:243-245, Feb. 12, 1948.

where there are no specialists in obstetrics and yet need the skill of a specialist. The ideal arrangement is for such a patient to live in the city of her chosen obstetrician for four or five weeks before term. This, however, is expensive, inconvenient and in many instances impossible. The question of induction of labor must be considered in such cases. I believe that induction is indicated provided the fetal head is low and the cervix is soft, partially effaced and somewhat dilated. Such a cervix is usually found 7-14 days before onset of labor. If the cervix is long and not effaced and dilated, labor should not be induced, regardless of the clinical history. This warning cannot be given too often. Those who disregard the condition of the cervix and induce labor when the cervix is not ripe for induction will often get into trouble. On the other hand, when labor is induced by medicinal or mechanical means in patients in whom the cervix is partially effaced and dilated and the head is low in the pelvic cavity there will be very little difficulty.

J. Guegen (*Médecine* 28:17, 1947) used sparteine sulfate as an oxytocic in 54 cases. He concludes that this drug is useful and less dangerous than hypophyseal extract. (See the 1946 YEAR BOOK OF OBSTETRICS AND GYNECOLOGY, p. 121.)

Despite repeated warnings during the last 40 or 50 years, articles occasionally appear which claim that ergot preparations are useful for induction of labor. I would again warn physicians not to use ergot in a parturient woman until after the baby has been delivered. Ergot preparations should never be used during pregnancy or the first or second stages of labor to prevent or control uterine bleeding. The only exception is the use of ergonovine intravenously at the time of delivery of a baby. This is the end of the second stage and the beginning of the third stage.

In England the most popular method of inducing labor is by means of the Drew-Smythe metal catheter which permits rupture of the bag of waters high in the uterus. As emphasized by A. Davis (*Am. J. Obst. & Gynec.* 55:548, 1948), bags and bougies are rarely used in England. The Drew-Smythe catheter has the great advantage of leaving the forewaters and consequently the uterine bacteriologic barrier intact, and it has drastically reduced incidence of infection. Labor does not always ensue immediately but does so in most cases. In any event, the procedure may be repeated two or even three times. Simultaneous stimulation with a complete medical induction is a useful reinforcement, and the danger of hemorrhage from damage to the placenta is negligible in careful hands. Davis gave me a Drew-Smythe catheter, which I have used twice with satisfactory results. I must add, however, that I do not believe that the forewaters play an important role in normal labor. Those

hours, another injection of 200 or 300 cc. produces expulsion of the uterine contents in one stage.

In all their cases of retention of a dead fetus, injection of opaque substance into the amniotic cavity has allowed the authors to control the injections fluoroscopically and to study the uterine contractions and action of various drugs on the contractions. Amniography outlines the uterine cavity and sometimes localizes the placenta; it shows the contours of the fetus and reveals certain deformities without skeletal changes, invisible on plain films (fetal ascites).

[I see no reason for sticking a needle through the abdomen to remove excess fluid. In cases of acute polyhydramnios there is often a monstrosity, so that nothing is to be gained by prolonging pregnancy. Even if there is no monster, withdrawal of fluid is usually followed by accumulation of more fluid. We have far more certain methods of initiating labor than the injection of artificial serum into the amniotic cavity. As regards the third indication, namely, therapeutic abortion at the beginning of pregnancy, it is certainly far safer to do a dilatation and curettement than to try to inject substances into the pregnant uterus through the abdominal wall. Repeated abdominal injections are certainly inadvisable. Many years ago, E. L. Cornell and J. T. Case (*Am. J. Obst. & Gynec.* 27:894, 1934) used amniography in six women for whom cesarean section was scheduled. In all cases the placenta was punctured by the needle, in two the puncture penetrating Schultze's fold in the cord; in one of these it was within 1 mm. of a large fetal vessel.—Ed.]

Action of Intravenous Spasmalgin on Uterine Contraction and Course of Labor in the Primipara: Fifteen Observations with Hysterographic Tracings. H. Pigeaud and A. Notter⁶ (Lyon) present three tables which show that Spasmalgin slightly slows down contraction rhythm, variably modifies the maximal force of contraction with a tendency to decrease it, and diminishes uterine tonus nearly constantly during the interval between contractions. The value for the differential contraction (expression analogous with that used in registering arterial tension) is therefore generally little changed.

(6) *Gynec. et obst.* 47:60-65, 1948.

ination. If the cervix is closed the patient is not at term regardless of how many days or weeks she has gone beyond the day calculated for delivery. If the cervix is effaced and partly dilated the patient is near, at or beyond term. In such a case the dates and the size of the baby must be taken into consideration. If the history is accurate and the baby appears to weigh more than 4,082 Gm. (9 lb.), especially if the parents are not unusually tall or heavy, the pregnancy may be considered as being overterm. However, postmaturity is by no means as frequent as is commonly believed. Failure to realize this has caused many physicians to induce labor in patients who are not at term. Frequently, the induced labors last two or more days and the result is a dead baby and often an infected and lacerated mother. Therefore, before labor is induced in any patient, except for toxemia or other strict indication, one must be sure that the cervix is soft, partially effaced and somewhat dilated. This admonition cannot be repeated too often.—Ed.]

Puncture of Membranes and Amniography. L. Portes and A. Granjon⁵ (Paris) found that transcutaneous abdominal puncture with a lumbar puncture needle is easy, causes no appreciable trauma and may be used without anesthesia. The needle can be adapted to a monometer to register amniotic pressure and study its changes. They have used this method for removal of amniotic liquid in acute hydramnios of univitelline twin pregnancies to allow prolongation of pregnancy until the fetuses were viable, for injection of artificial serum into the amniotic cavity to initiate labor in uterine retention of a dead fetus and in therapeutic abortion at the beginning of pregnancy.

In retention of a dead fetus, the amounts injected varied from 300 to 600 cc. serum, depending on when the pregnancy was arrested in its development. In therapeutic abortion, puncture may have to be repeated. At the first puncture veritable lavage of the amniotic cavity in several stages is performed with 400-500 cc. serum, causing alternate hyper- and hypotension which results in death of the fetus. If labor does not start in 48 or 72

(5) *Gynec. et obst.* 47:42-48, 1948.

correctly established; women who have been given narcosis do not seem to respond. Oxygen may be given by nasal catheter or tracheal intubation if necessary. The beneficial effect of oxygen on the fetus is evident within a few minutes of its administration to the mother.

[It is now generally recognized that in cases of fetal distress evidenced by irregular heart counts, administration of oxygen to the mother will relieve fetal distress. Of course, if the oxygen supply to the baby is cut off by mechanical means its administration will not help. A. S. Gutman (Brasil med.-cir. 10:63, 1948) reports 32 cases of fetal distress in which oxygen was administered to the mother. In 15 oxygen alone gave excellent results. In every case of fetal suffering oxygen administration should be the first method of treatment.—Ed.]

Estimation of Pelvic Capacity. On the basis of manual and radiographic measurements of 935 obstetric patients, William F. Mengert⁸ (Southwestern Med. College) finds that the best index of inlet or of midplane capacity is the product of the transverse and anteroposterior diameters. Average product of midplane diameters for the group was 145, and of inlet diameters, 125. These are accepted as normal and represent 100 per cent for each plane respectively. Studies show that 85 per cent of normal capacity of either inlet or midplane represents the borderline between adequacy and contraction. As a rule, inlet and midplane capacities vary together; association of a large inlet with a small midplane, or the reverse, is relatively uncommon. Measurements of the outlet are unimportant, since there can be no serious outlet contraction without commensurate midplane contraction. Also, much of what was previously termed outlet contraction was actually midplane contraction.

Of the 935 patients, 592 were delivered. They were allowed to progress to second stage pains with the membranes ruptured before operative intervention was considered; a few were delivered electively by section.

(8) J. A. M. A. 138:169-174, Sept. 18, 1948.

The action on the course of labor seemed more favorable as the injection was made in a more advanced phase. Dilatation progressed rapidly and spontaneous expulsion occurred in all cases except in one in which low forceps had to be used. In all cases of normal labor with dilatation of over 5 cm. at the time of the injection (membranes ruptured) expulsion took place less than four hours after the injection. The analgesic action seemed nearly constant; its average duration was 75 minutes. No effect on delivery was noted. Arterial tension was decidedly lowered, an average of 1-2 cm. on both maximum and minimum. All infants were in good condition and cried immediately after birth.

Intravenous injection of Spasmalgin may thus advantageously replace intramuscular injection, which, even in doses of three ampules given in 30 minutes, never provides the total analgesia obtained in half the patients receiving the intravenous injection.

[Spasmalgin consists of 0.01 Gm. Pantopon, 0.02 Gm. papaverine and 1 mg. atropine.—Ed.]

War Surgery and Obstetric Practice. In a preliminary report on use of oxygen Samuel Soichet⁷ (Univ. of Brazil) states that its sedative effect, observed during World War II, is now being utilized in obstetrics. Administration of pure oxygen has yielded favorable results, when used in closed circuit and high concentration, in cases of prolonged labor, in dystocia due to the condition of the uterine muscle and in hypertony and uterine spasms which, by impeding placental circulation, cause fetal asphyxia. Many cases in which cesarean section would otherwise appear necessary may be returned to normal progression. By sedation of the uterine fiber and by increasing the oxygen-carrying capacity of maternal blood, fetal hypoxemia is avoided. All patients observed have been benefited by the treatment when the indication was

(7) An. brasil. de ginec. 24:398-405, May, 1947.

Value of X-Ray Studies of Pelvis in Obstetrics is stressed by O. Hunter Jones¹ (Charlotte, N.C.), who analyzed 93 questionnaires returned by members of the South Atlantic Association concerning use of x-ray. Fifty-five per cent used x-ray studies in only 1-10 per cent of cases; three physicians used them rarely if ever. Only 27 per cent of the physicians used x-rays in 11-100 per cent of cases and of these only 5 per cent in 80-100 per cent of cases. Most x-ray studies were made at or near term, and less frequently during labor, when the relation between fetus and pelvis can be shown.

About one third of the obstetricians found pelvic x-ray studies to be of real value, but only 50 per cent of this group used x-ray as an important part of their armamentarium. One-third showed a "lukewarm" interest in and derived occasional benefit from these studies. The remaining one-third found them of little if any value, and these used them least.

Jones believes that one reason why x-ray means so little to many obstetricians is that they think of it and use it only for measurements and forget that information of greater importance is gained by studying the pelvis and fetopelvic relation under stereoscopic vision. In his own practice, he uses the Caldwell-Moloy technic with an ordinary stereoscope instead of a precision stereoscope. The anteroposterior diameter is measured by means of a centimeter lead ruler which is placed between the thighs on the lateral film.

Interpretation of these films is for the most part qualitative; they give a far more accurate impression of the shape and size of the pelvis at all levels than can be obtained from vaginal examination. Pelvic radiography should not, of course, take the place of careful vaginal examination, but the obstetrician should be aware of the limitations of, and at times erroneous impressions obtained from, vaginal examination.

(1) *Am. J. Obst. & Gynec.* 54:776-782, November, 1947.

There were 19 sections, an incidence of 3.2 per cent. This high incidence was due to the fact that most patients submitted to section were measured radiographically, a fact automatically including them in the series. There were no maternal deaths and 26 fetal deaths, of which 14 were related to cephalopelvic disproportion or were unexplained. There was a tendency for fetal deaths to occur among women with less than average pelvic capacity.

Roentgenography and Roentgenometry of Pelvis. Herbert Thoms⁹ (Yale Univ.) points out that all essential information concerning the size and shape of the bony pelvis can be obtained by roentgen and palpatory techniques, but that such information must be properly evaluated by the obstetrician.

Two roentgenograms showing inlet and lateral pelvic aspects give useful morphologic and dimensional information. The inlet roentgenogram made at a 36 in. target-film distance presents a view directly through the pelvis at a right angle to the plane of the inlet. The lateral film presents a view from a right angle to the lateral pelvic aspect. Since both films are made at the same target-film distance and the distortion produced by spread of the rays is about the same, the images bear a relation in size to each other.

Survey of the pelvis should also include palpation and mensuration of the outlet in the region of the pelvic arch. To determine the symphysis-biparietal distance, in order to estimate the availability of room in the pelvic arch, Thoms modified his outlet pelvimeter, substituting a slide crossbar for the sliding scale formerly used to measure the bituberal diameter. After palpation of the pubic arch, the bar is fitted as snugly as possible in the arch and held in this position while the movable arm is fitted to the under surface of the symphysis. The symphysis-biparietal distance is then read from the scale.

(9) J. Mt. Sinai Hosp. 14:653-658, Sept.-Oct., 1947.

and functional pelvic diagnosis in conjunction with rectal palpation of the pelvis give much more reliable information as to the true size of the pelvic opening than does a dubious external measurement. For one who is inexperienced, external pelvic measurement is obligatory so that he may examine the pelvis more closely and familiarize himself with its characteristics. However, it is essential to call the novice's attention to the deficiencies in external pelvimetry and especially to caution him about the unreliability of the "computed difference," so that he may not be led to neglect pelvic diagnosis.

[It is now almost a routine in my practice to have a roentgenogram of the pelvis and baby's head made about four weeks before term in every primipara and in all multiparas who have had dystocia in previous labors. The roentgenologist gives his interpretation, and I study each film so that I may become familiar with any changes in the size or shape of the pelvis which I failed to detect on bimanual and other examinations. Anteroposterior and lateral views are taken, and I seldom resort to roentgen mensuration. I should like to emphasize two statements of Mengert: as a rule inlet and midplane capacities vary together, and there is no serious outlet contraction without commensurate midplane contraction, which is readily recognized on x-ray films.

Jones's questionnaires revealed that only about 5 per cent of the obstetricians he questioned used x-ray studies of the pelvis in 80-100 per cent of their cases. This is unfortunate. A much larger percentage of physicians should use roentgenography in their obstetric patients. If one relies entirely on external and internal measurements, many cases of pelvic contraction or distortion will be unrecognized. It has been amply proved that external pelvimetry and even internal examinations are often unreliable. For this reason I urge general practitioners to have roentgenograms taken of nearly all, or all, of their primiparas a few weeks before term. But they should send their patients to a roentgenologist who is interested in this subject.

W. I. C. Morris (*Lancet* 2:139, 1948) devised an instrument and technic to detect narrowing of the pubic arch and roughly to assess its degree. This is a much more accurate method of evaluating the obstetrical caliber of the pubic arch than any of the standard subjective estimations which depend solely on palpation. It enables the obstetrician to detect the cases in which the pubic arch requires radiologic investigation. D. J. MacRae (*Lancet* 2:434, 1948) de-

Jones advocates x-ray studies in (1) all patients with contracted pelves, questionable contraction, suspected disproportion or strikingly abnormal architectural features, as revealed by vaginal examination; (2) all patients not previously x-rayed whose labor is not progressing satisfactorily; (3) all patients with a history of difficult labor or delivery in previous pregnancies; (4) all primiparas and some multiparas with abnormal presentations; (5) elderly primiparas unless the pelvis is obviously ample, and (6) all patients with fractured pelves or spinal or other deformities.

Critique of External Pelvimetry. According to H. Hosemann² (Göttingen), although external pelvic measurement seems to be exact, its value is often overestimated. The method is open to considerable subjective error, and conclusions as to size of the small pelvis, and especially of the pelvic outlet, drawn from measurements of the large pelvis should be made with great reservation. Decisions are most fairly made on the basis of pelvic statistics. A sufficient number of pelves must be measured internally and externally to see how much external measurements differ from internal.

The variation in thickness of bones and soft parts is so great that in the most favorable cases probability of estimating the conjugata vera within 0.5 cm. accuracy is only 18.9 per cent. Conversely the probability that the conjugata vera will deviate 0.5 cm. or more from the computed value of 10 cm. amounts to 81.1 per cent.

Since soft parts and especially bones vary so greatly that determination of a "computed difference" (*Abzugzahl*) with a definite value gives results that are only problematic, the question arises whether external pelvimetry should be used at all. The conjugata externa, unreliable as it is, bears the closest relationship to the conjugata vera. To the experienced obstetrician, the patient's general constitution, the shape of the Michaelis rhomboid

(2) Zentralbl. f. Gynak. 69:49-55, 1947.

tion; only 4 did not nurse their children. In less than 30 days after delivery there were only 3 pseudomenstruations and no real menstruations; in 30-60 days, 16 pseudo- and 7 real menstruations; in 60-90 days, 4 pseudo- and 10 real menstruations; in 90-120 days, 1 pseudo- and 12 real menstruations; and after 150 days, real menstruations only.

Of 60 women having their first regular bleeding after abortion, 48 (80 per cent) had real menstruation and 12 (20 per cent) pseudomenstruation. In less than 25 days after abortion there were 5 pseudo- and 2 real menstruations; in 25-30 days, 3 pseudo- and 10 real menstruations; in 30-35 days, 2 pseudo- and 20 real menstruations; in 35-40 days, 1 pseudo- and 9 real menstruations; and in 40-50 days, only real menstruations.

As a result of the great loss of energy during birth, the organism is incapable of having a normal menstrual course until two cyclic periods have elapsed. The much smaller loss of energy in abortion allows the organism to develop a corpus luteum cycle after only one period has elapsed.

[V. Gruenberger (Wien. klin. Wchnschr. 60:498, 1948) also studied the time of the first bleeding after labor and miscarriage. He found that it occurred about four to five weeks after miscarriage in the early months of pregnancy. In cases of interrupted pregnancy in the later months the first bleeding occurred after six and seven weeks. In two thirds of the cases after abortion histologic investigation of the uterine mucosa at the time of the first bleeding revealed a secretory phase. After full-term labor the first bleeding in most cases took place within two to four months. Three fourths of the patients examined at the time of the first bleeding were still nursing their babies. Examination of the mucosa at the time of first bleeding showed a secretory phase in only one third. In 70.4 per cent of all patients endometritis was present. R. A. Lyon (Proc. Soc. Exper. Biol. & Med. 63:105, 1946) attempted to determine the time of reappearance of ovulation in nonlactating primiparas by means of basal body temperature charts. Endometrial biopsies were taken during the phase of temperature elevation in 7 women and all showed progestational changes. Menstruation occurred within two weeks of biopsy in all of these

vised an instrument for measuring the anterior and posterior sagittal diameters of the outlet. Both of these devices are worthy efforts of determining outlet contractions more accurately.

Those interested in the subject of pelvic measurements and x-ray mensuration should read N. J. Eastman's thought-provoking article (*Obst. & Gynec. Surv.* 3:301, 1948). Eastman sketches the history of error in pelvic mensuration from the earliest times to our own day and shows how valueless such measurements are. He then demonstrates the value of x-ray measurements of the pelvis. Eastman believes that x-ray pelvimetry is essential to the management of pelvic contractions for several reasons. (1) It provides precision of mensuration to a degree which has never before been possible. (2) It provides mensuration of certain diameters which were previously not easily obtainable, such as the transverse diameter of the inlet and the intercrystal spinous dimensions. (3) By the stereoscopic technic it permits visualization of the general architecture of the pelvis; this type of information is almost as valuable as actual mensuration. (4) When standing films are taken in the course of labor, precise information is obtainable concerning descent of the biparietal plane of the head. Information which is difficult to obtain by palpating the presenting part because of elongation of the head may make digital findings misleading. Eastman emphasizes that x-ray pelvimetry is a valuable adjunct in the management of patients with contracted pelves, but it must be regarded as an adjunct only, just as the cardiologist considers the electrocardiogram a helpful aid in the management of patients with heart disease. I fully agree with this. As I have previously said, routine x-ray investigation has a proper place in obstetrics if physicians do not depend solely on the roentgenologist or the x-ray pictures when deciding whether to perform a cesarean section. Although roentgenograms are most dependable and certainly much more accurate than pelvic measurements with the fingers, hands or instruments, they should nevertheless be used in conjunction with the information obtained by such examinations.—Ed.]

First Menstruation after Delivery and Abortion. P. Elsner³ (Univ. of Vienna) determined the phase of the cycle from the histologic picture of specimens of uterine mucosa obtained by curettage after dilatation of the cervix up to Hegar 5. Of 60 women having their first regular bleeding after delivery, 35 (58 per cent) had real menstruation and 25 (42 per cent) pseudomenstrua-

(3) *Wien. klin. Wchnschr.* 60:433-435, July 9, 1948.

would be expected to jeopardize subsequent delivery of any child at term.

[I fully agree with the last paragraph.—Ed.]

ANALGESIA AND ANESTHESIA

Premedication and Anesthesia in Obstetrics: Current Practices at Boston Lying-in Hospital. According to Bert B. Hershenson,⁵ emphasis is placed on the knowledge, experience, skill, judgment, attention and mutual professional confidence of the team, comprising obstetrician and anesthesiologist and their co-workers, rather than on the agent or technic. For uncomplicated vaginal delivery, the following procedure has been devised.

PROCEDURE.—Early in labor, after the admission enema, 0.1 Gm. Seconal is given, usually by mouth. If there is no untoward reaction, at the end of an hour 0.1 Gm. Seconal and 0.1 Gm. Sodium Amytal are given by mouth or rectum. Scopolamine hydrobromide, 0.6 mg., is given intramuscularly. Total dosage of barbiturates during labor is limited to 0.4 Gm. As labor progresses, intramuscular injections of scopolamine and apomorphine, 0.6 mg. each, are given, followed in an hour by intramuscular injection of 0.4 mg. scopolamine and 1.2 mg. apomorphine. The latter combination is administered every two hours until the patient is ready for delivery. If the patient shows muscular overactivity or agitation, additional apomorphine, 0.6-1.2 mg., is given and may be repeated at 15 minute intervals. Delivery is completed under inhalation anesthesia.

This procedure is modified to meet individual needs, problems such as respiratory, cardiovascular, genitourinary, gastrointestinal and central nervous system complications, metabolic disturbances, hyperthyroidism and other special conditions. Spinal anesthesia is used when it is definitely indicated. Over 80 per cent of deliveries are completed under inhalation anesthesia. Among the advantages of this method are rapidity of exchange of agent via the lungs, short induction and recovery periods, predictable and controllable depth and duration of

(5) *New England J. Med.* 239:429-433, Sept. 16, 1948.

patients. Average time for reappearance of menstruation was 8.4 weeks after delivery, the range being from 5 to 15 weeks. The first menstruation postpartum is usually anovular. The average first ovulation occurred at 10.2 weeks postpartum with a range from 6 to 17 weeks.—Ed.]

Subsequent Childbearing of Primigravida Presenting Breech at Term was investigated by Clyde L. Randall and Richard W. Baetz⁴ (Buffalo Gen'l Hosp.). There were no maternal deaths either at the first or subsequent deliveries. After nonviable or macerated fetuses were excluded, corrected fetal mortality among the primigravidas under age 30 (76.5 per cent of the group) was 8.1 per cent and among those over 35 (8.8 per cent of the total) 8.3 per cent. There were 17 deaths among the viable infants born to these women, a corrected fetal mortality of 8.9 per cent. Of viable infants born to these same patients at a second pregnancy, seven died, a corrected fetal mortality of 3.9 per cent.

At the second delivery, 38 (21.2 per cent) women had breech presentations. Corrected fetal mortality in this group was 10.5 per cent. Among 141 women with vertex presentation at their second delivery, fetal mortality was 2.13 per cent.

It appears, therefore, that fetal mortality incident to delivery of a breech presentation is almost equally high among multigravidas and primigravidas. If cesarean section is justified to assure a live baby for the primigravida, it must be remembered that breech presentation in the multigravida presents essentially the same problem.

The authors believe that in most instances successful vaginal delivery of the primigravida with a breech presentation at term should be expected of the obstetric specialist. Elective cesarean section seems indicated only when the primigravida with breech presentation is of such an age that she is unlikely to bear subsequent children or when there is evidence of disproportion that

(4) New York State J. Med. 48:49-54, Jan. 1, 1948.

wildly excited. Two infants were mildly asphyxiated. The drug was to blame in one case.

Trilene Analgesia in Labor was used in 100 unselected cases by B. N. Purandare⁷ (Bombay). The drug was administered by inhalation from Freedmann's bottle, which permits only 0.65 per cent Trilene to be inhaled and also prevents aspiration of liquid, even if the bottle is tilted. The patient holds the mask and is instructed to breathe the gas well before the peak of pain, so that she can bear down on instruction. Trilene does not affect uterine contractions and hence does not prolong labor. Despite its peculiar odor it does not induce nausea or vomiting. In this series it produced no alterations in blood pressure, had no injurious effect on liver or kidneys and was non-irritant to the mucosa despite prolonged inhalation.

Of 100 patients, 61 were thoroughly satisfied with the analgesia, 34 had partial relief and 5 were not satisfied.

Incidence of postpartum hemorrhage was 26 per cent, as compared with 18 per cent in 200 control cases. Analysis of these cases showed that in pregnancies complicated by anemia, toxemia hydramnios, etc., incidence of postpartum hemorrhage was higher among patients given Trilene than among controls. Incidence of postpartum hemorrhage increased directly in proportion to severity of anemia; this was not true of toxemia.

Prolonged administration of Trilene appears to produce slight asphyxia in the infant, though there is no difficulty in resuscitation. This drug seems to produce less depression of the respiratory centers than do barbiturates or nitrous oxide.

No maternal contraindications were discovered, except for severe anemia or respiratory disease at time of labor. However, Trilene for actual anesthesia has no advantage over other drugs, and since Freedmann's apparatus produces only analgesia, it cannot be used for repair of perineal tears.

(7) *Indian Physician* 6:181-192, August, 1947.

anesthesia, retrievability of the agent without residual injury, wide margin of safety, lack of extra load on the detoxifying mechanisms of the body and possibility of maintaining highly oxygenated atmospheres. Special stress is placed on use of oxygen-rich atmospheres, especially during the terminal portion of the second stage of labor.

Newer Obstetric Analgesics: Preliminary Evaluation of Compounds No. 10720 and No. 10820 (Dolophine). Curtis J. Lund⁶ (Univ. of Minnesota) used a new phenylpiperidine compound similar to Demerol, compound no. 10720, for obstetric analgesia in 50 labors. The most satisfactory dose was found to be 5-7.5 mg. The combination of 5 mg. no. 10720 with 1/200 gr. scopolamine produced results comparable to those with 7.5 mg. alone. The peak of analgesia is reached in 1½ hours, and most of the effect is lost within 3 hours. Thus, the drug should not be given oftener than every three hours. The analgesia produced is satisfactory. The patients often sleep soundly between contractions. Excitement was not noted, and nearly every patient was able to co-operate fully. There was no evidence of interference with the effectiveness of the uterine contractions. About three fourths of the women completed their labor in less than four hours after medication. There were nine asphyxiated infants (18 per cent). The drug seems to cause some increase in mild asphyxia. In four cases asphyxia could be attributed to the drug; in three it was mild and in one moderate. Three of the four babies weighed less than 2,750 Gm., and the mothers of two received 7.5 and 10 mg. of the drug, respectively. Lund concludes that the larger doses of no. 10720 should not be given to mothers with small infants.

Dolophine (no. 10820) was administered to 17 obstetric patients in doses of 5-15 mg. Analgesic effects were disappointing. Two women were nauseated and one was

(6) Am. J. Obst. & Gynec. 55:1007-1015, June, 1948.

anesthesia required and was a factor in production of apnea in the newborn.

Intravenous Pentothal Sodium anesthesia does not affect uterine contractility or contractions. Average estimated blood loss was 168.4 cc. Comparison with other anesthetics showed that Pentothal Sodium neither increased nor decreased blood loss in the placental stage.

Two hundred and seventy infants (77 per cent) required no resuscitation; 44 (12.5 per cent) required little resuscitation; and for 37 (10.5 per cent) minor degrees of resuscitation were inadequate. In no case did Pentothal Sodium per se appear seriously to affect resuscitation or survival of the newborn. However, deliveries were planned to be completed within eight minutes of induction of anesthesia, and this limit was rarely exceeded and most often not approached.

All mothers survived. There were 10 infant deaths, but there was no reason to assume that Pentothal Sodium anesthesia was in any way the cause.

The authors neither use nor recommend Pentothal Sodium as a routine obstetric anesthetic; but as used in a small series and in 2 per cent solution, they found it safe for mother and child. It is ideal for emergency obstetric use.

[The search for an ideal analgesic continues. A few articles are abstracted here and I shall discuss a few more now. M. F. F. Kohl (*Am. J. Obst. & Gynec.* 56:811, 1948) found intravenous vinbarbital sodium excellent for analgesia. He combined this with intramuscular scopolamine hydrobromide but mentions that constant nursing attention is necessary because of restlessness. Complete analgesia and anesthesia occurred in about 85 per cent of patients. There was a high incidence of apnea and cyanosis in the infants during the first day of life. H. F. Burkons (*Am. J. Obst. & Gynec.* 56:549, 1948) reported that 98 per cent of his patients acknowledged highly satisfactory results with intravenous vinbarbital sodium. Restlessness requiring restraint by the attending nurse occurred in 14 per cent. M. S. Lewis and J. B. Brodie, Jr. (*South. M. J.* 41:820, 1948) report 3,000 cases of labor in which vinbarbital sodium was given for amnesia, analgesia and anesthesia. Mild to moderate degrees of restlessness occurred in 23.4

Results may be improved by further experiments in methods of administering Trilene and by combining Trilene with drugs such as chloral bromide and Demerol during the first stage. Investigation of the effect of simultaneous administration of vitamin B has been started. Purandare advocates use of Trilene alone in multiparas, and in primiparas, its use up to within one hour of delivery, when a single injection of caudal analgesia can be given.

Sodium Pentothal Anesthesia for Selected Vaginal Obstetrics has been successful in 350 patients, according to A. Louis Dippel, R. J. Helman, C. E. Wolters, H. A. Wall, Jr., and F. H. Hairston⁸ (Baylor Univ.). Patients selected were those in whom there was every reason to believe that delivery could be completed promptly after induction of anesthesia, before the time usually required for an appreciable amount of the barbiturate to reach fetal circulation (10-12 minutes).

Two or 3 cc. of a 2 per cent solution of Pentothal Sodium was injected initially into an antecubital vein, after which 2 or 3 cc. was injected every 20 or 30 seconds until the patient ceased to count. Five cc. was then given and the patient was usually ready for delivery. The slightest movement by the patient indicated injection of an additional 5 cc.

Of the 350 cases, 110 (31.3 per cent) were spontaneous deliveries, 226 (64.4 per cent) low forceps deliveries, 11 (3.1 per cent) breech extractions, 1 (0.3 per cent) podalic version and extraction without tear, and 3 (0.9 per cent) midforceps deliveries with episiotomy.

Average amount of Pentothal Sodium given was 39 cc. (0.78 Gm.). Amount of anesthesia varied with amount and recency of administration of analgesic. All but 40 patients received analgesics, and 182 (58.7 per cent) received the last dose of analgesic less than two hours before delivery. This, of course, influenced amount of

(8) Surg., Gynec. & Obst. 85:572-582, November, 1947.

employed and anesthetic agents and methods used. All forms of analgesia and anesthesia increase incidence of resuscitation in the newborn infant and therefore increase incidence of asphyxia neonatorum. Grantly Dick Read's method of the control of pain in childbirth by suppression of fear permits the conduct of labor without recourse to obstetric analgesics and anesthetics. For the sake of the infant, pharmacologic principles must be scrupulously adhered to when analgesics and anesthetics are administered to parturient women. Each patient must be evaluated and treated individually. Drugs must be administered in the minimal effective dose. The physician must be in constant attendance to evaluate effects of the agents.—Ed.]

Anatomic Basis for Continuous Caudal and Other Forms of Regional Block in Obstetrics. Continuous caudal analgesia is a means of administering sufficient anesthetic to relieve the pains of parturition completely without narcotizing the baby. Over 20 years ago John G. P. Cleland⁹ (Oregon City, Ore.) first began studies to determine the cord segments supplying the sensory nerves to the uterus in the cat and dog. Knowledge of the sensory nerves would allow adequate regional obstetric anesthesia leaving enough motor roots unaffected to carry on normal labor. Only the first and second lumbar roots, corresponding to the eleventh and twelfth thoracic roots in man, were found to carry pain impulses from the uterus. In 1932, Cleland first carried a patient, an eclamptic, painlessly through the entire course of active labor. Labor was painlessly induced by a bag under caudal block, and within one-half hour after the pains became regular, they were abolished by paravertebral block of the eleventh and twelfth thoracic roots. As soon as stretching pains began, caudal block was repeated, and spontaneous painless delivery of a crying baby followed.

Further studies showed that the sensory pathway from the uterus was from the presacral nerve through the fourth and third lumbar sympathetic ganglions and along the chain to the twelfth and eleventh thoracic roots

(9) *Canad. M. A. J.* 59:225-230, Sept. 19, 1948.

per cent, but all were promptly controlled by additional administration of the drug. J. C. Brougher (*West. J. Surg.* 56:480, 1948) used Demerol in 348 patients and found it highly satisfactory. This drug is largely an analgesic and, when combined with a barbitol and paraldehyde, its action is highly desirable. R. Mackey (*M. J. Australia* 2:748, 1947) used Seconal and paraldehyde and obtained analgesia and anesthesia in 86.7 per cent of his cases. There was no increase in maternal mortality or morbidity, but postpartum hemorrhage occurred in 12.4 per cent as compared with hospital incidence of 8 per cent. H. Roberts (*Brit. M. J.* 2:590, 1948) used Pethidine and scopolamine in 500 cases and obtained the desired relief in 82.2 per cent. D. Beaton (*Edinburgh M. J.* 55:354, 1948) also used Pethidine with good results in women in labor.

C. L. Cooley and H. F. Schwartz (*West. J. Surg.* 56:278, 1948) used Pentothal Sodium anesthesia with good results. They believe this drug has distinct advantages over nitrous oxide and oxygen or ether anesthesia. F. L. Herrick (*Am. J. Obst. & Gynec.* 55:883, 1948) praises the effects of Pentothal in cesarean section. In 492 sections there were no maternal deaths and 15 fetal deaths, only 5 of which may have been due to the anesthetic. G. Gottam (*Am. J. Surg.* 76:23, 1948), who reports on 7,694 cases in which intravenous Pentothal Sodium was used, maintains that Pentothal given by syringe is dangerous and solution strengths above 1 per cent are not safe. The intravenous drip method with solution strengths of 1 per cent or below is not dangerous.

A. C. Barnes, F. B. Hapke and J. H. Holzaepfel (*Health Center J.* 1:18, 1947) report that methadon must be considered a pain-relieving drug which presents a measurable hazard to the baby when used during labor. E. M. Christensen and E. G. Gross (*J. A. M. A.* 137:594, 1948) maintain that methadon is an analgesic agent three times as potent as morphine and many times more potent than meperidine. It lacks sedative properties, and undesirable side-effects are minimal. It may be administered intravenously for analgesia of rapid onset and short duration, or subcutaneously for slower onset and longer analgesic effects.

W. W. Jack and E. S. Taylor (*Am. J. Obst. & Gynec.* 56:587, 1948) report the fifth case of edema of the uvula and glottis associated with use of Demerol and scopolamine.

In a paper read before the Chicago Society of Anesthesiologists on Oct. 26, 1948, D. M. Little and R. M. Tovell showed that the etiologic factors of asphyxia neonatorum include age, parity and health of the mother, viability of the germ plasm, immaturity of the infant, presentation and position of the fetus, medical induction of labor, complications of labor, type of delivery, analgesic drugs

Philadelphia and Memphis, with Controls is presented by Robert A. Hingson, Waldo B. Edwards, Clifford B. Lull, Frank E. Whitacre and H. Charles Franklin¹ (U.S. Public Health Service). The New York study, done at the U. S. Marine Hospital, covered four years. Regional methods of nerve block for delivery were used in 92.7 per cent of cases. In the 1,687 cases there was only 1 maternal death. Rates of stillbirths and neonatal deaths per thousand live births were: for caudal analgesia, 16.2; for spinal anesthesia, 28.3; and for general or no anesthesia, 162.2.

At Philadelphia Lying-in Hospital studies were made on 2,516 mothers delivered with continuous caudal analgesia and a control group of 1,024 mothers delivered with the usual anesthetics and sedatives. In the caudal group 2.5 per cent of infants required use of a special agent to induce respiration, as compared with 8.7 per cent in the control group. In the caudal group stillbirths amounted to 9.1 per thousand live births, as compared with 24.8 per thousand in the control group. Deaths in the first week of life in the caudal group amounted to 11.5 per thousand live births, as compared with 20.8 per thousand in the control group. Thus, the total loss of infants amounted to 20.6 per thousand live births in the caudal group, as compared with 45.6 per thousand in the control group, a difference which is definitely significant.

The Memphis study, at John Gaston Hospital, comprised 2,626 consecutive births, of which 1,271 were managed with continuous caudal analgesia, 324 with spinal and continuous spinal anesthesia, 375 with general anesthesia and 577 with no anesthesia.

In the caudal group, stillbirths amounted to 18.4 per thousand live births. The fact that this rate is twice as high as the Philadelphia rate is explained by the high percentage of Negro patients, who show a greatly in-

(1) J. A. M. A. 136:221-229, Jan. 24, 1948.

via the rami communicantes (broken white line, Fig. 16). The motor supply from the cord to the uterus was found to be extraordinarily wide, extending from third thoracic to the second lumbar roots (broken black line, Fig.

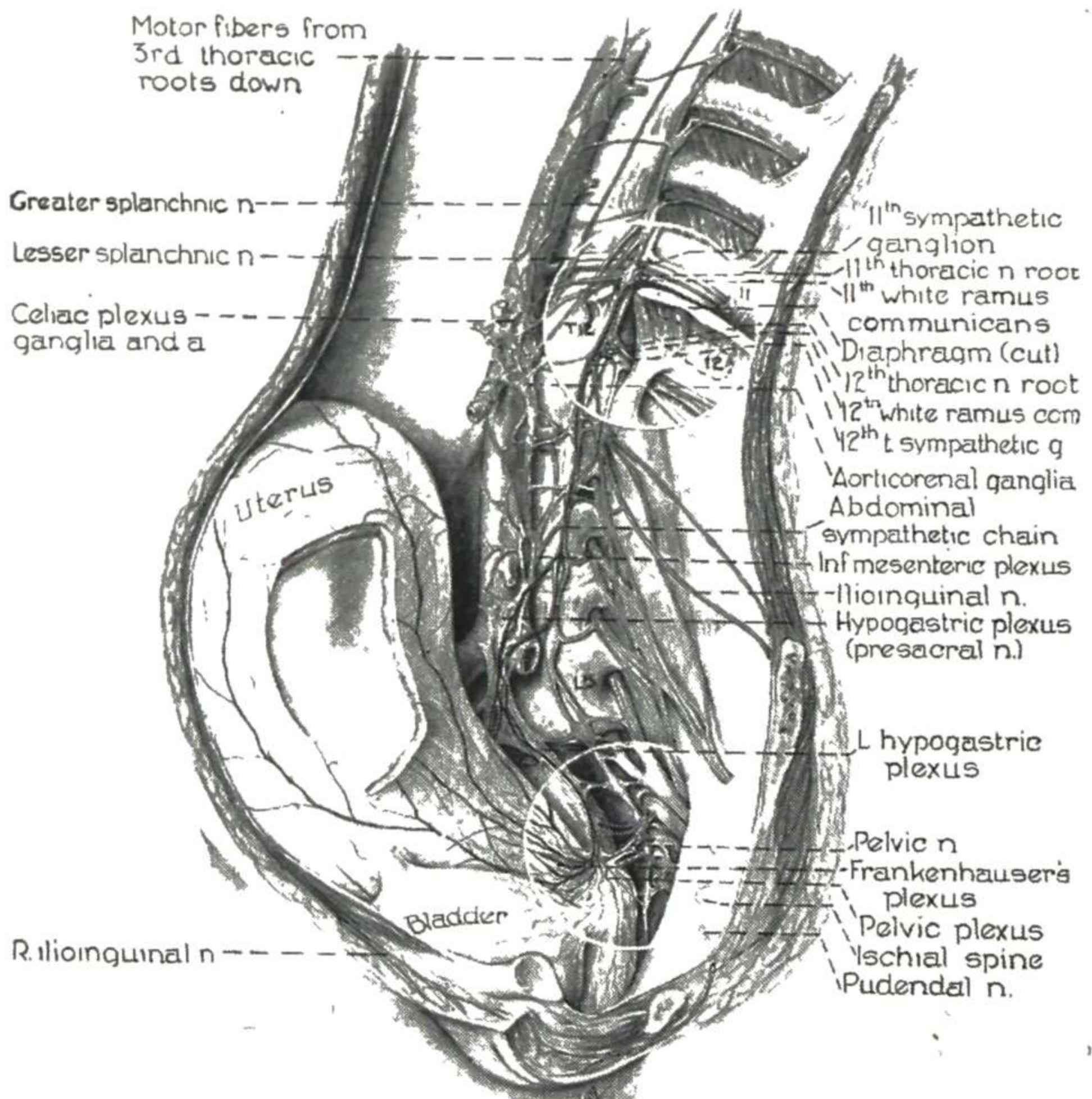


Fig. 16.—Sensory pathway and motor supply to uterus. (Courtesy of Cleland, John G. P.: *Canad. M. A. J.* 59:225-230, Sept. 19, 1948.)

16). Motor impulses from the higher centers are important in maintaining uterine contractions. Average level of skin anesthesia which must be produced before complete pain relief with caudal anesthesia is about $1\frac{1}{4}$ in. below the umbilicus.

Newborn Mortality and Morbidity with Continuous Caudal Analgesia: Analysis of Cases in New York, Phil-

To effect consistent relief of the pain of uterine contractions cutaneous anesthesia nearly to the costal margin is usually required. Since volume of the epidural space varies greatly, it is necessary to have some concept of the size of this space in each case to regulate the volume of anesthetic injected. The estimation can be made by preliminary injection of a fixed volume of 1 per cent procaine solution and noting level of anesthesia obtained.

Low Spinal Nupercaine Anesthesia in Obstetrics is considered to be the anesthesia of choice by Herbert E. Schmitz and George Baba³ (Loyola Univ., Chicago), who report results of its use in 375 cases. Satisfactory relief (comfortable delivery or alleviation of distress for at least one hour) was obtained in 370 of the 375 patients. Duration of subjective relief varied, but averaged one to two hours. The objective anesthetic effect generally exceeded three hours. For operative deliveries, use of deeper anesthesia was routine.

Patients were carefully evaluated as to contraindicating factors, type of presentation, station of the presenting part, cervical dilatation and effacement and progress of labor. "Heavy Nupercaine" solution (2.5 mg. Nupercaine per 1 cc. of 5 per cent glucose solution) was given when delivery was thought to be imminent within the next three hours. The early first stage of labor was treated by production of analgesia, and spinal anesthesia was reserved for the late first stage and the second stage.

Motor weakness to complete paralysis of the lower extremities was present in all 375 cases. Incidence of hypotension requiring stimulation was 0.34 per cent. The ready response evoked in these patients by use of ephedrine indicated that therapeutic rather than routine prophylactic use of this drug should be practiced. Fetal bradycardia, which may accompany sudden hypotension, is promptly corrected by administration of oxygen to the mother.

(3) *Am. J. Obst. & Gynec.* 54:838-847, November, 1947.

creased stillbirth rate. In the general anesthesia group there were 56.3 stillbirths per thousand live births, in the spinal anesthesia group 45.2 per thousand and in the group delivered without anesthesia 80.4 per thousand, an alarming rate.

Neonatal mortality was as follows: caudal 18.4, general 16.9, spinal 29 and no anesthesia 63.6 (although after exclusion of all infants under 3 lb. in the latter group the rate was 34.9 per thousand live births).

Analysis of stillbirths and neonatal deaths in relation to the mothers' ages (under 25, 25-29 and 30 years and over) showed that these rates were consistent for all three groups.

[W. H. Masters (*Am. J. Obst. & Gynec.* 56:756, 1948) reports 1,500 cases in which caudal analgesia was satisfactory in 80 per cent. Systolic blood pressure fell to 80 mm. or below in 13.6 per cent, but this was usually promptly restored to normal by change in position or administration of vasopressor drugs. Occult subarachnoid tap occurred in two cases and localized infection at the site of puncture in five cases. J. Cadi (*Bol. Soc. chilena de obst. y ginec.* 13:103, 1948) of Santiago used caudal anesthesia in obstetric and gynecologic cases with great satisfaction.—Ed.]

Single Injection Caudal for Obstetric Analgesia and Use of Pontocaine. Willis E. Brown² (Univ. of Iowa) used Pontocaine for single injection caudal anesthesia in 148 patients. Duration of analgesia ranged from 6 hours to 45 minutes and decreased with succeeding injections. The first stage of labor is shortened appreciably and the second stage prolonged. The third stage is considerably shortened, and blood loss is minimal. Vasomotor reactions were minimal and toxic reactions mild; any reactions occur within the first 10-15 minutes following injection. Best results were obtained with 30 cc. of 0.1 per cent Pontocaine solution in 0.9 per cent sodium chloride solution with added Adrenalin. A 0.2 per cent Pontocaine solution did not produce satisfactory analgesia and caused toxic reactions. There were two fetal deaths, one child being stillborn and the other premature.

(2) *Am. J. Obst. & Gynec.* 55:717-723, April, 1948.

seven additional cases 50 mg. Monocaine Formate was used. The greatest difficulty with use of this drug was an inconstant level of anesthesia.

In 24 cases there was failure to obtain anesthesia; repeat injection was successful in 14 and in 10 the blocks were not repeated. As a general rule, anesthesia was instituted when cervical dilatation was 5-6 cm. in multiparas and 8 cm. in primiparas. About 64 per cent of patients were in labor for more than five hours before receiving the anesthetic. The usual duration of complete uterine analgesia obtained from Novocain and Metycaine was 60-90 minutes; perineal anesthesia usually lasted nearly 2 hours. Pontocaine generally gave uterine analgesia of 90-105 minutes and perineal anesthesia of 2-2½ hours. Nupercaine produced a mean duration of uterine analgesia of 2 hours and 18 minutes. Perineal anesthesia lasted over three hours.

There was no significant increase in low or midforceps delivery as compared with a control series. No effect in the length of second stage of labor was observed. When no oxytocic was used 89 per cent of the placentas were delivered in six minutes or less. Similar results were obtained with use of an oxytocic. Episiotomy blood loss was not significantly different from that of patients under ethylene-ether anesthesia. Nearly 80 per cent of the infants cried in less than one minute after delivery. Corrected fetal mortality was 0.42 per cent, and there was one maternal death. There was no significant change in systolic blood pressure in 44 per cent of cases and a maximal fall greater than 20 mm. in 26 per cent. No patients exhibited signs of vascular collapse. There was slight increase in the number of patients requiring postpartum catheterization. Postpartum headaches occurred in 14.5 per cent of all patients, but only 0.8 per cent had a severe headache. Supplementary inhalation anesthesia was used in 96 cases. Evaluation of the effectiveness of saddle block anesthesia showed that 72.2 per cent of

There were two "reactions"; one proved to be attributable to Demerol sensitivity and the other to the spinal anesthetic agent. These two cases emphasize the need for routine testing for sensitivity.

Neurologic complications in spinal anesthesia are always a potentiality. One case of foot drop occurred in this series and suggested localized injury to the right fifth lumbar root. To guard against neurologic complications the following conditions should be met: (1) the apparatus must be scrupulously clean, (2) the solution must be free of deterioration and impurities and (3) no injection should be made if the spinal puncture causes radiating pain or yields blood.

Postspinal headache occurred in 52 patients, particularly on the day that the patient was permitted out of bed. Incidence of postspinal anesthesia headaches dropped after adoption of two precautionary measures: minimizing spinal fluid loss at the time of spinal puncture, and assumption of the near-upright position from the day of delivery.

Low spinal anesthesia provided dramatic and effective relief of the discomfort of labor and maximal safety to infant and mother and was satisfactory to nursing staff and obstetrician because of simplicity of the technic. Because of dangers connected with its use, however, the most careful technic must be closely observed.

Spinal (Saddle Block) Anesthesia in Obstetrics. G. J. Andros, William J. Dieckmann, P. Ouda, H. D. Priddle, R. C. Smitter and W. M. Bryan, Jr.⁴ (Chicago Lying-In Hosp.) studied 719 cases in which modified saddle block anesthesia was used in labor and delivery. Buffered Nupercaine was given to 404 patients and pre-mixed unbuffered Nupercaine to 109. Dose was 2.5 mg. in each case. Pontocaine Hydrochloride, 5 mg., was used in 115 instances. Novocain, 50 mg., was used in 27 cases. In 47 instances 33 mg. Metycaine was administered. In

(4) *Am. J. Obst. & Gynec.* 55:806-820, May, 1948.

rics who objects to my criticism of spinal anesthesia. Of all anesthetic agents and procedures, spinal anesthesia exacts the largest toll of deaths and complications during the period of learning. The last sentence in the abstract is startling, but it should not mislead the general practitioner.

Statistically, it has been shown that spinal anesthesia is the most dangerous anesthetic for pregnant women. I have made this statement many times and have been criticized by those who are enthusiastic about one or another type of spinal anesthesia. C. W. Hansen (*Anesth. & Analg.* 16:349, 1937) reported that in almost a million surgical cases in which ethylene, nitrous oxide, cyclopropane, ether, chloroform, local and spinal anesthesia were used, the highest death rate was that for spinal anesthesia. In 1944 Trent and Gaster (*Ann. Surg.* 119:954, 1944) analyzed the anesthetic deaths in more than 54,000 consecutive cases and proved the same thing. In this series local anesthesia had no deaths, whereas spinal alone showed an incidence of one death per thousand, and spinal with supplemental anesthesia had a death rate of two per thousand.

H. Franken (*Zentralbl. f. Gynak.* 58:2191, 1934) collected 2,088 cesarean sections done under spinal anesthesia; there was one death for every 139 sections. Franken contrasted this with an incidence of one death in 3,600 operations performed under spinal anesthesia in nonpregnant persons. Hence, the death rate for cesarean sections was 26 times as high as for other procedures. Franken attributes the increased death rate in pregnant women to two factors. If uterine contractions are present and not relieved by analgesics, the spinal anesthetic may be forced up to the medulla oblongata. Furthermore, characteristic circulatory changes in pregnancy and the effect of spinal anesthesia on the circulation combine to become particularly dangerous. Perhaps the physiologic lordosis of pregnant women near and at term favors progress of the anesthetic agent upward to the brain.

R. Jarman (*Brit. J. Anesth.* 16:100, 1939) analyzed 1,300 deaths on the operating table and found that 80 occurred from spinal anesthesia as compared with 29 under chloroform.

The risk of death is not the only serious drawback to the use of spinal anesthesia in obstetrics. Headaches often follow its use and there is a pronounced drop in blood pressure in many patients.

In a monograph (*Acta chir. Scandinav.*, vol. 95, supp. 121, 1947) Gunnar Thorsen disclosed that complications of the central nervous system occur after spinal anesthesia with the technic now used and that these complications are more frequent than is generally assumed. He makes the following significant statement: "Neurological complications occur in such frequency, to such an extent, and with such an intensity and duration of symptoms as to pre-

women had no discomfort during labor and no significant postpartum complications. Poor results were obtained in 6.4 per cent.

[There have been many other reports on the use of saddle block anesthesia. C. L. Jorgensen, J. H. Graves and J. E. Savage (South. M. J. 41:830, 1948) report satisfactory results in 1,000 cases. J. Erbslon and K. Brands (Zentralbl. f. Gynak. 69:255, 1947) report 128 cesarean sections performed under spinal anesthesia, with 1 death from volvulus during the puerperium.—Ed.]

Spinal Anesthesia in More Than 5,000 Vaginal Deliveries. Walter C. Rogers⁵ (Pasadena) reports the use of spinal anesthesia in 5,067 patients delivered vaginally during four years. Nitrous oxide was given to 770 patients, the indications being labor progressing too rapidly for spinal anesthesia, a known dead fetus or the patient's objection to spinal anesthesia. There were no maternal deaths with either anesthesia. A tendency to yawn or vomit, pallor, a marked drop in blood pressure and air hunger are the danger signals of spinal anesthesia, usually occurring in that order. They require prompt action by the anesthetist to avert disaster. There were about a dozen serious anesthetic accidents, characterized by profound shock. The patients responded to oxygen and pressor substances. Postspinal headaches occurred in 5-10 per cent of patients. They usually last two to five days and often can be controlled by intravenous use of caffeine sodium benzoate.

Corrected fetal mortality was 0.85 per cent with spinal anesthesia and 1.15 per cent with nitrous oxide. There were no fetal deaths attributable to the anesthetic. Spinal anesthesia definitely increases incidence of forceps deliveries because of reduction of voluntary expulsive forces. With both anesthetics fetal mortality was lowest with low forceps delivery. Even more striking was the fact that fetal mortality with spontaneous delivery exceeded that for midforceps.

[Rogers is one of the enthusiasts of spinal anesthesia in obstet-

(5) West. J. Surg. 56:236-242, April, 1948.

anesthetic. I have encountered surgeons who say they are not sure they would have a spinal anesthetic for themselves unless an expert anesthetist administered it. Unfortunately the number of such experts is limited. At the meeting of the Southern Surgical Society in 1938, approximately 100 men in the audience were asked how many would have spinal anesthesia for an upper abdominal operation. Only six men answered in the affirmative.

Whether spinal anesthesia will lose its popularity for obstetric patients is to be decided. When a patient requires an operation we must administer an anesthetic and take some risk, even though it is small. On the other hand, women who are to give birth to babies are essentially normal persons undergoing a physiologic process and there is no need to take any risk. We should recall that most women give birth to babies without benefit of any analgesic or anesthetic. This is not an argument to withhold pain relief from women in labor. We should, however, use the least harmful drugs and procedures. In the case of cesarean sections, we should not employ the most dangerous anesthetic but the safest, i.e., direct infiltration anesthesia. When use of local anesthesia is inadvisable or not feasible, an inhalation anesthetic should be given. Far more women, however, can be delivered under local infiltration or block other than spinal anesthesia than is generally believed. This was beautifully demonstrated at the Chicago Lying-In Hospital before the advent of saddle block, when local infiltration anesthesia was used in over 80 per cent of the cesarean sections.—Ed.]

General and Local Anesthesia in Cesarean Section and Risk of Fetal Anoxia. Maurice Mayer and Jacquemin⁶ (Paris) review 72 cesarean sections of which 36 were done under local-regional and 36 under general anesthesia. In the first series, 27 (78.7 per cent) infants cried on extraction, 7 (15.15 per cent) cried after removal of obstruction and 2 (6.06 per cent) were born apparently dead but were revived. In the second series, 20 (55 per cent) infants cried on extraction, 8 (22.6 per cent) cried after removal of obstruction, 7 (19.3 per cent) were born apparently dead but were revived and 1 (2.77 per cent) was born dead. It is to be noted that the fetuses in the first series were generally more compromised than those in the second, and that in at least five cases the indication for local anesthesia was alarming degree of

(6) *Gynec. et obst.* 47:49-57, 1948.

sume strict indications for spinal anesthesia. It should not be adopted at operations which can be performed with the same prospect of success under local anesthesia, possibly supplemented with superficial narcosis. Unless individual or local circumstances render it unavoidable, it should not be applied except at major, complicated interventions, and at operations demanding complete muscular relaxation or a contracted intestine. Technical advances will in all likelihood considerably facilitate the use of general anesthesia in the cases where spinal anesthesia has hitherto been advisable."

In an article on low spinal cord injuries following spinal anesthesia, E. Schildt (*Acta chir. Scandinav.* 95:101, 1947) says, "Between 25- and 30,000 spinal anesthetics are given each year in Sweden. I collected 23,000 cases and found 6 cases of post-anesthetic lesions in three years. The indications for spinal anesthesia should be made more rigid. In those cases in which, without any essential inconveniences or risks, other and less harmful methods of anesthesia can be substituted for spinal anesthesia, without doubt this should be done."

It is true that the most important factor in the use of spinal anesthesia is the anesthetist and that the drug and the method are of secondary importance. However, some anesthetists admit that the method and the anesthetic agent are responsible for some fatalities. According to M. J. Nicholson and U. H. Eversole (*J. A. M. A.* 132:679, 1946), "In the concentrations employed most spinal anesthetic drugs have a toxicity little short of that which would produce paralysis in a higher percentage of patients." In speaking of the neurologic complication of spinal anesthesia these authors say, "It seems rather evident that the lesion produced is the direct result of the administration of a spinal anesthetic agent, since in most cases it has occurred immediately following the operative procedure." In the discussion of this paper J. A. O'Reilly said, "I feel that a spinal puncture or the giving of a spinal anesthesia should be considered a major surgical procedure. I think, sometimes, that fact is overlooked. . . . Complications are fairly frequent. Some of the complications are very serious. . . . What I get from this paper is the fact that spinal anesthetics may cause considerable damage."

All spinal anesthetics should be administered by well trained anesthetists, not by obstetricians. Certainly it is not safe to give a spinal anesthetic and then proceed to deliver a baby, either from below or by cesarean section. Someone must carefully watch the patient who is given a spinal anesthetic from the moment the drug is injected until after the delivery. Furthermore, the person giving spinal anesthesia must be well versed in the art of preventing and dealing with any complications which may arise from the spinal

with ischiorectal abscess. Two fetal deaths occurred in the test group; both were neonatal deaths from intracranial trauma. Duration of labor in the test group was essentially the same as in the control group. Satisfactory anesthesia was obtained in 90 per cent of the study group and in 50 per cent of the control group. Some patients in the latter group received nitrous oxide and oxygen at the birth of the head.

Local Anesthesia in Obstetrics by means of pudendal block and perineal infiltration is advocated by Robert Mackey⁸ (Women's Hosp., Sydney) for delivery of the premature infant, in breech deliveries, and for cesarean section. The anesthetic agent used is 1.5 per cent solution of Metycaine, which has proved singularly nontoxic, only one reaction having been reported at Women's Hospital since 1944.

The technic has been used routinely for delivery of patients with diabetes, cardiac or pulmonary disease and severe pre-eclampsia. It is also used when application of low forceps is indicated and the patient's condition precludes general anesthesia.

Since adoption of this technic for delivery of premature infants, survival rate of technically viable premature infants has increased, and Mackey is convinced that this is by far the best method for such deliveries.

In breech deliveries of primiparas it is most desirable that the patient use her own powers to expel the fetus. Episiotomy is also necessary. The technic fulfils these requirements, the only drawback being that occasionally chloroform anesthesia is required for delivery of an extended arm or head. In general, however, results in 33 cases of uncomplicated breech presentation in primiparas were excellent; postpartum bleeding was minimal, and there was no untoward influence on the second or third stage of labor.

Mackey favors local infiltration anesthesia for ce-

(8) M. J. Australia 2:593-600, Nov. 15, 1947.

fetal distress, facts suggesting that the infants would not have survived general anesthesia.

Case analysis shows that local anesthesia places the child in more favorable condition, irrespective of the type, duration and intensity of trial labor preceding cesarean section. To eliminate as far as possible all painful sensations, the authors combine local parietal and subperitoneal anesthesia with intravenous analgesia administered only at the time of extraction of the fetus, i.e., when the surgeon is ready to incise the lower segment. If extraction is done within five minutes of intravenous injection, the amount of drug absorbed by the fetus is negligible.

Method of Obstetric Analgesia and Anesthesia is described by Lees M. Schadel, Jr.⁷ (Hahnemann Med. College and Hosp.). If the cervix is dilated 4 cm. or more and strong painful contractions are present, Demerol, 1 mg. per lb. body weight, and scopolamine hydrobromide, 1/150 gr., are administered intramuscularly. Demerol may be given intravenously if desired. When the cervix is completely dilated in the multipara or the perineal stage is reached in the primipara, pudendal block is completed on the delivery table, using 1:100 Intra-caine solution.

This method was used in 100 patients chosen at random, the criteria for selection being a normal pelvis and a prospective normal delivery. Results were compared with those in a control group of 100 women with normal spontaneous delivery. There were no serious complications of labor and no maternal mortality in either group. Conditions contributing to maternal morbidity in the study group included postpartum hemorrhage in two cases, mild endometritis and parametritis in seven, retained secundines in two, ischiorectal abscess in two and infected episiotomy wound in one case. In the control group there were 10 patients with parametritis and 2

(7) Am. J. Obst. & Gynec. 55:1016-1022, June, 1948.

taneously. Demerol seemed to have no effect on the infant, and its analgesic action was gratifying to the patient. Immediate postoperative condition of the patients was satisfactory.

[J. F. Mohan (Cincinnati J. Med. 29:335, 1948) mentions that for the past 20 years cesarean section has been performed routinely under local infiltration anesthesia at the Long Island College Hospital, with satisfactory results. For cesarean section E. A. Graber and S. Druce (New York State J. Med. 48:1269, 1948) prefer local anesthesia combined with nitrous oxide and oxygen. E. L. Cornell (Am. J. Obst. & Gynec. 56:582, 1948) recommends the use of music as a mind diverter in local or spinal anesthesia.

Two obstetric deaths from direct infiltration anesthesia have now been reported. Within my knowledge, these are the first to be reported. In the Newsletter of the American Society for Anesthesiologists (April-June, 1948) is reported the case of a woman, aged 40, who had a tubal ligation on the first postpartum day, under procaine infiltration anesthesia. Convulsions occurred, and she died. There was no autopsy. Procaine had been used for a tooth extraction many years before without ill effect. The second case was reported by F. R. Locke (South. M. J. 41:228, 1948).—Ed.]

Anesthesia as Cause of Maternal Death, with Special Reference to Aspiration Asphyxia and Atelectasis is discussed by Charles A. Gordon¹ (Brooklyn). In a total of 958 puerperal deaths from 1937 to 1946, 43 were due to anesthesia. In 17, death was attributed to the toxic action of the anesthetic itself and in 26 either to aspiration asphyxia or to atelectasis.

Gordon recommends that no food be given during labor if birth may be anticipated within 12 hours. If delivery impends within 12 hours after admission, it should be assumed that the stomach is not empty, and vomiting should be induced if general anesthesia is to be administered.

The anesthetist should be acutely aware of the hazards of induction of anesthesia and emergence. Apparatus for suction should be in readiness. The head of the delivery table should be lower than the foot. If respiration is satisfactory, induction should be as rapid as possible. If the

(1) J. Mt. Sinai Hosp. 14:352-362, Sept.-Oct., 1947.

sarean section in all cases, but when fetal anoxemia is present or anticipated, as in antepartum hemorrhage, it should be regarded as a necessity. The fetus has its full complement of oxygen, none of which has been displaced by gaseous anesthetics or depressants soluble in maternal and fetal plasma. The mother is spared the disadvantages of general anesthesia with its resultant vomiting and strain. Bleeding during operation and postoperatively is minimal, as uterine contractions are not inhibited, and statistics show a shortened convalescence with minimal postoperative discomfort.

When the head is deeply engaged in the pelvis, supplementary anesthesia must be given. The author gives Pentothal intravenously at the time the incision in the uterus is made. The fetus is removed before the general anesthetic can act on it, and suturing of the uterus, peritoneum and abdominal wall, as well as the "peritoneal toilet" can be performed with ease.

Combined Local Infiltration Anesthesia and Pentothal Sodium Anesthesia in Cesarean Sections: Preliminary Report. Julius A. Fino and Josiah R. Eisaman⁹ (Univ. of Pittsburgh) used this procedure on 40 patients. Local infiltration was done with Novocain. Pentothal Sodium was given intravenously, average amount being 12.4 gr. It was administered when the uterus was adequately exposed. In low cervical cesarean sections it was started after infiltration and dissection of the vesical fold. Nitrous oxide in small amounts with continuous oxygen was used during operation in all cases. In 22 cases Demerol was given preoperatively. There were 27 classical and 13 low cervical sections. Length of time from beginning of Novocain infiltration and extraction of the child varied from 9 to 30 minutes; most infants were delivered within 15 minutes.

There was no fetal or maternal mortality. Two infants had delayed respiration, and all others breathed spon-

(9) Am. J. Obst. & Gynec. 55:887-890, May, 1948.

food. The advisability of passing the Levin tube and decompressing the stomach should be considered in patients whose abdomens become tense and tympanitic during labor and while under analgesic medication. Restraint and care in moving anesthetized patients and careful application of pressure, if pressure is to be used upon the fundus of the uterus, must be practiced. A sound procedure in the management of a patient with accumulated gastric contents, as well as a patient with an upper respiratory infection, is avoidance of a general anesthetic.

When patients are anesthetized with cyclopropane it is dangerous to administer pituitary extract. This fact should be borne in mind by the obstetrician and by the anesthetist. The reason for this admonition is that death may occur as a direct result of the administration of pituitary extract during cyclopropane anesthesia. Therefore, when an oxytocic is necessary under cyclopropane anesthesia, ergotrate, not pituitary extract, should be used.—Ed.]

Analgesia and Acceleration of Labor by Combined Curare and Spasmalgin. H. Laborit, G. Valla, A. Le Lamer and L. Vogel² first used Intocostin (Squibb) and later 3.602 R. P. (Specia Laboratories), both intramuscularly. They injected 20-30 units of Intocostin (1-1.5 cc.), usually followed by 1 cc. after two or three hours and on rare occasions by 1 cc. after the same interval, in primiparas who had received a first injection at onset of labor. They injected 0.3 Gm. (1.5 cc.) of 3.602 R. P. every two hours as needed. With the latter, which they prefer, an injection at onset of labor in primiparas and secundiparas and another when dilatation reaches the size of a palm are usually enough to insure analgesia and excellent contractions. In multiparas, injection must be given as soon as possible, because the analgesic effect appears only after 20-30 minutes and, if labor progresses rapidly, full benefit might not be obtained from the drug.

Spasmalgin (Roche) is injected simultaneously with the first dose of curare and repeated every 30 minutes until disappearance of subpubic sensitivity due to spasm of the cervix. Generally, two or three ampules suffice and bring on complete dilatation.

(2) *Gynec. et obst.* 47:585-591, 1948.

breath is held or if attempts at vomiting occur, anesthesia should be stopped at once and the patient's head promptly turned to one side.

Hyperpnea induced by carbon dioxide will hasten recovery and increase the safety of this stage of anesthesia. The recovery bed should be elevated at the foot and the patient placed on her side. Deep breathing or coughing may be encouraged until she is mentally alert. Bronchoscopy may be indicated.

Local anesthesia is much safer than general. Episiotomy and low forceps delivery can readily be done under local infiltration. Nitrous oxide combined with local anesthesia is highly satisfactory. It may be difficult to anesthetize highly nervous women without anoxemia. In that event the gas, oxygen, ether sequence is satisfactory and safe if administered by an alert, trained anesthetist. Spinal anesthesia has advantages for abdominal delivery, but its safety is uncertain, especially in the hands of an obstetrician who uses it infrequently. Despite speed of induction and recovery with cyclopropane, its potency and the danger of ventricular fibrillation should prohibit its use.

[H. F. Chase (*Am. J. Obst. & Gynec.* 56:673, 1948) has shown that in dogs certain analgesic or amnesic agents and combinations of such agents may delay passage of food from the stomach for a significant period. He emphasizes that the premedicated anesthetized patient is unprepared reflexly to guard against regurgitation and the anesthetist is not warned by the usual sign of vomiting that regurgitation has occurred. Aspiration into the trachea of regurgitated gastric contents might occur in this crucial interval and the incipient effects of irritation not be evident until the anesthetic is discontinued and the patient's reflexes return. Upon recovery of consciousness, the patient may complain of pain in the chest and often may cough up blood-tinged sputum. Signs of respiratory difficulty upon recovery of reflexes may be out of proportion to any evidence of aspiration during anesthesia. Several preventive measures may be suggested. The physician should impress on his patient the dangers of eating after labor starts, especially if sedative drugs are to be used. Emesis may be induced in patients admitted to the delivery floor with a history of recent ingestion of

The first stage may be completed with the woman in any position she chooses. The physician must remember that the patient must not be allowed to have any anxiety, and therefore his words, actions and even thoughts should be confident and truthful. Relaxation during contractions is essential in this stage.

The first test period of labor occurs when the cervix is about three-fifths dilated. The patient needs reassurance in a kindly but not oversympathetic manner, firm encouragement, common sense explanation and companionship.

The second test period occurs between four-fifths and full dilatation of the cervix. Backache results from tension on the cervix uteri. Understanding and personal attention is again required. An anesthetic should be given if the patient requires it, but if she can be made to realize that the sensations are more threatening than actually painful, she will probably refuse anesthesia.

During the second stage the patient is required to assume the dorsal position, holding her legs herself, with her hands either over her knees or in the popliteal spaces. She is instructed how to aid expulsive contractions and to take advantage of periods of amnesia between contractions.

The third test period occurs when the occiput starts its rotation to the front and commences to exert direct pressure on the pelvic floor. The patient must again be reassured and the threatening character of the sensations explained.

The fourth test period coincides with crowning. The patient should be kept under firm control until two or three contractions have passed and the vulval margin loses sensitivity.

Delivery is not painful. After the cord has been separated the infant is wrapped in a towel and handed immediately to its mother. Her emotional state is now that of pride and achievement.

With this treatment, labor advances and dilatation progresses without the woman's being aware of it; in fact, she often sleeps. When dilatation is complete, the patient must be made to push. Expulsion is always rapid even in primiparas (15 minutes average), the perineum being surprisingly soft.

This method was used in 23 cases. In eight primiparas attended from onset of pains, duration of labor varied from six to two hours. In 15 multiparas labor was more or less rapid but painless, although 3 gave birth to children weighing over 4 kg. Once dilatation was complete, expulsion occurred in 30 minutes or less in 22 patients. In one primipara whose pelvis was at the limit of normal and whose child weighed 4,150 Gm., expulsion took one hour. The technic may be used by any physician, since the doses employed cannot cause respiratory accidents in mother or child.

[A more complicated procedure to hasten labor is advocated by A. Pontonnier, Y. Ferrier and R. Baux (*Toulouse Med.* 48:67, 1947). Once labor is under way these authors inject Dolosal, followed in 15 minutes by artificial rupture of the membranes, bilateral infiltration with Novocain of the lumbar sympathetic nerves, and an injection of 10 units of pituitary extract. This procedure is said to give immediate and complete analgesia, absence of uterine spasm and rapid dilatation; the second stage of labor is accelerated but painful. One case of obstetric shock and increased perineal lacerations was observed. In 21 cases there were three complete and two partial failures. I strongly urge physicians not to try either the combination of curare and Spasmalgin or the combination of Dolosal, rupture of the membranes, infiltration of the sympathetic nerves and posterior pituitary extract.—Ed.]

Outline of Conduct of Physiologic Labor is presented by Grantly Dick Read³ (London), who defines physiologic labor as parturition neither inhibited nor disturbed by mechanical, chemical or psychologic factors. The patient must not be just a passive subject for treatment; she should be a properly prepared and educated collaborator in the birth of her child.

(3) *Am. J. Obst. & Gynec.* 54:702-710, October, 1947.

Labor terminated uneventfully in most older women. Incidence of cesarean section and cesarean hysterectomy was, however, greatly increased, and that of midforceps was four times the general hospital incidence. Breeches and transverse presentations were more numerous, and postpartum hemorrhage was more frequent. One of every 10 mothers failed to take a baby home. High fetal mortality resulted from an increased number of premature babies and babies with congenital abnormalities and a higher incidence of fetal damage because of the greatly increased number of pregnancy complications.

[In Davis and Seski's cases there were two women 46 years and two 48 years of age who gave birth to children. One of my patients was 52 years of age when her third child was delivered. There was no trouble during pregnancy or labor.—Ed.]

Postmaturity is not a problem, according to L. A. Calkins⁵ (Kansas Univ.). Placenta and baby weight increase rapidly up to about day 260. Weight increase is much less rapid from day 260 to 280, and the increment after full term is reached is very small. From study of 6,000 pregnancies, Calkins concludes that placenta size is more significant in determining the baby's size than is three weeks' postmaturity. Average weight of primiparas' babies with small placentas (less than 500 Gm.) at full term is 2,810 Gm. With placentas between 500 and 695 Gm., the baby's weight is 3,295; with large placentas, it is 3,675 Gm. Thus the span between small and large placentas is, on the average, 865 Gm. Compared with this, the increment between 280 and 300 days is only 120 Gm. or less. If an infant is to be oversize at full term, it will therefore have acquired most of that excessive size by about day 260, and when the infant's size may be a complication, it is important to recognize the large size early. On the other hand, if the infant is large at full term, its further increase in size will be of little significance. Actually, the second stage of labor in primiparas

(5) *Am. J. Obst. & Gynec.* 56:167-172, July, 1948.

The third stage is explained, and when the contractions of the uterus become strong enough for her to feel the desire to push down she is asked to give a long expulsive effort to squeeze out the afterbirth.

Such labors can be seen in most healthy women with well conducted delivery. Hemorrhage is rare and usually slight if it does occur. Obstetric shock is not seen, and lacerations are unusual. The well-being and happiness of the mother is impressive, and the lusty health of the infant gratifying.

[The Department of Anesthesia in the Addington Hospital in Durban, South Africa (South African M. J. 21:268, 1947) reported attempts to make childbirth painless. In the experimental antenatal clinic, lectures are given on the anatomy and physiology of the external organs, on fertilization and labor. The terms labor and pain are not used in instructions to patients. As a result patients are more easily managed.—Ed.]

COMPLICATIONS

Childbearing in Twilight of Reproductive Period. To determine how aging influences reproductive function, M. Edward Davis and Arthur Seski⁴ (Univ. of Chicago) reviewed the records of 1,011 women aged 40 and older delivered at Chicago Lying-In Hospital from 1927 to 1944. During this period, a total of 52,128 women were delivered. Incidence of pregnancies in women 40 and older was 1.94 per cent; the large majority were multiparas. Abortion terminated 50 pregnancies (4.9 per cent). Circulatory diseases including heart disease, thrombophlebitis, phlebothrombosis and extensive symptomatic varicosities were three times as common as in the general hospital group. Incidence of toxemia in women 40 and older was 24 per cent, whereas the hospital incidence is 7.1 per cent. Placenta previa was four times as frequent in the older women, and abruptio placenta three times more frequent, than in the total hospital group.

(4) Surg., Gynec. & Obst. 87:145-152, August, 1948.

version of the uterus which may create pseudo-overriding, and on the dystocias associated with bony dystocia (placenta previa, induration of cervix and lower segment, and malpresentations of the fetus). Two practical precautions must be mentioned: as trial labor may have to be ended by cesarean section, it should not be used in the home; and, as trial labor involves a period during which the membranes are ruptured and the amniotic cavity may become infected, all possible causes of infection must be avoided, particularly frequent digital examinations through the vagina.

Definition of trial labor must include three elements: limitation of the cases for which it should be reserved; selection of the moment to stop it by evaluating the probable effects of the uterine contraction, and the patience necessary to make only extremely rare examinations.

Conduct of Trial of Labor must be such that operative intervention can be undertaken at any time with comparative safety to the mother, according to A. W. Andison⁷ (Winnipeg Clinic). If careful clinical and radiologic investigation justify a trial, the patient should be permitted to go into labor spontaneously. Throughout the first stage scrupulous attention to every detail is essential, and complete notes should be kept. Every effort should be made to keep the membranes intact as long as possible in order to decrease the risk of infection. By the end of 24 hours, and often before, it should be possible to decide on the mode of delivery. If the head is not engaging well after this interval, it is unlikely to do so. However, application of rigid time limits is unwise, since what the patient can accomplish, not what she can endure, is on trial.

No patient has had a thorough trial until the membranes have ruptured. If cervical dilatation is complete, it is justifiable to rupture the membranes artificially. If

(7) *Canad. M. A. J.* 57:527-531, December, 1947.

is slightly longer (about six minutes) when the baby is large, but this appears to be physiologic.

[H. Sievers (Zentralbl. f. Gynak. 69:726, 1947) maintains that because of the psychic trauma and repercussions of the war on the neuroendocrine systems of future mothers the number of prolonged pregnancies increased 8.5 per cent, and fetal and maternal morbidity and mortality increased. Frequency of intrauterine fetal death also increased. In Sievers' opinion a prolonged pregnancy is one that exceeds 294 days from the last menstrual period. Babies' length and weight vary too much to be a reliable guide. Sievers believes that radiography of the centers of ossification, particularly of the knee, will indicate postmaturity. In some cases circumference of the abdomen is reduced, due to absorption of liquor amnii. J. A. Stroink (Gynaecologia 124:78, 1947) reports that as a result of starvation in Holland, duration of pregnancy was somewhat shorter than usual. E. Urzaiz Rodriguez (Ginec. y obst., Mexico 3:93, 1948) believes that prolonged pregnancy is apparent, not real. The cause of gigantism is not prolonged gestation but usually diabetes, syphilis or some other disorder. When pregnancy went beyond 280 days in his cases no baby was a giant and when babies weighed more than 3,500 Gm. no pregnancy had been prolonged. True postmaturity is a very rare condition.—Ed.]

How to Define Trial Labor. According to Bailey, introduction of low cesarean section made possible use of trial labor. Subsequently, the sulfonamides and penicillin increased the chances of success in late and even very late operations. The principle of trial labor is as old as the practice of obstetrics: in the case of a moderately contracted pelvis it is advisable to wait, but not indefinitely. Henri Vignes⁶ (Paris) advises trial labor when disproportion of the head and pelvis is such that engagement seems probable. The probability of engagement is evaluated by measuring the diameter between the promontory and lower pubic border: most obstetricians consider 10.5 cm. as the lower limit of normal, but this value is not absolute, as the form of the pelvis must also be considered. The probability of engagement also depends on the diameters of the fetal head and its malleability, on overriding, taking into consideration the degree of ante-

(6) *Semaine d. hop. Paris* 24:929-933, Apr. 10, 1948.

remains at — 1 or 2 and cervical dilatation reaches 5 or 6 cm., one should not conclude that a cephalopelvic disproportion exists and perform a cesarean. The physician must first rupture the bag of waters and wait three or four hours to see whether the head will descend and rotate anteriorly from an occiput posterior position. In most instances of moderately contracted pelvis when the head remains high, the head will descend, the cervix will dilate and vaginal delivery will take place after the bag of waters is ruptured. If the head fails to descend after three or four hours of strong pains following artificial rupture of the membranes, a cesarean section should be done. I do not believe cesarean section should be delayed until after a patient's membranes have ruptured and she has been in the second stage for two hours. It is true that with modern antibiotics the risk of infection is very low. Nevertheless, decision on the necessity of cesarean section should be made before complete dilatation of the cervix.

M. Riviere, A. Chastrusse and A. Misson (*Rev. franc. de gynéc. et d'obst.* 42:303, 1947) maintain that the type of the pelvis and the size of the baby should not influence the decision to do a cesarean section in a breech presentation because some large infants are born spontaneously through contracted pelvises, whereas other small babies must be delivered by cesarean section. They maintain that the rhythm and intensity of uterine contractions, progress of cervical dilatation and degree of advancement of the presenting part determine whether labor should be allowed to continue naturally. If dilatation of the cervix ceases, section should be done promptly. This seems to be poor logic, because the state of the cervix is not the criterion in cases of contracted pelvis. Since the diameter of the head is the largest part of the baby to come through the cervix and the pelvis, one must decide whether a cesarean section is necessary in breech cases before the patient goes into labor. In my opinion, there is no trial or test labor for breech presentations. The terms apply to head presentations only.—Ed.]

Investigation and Treatment of "Borderline" Cases of Contracted Pelvis is discussed by J. M. Munro Kerr⁸ (Glasgow Univ.). Pelvic contractions often affect outlet as well as inlet, a fact which is often forgotten. Radiography is an invaluable aid in diagnosis of contracted pelvises. X-rays are best taken during week 36 or 37 of pregnancy, thus allowing the physician sufficient time to prepare for complications. The most useful single pelvic picture is a lateral x-ray. If the lateral film suggests

(8) *J. Obst. & Gynaec. Brit. Emp.* 55:401-417, August, 1948.

the head fails to advance after two or three hours of strong contractions with the membranes ruptured and the cervix partly dilated, termination of labor by cesarean section is indicated.

Abdominal examination yields much valuable information. Information from a rectal examination is limited and often incorrect. Therefore vaginal examination is essential in most cases. Provided it is done with full aseptic precautions, even a repeated vaginal examination does not seriously increase risk of infection. It is indicated when the membranes rupture, to exclude presence of cord prolapse, and later to discover the cause of any delay in progress.

Development of signs of distress in mother or fetus before engagement of the fetal head calls for immediate termination of labor by cesarean section. Section is indicated in all cases in which signs of obstructed labor become evident.

However, in any series of patients given a carefully managed and thorough trial of labor, it will be found that, if adequate time is allowed to see what the mother can accomplish, successful vaginal delivery can be achieved in the great majority.

[There is considerable confusion concerning the terms "trial of labor" and "test of labor." There is no uniformity concerning definitions for these two terms and while they are different, many obstetricians use the terms interchangeably. Usually, when a patient is given a trial labor, she is observed for the strength, frequency and character of uterine contractions, amount of dilatation of the cervix and descent of the head. Test of labor, on the other hand, has two distinct connotations. Some obstetricians insist that a test of labor is achieved only after the patient has complete dilatation for two hours with membranes ruptured. Others maintain that a woman has a fair test of labor when she has had strong, regular, uterine contractions for many hours, without much progress of cervical dilatation. I believe that close observation of a woman with a borderline pelvis will reveal (after a variable number of hours) whether the baby's head can go through the mother's pelvis. However, it is absolutely essential that the membranes be ruptured before a final decision is made. Therefore, when the fetal head

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abnormality, a frontal view should be taken. Additional factors which influence labor in the contracted pelvis are: (1) size of fetal head; (2) moldability of fetal head; (3) "give" in maternal pelvis; (4) degree of cervical rigidity; (5) efficacy of forces. Müller's bimanual method and cephalometry are useful aids in estimating size of the fetal head and its adaptability to the maternal pelvis. It is commonly assumed that 2-3 mm. in one diameter is the usual degree of molding which may be obtained. However, ossification of the fetal skull is an important factor in determining degree of molding; the greater the ossification, the less the molding. The lower pelvic cavity and outlet often "give" very appreciably during labor, which accounts for the many cases in which obstructions do not prove as difficult as was anticipated by measurements of the pelvis and x-ray. A rigid cervix makes it inadvisable to push trial labor very far. The strength of the forces is unpredictable; good forces can easily be weakened by wrong or wrongly timed analgesics and sedatives.

Induction of premature labor is contraindicated in primigravidas; judiciously used in multigravidas, it is useful. An adequate trial of labor requires that the patient be in active labor for two to six hours with the membranes ruptured and the fetal head adjusted to the pelvic brim. When section is indicated, the lower segment operation is the one of choice, and the transverse incision should be made as low as possible. Kerr believes that there is a place for symphysiotomy in carefully selected cases of outlet deformity.

[Kerr has practiced obstetrics for 60 years and his article contains much useful advice and should be read in its entirety.—Ed.]

Cuban Concept of Cephalopelvic Disproportion Syndrome and Its Treatment is presented by Hector Valle Pineda and Alfredo Sardinias Ramirez⁹ (Havana).

Disproportion is not a subnormal true conjugate di-

(9) South. M. J. 40:914-919, November, 1947.

ameter or a morphologic classification of the pelvis, but rather a group of symptoms and signs which signify relative disproportion of pelvis and head. Pelvic dystocia occurs in Cuba in eight of every nine cases of disproportion.

Three methods of treatment are commonly used when the fetus is viable. Cesarean section is employed in cases of medium or great inlet disproportion, both in primiparas and multiparas, and also in cases of complex inlet disproportion. Symphysiotomy is done in every transit disproportion (cephalic pole impacted) in primiparas and in multiparas and in cephalic or pelvic presentations. Test labor is used in slight and minimal inlet disproportions. Almost 80 per cent of cases in which inlet disproportion is slight or minimal end in spontaneous delivery.

Use of internal version and high forceps is condemned by the Cuban school.

If test labor fails, excellent results are obtained with cesarean section in the primipara and with symphysiotomy in the multipara. Timing of symphysiotomy is of the utmost importance; it must not be delayed until amniotic liquid becomes intensely colored with meconium and there are alterations of the fetal heart beat.

Symphysiotomy is an easy operation without danger to the life or health of mother or child, but its success depends both on the timing and on the conduct of post-operative labor. Unlike cesarean section, which limits the patient's reproductive capacity, symphysiotomy increases this capacity owing to enlargement of the pelvis. Repeated symphysiotomy is rarely necessary.

Management of Prolonged Labor: Four Year Review from Lewis Memorial Maternity Hospital is presented by Herbert E. Schmitz, James X. Bremner, Janet E. Towne and George R. Baba¹ (Chicago). Twenty-four hours was selected as the upper limit for normal duration of labor, and labor was considered to begin with regular uterine

(1) Am. J. Obst. & Gynec. 54:643-650, October, 1947.

contractions associated with pain, regardless of presence or absence of effacement, dilatation of the cervical os or rupture of the membranes.

Incidence of prolonged labor in 5,599 patients delivered was 4 per cent. Cases of obstructed labor due to complicating tumor or disproportion were excluded. Routine procedure was extremely conservative, being directed toward anticipating and combating infection and exhaustion during the antepartum phase and maintaining a constant vigil for hemorrhage and shock in the postpartum phase. Morbidity was 9.9 per cent, as against 3.8 per cent in the total group. Corrected mortality rate was 6.69 per cent for the group with prolonged labor and 1.66 per cent for the total group.

Of 224 patients having prolonged labor, 155 were primigravidas. Among the 5,599 patients, 35 were primiparas aged 35 or more; of these, 9 had prolonged labor. Average duration of labor was 47 hours, as compared with 37.8 hours for the whole group with prolonged labor. Four of five fetal deaths occurring in primiparas over age 35 occurred among the nine with prolonged labor. There was no maternal death in patients with prolonged labor.

[In cases of prolonged labor, particularly when the membranes have been ruptured for 24 hours or more, it is advisable to give antibiotics. Penicillin alone is not sufficient, hence both penicillin and sulfonamides, particularly sulfathiazole, should be given hypodermically, orally or vaginally.—Ed.]

In-co-ordinate Uterine Action in Labor is considered by T. N. A. Jeffcoate² (Univ. of Liverpool) to include all conditions in which the activity of one part of the uterus is independent and out of keeping with the purpose of the whole. The course of labor is prolonged. Commonly after a distressing and long first stage the second stage is normal and delivery spontaneous. In more severe cases forceps delivery becomes necessary. In the most serious cases the cervix may be only half dilated or less,

(2) *Canad. M. A. J.* 58:42-48, January, 1948.

even after several days of labor; maternal and fetal risks are considerable.

Although the cause is by no means clear, it appears that uterine spasm is more likely to occur in women who are apprehensive, particularly in primigravidas.

The primary treatment of spasmodic uterine action without gross disproportion is conservative and aims at allaying the patient's anxiety and at relief of pain and muscle spasm. Prompt and intensive treatment of a colicky uterus may prevent development of constriction ring. Drugs to relieve pain and spasm should be given at once and repeated as long as colicky contractions persist. Until the cervix is fully dilated there is little place for active intervention. When signs of fetal distress develop during the first stage, lower segment cesarean section is usually indicated.

Prognosis for the second confinement depends largely on the degree of dilatation reached by the cervix in the first; but usually uterine efficiency improves with each pregnancy.

Studies on Insufficiencia Pelvis (Gravidarum et Puerperarum). During pregnancy, the pubic symphysis and sacroiliac joints of the maternal pelvis relax, probably as a result of hormonal influence. The consequent pelvic instability gives no subjective symptoms as a rule but in some cases becomes pathologic and produces symptoms. To the symptomatic group, Sune Genell³ (Women's Clinic, Malmö) applies the term *insufficiencia pelvis*. Skajaa observed symptoms of pelvic insufficiency in 31 of 185 obstetric patients (16 per cent). Among 12,500 patients delivered at the Malmö Clinic, Genell observed 92 cases, an incidence of 0.8 per cent. There were only 33 primiparas in this group. All patients complained of unmotivated fatigue. Seventy-six had aching pains in the back and hips, sometimes of sciatic type. Ninety per cent had difficulty in turning over in bed and 70 per cent

(3) *Acta obst. et gynec. Scandinav.* 28:1-37, 1948.

in walking, especially up and down stairs. Tenderness over the symphysis was frequent. A positive Trendelenburg test is pathognomonic of pelvic insufficiency, being absent in only 5 of the 92 cases. In severe cases the patients had a waddling gait. The erector dorsi muscles were fixed in most cases almost to a state of contracture because of the patient's need to fix her unstable pelvis. In five cases x-rays showed distinct decalcification at the pubic symphysis with ragged outlines of the pubic bone-ends or even actual splintering.

In treatment Genell suggests use of calcium and vitamin D combined with regular rest hours during the day. During the rest period, the patient should lie on her back without a pillow but with a small cushion under the lumbar region. In severe cases a corset may be required.

Use of Postpituitary Extract in Physiologic Amounts in Obstetrics: Preliminary Report. G. W. Theobald, A. Graham, J. Campbell, P. D. Gange and W. J. Driscoll⁴ have used a Pituitrin drip in dilutions of 1:2,500, 1:5,000 and 1:10,000. The 1:2,500 solution apparently caused irregularity of the fetal heart beat in some cases. The authors believe that the ideal solution may lie between 1:5,000 and 1:10,000. They now adhere to the following composite routine.

METHOD.—Four doses of quinine sulfate, 0.65 Gm., are given at four hour intervals. Two oz. castor oil is given either just before or just after the third dose of quinine. About four hours after administration of castor oil, a copious warm enema is given. If the patient does not go into labor within 24 hours after completion of quinine induction, the membranes are ruptured immediately below the presenting part. Should labor not begin during the next 24 hours, Pituitrin drip is started.

Of 43 patients thus treated, 22 went into labor within 24 hours of completion of quinine therapy; the membranes were ruptured in 20, and Pituitrin drip was administered in 9. In one of the last group Pituitrin drip

(4) Brit. M. J. 2:123-127, July 17, 1948.

was given 24 hours after completion of quinine therapy; the membranes were not ruptured because the patient had marked pelvic contraction. All infants, except one, a breech delivery, were born alive and survived.

Pituitrin drip method was used in 20 patients with primary uterine inertia, only 1 of whom had previously given birth to a full term living child. Two were delivered by cesarean section, nine by forceps and the other nine spontaneously. One baby died from a tentorial tear. In uterine inertia Pituitrin drip does not cause very strong pains, but it almost always increases both frequency and intensity of the pains. It makes possible use of sedative drugs, for Pituitrin drip can be continued while the patient is narcotized.

Cervical Dystocia, with Special Reference to Fibrous Nature of Cervix is discussed by Otto H. Schwarz and Ralph B. Woolf⁵ (St. Louis Maternity Hosp.), who confirmed Danforth's findings in a study of 19 uteri. Contrary to the opinion of others that this condition results from destruction of the cervical "specialized muscle and elastic fibers" and replacement of these tissues by non-expansile scar tissue cells, Danforth found that the basic structure of the nonpregnant cervix is fibrous connective tissue. The usual amount of smooth muscle does not exceed 10 or 15 per cent, and muscle fibers are scattered at random throughout the cervix. Elastic tissue fibers were sparsely and haphazardly scattered throughout the cervix, being most abundant in and around the walls of the larger blood vessels. Elsewhere they constituted but a fraction of 1 per cent of the total fibrous tissue of the cervix.

Except for greatly increased vascularity and edema, the fundamental structure of the cervix in pregnancy was similar to that of the nonpregnant specimens. The basic tissue was fibrous. Smooth muscle amounted to 2-40 per cent (average, 10 per cent). Distribution of muscle is

(5) Am. J. Obst. & Gynec. 55:151-168, January, 1948.

likewise variable, though the presence of small bundles in the central portions of the tissue is somewhat more common. When they do appear, the bundles are heavily interspersed with fibrous tissue and appear to have insignificant sphincteric possibilities.

The authors confirmed the picture described by Danforth (Figs. 17-19). They believe that the functional rig-



Fig. 17.—Gross specimen from patient 28 weeks pregnant, showing complete cervical canal and development of lower uterine segment. (Courtesy of Schwarz, Otto H., and Woolf, Ralph B.: *Am. J. Obst. & Gynec.* 55:151-168, January, 1948.)

idity in cervical dystocia, especially in elderly primiparas, occurs because the fibrous cervix has not previously received the physiologic hormone stimulus of pregnancy. The part played by ovarian hormones in softening the cervix is not fully understood, but there can be no question that they play a part, especially progesterone. It is quite possible that hormonal imbalance or deficiency of one or the other or possibly both plays a part in functional rigidity of the cervix.

[In the opinion of H. Sauter (*Gynaecologia* 125:87, 1948) spasm of the cervix in labor is the result of overactivity of the



Fig. 18 (top).—Section low down on cervix in Figure 17, showing nothing but connective tissue.

Fig. 19 (bottom).—Section high up on same cervix, showing about 50:50 ratio of muscle to fibrous tissue.

(Courtesy of Schwarz, Otto H., and Wolf, Ralph B.: *Am. J. Obst. & Gynec.* 55:151-168, January, 1948.)

sympathetic nervous system. He recommends yohimbine to counteract this type of spasm. Following use of this drug the cervix becomes soft and rapidly dilates. H. E. Bowles (*Proc. Staff Meet.*

Clin., Honolulu 14:67, 1948) reports a case in which the cervix closed completely after conception so that it was impossible to find any cervical opening even after hours of hard labor. Cesarean section was necessary after 15 hours of vigorous labor.—Ed.]

Uterine Ring Dystocia. Herman W. Johnson⁶ (Baylor Univ.) reviews the clinical aspects of "contraction ring," the term being used strictly as defined in *Standard Nomenclature of Disease and Operations*. Incidence depends on the physician's awareness of the condition; in 10,000 cases constriction ring was the cause of 1 in 80 cases of dystocia.

Cases of contraction ring in unobstructed labor may be clinically mild or severe. Mild cases comprise labors in which other causes of dystocia can be eliminated and which greatly exceed normal duration but which terminate spontaneously or by simple delivery procedures in less than 30 hours. Severe cases comprise labors greatly exceeding 30 hours and terminating under surgical anesthesia by more involved delivery procedures. The complication may develop at any time from the beginning of labor to very late in the first stage, or even during the second stage.

Development of a contraction ring early in the first stage of labor is attended by colicky pain, pallor and perspiration and by signs of fatigue which necessitate frequent periods of rest by sedation. Method of diagnosis and treatment follows.

TECHNIC.—The middle finger of the examining hand is inserted rather deeply between cervix and head. The other hand is placed on the body of the uterus and kept there until a strong contraction is felt, when the impact on the examining finger is sensed as very weak. The fetal head is movable or loose in the pelvis.

When, with periods of rest and labor, 30 or more hours have elapsed, when vaginal or rectal examination shows the cervix to be 4 cm. dilated, soft and edematous, the patient is ready for delivery per vaginam. After episiotomy, the hand is carried deep into the vagina to iron out posterior pelvic

(6) J. Missouri M. A. 44:729-731, October, 1947.

fascia and underlying portions of the levator ani muscles. The edematous cervix is felt as a drape covering the most dependent portions of the presenting part. It does not require manual dilatation because the cervix generally brushes aside when the fingers of the operating hand are separated. The hand is then carried upward posteriorly between lower uterine segment and fetal head to ascertain position and presence of any loops of cord below the ring. The contraction ring is examined to determine what effect the anesthesia is having on its tone. If a loop of cord is not present in the lower uterine segment, painstaking cephalic application with midplane forceps is made. It may then be desirable or necessary to deepen anesthesia. Delivery is effected by careful steady traction, assisted by gentle pressure on the fundus toward the pelvic inlet. If a loop of cord is present in the lower uterine segment, making it almost impossible for the cord to escape pressure from the forceps' blade, Johnson prefers to lift the head up through the dilating or dilated ring and complete delivery by version and extraction. Adrenalin chloride will not dilate this type of ring, but ether carried to the point of deep surgical anesthesia will relax it.

[Herman Johnson has had an enormous experience with constriction rings. In his hands the technic of treating constriction ring dystocia yields excellent results. General practitioners should not employ this procedure but in such cases should call a specialist in consultation.—Ed.]

Fetal Mortality Associated with Constriction Ring Dystocia. M. Pierce Rucker⁷ (Richmond, Va.) reports 216 cases of constriction ring dystocia, of which 202 were previously reported [see 1947 YEAR BOOK OF OBSTETRICS AND GYNECOLOGY, p. 153.—Ed.]. Of 217 infants born (there was one set of twins), 42 died. Analysis of the 42 deaths showed that 13 were due to other causes and 29 to the constriction ring. In 20 of the 29 cases delivery was difficult; 8 deaths, including 3 in cases of prolapsed cord, were considered due to interference with fetal circulation; 1 death was due to an amniotic sac infection.

As to whether treatment should be expectant or operative, Rucker concludes from analysis of the literature and

(7) J. Mt. Sinai Hosp. 14:576-584, Sept.-Oct., 1947.

his own experience that prompt recognition of the constriction ring followed by some type of operative delivery seems to offer the best chance for the baby.

[In the Capetown Peninsula Maternity Hospital, J. T. Louw (South African M. J., vol. 22, 1948) found the incidence of constriction ring to be 1 in 277 cases. Seven cases were treated by cesarean section, two by version and extraction, and one by subtotal hysterectomy; there was one spontaneous delivery. According to A. Granjon and S. Vassy (Gynéc. et obst. 47:375, 1948), amyl nitrate by inhalation is most useful in cases of severe contraction of the uterus when it is desired to produce complete relaxation to permit intrauterine manipulation.—Ed.]

Diabetes Insipidus and Uterine Atony: Case Observed over Period of 26 Years is reported by G. Marañón⁸ (Madrid Univ.).

Girl was first seen in 1921, at age 17, at which time extraordinary thirst and polydipsia had followed sudden immersion in the sea; the experience had upset her greatly. Results of clinical examination were normal, as was the sella turcica. She responded at first to injections of Pituitrin, but was unable to continue treatment after 10 injections because of intense dizziness and faintness associated with slight spasticity in the left arm and leg with coldness of the extremities. She was also unable to tolerate treatment with a mercurial salt or other posterior pituitary preparations.

She married at 27 and pregnancy began at once. Vomiting was severe. Parturition seemed to start several times, but pains stopped almost immediately. After five days without further pains, a stillborn full term infant was delivered.

Two years later she had a spontaneous miscarriage. Her third pregnancy ended happily; pains were slight, but at intervals she was given up to five injections of Pituitrin, and a full term infant was delivered. A fourth pregnancy the following year ended in removal of a stillborn infant three days after cessation of ineffectual labor. Pituitrin was unobtainable on this occasion.

At her last visit in April 1947 the patient, aged 43, appeared normal. She felt well and had become accustomed to thirst and polyuria.

Such cases of so-called essential diabetes insipidus result from some disturbance of the hypothalamic-pitui-

(8) Brit. M. J. 2:769-771, Nov. 15, 1947.

tary mechanism, even though the lesion cannot be demonstrated.

The syndrome of uterine atony may be explained on the basis of deficiency or lack of the oxytocic hormone (produced in the posterior lobe of the pituitary) which may cause deficiency in uterine contractions. Such cases of uterine atony due to posterior pituitary lesions are very rare, and women with such lesions seldom become pregnant.

Dystocic Labor Followed by Amenorrhea and Diabetes Insipidus: New Syndrome. Melvyn Berlind⁹ (Miami Beach) studied three patients with striking similarity in their histories. All had had difficult labor and operative delivery immediately followed by a condition clinically similar to "pituitary shock," onset of secondary amenorrhea 3-12 months after delivery and concomitant onset of typical clinical diabetes insipidus.

Spontaneous correction of these conditions did not take place, at least within two years. Diabetes insipidus was readily relieved by repeated hypodermic injections of Pituitrin. The two day treatment (intramuscular injection of 5 mg. crystalline α -estradiol benzoate and 25 mg. crystalline progesterone, both in peanut oil, divided over two successive days) brought about menstruation in all three patients. However, menstruation occurred only as a result of hormone injections, and dosage could not be reduced. Gonadotrophin treatment is being tried and x-ray stimulation of the pituitary body held in reserve.

Apparently the syndrome resulted from injury to the pituitary body, causing lack of stimulation of the ovaries with failure of ovulation (absence of secretory endometrium) and amenorrhea. The diabetes insipidus is probably related to the same pituitary injury (pars intermedia), since Zondek and co-workers demonstrated the presence in diabetes insipidus of intermedin, derived from

(9) M. Rec. 160:731-733, December, 1947.

the pars intermedia of the pituitary body, and Sulzberger's recent work indicates that this may be a specific hormone regulating water metabolism.

OPERATIVE OBSTETRICS

Study of 710 Complete Lacerations Following Central Episiotomy. D. Frank Kaltreider and D. McClelland Dixon¹ (Univ. of Maryland) define third degree laceration as one which completely involves the sphincter or a portion of the rectum, except when the rectum is incised or lacerated and the sphincter is intact. They found 710 third degree lacerations in 15,167 central episiotomies, an incidence of 4.49 per cent.

The main factors causing rectal tears were use of low forceps delivery, inexperience, occiput posterior and occiput transverse positions and prolonged labor. Morbidity was increased by rectal lacerations, being 2½ times the average for the clinic. Complications occurred in 13.09 per cent, two thirds of them being serious. Mild skin separation with infection occurred in 18 patients (2.53 per cent), sinus from vagina to perineal body in 14 (1.98 per cent), breakdown of the incision to the sphincter but not involving it or the rectum in 15 (2.11 per cent) and rectovaginal fistula in 16 (2.25 per cent).

As against the disadvantages of central episiotomy, the authors found the following advantages: (1) soft tissue anterior posterior diameter, the most available diameter at the outlet, is increased; (2) when a spontaneous tear occurs, it usually extends into the median portion of the perineal body; (3) there are few vaginal lacerations; (4) the anterior vaginal wall is protected by increasing the anteroposterior diameter; (5) when rectal lacerations occur, they are not ragged and are usually in the midline; (6) elective perineorrhaphies may be done when indicated; (7) the incision is more protected from trauma during the puerperium and there

(1) South. M. J. 41:814-820, September, 1948.

is less tension on the episiotomy when the patient moves; (8) the episiotomy is simple to repair; (9) postpartum pain and discomfort are minimal; (10) there are few minor infections and breakdowns; (11) the final result is good and the tissues return normally to their prepartum state. Central episiotomy is considered satisfactory in 93 per cent of deliveries. Using it in occiput posterior and occiput transverse positions is probably not advisable until experience is gained.

[Eastman prefers median episiotomy to other types because repair is easier and patients complain less about pain from the stitches. I prefer a mediolateral episiotomy and have found little difference in the amount of pain and the results of the two types. Extension of the episiotomy wound into the anus is more common with median episiotomy than with mediolateral.—Ed.]

Immediate Attention to Postpartum Cervix. Donald G. Tollefson³ (Los Angeles) has made it a practice for the past 12 years to inspect all cervixes after completion of the third stage of labor. In 1,269 deliveries repair was done on 380 primiparas and 292 multiparas, an incidence of 56 and 49 per cent. Repair was not attempted when there was marked uterine relaxation or a recent infection, when the patient was taking the anesthetic poorly or when prolongation of anesthesia might be dangerous. Satisfactory results were obtained in about 85 per cent of the repaired cervixes. In over 50 per cent of the women on whom cervical repair was not done, cauterization or conization was necessary, and in some trachelorrhaphy was required. In 129 instances in which the cervix had been trimmed and repaired previously, there was no delay in delivery and microscopic sections revealed a minimum of scar tissue. Tollefson advises repair of cervixes with marked thinning at the angles, with or without visible lacerations.

[I fully agree that the cervix should be inspected in all cases after labor but do not agree that repair of the cervix should be carried out in about half of the cases. Anatomically there is thin-

(3) West. J. Surg. 56:285-288, May, 1948.

ning at the sides of the cervix in nearly all women after labor and I do not think there is any need to remove these thin areas. When a cervical laceration of 1 cm. or more is present the cervix should definitely be repaired. I have not found cauterization, conization or trachelorrhaphy necessary in 50 per cent of women delivered. Tollefson and his associates are especially skilled, but general practitioners should repair only lacerated cervixes.

In the following article Sheets advises that all pieces of removed cervical tissue from the cervix be examined. With this I heartily concur and cannot urge too strongly that all pieces of tissue, whether they suggest malignancy or appear to be harmless cervical polyps or urethral caruncles, be examined by a pathologist. Occasionally malignancy is found where it is least expected.—Ed.]

Usual and Unusual Findings in Cervix Uteri at Time of Repair Immediately Following Delivery: Preliminary Report. Maurice V. Sheets⁴ (Los Angeles) examined microscopically 200 specimens of cervical tissue removed during repair immediately after delivery. Young granulation tissue and fibroblastic proliferation were almost uniformly observed in certain areas of the specimens. Russell bodies were occasionally seen in presence of marked inflammatory reaction. Decidual reaction was encountered in more than 40 per cent of cases. Portions of Gartner's duct were found in 2 per cent of cases. The gland-bearing areas presented a peculiar inverted or everted shape, resembling adenopapillomas. The tissue arrangement simulated to a certain degree adenomatous neoplastic change.

Deviations from the normal cellular structure and composition of the squamous epithelium of the portio vaginalis were observed 90 times, or in 45 per cent of specimens. The keratohyaline stratum was sometimes moderately increased in thickness, but true keratinization was not encountered. The nuclei of the malpighian stratum stained deeply with basic dyes. They were pyknotic, and many variations in the arrangement and staining quality were encountered, but in general the nuclei maintained horizontal polarity. In two instances, con-

(4) West. J. Surg. 56:317-333, June, 1948.

dylomatous papillomas were found. The malpighian layer showed excessive thickness with hyperplasia of cells extending throughout that stratum combined with active proliferation of basal cells. One of the papillomas belonged to Edmondson's type 1 and the other to type 2.

Unripened epithelial cells originating from normal squamous epithelium may extend onto the surface normally occupied by columnar epithelium or project into the stroma. A count of all instances in which atypical aberrant epidermoid epithelium appeared in the present series, whether related to normal squamous epithelium or not (described by Novak as metaplasia), resulted in an incidence of 71.5 per cent. Unripened epithelium, originating from normal squamous epithelium and extending onto the surface or marginally into the stroma, described by Novak as epidermization, was observed 24 times. The lesion may be due to hormonal imbalance.

Basal layer hyperplasia was encountered in less than 10 per cent of cases. Although the cells of the stratum basalis give the appearance of malignancy, the basement membrane is intact. In some cases, however, differentiation cannot be made by histologic examination alone, and repeated follow-up examinations are necessary. Preinvasive carcinoma, in the absence of invasive carcinoma, was not seen in this series. It was found in two cases in conjunction with invasive carcinoma; these were the only cases of carcinoma in the entire series, an incidence of 1 per cent. Both were clinically unsuspected and grossly not demonstrable. In one case, total hysterectomy was performed six months after biopsy. Cancer was not grossly evident in the excised tissue. The other patient was followed for six months, and no clinical evidence of carcinoma was encountered. The patients were aged 39 and 35, respectively. The low incidence of cancer in this series may point to some protective influence of pregnancy. In the first patient it could not be determined whether the carcinoma was present before conception.

Histologically, it was a preinvasive intraepithelial type of carcinoma with beginning invasion. The malignant process began within the basal layer at the junction of squamous and columnar epithelium. The second patient has not been adequately followed.

Sheets suggests that specimens obtained through cervical trimming and repair immediately after delivery should be routinely examined microscopically.

Elective Use of Kielland Forceps in Management of Occipitoposterior and Occipitotransverse Positions is advocated by Lee M. Miles⁵ (Albuquerque, N. M.), who reports results in 547 cases. When the cervix was fully dilated and the head deeply engaged in the pelvis, anesthesia was administered and Kielland forceps applied in the originally described manner, the head rotated and delivery effected. Miles did not observe any arbitrary time limit before application of forceps and did not wait for signs of maternal or fetal distress. He considers it unnecessary to remove the Kielland forceps and apply conventional instruments for actual delivery.

The 547 cases occurred in a series of 2,588 consecutive deliveries. In the whole group maternal morbidity was 3.67 per cent; among those delivered by means other than Kielland forceps, 3.72 per cent, and among those delivered by Kielland forceps, 3.47 per cent. Incidence of postpartum hemorrhage in the Kielland forceps group was 1.09 per cent, and in the group delivered by other means 1.07 per cent. Total maternal mortality was 6; 2 deaths were in the Kielland forceps group, but neither could be attributed to method of delivery.

Among the 547 babies delivered by Kielland forceps there were 5 stillbirths and 8 neonatal deaths. Of the 5 stillbirths, 4 fetuses were badly macerated at birth. Of the 8 neonatal deaths, 3 were in cases of congenital deformity, so that the corrected neonatal mortality was 0.9 per cent.

(5) Am. J. Obst. & Gynec. 55:504-510, March, 1948.

Miles believes that for the mother there is no appreciable difference between the outcome of delivery with elective use of Kielland forceps and that with other methods of delivery. If early delivery by means of Kielland forceps is effected before the fetus is damaged by the forces of labor, fetal loss would approach zero.

[I believe the Kielland forceps has a definite field of usefulness in cases of deep transverse arrest and in cases of asynclitism. However, I advise against inserting the anterior blade inside the uterus and rotating it as advocated by Kielland. I believe it is much safer to make the anterior blade wander into place as with the Simpson or other forceps.—Ed.]

Reflections on Actual Value of Forceps. Jorge de Rezende⁶ (Univ. of Brazil) finds that use of forceps is increasing, especially in North American clinics in which continuous caudal analgesia is used. Despite all that has been written in favor of the innocuousness of certain types of forceps, the fact remains that they act as pincers. Before applying forceps it is necessary to decide whether extraction is possible and indicated. The possibility of extraction depends on the condition of the soft tissues, bony canal and fetus and on accessibility of the fetal head. The indication depends on maternal or fetal distress. Application of forceps requires an exact morphologic and topographic diagnosis and selection of the instrument. A given type of pelvis and a given position of the vertex may indicate selection of a special type of forceps. However, according to DeLee, the man behind the forceps is more important.

The direction in which to guide rotation in occipitoposterior presentations has caused obstinate controversies for many years. The fact is that forceps introduces a complicating element because of the manner in which traction is made. Downward traction facilitates descent but causes partial deflexion of the head and thus hinders rotation. More extensive use of Kielland forceps has been recommended, but de Rezende believes that this instru-

(6) Rev. de gynec. e d'obst., vol. 41, supp. 6, December, 1947.

ment cannot be used in general practice and that its handling should be taught only to specialists.

The pitfall is use of a reducing instrument and of pelvic compression by the blades acting as levers on the pelvic bones; the traction force in cephalic compression may reach ten times the force used by the operator: 20 kg. traction submits the fetal head to 200 kg. pressure. The precept of *non vi sed arte* should dominate application of forceps.

[De Rezende is entirely correct that the use of forceps is increasing in North American clinics, particularly where caudal anesthesia is used. He might have added that forceps deliveries are also increasing with spinal anesthesia. In most cases of mid-forceps deliveries anterior rotation of the head is not complete. In such instances difficulty may be encountered. General practitioners should wait as long as possible for anterior rotation of the head to occur before they apply forceps.—Ed.]

Failed Forceps. Isidore Daichman and William Pomerance⁷ (Jewish Hosp., Brooklyn) review causes of failed forceps in 59 cases. Maternal mortality was 1.8 per cent and corrected fetal mortality over 27 per cent. Labor was prolonged and irregular in most cases. In 23 cases the reason for failure lay in too early interference, and in 7 cases poor choice of procedure was held responsible. These figures suggest that protracted labors are a great strain on the attendant's patience. Consultation with another staff member might greatly decrease the number of instances of too early interference and would contribute to choice of the safest and best method of terminating labor.

In 13 cases disproportion was thought to be the cause of failure of attempted forceps delivery. Fetal mortality in this group was 76.8 per cent. Careful vaginal examination, under anesthesia if necessary, and use of x-ray pelvimetry are suggested as aids to rule out abnormal pelvic configuration and disproportion.

In two cases too long a second stage had been per-

(7) Am. J. Obst. & Gynec. 56:527-530, September, 1948.

mitted before attempting delivery. The second stage may be permitted to continue a reasonably long time, provided there is progress in descent and mother and baby are in good condition. In two instances a constriction ring was the reason for failure, and in one case, poor technic on the part of the operator was thought to be responsible.

Maintenance of adequate food and fluid intake, short periods of sedation during labor and competent administration of anesthesia at delivery are of great help in many of these cases. Prophylactic use of infusions of glucose in saline, plasma and whole blood are advised in selected cases.

[After forceps are applied one should always make a trial traction. The operator should sit comfortably on a chair in front of the patient and make gentle but firm traction. The first pull or two will immediately tell whether delivery will be easy or difficult. If two firm tractions do not result in progress, the operator should stop, remove the forceps blades and make another careful examination. If the sutures and fontanelles do not give definite information one should always palpate an ear. Most textbooks teach that one should feel the posterior ear. I have trained myself to feel the anterior ear behind the pubis because I find that this does not displace the head. If, after removal of the forceps, one finds an occiput posterior presentation when he expected an occiput anterior, he should wait one or two hours or (if he has had sufficient experience) he can manually rotate the occiput to an anterior position, apply forceps and deliver the baby. If a physician with limited experience finds that he has to use extraordinary strength in pulling a baby through a pelvis, he should call a specialist in consultation. Persistent forceful efforts to deliver the baby will produce trauma.—Ed.]

Face Presentation is discussed by Stephen J. Rudolph, Jr.⁸ (Philadelphia Lying-In Hosp.) on the basis of 61 cases in a total of 35,163 deliveries from Jan. 1, 1931 through July 31, 1946, an incidence of one face presentation to 576 deliveries.

In only 37 cases could the malpresentation be ascribed to one of the commonly accepted causes—abnormal pelvis, normal pelvis with large infant, monstrosity, placenta

(8) Am. J. Obst. & Gynec. 54:987-993, December, 1947.

previa or cord around the neck. Almost 40 per cent of patients had clinically normal pelves, normal average or smaller than average infants and no etiologically significant complications.

There were no maternal deaths. Twelve (19.7 per cent) of the babies were either stillborn or died before the tenth day. However, only four of these deaths occurred in infants normally formed and weighing more than 3 lb. Two were due to poor obstetric judgment and one to prolapsed cord; one was an antenatal death of unknown cause. There was an almost equal distribution among left mentoanterior, right mentoanterior and left mentoposterior positions; right mentoposterior occurred only four times.

More than 50 per cent of the deliveries were spontaneous or with only low forceps. Internal podalic version was used less in the later than in the earlier years. Incidence of cesarean section was 13 per cent. This was regarded as the safest procedure in cases of disproportion. In general, prognosis for mother and infant in face presentation appears good.

Face Presentation. Joseph W. Reddoch⁹ (Tulane Univ.) presents a study of 160 cases occurring among 88,114 deliveries, an incidence of 0.184 per cent. The condition was about three times more common in multiparas than in primiparas. Mentoanterior presentation constituted 57.5 per cent of cases, mentoposterior 22 per cent and mentotransverse 9 per cent; in some cases position was not stated. Parity alone or in combination with other factors was an etiologic factor in 52 cases. Disproportion, although present in 14 cases, did not play a major role in production of the presentation. It appears that primary face presentations are not uncommon, there being 56 cases in which no explanation could be found for the presentation.

Delivery was spontaneous in 86 cases, all positions

(9) Am. J. Obst. & Gynec. 56:86-99, July, 1948.

being represented. Infant mortality was 14.3 per cent. Low forceps to the face was used 16 times with 12.5 per cent infant mortality. Flexion of the head in 15 cases was followed by 40 per cent infant mortality. Version and extraction, used in 27 instances, was associated with 53.3 per cent infant mortality and 3.5 per cent maternal mortality. Cesarean section was used in eight cases with no mortality. Maternal morbidity varied directly with duration of labor. Almost 50 per cent of those having versions and extractions and high forceps delivery following flexion were morbid, whereas morbidity was under 20 per cent among patients with spontaneous deliveries. There were two maternal deaths, both due to sepsis. Corrected fetal mortality was 17.3 per cent.

Early diagnosis is important in management of face presentations. Spontaneous delivery may be anticipated in most multiparas and possibly in a few primiparas, provided there is no disproportion. In the latter group, Reddoch advises elective cesarean section.

[In both the Philadelphia and the Tulane series spontaneous delivery took place in more than half of the cases of face presentation. There were no maternal deaths in the first series but there was an unusually high maternal death rate (3.5 per cent) for the Tulane group delivered by version and extraction. Furthermore, more than half of the babies delivered by version and extraction died. The incidence of cesarean section in the Philadelphia series was 13 per cent, whereas it was about 5 per cent in the Tulane group. Face presentation alone is not an indication for cesarean section, but if it occurs in a case of contracted pelvis cesarean section is necessary. As shown by Reddoch, internal version and extraction carry a high maternal and infant mortality in cases of face presentation. P. Schmidt Goffi (*Rev. paulista de med.* 21:69, 1947) reports a series of 243 versions and extractions performed in the São Paulo Maternity. There were 12 maternal deaths (4.9 per cent), but 11 of these occurred in unregistered charity patients.—Ed.]

Management of Breech Presentation is outlined by H. Hudnall Ware, Jr., W. C. Winn and Eric C. Schelin¹ (Med. College of Virginia) on the basis of analysis of

(1) *Am. J. Obst. & Gynec.* 54:748-754, November, 1947.

291 breech deliveries occurring in 6,476 consecutive deliveries since September 1928, an incidence of 4.49 per cent. There were 5 stillbirths and 11 newborn deaths, an uncorrected fetal mortality rate of 5.46 per cent. After deducting for babies with congenital deformities incompatible with life and two babies who died in utero before onset of labor, the corrected stillborn and newborn death rate was 2.70 per cent for all babies weighing 4 lb. or more. There were no maternal deaths.

All patients were treated individually. Conservative treatment is advocated; onset of labor should be spontaneous whenever the patient's condition permits, and membranes should be kept intact until delivery is imminent. When the mother's condition remains good and labor progresses normally without any indication of fetal distress, the authors let the baby's hips deliver spontaneously and then, under anesthesia, guide the shoulders and head through the birth canal. Potter's technic is used, and Piper forceps are applied whenever the head cannot be delivered easily. The Celsus-Wiegand-Martin maneuver can be used to advantage when assistance is indicated. The authors do not use Mauriceau's maneuver, believing it to be dangerous, frequently causing injury to the baby.

Episiotomy was performed 197 times in 236 vaginal deliveries, an incidence of 83 per cent. This procedure reduces trauma to both mother and baby and reduces fetal mortality.

Analgesia was given to all patients except those delivered by elective cesarean section and some of those with uterine inertia. Analgesia included 1/200 gr. hyoscine, and 1/6 gr. Pantopon and 1½-3 gr. doses of Nembutal, with a total of not more than 9 gr. Nembutal in a prolonged labor and a smaller total for short labors.

When the baby presents as a breech in an elderly primipara or when a patient has a borderline pelvis and a large baby, delivery by cesarean section should be

carefully considered and in such cases frequently done.

The authors emphasize the difference between the fully dilated cervix and the fully dilated and paralyzed cervix. The former frequently contracts around the baby's shoulders or neck and causes difficulty in delivery of shoulders and aftercoming head, whereas the latter rarely interferes with delivery of shoulders and head.

Breech Presentation and Delivery: Review of 445 Consecutive Cases in a General Hospital is presented by Harry Meyer² (Touro Infirm., New Orleans). From 1937 to 1947 incidence of breech presentation and delivery in 13,577 cases was 3.1 per cent. Delivery was vaginal in 86.3 per cent and by cesarean section in 13.7 per cent.

No mother died. Puerperal morbidity for vaginal deliveries was 9.9 per cent and for cesarean section 29.5 per cent. However, with few exceptions, patients having postpartum fever were only mildly ill and completely recovered in three to five days.

Corrected fetal mortality rate (omitting babies weighing less than 5½ lb., macerated stillbirths, antepartum deaths, monsters and one baby who died postoperatively owing to congenital anomaly of the small bowel) was 4.9 per cent for all vaginal deliveries and 3.5 per cent for cesarean section. During the past 10 years maternal morbidity rate at Touro Infirmary was 33 per cent and fetal mortality rate 10 per cent. Incidence of cesarean section rose from 4.5 per cent during 1933-37 to 13.7 per cent in this series.

In breech presentation Meyer advocates attempt at external version four to six weeks before term and use of roentgenography to rule out complicating factors. Delivery of a persistent breech should be conducted conservatively for the most part, manual aid being given only after the breech and body are delivered spontaneously. Delivery of the baby should never be hurried, since the most frequent cause of fetal death, intracranial in-

(2) Am. J. Obst. & Gynec. 56:375-380, August, 1948.

jury, is the usual result of injudiciousness. Elective cesarean section is indicated when, after careful internal pelvic examination, evaluation of the baby's size and possibly x-ray examination, the success of vaginal delivery seems doubtful, regardless of the patient's age.

[P. Schmidt Goffi (Rev. med. mod. 1:165, 1948) reports that there were 125 breech deliveries at the Maternity of São Paulo in 1947. Total fetal mortality was 35.2 per cent and mortality for 69 babies weighing more than 2,500 Gm. was 10.1 per cent. P. Paquet and C. Pirson (Bruxelles-med. 27:400, 1947) compare the Bracht with the Mauriceau maneuver of breech delivery. The Bracht maneuver was used in the obstetric clinic of Brussels University from 1941 to 1944 and is carried out as follows: When the lower portions of the scapula are outside of the vulva the obstetrician gently lifts the back of the baby toward the mother's abdomen. The arms then emerge spontaneously. Suprapubic pressure causes the head to emerge from the pelvic cavity (first the chin, then the mouth, the nose and the brow). Advantages of this procedure are that there are no intravaginal maneuvers and no undue traction on the child's body and neck. Among 105 cases in which Bracht's maneuver was used infant mortality was 5.5 per cent, and in the cases in which the Mauriceau maneuver was used (from 1927 to 1940) infant death rate was 11.9 per cent. In addition there was an incidence of 6.3 per cent for fractures of the humerus or clavicle or paralysis of the arm. A. E. Trites (Am. J. Obst. & Gynec. 55:430, 1948) reports 145 breech deliveries at the Vancouver General Hospital with a fetal mortality of 5.5 per cent and 55 private breech deliveries with a death rate of 3.6 per cent, corrected to 1.8. Trites believes that the fetal death rate can be reduced by a complete study of the maternal pelvis, clinical and radiologic methods and delivery by cesarean section if the pelvis is contracted. Labor should be so conducted as to achieve spontaneous delivery of the breech, with interference only on definite indications. Constant personal supervision of the second stage of labor by the attending obstetrician is necessary. Utilization of local anesthesia, wide episiotomy and frequent application of forceps on the aftercoming head are also necessary.

One reason for the relatively high fetal mortality of breech presentation is the large number of premature babies which present by breech. Many of these babies die from prematurity and from the injuries of delivery, which they tolerate poorly. The mortality of fullterm babies delivered by breech should not be higher than that of head presentations. Statistics to confirm this opinion were published a few years ago by P. Tompkins (Am. J. Obst. & Gynec.

46:695, 1943), who reported 146 uncomplicated breech deliveries with a fetal mortality of only 2.7 per cent.

Conduct of a breech presentation begins in pregnancy. In all nulliparas one should have a roentgenogram of the pelvis to supplement vaginal examination. A gentle attempt should be made to turn the baby from the breech to a head presentation, preferably between week 32 and week 34. If gentle efforts do not succeed, the attempt should be stopped. All breech deliveries should be in a hospital. The bag of waters should never be ruptured artificially until complete dilatation, because of the great risk of prolapse of the cord. A specialist may wait for the breech to be born over the perineum or he may break up the breech and do a breech extraction. For physicians with limited experience it is far safer for mother and baby to permit delivery by the mother as far as possible before interference. If an inhalation anesthetic is given it should be fairly deep for delivery of the shoulders and head. Episiotomy should be extensive in all primiparas. After the umbilicus appears, the baby's back should be turned upward to prevent the occiput from rotating posteriorly. The shoulders should be delivered gently and if there is any trouble with delivery of the head, forceps should be applied. Forceps are not used often enough on the aftercoming head. In women past 35 years of age with a breech presentation, certainly if there is pelvic contraction, cesarean section should be performed. In all cases of breech presentation in a primipara, one should carefully study the relation between the baby's head and the mother's pelvis at term in order to decide whether cesarean section is necessary.—Ed.]

Method of Delivery for Hydrocephalus Associated with Breech Presentation described in Stander's *Obstetrics* (New York City: D. Appleton-Century Company, Inc., 1945, pp. 926, 1119) but differing in minute detail is described by D. N. Danforth³ (Northwestern Univ.) because he believes its simplicity and safety warrant more general acceptance than it has received.

TECHNIC.—The breech is allowed to advance and is delivered according to accepted procedure, with one exception: since the labor is to end by stillbirth, the patient may be spared the necessity of delivering by voluntary effort. When the breech approaches the perineum, traction is applied in the groin with a blunt hook. Delivery of the breech and shoulders is then completed. No attempt is made to cause the head to engage more deeply. A Jackson retractor is placed anteriorly,

(3) Am. J. Obst. & Gynec. 54:694-695, October, 1947.

and the highest spinous processes which can be visualized are palpated. An incision is made in the midline over two of these processes, which ordinarily are those of the lower cervical or upper thoracic spine. The skin edges are retracted with Allis forceps, and a laminectomy is performed over these two segments (Fig. 20). The tip of a uterine dressing forceps is introduced into the opening in the spinal canal and forced gently but firmly upward into the cranial cavity. It is rotated to enlarge the canal, and the blades are separated slightly. By

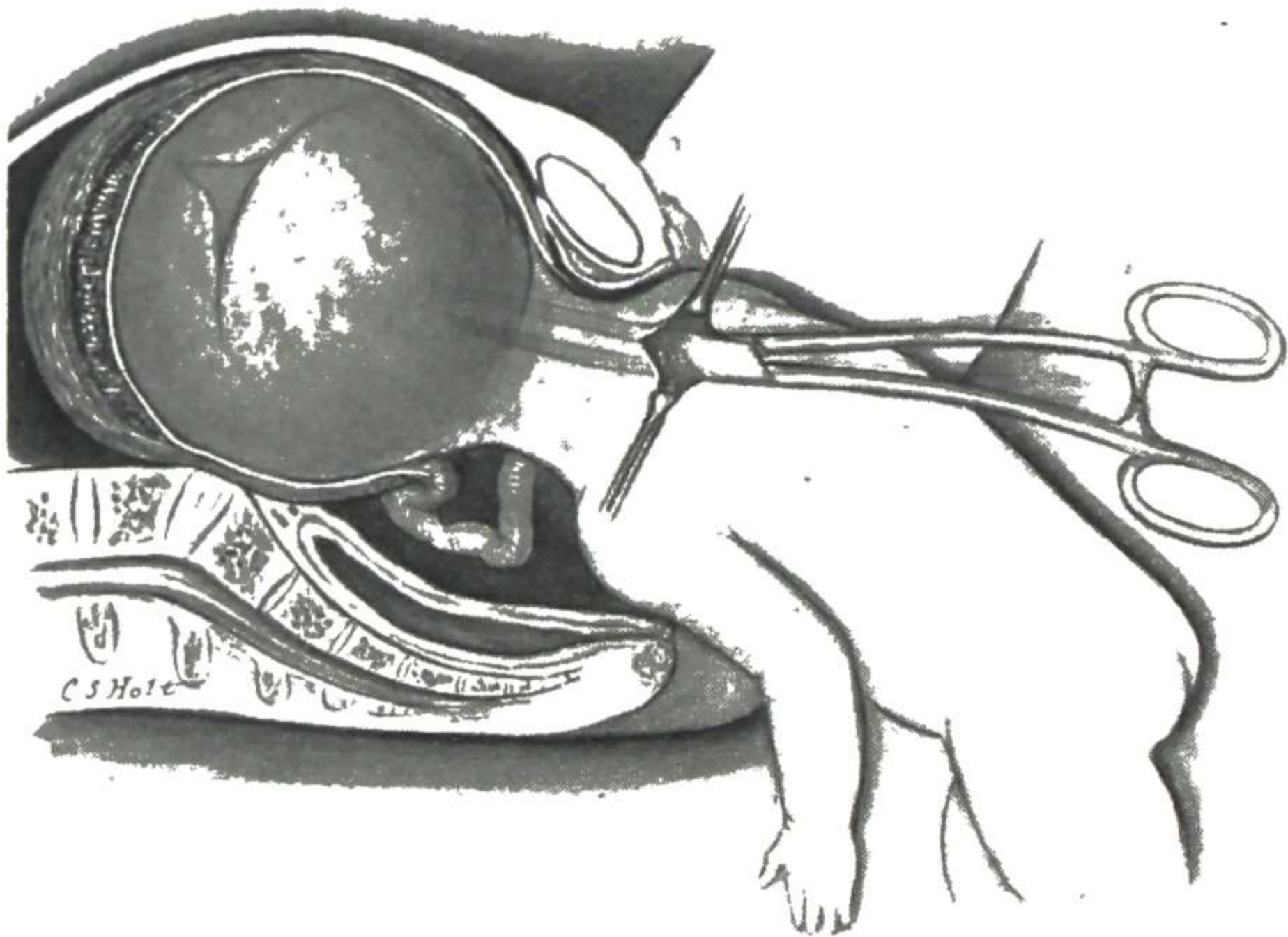


Fig. 20. (Courtesy of Danforth, D. N.: *Am. J. Obst. & Gynec.* 54:694-695, October, 1947.)

making pressure on the head from above, the cerebrospinal fluid is caused to issue from the laminectomy wound. This is continued until either the flow stops or the collapsed head advances sufficiently that it can be delivered. The dressing forceps is now withdrawn, and the head is delivered by the Mauriceau maneuver.

[E. D. Plass (*Am. J. Obst. & Gynec.* 55:548, 1948) recommends that in case of hydrocephalus in a breech presentation, when the spinal canal is opened in the cervical region, a metallic catheter be passed through the defect in the vertebral arches into the distended ventricles. When the hydrocephalic head presents, the fluid can be drained easily through a paracentesis trocar.—Ed.]

Hysterostotomy is a more correct term for Dührssen's incisions and should be used. Louis H. Douglass and James H. Graves⁴ (Univ. of Maryland) advise routine inspection of the cervix immediately postpartum as a simple, beneficial and practical procedure. At University Hospital, Baltimore, during 12 years in which 29,259 women were delivered, hysterostotomy was done 229 times, an incidence of 1 in 128 deliveries. Of the 229 patients, 63.8 per cent were private patients. Some of the indications were cervical dystocia, maternal exhaustion, lack of progress, cephalopelvic disproportion, irregular fetal heart beat, cervix about neck in breech delivery and prolapsed cord. The authors believe that the incidence here reported is too high and that many cases could have been better handled. However, hysterostotomy occupies a definite, though limited, place in obstetric practice.

The incisions usually recommended are at 10, 2 and 6 o'clock, although any one or combination of two of these incisions is often sufficient. Extension of the incision was a minor complication. Cervical tears and incisions are repaired satisfactorily with a continuous suture. There was one maternal death. Corrected infant mortality was 17.2 per cent, the large majority of deaths being associated with high and midforceps delivery. Maternal morbidity was 46.7 per cent. Follow-ups on 157 patients revealed the cervix well healed in 61.8 per cent. Hysterostotomy does not appear to affect fertility or interfere with subsequent labors.

[Dührssen's incision should not be used in cases of placenta praevia, malposition of the fetus, an unusually large fetal head or a very small pelvis, unless the baby is very small. Before cervical incisions are carried out one should carefully re-evaluate the case and decide whether cesarean section is the proper treatment. Of course, in most cases where cervical incisions are made a patient has been in labor a very long time and the membranes have ruptured. It is important to evaluate the obstetric possibilities of a

(4) Am. J. Obst. & Gynec. 55:683-690, April, 1948.

patient not only at the very first visit to the doctor's office but repeatedly during pregnancy and during the first few hours of active labor.—Ed.]

Hydrostatic Bag in Obstetrics. N. S. Assali and R. W. Kistner⁵ contend that there is still a place for the hydrostatic bag in obstetrics. During 1938-47 there were 22,935 deliveries at Cincinnati General Hospital; in 244 a bag was used, an incidence of 1 per cent. Bleeding was the major indication, accounting for 44 per cent of the cases. There were 64 cases of placenta previa, 12 of which were central. In three cases of central placenta previa the bag was inserted in the vagina until the operating room could be prepared for cesarean section. In these three cases the infants survived. In seven of the remaining nine cases of vaginal delivery the infants died. As a result, the authors no longer advise use of the bag in patients with central placenta previa. The bag was used 23 times for abruptio placentae, and only three live infants were delivered. In most cases no fetal heart beat was present on admission. The bag was used in 102 cases to produce dilatation. Adequate dilatation was secured in 54 cases of prolonged labor due either to uterine inertia or to cervical dystocia. Breech, mostly footling, and transverse presentations constituted other indications. Induction of labor was secured by the bag in 20 pre-eclamptic and 14 eclamptic patients; 18 babies were delivered. Gross fetal mortality was 48 per cent and corrected 30 per cent.

Puerperal infection occurred in 86 patients, a complication which the authors believe may be reduced by regular prophylactic use of antibiotics. Prolapsed cord occurred in 24 cases. Gross fetal mortality was 43 per cent and corrected 25 per cent for the entire series. There were four maternal deaths in the series; none was related to use of the bag.

[I do not see how these authors can conclude that there is still a place for the hydrostatic bag in obstetrics if they use their own

(5) Am. J. Obst. & Gynec. 56:781-789, October, 1948.

statistics for this conclusion. I believe we can entirely dispense with the use of the bag because other procedures are now far more satisfactory for both mother and baby in the cases in which a bag was formerly used. This is particularly true for placenta praevia and induction of labor.—Ed.]

Statistical Review of 241 Consecutive Cesarean Sections is presented by Theodore Adams⁶ (Portland, Ore.). These represent 7.9 per cent of 3,045 deliveries done by the author and his associates over six years. The low operation was done 144 times, the classic operation 73 times, cesarean hysterectomy 22 times and Waters' operation twice. Eighty-three (34.4 per cent) of these sections were done because of previous section. Dystocia accounted for 93 (39.6 per cent) sections. Principal indications in this group were: contracted pelvis, 50 cases; large child, 15; rigid cervix, 11; obstructing tumors, 9. Placenta previa and premature separation of the placenta were indications for 51 sections. Heart disease, toxemia and diabetes were less common indications.

One patient with fulminating eclampsia was operated on under local infiltration anesthesia. For the remaining 240, cyclopropane was used 153 times and spinal anesthesia 87 times. The latter type of anesthesia is now preferred by Adams except when there is hemorrhage. In such cases drop in blood pressure might make its use dangerous.

There were two maternal deaths, an uncorrected mortality of 0.8 per cent. The low operation was done in one case and the classic in the other. One death was due to generalized abdominal carcinomatosis and cannot be attributed to section. The other was due to pulmonary atelectasis. In this series the low operation proved so successful in the "potentially infected" patient that Adams believes extraperitoneal section may be reserved for patients with definite infection in whom removal of the uterus is undesirable.

(6) West. J. Surg. 56:243-249, April, 1948.

Cesarean Section for Disproportion in Multipara. L. V. Dill, T. M. Leonard and J. B. Sheffery⁷ (Gallinger Mun. Hosp., Washington, D.C.) review 27 first cesarean sections done on multiparas with the primary indication of cephalopelvic disproportion. Average age was 29.8 years. Each woman had previously delivered an average of four babies vaginally. Average weight of babies in previous pregnancies was 7 lb. 4 oz., whereas average weight in the present delivery was 8 lb. ½ oz. Fetal mortality in previous pregnancies was 13 per cent; in the delivery under discussion it was 3.7 per cent.

The complication rate (52 per cent) was excessive, even in view of the moderately advanced age of the patients. Toxemias of pregnancy occurred in 10 patients, bleeding from premature separation in 2, constriction ring in 1 patient and heart failure in 1. It is likely that several of these patients could have been delivered vaginally had not complications been so acute.

Pelves were of the borderline type, except for six which were within normal limits. Average conjugata diagonalis was 11.3 cm., and intertuberos diameter averaged 9.6 cm.

Average length of labor was 23 hours or more, and average length of time since rupture of membranes was 16 hours. The authors believe that thorough evaluation of the pelvis in borderline cases requires that the membranes be ruptured for at least a portion of the labor. After the membranes have been ruptured, if the head does not engage within a reasonable time, little has been lost and much may be learned.

There were one maternal death and one fetal death; neither was connected with labor or neglect of an obstructed labor. Four patients had severely febrile postoperative courses but were never seriously ill.

Because of the concept that multiparas rarely have cephalopelvic disproportion, 11 of these patients had labors of over 24 hours, 14 had a morbid postoperative

(7) Am. J. Obst. & Gynec. 56:515-520, September, 1948.

course and 10 required cesarean hysterectomy or an extraperitoneal procedure.

There is little indication for segregating, even with mental reservations, primiparas and multiparas with unengaged heads at onset of labor. These patients should have a sterile vaginal examination and x-ray mensuration for pelvic size, configuration and abnormalities as soon as possible disproportion is recognized. Since the fetus increases in size with multiparity, the size of the fetus and fetal head should be carefully estimated. The fact that a multipara has had one or more vaginal deliveries should be regarded as an optimistic historic fact, not as a diagnostic criterion for spontaneous delivery of the pregnancy at hand.

[Nevertheless, multiparas who previously did not have dystocia rarely require cesarean section for cephalopelvic disproportion. Every woman who has had a difficult forceps delivery or difficult version and extraction should be carefully studied for possible necessity of cesarean section. Not infrequently, I have had difficulty in delivering a first baby with forceps. In some of these cases delivery was so difficult that I made a note on my records that the patient should have a cesarean section the next time. However, when some of these patients came to me a second time, I felt confident that because I was able to extract an uninjured baby once through the pelvis, I should be able to do so again. In most cases this was true, but occasionally after a test of labor in the second labor, cesarean section was necessary. When we are overconfident we sometimes come to grief. As we get older, however, we take fewer chances.—Ed.]

Cesarean Section at Boston City Hospital, 1936-46. Daniel J. McSweeney and Arthur J. Hassett⁸ (Boston Univ.) present a statistical study of 961 cesarean sections (3.3 per cent of 28,341 deliveries) done during 10 years. Patients aged 35 years and over accounted for 70 per cent of sections and primigravidas for 28 per cent. Of the remaining 689 cases, 87 per cent were repeat sections. Incidence of disproportion requiring cesarean section was about 1 in 100 cases. Uterine inertia and con-

(8) *New England J. Med.* 239:254-258, Aug. 12, 1948.

traction ring dystocia accounted for 40 cases. Primiparous breech delivery was the causative factor in 1.5 per cent of cases. Of 1,200 breech presentations, only 17, all in primiparas, required cesarean section. Placenta previa was the indication in 68 cases, and there were 57 cases of premature separation of the placenta requiring section. Sixteen sections were performed for severe toxemia and eclampsia. Four patients with rheumatic heart disease were decompensated at the time of operation and were managed by section with a fatal outcome in three.

[The 75 per cent maternal mortality in the cases of heart disease indicate again that cesarean section should rarely be done in women with heart disease. Note the very low incidence of cesarean section for breech presentations (17 in 1,200 cases). Eighty-seven per cent incidence of repeat cesarean sections is very high. A rising incidence of repeat sections is an important factor in the increasing frequency of cesarean sections in this country.—Ed.]

Morbidity in the entire series was 26.6 per cent. Since introduction of sulfonamides and penicillin, this has been reduced to 10 per cent. Rate for elective section was 15 per cent, in contrast to 37 per cent for the emergency operation. Low cervical operation was used in 91 per cent of cases. Waters' extraperitoneal operation was done in 10 frankly infected cases and Porro cesarean hysterectomy in 20. There were no deaths from either procedure. Spinal anesthesia has been used routinely since 1941 except in cases with bleeding. Local anesthesia was employed in only six cases, but the authors urge its more general adoption because of its safety. There were 72 fetal deaths, a gross mortality of 7.5 per cent, and a corrected mortality of 3 per cent. Most neonatal deaths were due to prematurity. There were 23 maternal deaths, a mortality of 2.4 per cent. There were five deaths among those with repeat sections. Two of these were from spinal anesthesia and one from aspiration of vomitus during inhalation anesthesia.

[The authors add that the deaths from spinal anesthesia and from aspiration of vomitus during inhalation anesthesia occurred before the present well trained anesthesia service assumed the

responsibility of this important phase of obstetrics. They add that anesthesia for cesarean sections is now administered only by qualified men of the anesthesia service.—Ed.]

Cesarean Section in Detroit during 1945—Comparison with 1925 and 1930. Harold C. Mack and R. S. Siddall⁹ (Wayne Univ.) present a statistical study. In Detroit during 1945 there were 1,000 cesarean sections (1 in 37 births) in contrast to 154 (1 in 217) in 1925 and 203 (1 in 167) in 1930. Maternal mortality was 13 per cent in 1925, 4.4 per cent in 1930 and only 0.8 per cent in 1945. There were eight maternal deaths in 1945; in at least four the fatal outcome was due largely to faulty judgment or management. Three deaths were associated with toxemia and two with placenta previa and premature placental separation. Fetal mortality did not show a corresponding reduction; fetal death rates for the same years were 11, 12.8 and 7.8 per cent. Of 78 fetal deaths in 1945, 36 per cent were stillbirths.

The 25 Detroit hospitals with less than 1,000 deliveries during 1945 had a considerably higher general maternal mortality, a lower incidence of cesarean section and a higher cesarean mortality than did the larger hospitals. Moreover, three of the four deaths ascribable to questionable treatment occurred in these smaller hospitals. Proportion of cesarean sections for the various indications remained remarkably constant except that toxemia, which was the indication in 17 per cent of all sections in 1925, was the indication in only 7 per cent in 1945.

Analysis of 416 Consecutive Cesarean Sections was made by C. J. Andrews, Richard B. Nicholls and William C. Andrews¹ (Norfolk Gen'l Hosp.). Patients were divided into two groups: 275 private patients who had good prepartum study and 141 patients who were referred either late in pregnancy, in labor or for emergency treatment.

Disproportion accounted for 211 sections. X-ray study

(9) *Am. J. Obst. & Gynec.* 56:60-73, July, 1948.

(1) *Ibid.* 54:791-800, November, 1947.

(Snow technic) was used extensively to obtain information as to the probable outcome of labor. This plan has increased the number of sections, but also contributed to proper application of cesarean section and eliminated severe complications associated with prolonged labor, uterine inertia and hemorrhage. Placenta previa and premature separation of the placenta accounted for 61 cases. Section was not done routinely in such cases. Again, x-ray study was a great help as a diagnostic adjunct.

Eclampsia, pre-eclampsia and toxemia accounted for 12 operations. The authors do not consider these conditions indications for section and use section in selected cases only when the patient has been adequately treated.

Cervical operations were performed in 94.5 per cent of the 416 cases. Among personal cases morbidity rate was 13.1 per cent and among referred cases 14.6 per cent. There were 16 infant deaths among personal cases, a fetal mortality rate of 5.8 per cent. Eleven of these babies were lost because of placenta previa or premature separation of the placenta. In the referred group 20 babies were lost, a fetal mortality of 14 per cent. Nine of these died because of hemorrhage in the mother.

In 3,935 deliveries during the 12 years covered by this study, there were 9 maternal deaths, 6 among cesarean section patients; of the 6 deaths 4 occurred in the referred group. The first death in the personal group was due to sepsis and overwhelming infection, occurring in 1938 before the advent of sulfonamides, penicillin or other antibiotics now commonly used. The second was due to pulmonary embolism, which is a surgical risk faced by any patient. In the referred group, all four deaths occurred in patients who had no prenatal care.

Cesarean sections per se are not the chief cause of maternal deaths, which are due, rather, to the obstetric complications. This also applies in general to the fetus. Proper prenatal study and individualization definitely reduce maternal and fetal mortality.

Which Type Cesarean Section? Roy J. Heffernan and Charles Leavitt Sullivan² (Brookline, Mass.) discuss the relative merits of classic, low segment and extraperitoneal cesarean sections.

The classic method results in the highest morbidity and mortality because the uterine incision is the only barrier between peritoneal cavity and interior of the uterus. Although replacement of blood loss and use of chemotherapy and antibiotics have considerably lowered the incidence of peritonitis after this procedure, so many disadvantages remain that it should be used only when better methods are not applicable or when the uterus is to be removed.

The low segment operation is over twice as safe as the classic and has fewer subsequent complications, although it is not without danger when there is potential infection, since it does not insure protection against peritonitis from spill or seepage of infected uterine contents. It is satisfactory in uncomplicated cases without infection.

When potential or actual infection exists neither the classic nor the lower segment operation, even with use of antibiotics and chemotherapy, affords the patient full protection. Since 1942 the authors have used the extraperitoneal type of operation in actually or potentially infected patients and in 72 such patients have had no fetal or maternal mortality. There has been no postoperative morbidity and, when indicated, ambulation is permitted as soon as the effect of the anesthesia has subsided.

As the result of experience, indications for the operation have been widened to include the following conditions.

1. Infection. The procedure is indicated in any case in which there is the slightest suspicion of infection, either genital or extragenital.

(2) New England J. Med. 238:241-248, Feb. 19, 1948.

2. Ruptured membranes. It is also indicated in any case in which the membranes have been ruptured for eight hours. Amniotic infection may be present in an early stage without systemic reaction.

3. Labor. Any patient in labor for six hours or longer should have the added insurance of this procedure. Infection of the uterine cavity potentially starts with onset of labor.

4. Vaginal examination. The operation is performed in patients who have had vaginal examinations or repeated rectal examinations.

5. Unsuccessful trial at pelvic delivery. When an attempted forceps operation can be concluded only with serious damage to mother or baby, or both, the forceps should be removed and an extraperitoneal cesarean section performed.

6. Previous phlebitis or extensive varicosities. Earlier ambulation after this procedure is a definite advantage in patients with a history of these complications.

7. Poor surgical risks. This category includes all patients so regarded.

The modern extraperitoneal operation not only is the safest technic for the infected or potentially infected patient, but also may be used to advantage with less imperative indications.

Role of Extraperitoneal Cesarean Section in Infected Labor. Edward G. Waters³ (Margaret Hague Maternity Hosp., Jersey City, N. J.) reports a gross maternal mortality of 0.17 per cent in 43,671 live births during the past seven years. During this period, 1,490 sections were performed with loss of 10 patients, a maternal mortality of 0.67 per cent. Waters ascribes this low mortality to selection of operation. For patients not in labor or in labor 12 hours or less, with no manifestation of infection and without vaginal manipulation, low cervical operation is safe. When there is a possibility or probability that intrauterine infection exists or may develop, extraperitoneal cesarean section is the operation of choice. Waters advises extraperitoneal cesarean section for all potentially infected patients and advocates it to the exclusion of cesarean hysterectomy in all patients with severe in-

(3) Pennsylvania M. J. 51:1093-1097, July, 1948.

fection requiring abdominal delivery, except those with gross uterine or adnexal pathology. When vaginal delivery is possible in infected cases, it is preferred. Up to 1947, maternal mortality in the 699 extraperitoneal sections was 0.71 per cent. Of these, 367 were by the supraventricular route, with two deaths, a maternal mortality of 0.54 per cent. There have been no deaths in patients undergoing extraperitoneal section since 1940.

Cesarean Section in Potentially Infected Patients, Using Sulfathiazole in Uterus and Peritoneal Cavity.

John M. Settle and Lester A. Wilson⁴ (Med. College of the State of South Carolina) report results in 30 cases. They perform a transperitoneal flap operation, longitudinal incision being made through the lower uterine segment, and after delivery dust 5 Gm. sulfathiazole crystals in the uterine cavity, especially around the cervix and the incision, 5 Gm. under the flap and 5 Gm. over the line of sutures in the flap and in the lower part of the peritoneal cavity.

All cases were emergencies, and vaginal examinations had been done in most of them. The shortest labor was 15 hours, the longest 84 (average 30). The membranes had been ruptured in 70 per cent, the time interval ranging from 10 to 60 hours.

Morbidity was 43 per cent. There was one case of wound infection, but there was no thrombophlebitis, fistula, or serious infection. Other causes of morbidity were low grade infections. Only one mother died; it was confirmed at autopsy that death was due to pneumonia, and there was no evidence of puerperal infection. All the babies lived.

Sulfathiazole blood concentration 24 hours after operation ranged from 5 to 10 mg. per 100 cc. of blood; therefore caution is suggested when patients have nephritis or marked anemia.

[Because of the effectiveness of antibiotics extraperitoneal cesar-

(4) Am. J. Obst. & Gynec. 54:801-803, November, 1947.

ean sections are done less often. In frankly infected cases I still prefer to remove the uterus.—Ed.]

Cesarean Hysterectomy at Chicago Lying-In Hospital. W. J. Dieckmann, Floyd J. Bjork and Gloria T. Aragon⁵ (Univ. of Chicago) present an analysis of 153 cesarean hysterectomies performed since 1931. There was only one maternal death, a maternal mortality of 0.65 per cent. During this same period, 2,444 cesarean sections were performed, with a mortality of 0.41 per cent. Myoma was the indication for cesarean hysterectomy in 44 cases, and actual and potential infection were the indications in 33. Other indications included Couvelaire uterus, placenta previa, placenta accreta, sterilization and carcinoma of the cervix. Over two thirds of the patients were 30 or older, and over two-thirds had two or more children. Morbidity was 50 per cent in the clean and potentially infected cases and 71 per cent in the infected cases. Average duration of fever was short. In six patients peritonitis developed, although its characteristic symptoms and signs were absent. In all infected or potentially infected cases the entire body of the uterus and cervix must be removed for best results. Peritonitis routine is necessary for 48-96 hours or until the patient's condition warrants fluids orally. During this period, adequate supportive treatment and sufficient fluid must be given parenterally to insure at least 1,000 cc. urinary output. A serious complication was ligation of both ureters in two patients. There were 10 stillbirths and 8 neonatal deaths, a total uncorrected fetal mortality of 11.8 per cent.

Present Status of Female Sterilization Technics in the United States. Robert J. McNeil and A. N. Webb⁶ (Los Angeles) present the results of a questionnaire sent to leading members of the American Board of Obstetrics and Gynecology in each section of the country. From 124 replies, it was found that the Pomeroy technic was the

(5) J. A. M. A. 137:1017-1023, July 17, 1948.

(6) California Med. 69:39-46, July, 1948.

most frequently used after both cesarean section and laparotomy. The second most popular method with cesarean section was Madlener's, and with laparotomy, cornual resection.

In the New York and Philadelphia areas and in the South the Pomeroy technic was preferred with cesarean section. In and about Chicago, there was a slight preference for Madlener's method. However, the Los Angeles survey demonstrated an inclination toward subtotal hysterectomy. Sterilizations with laparotomy (chiefly post partum) were done preferably by the Pomeroy method in the New York area, but there was an increasing preference for cornual resection. The Chicago area showed somewhat more preference for cornual resection. Other sections of the country appeared to be about equally divided in their choice of methods, except Los Angeles, where subtotal hysterectomy again took a prominent lead. Most physicians who answered the questionnaire believed that less than 1 per cent of women under 30 who had undergone hysterectomy had menopausal symptoms within three to five years.

Pregnancy Following Tubal Sterilization. According to Wm. J. Dieckmann and Elizabeth B. Hauser⁷ (Univ. of Chicago) the simplest method of preventing conception is to block the lumen of the fallopian tubes; however, the number of failures is large.

In 912 cases of tubal sterilization there were 33 failures (3.6 per cent). The method in most cases was designated as that of Madlener, but in most cases did not conform with Madlener's directions. The tube was clamped close to the uterus with a Kocher or a Payr clamp and then ligated with a silk suture below and above the crushed area of the tube. Since early 1946 the authors have followed the original Madlener technic, crushing the tube in the proximal end of the outer third and placing one silk or cotton suture in the area of the crush as well

(7) Am. J. Obst. & Gynec. 55:308-312, February, 1948.

as tying through the crushed area. None of the patients had returned pregnant up to the time of this report.

A factor in the high incidence of failure may be that tubal ligations are usually done by the senior obstetric resident. The authors believe that with competent surgery the incidence of failure should be negligible. The procedure can be carried out at the time of a gynecologic operation, cesarean section or interruption of pregnancy by the abdominal route or as a 24 hour postpartum procedure.

[The differences in percentages of failure are interesting. Highest incidence of failure (5.6 per cent) was in 24 hour tubal ligations and the next highest (5.2 per cent) in vaginal tubal ligation. In cesarean sections with tubal ligation percentage of failure was 3.3, and in hysterotomies with tubal ligation, 1.3. However, in 93 cases of gynecologic abdominal tubal ligation there was no failure. Dieckmann and Hauser question whether the tube altered by normal tissue changes of pregnancy is less amenable to permanent closure or is so edematous and friable that the utmost delicacy in manipulation and ligating is necessary to prevent a cutting or shearing of the ligature in subsequent fistula formation. For many years I used the Madlener technic, but because of two failures with it now use the Pomeroy method. One failure resulted in an ectopic pregnancy which occurred by external migration of the ovum nine years after tubal ligation. G. W. Hunter and C. B. Darner (*Journal-Lancet* 68:118, 1948) had four failures with the Madlener technic, and in 141 cases had no failures with the Pomeroy technic. Sterilization for purposes such as multiparity should rarely be done and a wise physician will call another physician in consultation and obtain his written agreement to the sterilization operation.

During the past year there have been many articles on cesarean section. At the Margaret Hague Hospital (*Bull. Margaret Hague Mat. Hosp.* 1:45, 1948) there were 424 cesarean sections; 225 were transperitoneal and 199 extraperitoneal. There were two maternal deaths. Morbidity for transperitoneal section was 51.6, and for extraperitoneal 38.2 per cent. There was no significant difference between the 123 paravesical and the 68 supravesical transperitoneal operations in frequency of violation of the peritoneum.

W. Levine and S. Weiner (*Am. J. Obst. & Gynec.* 54:1013, 1947) report a series of 35 Norton extraperitoneal cesarean sections. There was one maternal death from embolism and the bladder was injured twice. The peritoneum was accidentally opened three times. R. T. Weaver, D. L. Adamson and F. L. Johnson (*Canad. M. A. J.*

58:168, 1948) report 60 Waters extraperitoneal operations with two maternal deaths, neither of which was due to the type of cesarean section employed. A. B. Tamis and J. Clahr (*Am. J. Obst. & Gynec.* 56:700, 1948) compare a series of 112 cesarean sections performed from 1929 to 1937 with a series of 127 from 1938 to 1945. Maternal mortality rate in the first group was 10.7 per cent and in the second 3.3 per cent. Reduction in maternal mortality is attributed to use of the low flap operation, routine use of antibiotics, improved technic and prevention of procrastination by proper evaluation of labor at admission. C. L. Pearl (*West. J. Surg.* 56:290, 1948) reports on 893 consecutive cesarean sections performed in a hospital devoted to the care of private patients. There was no maternal death, a truly remarkable achievement. There were 744 low cervical operations, 80 classical, 15 cesarean hysterectomies and 27 extraperitoneal operations. Uncorrected fetal death rate was 6.6 per cent. More than 92 per cent of the operations were done by specialists. C. Bachman (*South. M. J.* 41:473, 1948) reports on 533 cesarean sections with a maternal death rate of 0.37 per cent and a fetal death rate of 10.2 per cent. M. Fobe (*Gynéc. et obst.* 47:598, 1948) informs us that the incidence of cesarean sections in the different maternities in Belgium varies from 0.34 to 6.4 per cent. Maternal death rate for all cases in Belgium was 3.6 per cent.

Many authors have praised use of sulfonamides and penicillin for prophylaxis and cure in cases of cesarean section. R. G. Douglas and R. Landesman (*Am. J. Obst. & Gynec.* 56:422, 1948) believe that the combined prophylactic use of sulfadiazine and penicillin in cesarean sections has reduced severity of intrauterine and peritoneal infection at the New York Lying-in Hospital. Control of infection by these agents contributes to the safety of transperitoneal section and reduces the need for extraperitoneal operation and cesarean hysterectomy. Penicillin and sulfadiazine may be administered without serious toxic reaction during labor and the puerperium. Douglas and Landesman believe that penicillin and sulfadiazine may act together to increase total bacteriostatic activity against a single infecting agent. Their combined effectiveness covers a wide range of bacteria. J. T. Williams (*North Carolina M. J.* 9:137, 1948) reports 251 cesarean sections without a maternal death.—Ed.]

Pelvic Delivery Following Cesarean Section. Daniel H. Hindman⁸ (Boston) reports that from 1928 to 1947 at Boston Lying-in Hospital there were 177 deliveries through the natural birth passage in 118 patients who

(8) *Am. J. Obst. & Gynec.* 55:273-285, February, 1948.

had previously had cesarean section. An increase from 39 such deliveries in 1928-35 to 138 in 1936-47 is attributed, first, to wider use of x-ray pelvimetry during labor in cases of mild pelvic contraction and inertia, and, second, to greater consideration of pelvic delivery after hysterotomy. Most of the patients had had cesarean section because of a temporary indication.

Despite the fact that in 112 patients the uterus was explored manually, only 4 had fever during convalescence and it was mild in all. Morbidity incidence was well within the zone of that for the general clinic population. There was one maternal death, attributed to aspiration pneumonia. All but six of the infants were discharged in good condition.

The cesarean scar ruptured in eight patients, including two selected for prospective delivery through the pelvis. Only one patient, however, experienced labor; the second had spontaneous rupture before onset of uterine contractions. The other six disruptions occurred without labor before the appointed date of repeat hysterotomy. Hindman points out that though rupture of the uterus is among the most serious of all obstetric complications, statistics show that the accident is not nearly so formidable when a cesarean scar is implicated as when it occurs in a uterus free from cicatrix.

Because of the seriousness of the accident and because it may occur at any period of gestation or labor, Hindman stresses the importance of close observation during pregnancy and labor. To avoid the rigorous stress of the expulsive stage, it is his policy to effect delivery by low forceps operation at full dilatation of the cervix. No oxytocics are given until the obstetrician has ascertained by manual exploration that the uterus is intact.

If precautions are observed and cases limited to those in which cesarean section was previously performed because of some temporary indication, attempts at pelvic delivery should be encouraged.

[A. Pauwen (Zentralbl. f. Gynak. 69:110, 1947) reports on 148 vaginal deliveries after previous cesarean section. This represents 56 per cent of women who had had cesarean sections at the author's hospital. The uterus ruptured during the course of labor in one patient. Pauwen insists that previous cesarean section does not indicate that all subsequent deliveries must be by the abdominal route. The results reported by Pauwen are excellent but Hindman's paper should make us sit up and take notice. The cesarean scar ruptured in eight patients. This is a large number. In seven patients disruption occurred before onset of labor. In studying each of the eight cases, I found that six had had a classical operation and that the remaining two had had both classical and Kerr cesarean sections. Therefore, all eight women who had had rupture of the uterus had had classical operations.]

I have repeatedly said that rupture of the uterus following classical operations is fairly common, whereas rupture following the low cervical operation is uncommon. The report by Hindman is confirmatory evidence. Hindman mentioned a study by McDowell of 3,300 classic cesarean sections performed by the Potters of Buffalo with 50 ruptures, an incidence of 1.5 per cent. J. R. Gepfert (Am. J. Obst. & Gynec. 37:466, 1939) reviewed the literature and found that rupture of the uterus following the cervical operation occurs about one-sixteenth as often as rupture following the classical cesarean sections. Further, rupture of the uterus following classical cesarean section frequently occurs during pregnancy without any warning. On the other hand, nearly all ruptures following cervical cesarean section have occurred in women during labor, while the patients were in a hospital under observation where they could be treated immediately. I now almost routinely perform a cesarean section on all women who previously have had a cesarean section, regardless of the indication for the first operation. The operation is elective and is usually done 7 to 10 days before the calculated delivery date, provided the baby is large enough. I resort to repeat cesarean section electively because on two occasions following cervical cesarean sections I found the lower uterine segment so thin that only a miracle would have prevented rupture of the uterus if the patient had had labor contractions.—Ed.]

Present Concept of Symphysiotomy. Guillermo Vautrín⁹ (Havana) outlines the anatomic considerations and indications for symphysiotomy, which he has found gives excellent results when cases are properly chosen.

Pelvic contraction must be slight—a minimum of 8

(9) Rev. med. cubana 58:673-688, September, 1947.

cm. conjugata vera for flat pelves, or 8.5 cm. for generally contracted pelves. Size and molding of the fetal head is a variable which may alter this rule. Multiparity is another condition usually cited, but Vautrín does not consider it essential if other indications are present. If the cervix is not dilated or dilatable, low cesarean section rather than a symphysiotomy is indicated. Uterine contractions must be adequate or able to be made so by appropriate drugs. In primiparas in whom the head is not engaged, low cesarean section should be done. On the other hand, in multiparas symphysiotomy may give excellent results in similar circumstances. Symphysiotomy is useful in cases in which the head is arrested in the upper part of the birth canal and the other indications are present. High forceps should not be used. Especially in primiparas, episiotomy should be done in conjunction with a symphysiotomy.

Symphysiotomy. Julio Bazan and Carlos S. E. Rossi Escala¹ (Buenos Aires) report on 264 cases in which symphysiotomy was done over 27 years. The operation requires a specialist and should be used only with trial labor in simple pelvic dystocia, preferably in multiparas. It may be done in young primiparas if the soft tissues have good elasticity and sufficient amplitude, uterine contractions are normal, there is a vertex presentation, pelvic diameter is not less than 8.5 cm. and normal fetal heart beats are present. It is contraindicated in complicated dystocia. Subsequent delivery should be spontaneous because use of forceps endangers prognosis, as illustrated in this series by occurrence of six cases of urinary incontinence, three of vesicovaginal fistula and one each of intractable sciatica, symphysalgia and abscess of the symphysis.

The partial technic of Zarate was used in 227 (85.98 per cent) of the 264 symphysiotomies and Frank's technic (during the first years of the series) in 37 (14.01 per

(1) *Semana med.* 55:1053-1056, June 24, 1948.

cent). The operation was performed on 221 multiparas (83.71 per cent) and 43 primiparas (16.28 per cent). Delivery was spontaneous after symphysiotomy in 239 cases (90.53 per cent) and by forceps in 25 (9.46 per cent). There was no maternal mortality; fetal mortality was 4.92 per cent (13 cases).

Although permanent dilatation of the pelvis occurs in some symphysiotomized patients, it is not an important consideration in subsequent deliveries.

[H. Duék (An. brasil. de ginec. 13:361, 1948) believes that symphysiotomy is seldom used because cesarean section is now such a safe operation. I have never done a symphysiotomy because I have never seen the need for it. In 1922 I helped Dr. DeLee do his last symphysiotomy. The complications which followed were a nightmare to him and to me, and I have never forgotten this case. I must add, however, that last year, Alex Spain of Dublin showed me a report of patients upon whom he had performed symphysiotomies and I agree that there are rare indications for this operation.—Ed.]

Bilateral Oophorectomy in Early Pregnancy: Cesarean Section at Term. A case is reported by H. K. Bonn² (Los Angeles) which appears to cast doubt on the belief that presence of an ovary (producing progesterone, the hormone of the corpus luteum) is necessary for continuance of pregnancy during the first 12 weeks.

Woman, 30, had her last menstrual period beginning July 20, 1942 and lasting four days, flow being normal. She did not menstruate in August and believed that she was pregnant.

On September 8 signs and symptoms of an acute abdominal condition appeared suddenly. An osteopathic physician operated at once, removing an orange-sized cyst of the right ovary with a twisted pedicle, both tubes and left ovary. Possibility of pregnancy was not considered. Recovery was uneventful.

In January 1943 she consulted the same surgeon because of a large mass in the lower part of the abdomen. At this time a competent pathologist examined the surgical specimens and reported that the ovarian cyst was of endometrial type, the left ovary and both tubes being normal. Roentgen therapy was recommended for supposed intra-abdominal endometriosis.

(2) Arch. Surg. 55:288-291, September, 1947.

On January 12 the patient consulted Bonn. Diagnosis was of 5½ months' pregnancy with probable intrauterine tumor.

Prepartum course was normal. Cesarean section was performed on April 20, this date being considered to be 7-10 days before term. A living child was delivered and the placenta removed intact. An extensive uterine tumor and fibroids near the cervix were found, but hysterectomy was not done because of the patient's request, the fact that excessive hemorrhage occurred from the incised wall of the tumor and the presence of firm, widespread adhesions.

If 15 days are added to the beginning of last menstruation (July 20) to give the most likely date of conception, then duration of gestation was 35 days at the time of bilateral oophorectomy on September 8. This is far less than the 90 days during which progesterone is believed necessary for retention of pregnancy.

[C. G. Hartman and G. W. Corner (Anat. Rec. 98:539, 1947) report that in the monkey the corpus luteum of pregnancy may be removed as early as the twenty-fifth day of gestation without interrupting pregnancy. It is almost certain that all ovarian tissue may be removed without disturbing pregnancy. However, they report a case in which a mass of ovarian tissue was left behind despite the fact that four successive exploratory operations were done in a deliberate search for residual ovarian tissue. Therefore, Hartman and Corner believe that nothing can prove absence of ovarian tissue except complete cessation of the menstrual cycle, demonstration by serial sections that the ovaries were completely removed and, at autopsy, proof by thorough microscopic search of the ovarian site and adjacent tissues that residual ovarian tissue is absent. Practically, it should be emphasized that total removal of the ovaries is assured if the fallopian tubes and as much as possible of the mesosalpinx are excised with the ovary.—Ed.]

UTERINE HEMORRHAGE

Manual Removal of Placenta is evaluated by Robert W. DeVoe (Mayo Found.) and Arthur B. Hunt³ (Mayo Clinic). During 1936-45 this procedure was used in 98 (1.3 per cent) of 6,753 obstetric patients. Incidence of obstetric complications and operative deliveries was increased in these patients, both in the current pregnancy

(3) West. J. Surg. 55:647-650, December, 1947.

and in previous ones. The placenta was removed manually because of prolonged retention and/or hemorrhage, and in some cases, to prevent hemorrhage.

In 89 patients in whom the procedure was done early, uncorrected morbidity rate was 4.4 per cent, with no mortality. In the remaining nine patients, who had received preliminary obstetric treatment elsewhere or who had undergone repeated vaginal examinations before they were brought to the clinic, morbidity rate was 77.7 per cent. One patient, delivered in 1936, died of puerperal sepsis, septic thrombophlebitis of the pelvis and bronchopneumonia. In the nine patients the placenta had been long retained, hemorrhage had occurred or there had been opportunity for contamination.

Manual removal of the placenta is indicated early in cases of progressing postpartum hemorrhage and in cases unassociated with excessive blood loss in which the placenta has been retained for at least an hour after delivery of the fetus. Manual removal should invariably be done with rigid aseptic technic, and antibiotic agents or chemotherapy alone should not be relied on to combat needlessly incurred infection. If removal of the placenta is deferred unduly long, postpartum complications are likely. Ordinarily manual removal is comparatively safe when performed in an ideal environment, but, done as a last resort when severe anemia and contamination have occurred, incidence of complications may be high or death may occur.

[At the University of Brazil Medical School Maternity Hospital manual removal is a serious procedure. In 1921 incidence of manual removal of the placenta was 3.5 per cent and complications occurred in 20 per cent of cases. In 1946 and 1947 incidence of manual removal was reduced to 0.1 per cent by injection of the umbilical vein with fluid which usually causes detachment and easy expulsion of the placenta. J. Rodriguez Lima (*Descolamento Hidraulico da Placenta*: Rio de Janeiro, 1947) explains the technic which is so simple that midwives in Brazil are permitted to use it.—Ed.]

Intrauterine Pack in Management of Postpartum Hemorrhage. Lois A. Day, Robert D. Mussey and Robert W. DeVoe⁴ (Rochester, Minn.) report that since 1918 the intrauterine iodoform pack has been used at the Mayo Clinic as a hemostatic measure when postpartum bleeding could not be readily controlled by oxytocic agents and uterine massage. In about 12,000 deliveries, uterine tamponade was used 267 times, an incidence of 2.3 per cent.

Chief indications for intrauterine pack are persistent postpartum hemorrhage from an atonic uterus or from the placental site, shock and manual removal of the placenta.

Morbidity rate in patients treated by intrauterine packing was 10.9 per cent, which is lower than the rate (13.1 per cent) in patients with anemia from postpartum hemorrhage for which the intrauterine pack was not used. One death occurred after intrauterine packing. Hemolytic streptococci were found in the uterus. Had this infection occurred after the advent of penicillin and chemotherapy, the outcome might have been altered. When carried out aseptically before blood loss becomes severe, intrauterine packing gives excellent results.

[H. E. Anderson, A. R. McIntyre, B. V. Reaney and W. H. Taylor, Jr. (Am. J. Obst. & Gynec. 56:391, 1948) used oxidized cellulose gauze for packing the uterus in 24 women with postpartum hemorrhage. Packing was effective and no harmful results appeared. Many years ago I gave up uterine packing for the control of postpartum bleeding and have controlled bleeding by prophylactic measures and by giving ergotrate intravenously or pituitary extract intramuscularly or through the abdominal wall directly into the uterine muscle. Danger of infection is not the only drawback to use of uterine packs. In many instances the pack fails to control bleeding. When it is not firmly inserted into the uterine cavity, bleeding may continue above and around it and not infrequently through a pack. In such instances the pack is usually removed and a second pack inserted, thus increasing the risk of infection and often failing to control bleeding.—Ed.]

(4) Am. J. Obst. & Gynec. 55:231-243, February, 1948.

Fig. Fi
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Immediate Postpartum Hemorrhage Due to Retained Secundines. B. H. Carroll, H. H. Meier and O. H. Stone⁵ (Toledo, O.) measured the immediate postpartum blood loss of 115 patients with retained placenta, membranes

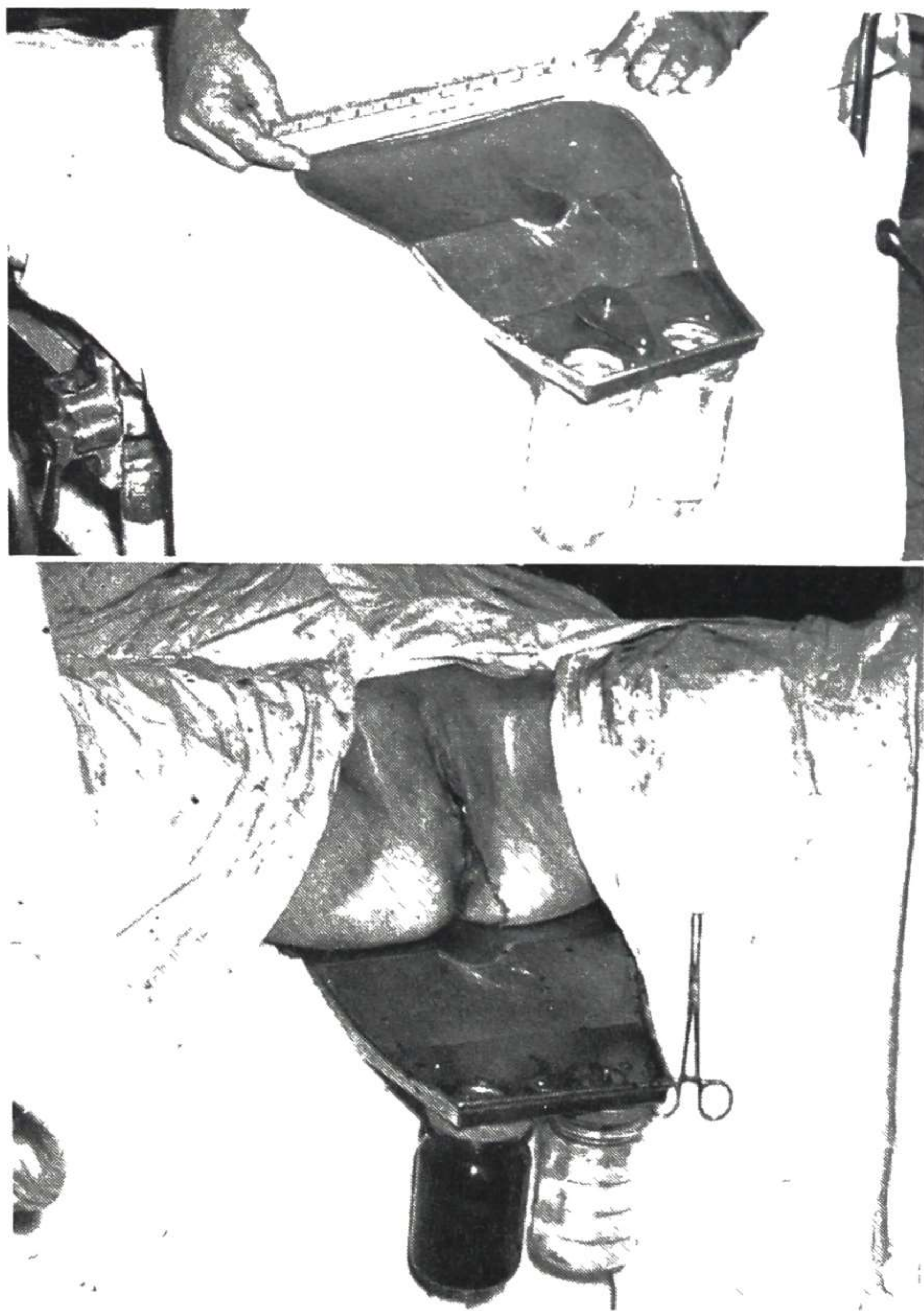


Fig. 21 (top).—Plate on table, showing incline, wing guide and containers.

Fig. 22 (bottom).—Delivery completed. Blood loss accurately measured.
(Courtesy of Carroll, B. H.; Meier, H. H., and Stone, O. H.: *Am. J. Obst. & Gynec.* 55:620-628, April, 1948.)

(5) *Am. J. Obst. & Gynec.* 55:620-628, April, 1948.

or both, using the apparatus shown in Figures 21 and 22. Blood loss of 57 patients was less than 500 cc. In this group the entire placenta or large portions of it were retained. In patients with blood loss over 500 cc., smaller pieces were retained. In all cases removal of the retained tissue promptly halted bleeding. When blood loss is over 500 cc. and the uterus fails to contract, manual removal of the retained tissue is indicated.

Blood loss over 500 cc. was associated with an increase in clinical complications. All but one case in which fever, shock and need for chemotherapy occurred were in patients with the greater blood loss. Moreover, ability to nurse the infant decreased. This emphasizes the need for objective measurement and control of blood loss. The customary method of estimation is deceiving and inaccurate. Transfusions were given to 33 per cent of patients and were always followed by noticeable clinical improvement.

[The authors are correct in their statement that the customary method of estimating blood loss is deceiving and inaccurate. Perhaps because we believe that when bleeding occurs it is usually our fault, we tend to underestimate the amount of blood lost. When a patient has bled a great deal it is best to give a blood transfusion regardless of the amount of blood lost. She should receive at least the same amount of blood as she has lost, and not simply the pint of blood usually given.—Ed.]

Undeveloped Secondary Embryo as Cause of Hemorrhage in Puerperium. Not infrequently the puerperium is interrupted by development of bleeding of varying degrees of severity after a number of days of normal lochial discharge. This is usually ascribed to retained secundines, although bleeding from this cause is logically expected to occur immediately after delivery. Also there are many cases in which it is known definitely that the placenta was delivered intact and blood clots were removed, and yet late postpartum or puerperal bleeding occurs. Morris Leff⁶ (Central Maternity Hosp.,

(6) West. J. Surg. 56:448-450, August, 1948.

New York City) offers an explanation for this type of bleeding. In some multiple pregnancies one fetus may develop to full term while the other stops developing at an early stage and is gradually absorbed. Sometimes this blighted embryo may not be entirely absorbed. The living fetus is delivered and the placenta expressed, but the remnant of the secondary undeveloped embryo stays in place without giving immediate evidence of its existence. The uterus proceeds in its normal process of involution, but as it is reduced in size a stage is reached at which the embryo can no longer remain attached to the uterine wall and is cast off, with resultant hemorrhage. Leff advises immediate curettage for this type of bleeding. An undesirable sequel to curettage is development of amenorrhea, which may last for years.

[I have never seen a case of the type described by Leff. I do not believe such cases are common, because in all instances of serious uterine bleeding in the puerperium a curettage is performed, and in every good hospital the tissue is carefully examined by a pathologist. It would be difficult to overlook a fetus, if one were present, or the portion of the placenta to which the degenerated embryo was attached.—Ed.]

Treatment of Placenta Previa.—*Review of Cases Treated in Edinburgh Royal Maternity Hospital and Simpson Memorial Pavilion, Royal Infirmary, Edinburgh, 1926-45.*—John Sturrock⁷ divides the study into four periods of five years each. Maternal death rate steadily declined from 9.8 per cent during the first period to 0.8 per cent in the last, total number of cases in each period being remarkably constant. Total fetal mortality declined from 67 per cent in the first period to 39 per cent in the last; however, fetal death rate improved even more in cases after 36 weeks' gestation, in which it declined from 50 to 27 per cent.

Improvement is attributed to: increasing use of blood transfusion, which reduces incidence of shock due to hemorrhage; greater use of conservative management,

(7) *Edinburgh M. J.* 54:496-503, September, 1947.

prolonging gestation as long as possible; greater use of cesarean section in major degrees of placenta previa, and improved management of the premature child.

However, conservative management even in the hospital is not without risk to the mother; it involves possibility of ultimate disappointment because congenital fetal deformities are often associated with placenta previa, and it adds heavily to the strain on medical and nursing staffs.

Review of Cases Treated in Glasgow Royal Maternity Hospital, 1941-46.—The maternal aspect of treatment is considered by Hugh Stirling⁸ on the basis of 505 consecutive cases, of which 222 were classed as mild and 283 as severe. Incidence and severity were higher in multiparas.

There were 18 deaths (3.6 per cent), 4 in the mild cases and 14 in the severe. However, four deaths were unavoidable or not due directly to placenta previa, making corrected mortality rate 2.8 per cent. Morbidity rates were 13.7 per cent in the total group, 9 per cent in the mild cases and 17.3 per cent in the severe.

Evaluation of methods of treatment showed that choice of treatment was not of first importance in the mild cases. Cesarean section appeared to be the best procedure in the severe cases, giving the lowest maternal mortality.

In assessing the value of delayed treatment it was found that there was slight increase in maternal mortality in both groups receiving delayed treatment, this being largely accounted for by failures. In the mild cases morbidity rates were about the same in those given immediate and those given delayed treatment. In the severe cases morbidity rate was considerably higher when treatment was delayed.

There was no indication that any one method was more suited to immediate than to delayed treatment or vice

(8) Edinburgh M. J. 54:504-509, September, 1947.

versa, but the study showed a slight but definite added risk to the mother when treatment is delayed.

The fetal aspect is discussed by Robert A. Tennent.⁹ Of 507 infants born, 334 (65.9 per cent) left the hospital alive, 77 (15.2 per cent) were stillborn and 96 (18.9 per cent) died during the neonatal period; 320 infants were born to mothers with mild placenta previa. For these the corresponding figures were: living, 74.5 per cent; stillborn, 13.5 per cent, and died in neonatal period, 24.4 per cent. Of the 287 infants born to mothers with severe placenta previa, 59.2 per cent were live born, 16.4 per cent stillborn and 24.4 per cent died in the neonatal period. The facts confirmed that prematurity is the major danger to the infant. If the fetus can attain a weight of 6 lb., it has largely overcome the danger of neonatal death, but there is still a considerable chance that the infant may be stillborn.

Mild placenta previa usually was handled without treatment by puncture of the membranes, and severe degrees were treated by cesarean section. Of the 268 children born after immediate treatment 68.8 per cent were live born, 15.2 per cent stillborn and 16 per cent died in the neonatal period; mortality was 31.2 per cent. The corresponding figures for 139 infants born after delayed treatment were: live born, 58.3 per cent, stillborn, 15.1 per cent, and died in neonatal period, 26.6 per cent; mortality was 41.7 per cent.

Results were generally worse in the delayed treatment group. However, 63 of these infants did reach birth weight of 6 lb. or over, and in 62 cases pregnancy was continued for at least seven additional days. No doubt this improved fetal chance for survival, though life in utero with a placenta previa which is bleeding or has bled from time to time is not comparable with that in normal pregnancy.

Stirling and Tennent conclude that since fetal survival

(9) *Edinburgh M. J.* 54:510-521, September, 1947.

appears no more certain with delayed than with immediate treatment and since maternal mortality and morbidity are slightly increased by the former, treatment delay in most cases of placenta previa is not justifiable.

Antepartum Hemorrhage. Principles of treatment evolved from a survey of cases of premature separation of the normally implanted placenta and of placenta previa occurring in the Philadelphia Lying-in Hospital during 1934-45, are outlined by Robert A. Kimbrough and Brock D. Jones.¹

Choice of treatment in cases of abruptio placentae depends on severity of symptoms, the patient's general condition, whether or not she is in labor, and, most important, the degree of cervical dilatation. In mild degrees of separation during labor, in which neither mother nor baby present evidence of distress, it is rarely necessary to interfere with the normal course of labor. The more urgent cases, because of extreme blood loss and shock, require that the uterus be emptied by the quickest method compatible with the mother's safety. If she cannot be immediately and safely delivered by simple measures from below, cesarean section is the treatment of choice. Before any procedure for delivery is instituted the patient must be treated for shock, and lost blood must be adequately replaced by transfusion. After delivery, the uterus often fails to remain firmly contracted, and a relatively small amount of bleeding is poorly tolerated. Firm packing of the uterus and vagina is urgently indicated on the least provocation, as is intravenous administration of oxytocics.

Choice of treatment in placenta previa depends on severity of hemorrhage, degree of shock, location of the placenta, viability of the child and its presentation and, most important, the amount of cervical dilatation.

Treatment of shock and blood replacement by whole blood or plasma transfusions are essential before pro-

(1) Am. J. Obst. & Gynec. 55:496-503, March, 1948.

cedures for delivery are instituted. Examination is performed only after the patient has reacted and when the operating room is ready for both vaginal and abdominal delivery. The method of delivery depends almost wholly on status of the cervix. Because of danger of profuse hemorrhage and added risk of infection, manual dilatation of the cervix and forcible vaginal delivery are contraindicated. If the cervix is dilated and placenta previa is only partial or marginal, rupture of the membranes will allow the presenting part to exert sufficient pressure on the placenta to stop hemorrhage. Under similar conditions version and extraction are indicated only if the cervix is completely dilated. Braxton-Hicks version should be used only when the baby is dead or nonviable and the cervix partially dilated. In all cases in which the cervix is not dilated, in all cases of central placenta previa regardless of cervical dilatation, and in cases of malpresentation of the fetus, cesarean section is the safest treatment.

Intravenous administration of an oxytocic immediately after the second stage of labor and firm packing of uterus and vagina after expulsion or removal of the placenta lessens danger of postpartum hemorrhage.

Possible Significance of Arterial Visualization in Diagnosis of Placenta Previa: Preliminary Report. Leo J. Hartnett³ (St. Louis Univ.) obtained aortograms on 68 women in the later stages of pregnancy. Sodium iodide, 80 per cent, and Diodrast, 70 per cent, were the opaque mediums used. Preoperatively, kidney function tests and sensitivity tests to the contrast mediums were done on all patients. Those with abnormal kidney function or sensitivity were rejected.

Aortic puncture was done under Pentothal Sodium anesthesia and the contrast medium injected over five seconds. One x-ray exposure was made as injection was completed, and a second exposure, within seven seconds.

(3) Am. J. Obst. & Gynec. 55:940-952, June, 1948.

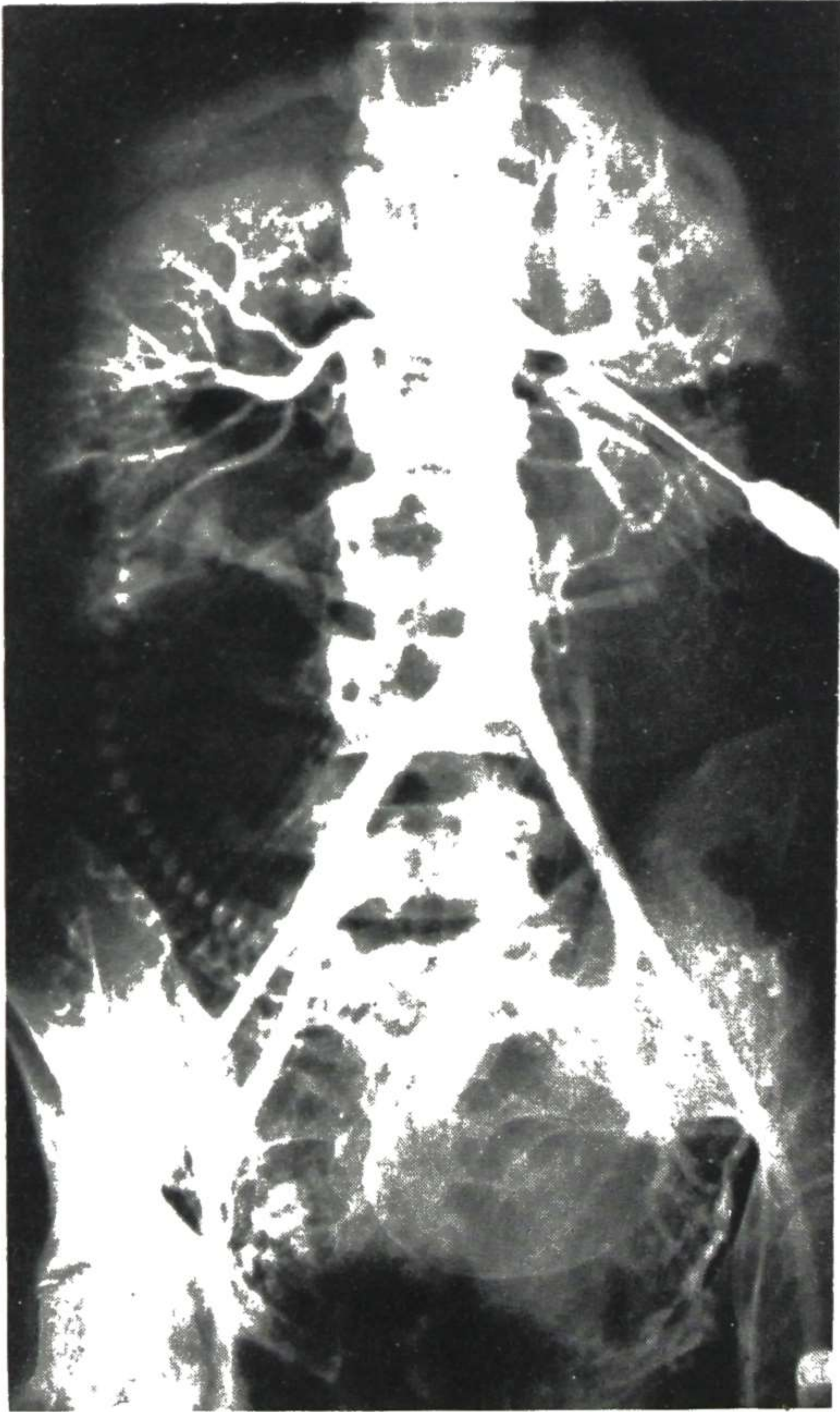


Fig. 23.—Aortogram of patient at twenty-eighth week of pregnancy, hospitalized because of moderately severe hemorrhage. Outline of maternal arteries over lower segment is shown. Characteristic mottling of maternal sinuses is making its appearance below fetal head. Central placenta previa found at operation. (Courtesy of Hartnett, Leo J.: *Am. J. Obst. & Gynec.* 55:940-952, June, 1948.)

By delaying the exposure time it was possible to visualize the maternal circulation over the placental site. The best plates were obtained with a setting of 75 kv.,

200 ma., at 0.5 second with a high speed Bucky grid. Sodium iodide was more satisfactory than Diodrast. There were no serious complications in this series. Extravasation of the solution occurred in 13 cases; lumbar pain for a few days was the only ill effect.

Two cases of placenta previa were encountered and correctly diagnosed by aortograms (Fig. 23). Cesarean section was performed in both cases and the placental location verified at operation. Hartnett believes that this procedure is fundamentally sound and that it should be of great value in cases of bleeding during pregnancy in which a choice is to be made between conservative and radical treatment.

Accidental Hemorrhage is discussed from the therapeutic viewpoint by G. F. Gibberd⁴ (Guy's Hosp., London).

When there are repeated small hemorrhages after the period of "threatened abortion," the only danger is that of premature labor. At any time during pregnancy rest in bed appears to be the only effective treatment.

Fairly profuse, sudden bleeding during the last months of pregnancy must be differentiated from placenta previa. If the head is deeply engaged in the pelvis and there is no associated toxemia, patients need only rest in bed for a week, and spontaneous onset of labor at term may be awaited. Accidental antepartum hemorrhage with a nonengaged part cannot be diagnosed with certainty until onset of labor, and the patient must be kept in the hospital until she is safely delivered. Cesarean section should not be performed until diagnosis is certain.

Traumatic revealed accidental hemorrhage following external version may occur, and it should be the rule never to use more force in performing external version under anesthesia than one would apply if no anesthetic were given.

Revealed accidental hemorrhage during labor seldom

(4) *Canad. M. A. J.* 58:53-57, January, 1948.

calls for interference unless there are signs of concealed hemorrhage as well. In the rare cases in which the loss tends to increase as labor proceeds, artificial rupture of the membranes is all that is necessary to reduce the bleeding to within safe limits. However, revealed accidental hemorrhage occurring during labor associated with toxemia may be associated with fetal mortality as high as 50 per cent.

Concealed accidental hemorrhage is extremely serious. Gibberd emphasizes continuous nature of pain and continuous hardness of the uterus as characteristic signs. The patient's general appearance is more important in assessing severity of illness than is pulse rate and blood pressure, since these may often be misleading. Gibberd advocates expectant treatment, believing that cesarean section is only rarely indicated.

Placenta Previa. Diagnosis and treatment is discussed by A. Louis Dippel⁵ (Baylor Univ.). Maternal deaths from hemorrhage have not decreased in comparison with deaths from other causes. Placenta previa is a common cause of antepartum hemorrhage. It is usually characterized by painless vaginal bleeding in the last trimester. Soft tissue roentgenography is a valuable aid in establishing the placental site. Dippel has found it 90 per cent reliable, the films being unsatisfactory for placental visualization in 10 per cent. Final diagnosis rests on digital palpation of the uterine cavity in the area of the internal cervical os. This procedure should be performed only in a delivery or operating room with every precaution taken against introduction of infection. The cervix is almost invariably excessively softened in placenta previa, and a soft, boggy pad prevents easy palpation of the presenting fetal pole.

The different varieties of placenta previa are named according to the amount of apparent encroachment on the cervical os. This relationship remains constant with

(5) Am. Pract. 11:597-602, May, 1948.

increase in cervical dilatation, and the exact variety of placenta previa may be diagnosed at any degree of cervical dilatation.

Accouchement forcé has no place in treatment of this condition. Blood transfusions are lifesaving and should be freely utilized. It is generally safe to carry the pregnancy to certain viability of the fetus, provided the maternal blood picture is carefully followed. Cesarean section should be resorted to only with central placenta previa and in certain primiparas, particularly those with partial placenta previa. Several methods of induction of labor may be utilized. Probably the best of these is simple membrane rupture. With breech and transverse positions and unengaged fetal head, the Voorhees bag may be used to great advantage. The third stage of labor must be conducted carefully.

Treatment of Placenta Previa: Some Historical and Modern Aspects. John E. Savage⁶ states that vaginal tamponade, the hydrostatic bag, internal podalic version and Hicks' version should be entirely eliminated from the management of placenta previa. He recommends that the patient be hospitalized without examination and without vaginal tamponade. Careful physical examination, complete blood studies and x-ray studies of the soft tissue should be made. Factors influencing selection of treatment are the patient's general condition, condition of fetus, history of patient and presence or absence of obstetric or medical complications. Lesions of the cervix, premature separation of a low implanted placenta and premature separation of a normally implanted placenta with external hemorrhage must be excluded.

The policy of watchful expectancy is to be followed, when possible, in all cases before term. In cases at term definitive treatment is to be carried out when the patient's condition will permit. Abdominal delivery is recommended for all patients with central placenta previa re-

(6) Bull. School Med. Univ. Maryland 32:97-110, October, 1947.

ardless of parity, all primigravidas not in labor regardless of the type of placenta previa, all multigravidas not in labor with partial placenta previa and all patients with cephalopelvic disproportion or any other obstetric indication for abdominal delivery.

Vaginal delivery by means of simple rupture of the membranes is recommended in partial or lateral placenta previa in multigravidas in labor with some dilatation and effacement of the cervix, in lateral placenta previa in multigravidas not in labor and in lateral placenta previa in primigravidas in labor with some dilatation and effacement of the cervix. Use of Willett's forceps is recommended if simple rupture of the membranes fails to control bleeding or to induce labor or when it is desirable to expedite delivery.

Management of the third stage of labor following vaginal delivery must include Credé expression of the placenta, or, if this fails or bleeding is persistent, cautious manual removal. The lower uterine segment and cervix must be investigated after manual removal. Uterine, cervical and vaginal packing is necessary if hemorrhage persists after removal of the placenta.

Liberal use of whole blood before, during and after delivery and also general supportive measures are indicated.

Expectant Management of Placenta Previa in an attempt to prolong pregnancy to term improves fetal results, according to Tiffany J. Williams⁷ (Univ. of Virginia). One hundred and five cases of placenta previa with 1 maternal death (0.95 per cent) and 29 fetal deaths (28 per cent) are reviewed. Of 74 babies weighing 2,500 Gm. or more, 8 (10 per cent) were lost, whereas of 31 babies weighing under 2,500 Gm., 21 (68 per cent) were lost.

Obviously, some patients will go into spontaneous labor prematurely, and others will have such persistent or

(7) Am. J. Obst. & Gynec. 55:169-176, January, 1948.

profuse bleeding that the physician is reluctant to adopt an expectant attitude. However, if labor has not begun, an expectant attitude may be adopted. The vagina and cervix may be gently examined to eliminate the possibility of some infrequent cause of bleeding such as ruptured varices or cervical tumor, but the cervical canal should not be explored. Patients should be kept under observation, preferably in the hospital. If they are permitted to return home, they should be instructed to abstain from sexual intercourse, to permit no vaginal examinations and to return to the hospital with the first recurrence of bleeding. Forty-one of the 105 patients were kept under observation from two days to three months in an effort to obtain a viable child. Fourteen patients had two or more hospitalizations for recurrent episodes of bleeding. Of the 41 patients, 5 babies (12 per cent) were lost. One was a term baby delivered by cesarean section who died neonatally of congenital malformations, and 4 were premature, of which 1 was still-born and 3 died neonatally. The 12 per cent fetal mortality in this group was in contrast to the 28 per cent mortality for the entire series.

[Baumann (Zentralbl. f. Gynak. 69:97, 1947) reviews 144 cases of placenta praevia treated in the Second Woman's Clinic in Budapest. From 1925 to 1935 maternal death rate was 7.9 per cent, whereas from 1936 to 1941 it was only 2.4 per cent. In the second period, when patients had bled considerably, an immediate cesarean section was performed. Death rate for the cesarean cases was 4.8 per cent. In the discussion of the article v. Mikulicz-Radecki advised vaginal cesarean section for the treatment of placenta praevia in multiparous women. Martin advocated vaginal cesarean section for primiparas as well as multiparas and reported 250 vaginal cesarean sections without a single death. In my opinion, vaginal cesarean section is contraindicated in cases of placenta praevia. Because of the bleeding such an operation is a formidable procedure. A disturbing paper on the treatment of placenta praevia is by H. Hauser. (Wien. klin. Wchnschr. 60:32, 1948) who advocates the treatment of placenta praevia by means of the Delmas method of manual dilatation of the cervix and rapid delivery under spinal anesthesia. In seven cases Hauser dilated the cervix completely within

5 to 20 minutes and then performed a podalic version and extraction. Fortunately, all mothers recovered. However, in one case there was a cervical tear into the parametrium, in a second an extensive tear in the vagina, and in a third case the tear in the cervix measured 7 cm. I certainly advise against this treatment for any purpose.

During the last three years there has been considerable discussion about temporizing for a few weeks when a woman has bleeding in the last few weeks of pregnancy and the baby is not viable. H. W. Johnson (*Am. J. Obst. & Gynec.* 56:200, 1948) advocates conservative treatment of placenta praevia. He is still waiting for a report of a case of fatal hemorrhage in a patient with placenta praevia who had had no cervical or intrauterine manipulation nor any attempt at manual removal of the remaining placental tissue during the third stage of labor.

It is difficult to compare results of the treatment of placenta praevia in different institutions because of confusion concerning the terminology. Textbooks on obstetrics disagree on the nomenclature of the various types of placenta praevia. Beck speaks of marginal, partial and central types of placenta praevia. Stander speaks of marginal, lateral or partial and central types, and DeLee and Greenhill refer to lateral, partial and total or central placenta praevia. Of course, practically speaking, all of these terms are relative because of the changes which occur through dilatation of the cervix. For example, a placenta which covers all of the external os when the uterus is dilated 3 cm. subsequently may cover only half of the opening. In all cases of vaginal bleeding in the last months of pregnancy, the patient should be immediately taken to a hospital in an ambulance and her blood typed and matched, including determination of the Rh factor if this is not known. A sterile vaginal examination should be made in the operating room with everything prepared for packing the vagina and for cesarean section. If the placenta is felt through the internal os or if bleeding is again started by examination, or if a boggy mass is felt in the lower uterine segment in the presence of a closed cervix, cesarean section should be done. If, on the other hand, there is dilatation of the cervix, and the placenta is not felt but serious bleeding has occurred, simple rupture of the membranes is the best treatment. In some cases this may be combined with traction on the scalp by means of a Willett or other forceps. In my opinion treatment of placenta praevia consists either of cesarean section or rupture of the membranes alone or combined with the use of Willett forceps. In all cases where there has been serious loss of blood, the blood should be replaced by transfusion without delay.

In the treatment of abruptio placentae I advocate two forms of treatment, cesarean section and rupture of the membranes. I have no faith in the use of vaginal packs either for abruptio placentae or placenta praevia. In discussing this point F. S. Kellogg (Obst. & Gynec. Surv. 3:746, 1947) says, "I would like to express the personal opinion that packs in the conservative treatment of toxic separation are not only a snare and a delusion but an added menace. If one elects to deliver such a patient from below, simple rupture of the membranes without the pack permits one to know what is really going on in respect to bleeding. The pack obscures the situation and I believe the pack tends to increase shock. The Spanish windlass or tight abdominal belt comes in equally for my disfavor; it obscures the bleeding situation in the uterus. Either the uterus splints itself and delivers the baby before the mother is dead or it does not. The binder as well as the pack simply encourages pressure bleeding into the myometrium which appears to be the major factor in the commonly noted excessive shock relative to the amount of estimated blood loss. I also lack enthusiasm for pitocin stimulation. It stimulates an already exhausted and tetanic uterus to further activity, whipping a dead horse, the theoretical result more pressure infiltration of the myometrium with blood, more shock, especially if free bleeding inside and outside the uterus is blocked by pack and a tight binder. None of these phenomena takes place with hysterotomy or if the membranes are ruptured only, without pack, binder or pitocin. In 1931 Browne, Assistant Master at the Rotunda, showed that albuminuria appeared rapidly when confined hemorrhage from any source occurred in the body due to blood and/or destroyed tissue 'toxin' and disappeared at a speed inversely proportional to the prolongation of the 'time before the confined blood was evacuated unless the kidneys were diseased. This prolonged the clearing time for albumin. He said the albuminuria was simply a visible index of what was going on in other organs of the body not visible, especially the liver, by way of endothelial damage."—Ed.]

Obstetric Hemorrhage is discussed by Lyman W. Mason⁸ (Denver). Bleeding during pregnancy is never normal. In the first trimester it can mean only threatened abortion, or ectopic pregnancy. Early bleeding should be treated as a threatened abortion. Progesterone in doses of 5-10 mg. every 4 hours for 24 hours is indicated. Estrogens may be helpful. If evidences of abortion continue for several days, oxytocics are given. Uterine products

(8) Rocky Mountain M. J. 45:388-393, May, 1948.

are usually passed within 24-48 hours. The nearer the uterus a tubal pregnancy is located, the earlier rupture occurs and the more massive is the hemorrhage. A decidual cast may occasionally be passed and is practically diagnostic of an ectopic pregnancy. Endocrine therapy for threatened abortion in the second trimester is less frequently successful than when given earlier. Bleeding in the last trimester is due either to premature placental separation or to placenta previa. Bleeding from placenta previa is always painless, but premature separation may or may not be accompanied by pain. The first symptom of concealed placental hemorrhage is usually sudden severe pain. Premature separations of severe grade require cesarean section, as do most types of placenta previa when there is any appreciable covering of the internal os by the placenta. Blood replacement is essential.

In Mason's experience, the chief causes of postpartum hemorrhage are ill advised attempts to express the unseparated placenta, atony of the uterus and injuries to the birth canal. Bleeding following placental expulsion is due to retention of portions of the placenta.

Avoidable and Unavoidable Obstetric Hemorrhage. According to Hugh G. Hamilton² (Kansas City) obstetric hemorrhage, both early and late, accounts for about 30 per cent of maternal deaths. Most deaths from hemorrhagic disorders in pregnancy are preventable.

The commonest cause of hemorrhage in early pregnancy is abortion. Special attention is directed to the patient who has slight hemorrhages for a prolonged time and then an ultimate moderate hemorrhage with a fatal result due to previous depletion of solid and fluid blood constituents. Another possibility to be considered in case of early hemorrhage is ectopic pregnancy. As many women have died from inadequate preoperative blood transfusions as from delay in diagnosis or in active ther

(2) J. Missouri M. A. 45:647-654, September, 1948.

apy. Hydatidiform mole causes bleeding which often resembles that of recurrent threatened abortion with hemorrhage increasing each time it occurs.

Abruptio placentae may be the cause of alarming blood loss in later pregnancy. If active treatment is not directed to the symptoms, they may progress with startling rapidity. Proper treatment of placenta previa begins in the antepartum period with careful blood study, including hemoglobin determination, red blood cell count, Rh reaction and serology. If hemoglobin content is under 10 Gm. despite antianemic therapy, transfusion should be given before emptying the uterus. Properly matched and Rh-compatible blood should be given freely during ante-, intra- and postpartum care of the patient with placenta previa. Because of danger of blood loss in the third stage of labor and the immediate postpartum period, more careful management is needed in these stages.

Every institution that does not have a blood bank should maintain a sufficient supply of plasma for supportive therapy until whole blood can be obtained.

Immediate Postpartum Period as Fourth Stage of Labor. The immediate postpartum period is defined as the interval after expression of the placenta to satisfactory reaction of the patient to delivery, including firm contraction of the uterus without excessive bleeding. Carl T. Javert⁹ (Cornell Univ.) points out that this period may vary from the traditional hour in the average normal patient to many hours when abnormal conditions arise. The period has definite clinical, anatomic, physiologic and pathologic characteristics that justify its being regarded as the fourth stage of labor.

Pathologic conditions include retained membranes, cotyledons or succenturiate lobes; rupture or inversion of the uterus; vaginal lacerations; postpartum chill; postpartum hemorrhage; convulsions of eclampsia; car-

(9) Am. J. Obst. & Gynec. 54:1028-1032, December, 1947.

diorespiratory failure; drug or anesthetic reactions, and aspiration pneumonia.

Of 88 maternal deaths in the New York Lying-In Hospital in 1932-45, 28 occurred in the immediate postpartum period. The most frequent cause of death was hemorrhage. Javert believes that a program to publicize the characteristics of the immediate postpartum period as a stage of labor will serve to reduce the number of preventable deaths occurring during this period.

[What Javert calls the fourth stage of labor has been discussed before by M. Leff (*Surg., Gynec. & Obst.* 68:224, 1939) and by E. M. Greenberg (*Am. J. Obst. & Gynec.* 52:746, 1946). There is no doubt that this period in labor is very important. I have included this period in the third stage of labor and have always emphasized its importance. Perhaps if a name is given to a certain portion of the third stage, as suggested by these authors, more attention will be paid to it; it is a dangerous period.—Ed.]

Puerperal Inversion of Uterus. Harold Henderson and Russell W. Alles¹ (Detroit) collected 24 cases from the records of Providence Hospital over a 16 year period, an incidence of 1 in 2,300 deliveries. There were six deaths, all occurring within 6 hours, the shortest period between delivery and death being 3½ hours. Of eight multiparas in the group, four died. The patient's age, position of the fetus and surgical intervention apparently had no etiologic significance. When predisposition to the condition is combined with an abnormal third stage, inversion may occur. One primipara had a recurrence with a second pregnancy. In five cases, the third stage was prolonged, and in two of these the placenta was removed manually; both patients died. Vigorous uterine manipulation should be avoided. In five cases diagnosis was based on a prolapsed uterus; in the others shock and hemorrhage and results of abdominal and vaginal examination constituted the basis for diagnosis.

The authors advise immediate manual replacement of

(1) *Am. J. Obst. & Gynec.* 56:133-142, July, 1948.

the inverted uterus in all cases. This may be done by the average operator without anesthesia and usually without increasing shock. Transfusions must be given at the same time.

Fatal Hemorrhage Associated with Third Stage of Labor: Study of 60 Maternal Deaths, Brooklyn, 1937-47, was made by Morris Glass and Alexander H. Rosenthal.³ Causes for hemorrhage were atony of the uterus, 40 cases; retention of part or all of the placenta, 12; inversion of uterus, 5, and varied causes, 3.

Only 13 patients received adequate amounts of blood by transfusion. Eighty per cent received either no blood or insufficient amounts. Since 41 patients died over three hours after hemorrhage, the inference that there was time for transfusion is justified. Estimated blood loss during the third stage is notoriously unreliable. Precise determinations should be made and adequate blood replacement carried out. Reliance should not be placed on intravenous or subcutaneous fluids or even on blood plasma.

Management of the placental stage, in which hemorrhage is the great hazard, is of paramount importance. Any predisposing cause for abnormal separation and expulsion of the placenta must be recognized. Under no circumstances should a patient leave the delivery room with the placenta retained. If one hour elapses without signs of separation, the placenta should be removed manually under general anesthesia, provided Credé expression fails. The difficulties and hazards of this procedure have been exaggerated.

If the uterus does not contract and bleeding continues despite therapy, the operating room should be prepared, the uterus and vagina packed tightly with wet gauze, and blood transfusions, which should already have been started, continued. Hysterectomy should be performed rapidly if bleeding is not controlled.

(3) New York State J. Med. 48:159-165, Jan. 15, 1948.

Low Maternal Mortality with Persistence of Hemorrhage as Chief Cause of Death: Analysis of Puerperal Deaths in Brooklyn during 1946. Charles A. Gordon⁴ reports that in Brooklyn in 1946 there were but 57 puerperal deaths, a rate of 8.7 per 10,000 live births, a reduction of 80 per cent from 1937, when there were 164 puerperal deaths (40.7 per 10,000 live births).

According to official records the 1946 maternal deaths were due to abortion in 7 cases, ectopic pregnancy in 2, toxemia in 12 and infection in 12. Only 8 deaths were formally ascribed to hemorrhage, but hemorrhage was the actual cause of death in 20 (35 per cent) of the 57 puerperal deaths.

Cesarean section was associated with death in 14 of the 57 cases. Anesthesia was an important cause of death, although it was not tabulated in the statistics of maternal death. Deaths from anesthesia can be ascribed to toxic action of the anesthetic, to aspiration asphyxia and to atelectasis. Rheumatic disease associated with childbirth was the cause of 14 deaths; 9 were attributed directly to cardiac disease and so not tabulated; 5 were due to puerperal causes.

Hemorrhage is still the principal cause of maternal death in Brooklyn. Gordon points out that all too often plasma is held to be a satisfactory substitute for blood, and adequate blood reserves are not maintained at all hospitals. The danger of aspiration asphyxia in obstetrics is not fully appreciated. Danger signals of pre-eclampsia or rheumatic heart disease should not be ignored. When symptoms appear, there is no substitute for continuous hospitalization, and election of cesarean section is often not wise.

Puerperal Hemorrhage: Is the Present Mortality Rate Unnecessarily High? James Knight Quigley⁵ (Rochester Gen'l Hosp.) reports that committees on maternal

(4) *Am. J. Obst. & Gynec.* 54:1058-1064, December, 1947.

(5) *New York State J. Med.* 48:55-58, Jan. 1, 1948.

welfare in Brooklyn, Philadelphia and Rochester agree that deaths from postpartum hemorrhage have not decreased in five years and that a large proportion of deaths investigated were preventable.

Quigley emphasizes that proper care of the third stage of labor requires the undivided attention of the physician. The placenta usually separates from the uterine wall almost immediately after birth of the child, and since its continued presence in the uterus serves no good purpose, it should be expressed by a piston-like pressure on the fundus. In absence of hemorrhage, retained placenta should be removed manually within two hours. Repair of lacerations and episiotomies should not be attempted until afterward.

After expulsion of the placenta, if hemorrhage occurs or continues, cervical, vaginal and perineal sources of bleeding should be sought and sutured quickly. If the fundus fails to contract well after administration of Ergotrate, bimanual compression of the uterus should be done until bleeding is controlled; if this fails the uterus must be packed from above downward. Quigley has never seen adequate packing fail to stop hemorrhage.

In the meantime, preparations must have been made for whole blood transfusion, and in most cases 500 cc. or more should be given initially. The need for transfusion should be based on measured and not on estimated blood loss. If 1 pt. (500 cc.) is lost and the patient is still bleeding, transfusion should be carried out. Symptoms and signs of hemorrhage lag behind actual blood loss and frequently appear too late for institution of life-saving measures. Plasma will often bridge the gap, but dependence should be placed on whole blood.

Rh factor determination and blood typing should be a routine procedure, and blood banks should be available.

[Gordon has repeatedly emphasized that the principal cause of maternal deaths in Brooklyn is hemorrhage. I believe that hemorrhage is the principal cause of death throughout the United States.

We are indebted to Gordon for pointing out this very important fact. We cannot overemphasize the necessity for saving blood and replacing lost blood.—Ed.]

Shock in Obstetrics, according to H. L. Sheehan⁶ (Univ. of Liverpool) is clinically and pathologically the same as shock in other conditions. His observations are based on clinical study and postmortem examination of 147 fatal cases of shock in relation to labor at Glasgow Royal Maternity Hospital.

All evidence points to great reduction in rate of blood flow through the skin, muscles and abdominal viscera. Significantly, however, the fact that the patient remains conscious until the terminal stages of shock indicates that blood flow to the brain remains relatively good. Slowing of blood flow through most of the body leads to reduction in the amount of blood returning to the right auricle, with resultant low pulse pressure and low arterial blood pressure. Characteristic subendocardial hemorrhages appear on the left side of the interventricular septum about 2 or 3 cm. below the aortic cusps. Patients die from what appears to be failure to maintain sufficient cardiac output to supply the brain.

Functional disturbances appear to be of nervous origin. Skin pallor, sweating, tachycardia, vasoconstriction and possibly absence of cutaneous vasomotor reflexes suggest sympathetic overactivity. Distention of the stomach, cecum, ascending colon and half the transverse colon corresponds in distribution to that of the sympathetic nerve supply.

There is no evidence that any primary endocrine disturbance is involved in production of shock.

Vasoconstrictive changes are similar to the defense reaction which occurs in response to hemorrhage. In shock, however, the mechanism appears to come into action without purpose, and its results are harmful. It is probably evoked by nervous or biochemical factors

(6) *Lancet* 1:1-8, Jan. 3, 1948.

and not by any significant reduction of blood volume.

The view that the stimulus in shock may be reduction in blood volume is not supported by the effect of blood transfusion. Study of two series of patients, the first observed during the period preceding general use of blood transfusion and the second after establishment of an active and efficient blood transfusion service, led to the conclusions that (1) blood transfusion is a lifesaving measure in patients with severe hemorrhage; (2) it appears to be of value in patients with a mixture of shock and significant hemorrhage, and should certainly always be given in this condition; (3) in obstetric patients with shock alone, or with shock and only minor hemorrhage, there is no evidence that blood transfusion is lifesaving.

Common obstetric causes of shock are prolonged labor, ruptured uterus, retained placenta and accidental hemorrhage. Both length of labor and trauma of delivery probably contribute to shock, but the importance of length of labor does not appear to be sufficiently recognized.

Shock in Obstetrics is characterized by circulatory deficiency with low blood pressure, decreased blood volume, decreased cardiac output and increased blood concentration. W. A. Scott⁷ (Univ. of Toronto) has found that most cases can be clinically evaluated in terms of hemorrhage, since other causes of shock are relatively rare.

Factors contributing to development of shock in obstetric patients are: (1) inevitable blood loss at delivery, which may more than overcome the increased blood volume of pregnancy, (2) disturbance of water balance, especially in cases of toxemia, which probably indicates increased capillary permeability, (3) sudden drop in blood pressure after delivery, whether or not an elevation existed, (4) trauma, sleeplessness and apprehension and (5) sudden lowering of intra-abdominal pressure after delivery, which probably results in dilatation of the splanchnic vessels.

(7) Brit. M. J. 2:647-649, Oct. 25, 1947.

Shock may result from hemorrhage, rupture of the uterus, inversion of the uterus, eclamptic toxemia and, possibly, psychic causes.

Blood loss may be slow and prolonged or sudden and rapid. Whatever the cause, a patient who has lost considerable blood rapidly responds to treatment better than one who has lost a comparable amount slowly.

Rupture of the uterus is probably more common than is recognized clinically. It seldom produces clinical evidence of shock, and when the latter develops it is secondary to hemorrhage.

In inversion of the uterus shock is usually quickly apparent. In cases in which shock is not immediate, it supervenes either as a result of hemorrhage or from attempts at replacement, which are often accompanied by profuse bleeding.

Severe vasomotor collapse following delivery of patients with eclamptic toxemia is probably explained by sudden lowering of intra-abdominal pressure with filling of the splanchnic vessels with noncirculating blood. When death does not result quickly from shock, it may occur later from damage to the central nervous system due to cerebral anemia.

Psychic causes of syncope during labor are recognized, but it is doubtful if true shock is thus produced.

Management of obstetric shock begins with prevention of bleeding. However, when hemorrhage has begun circulating blood volume must be replaced as rapidly as possible, preferably by blood but when necessary by plasma or even glucose solution. Morphine should be given to relieve pain and apprehension. Body heat should be retained. When shock intervenes, trauma of any operative procedure should be avoided unless it is necessary to stop bleeding.

• **Maternal Deaths and Obstetric Shock.** Paulo Schmidt Goffi² found 87 maternal deaths (4.37 per 1,000) among

(2) *Rev. med. e cir. de Sao Paulo* 7:83-89, Sept.-Oct., 1947.

19,887 parturient women at the São Paulo maternity hospital during the last three years. Mortality rate among charity patients was 7.54 per 1,000 and among paying patients 1.88, the difference being due principally to poor care received by the former before they entered the hospital. Average age of those who died was 26.7 years. Death was due to shock (hemorrhagic or not) in 39.1 per cent, and to infection and toxemia in 24.1 per cent respectively. Other causes were: anesthesia in 3.5 per cent, cardiopathy and pulmonary embolism in 2.3 per cent respectively, and hepatic cirrhosis, typhoid fever and malignant tumor in 1.2 per cent respectively.

Twenty-nine per cent of the cases of shock occurred in paying patients, and 71 per cent in charity patients, the higher incidence in the latter being due to the greater frequency of predisposing causes; hence, the advantage of adequate prepartum care. In the 34 cases of shock there were only five deaths from obstetric shock in which hemorrhage was apparently not involved; in the others, hemorrhage played a greater or lesser role, placenta previa occurring in 3, hemorrhage after delivery in 9, premature detachment of placenta in 8, retention of placenta in 4 and uterine rupture in 5.

[Treatment of the cases observed in the São Paulo Maternity is discussed by E. Martins Passos (*Med. mod.* 1:143, 1948). Therapy consisted of the use of oxygen, replacement of fluids by gum acacia, plasma and whole blood, glucose, vitamins B and C, cortical extract and sedatives. In all cases of shock the author advises the use of atropine, which paralyzes the parasympathetic system and prevents liberation of acetylcholine. He advises against use of heat, prolonged use of sympathicomimetic drugs, morphine, barbiturates and cardiac stimulants.—Ed.]

Circumvallate Placenta was observed in 47 of 8,861 consecutive deliveries by Arthur B. Hunt, Robert D. Mussey and John E. Faber⁸ (Mayo Clinic). One or more of the following signs or symptoms were observed in 24 instances: (1) signs of threatened but not inevitable

(8) *New Orleans M. & S. J.* 100:203-207, November, 1947.

abortion, (2) prolonged vaginal bleeding, (3) intermittent uterine contractions and (4) early rupture of the membranes with hydrorrhea followed eventually by premature labor, sometimes before the third trimester.

The maternal hazard is due to hemorrhage, which is seldom profuse, and to infection owing to the presence of blood in the lower part of the genital tract and the prolonged period between rupture of the membranes and labor. Fetal mortality was 24 per cent in the 47 cases and 50 per cent in the 24 instances accompanied by significant symptoms. Mortality was chiefly attributable to prematurity.

A definite tendency toward recurrence of circumvallate placenta is indicated by nine recurrences among 4 of 19 patients who had clinical symptoms.

Diagnosis cannot be established until the placenta is inspected. For this reason, little can be said regarding management. If hydrorrhea gravidarum develops, a nonirritating liquid antiseptic should be instilled into the vagina daily. In the absence of a positive diagnosis of placenta previa or abruptio placentae, management of bleeding during pregnancy is expectant. Operative methods of delivery should be deferred unless symptoms indicate that delivery is urgent.

Use of Placental Blood for Transfusion. V. Reček⁹ (Prague) has preserved and stored placental blood obtained from 1,000 parturient women and found the procedure of abstracting it harmless for mother and child. The blood was used for 57 transfusions given in the maternity hospital and elsewhere and was well tolerated. Physicochemical and biologic investigations have shown that placental blood is not a waste product but has full biologic value. Its undeniable advantage lies in its physiologic polycythemia and high content of hemoglobin, calcium and hormones.

Absence of isoagglutinins or their insignificant titer

(9) Casop. lek. cesk. 86:1226, 1947.

makes the transfusion of placental blood a safe procedure. There is no danger of sensitization if repeated transfusions are given, since a large number of donors is available. Cost of the blood is insignificant and the technic simpler than taking venous blood.

Storage of placental blood lessens the task of the blood donor service and allows realization of an efficient transfusion service even in small country hospitals. Maternity departments of all hospitals should store placental blood and be incorporated into a network of transfusion services. With 2,000 deliveries per year it should be possible to store at least 100 L. blood, so that the maternity department should be able to serve a whole district. The technic of preservation and storage is simple and easily performed anywhere.

PUERPERIUM

Excretion of Drugs in Human Milk—A Review. Norman Sapeika¹ (Univ. of Cape Town) notes that untoward reactions of the infant to drugs ingested by the mother have rarely been reported and that it is rarely, if ever, desirable to treat a child by giving drugs to the mother. Reported effects of certain drugs are summarized.

1. Central nervous system depressants
 - a) Alcohol: Ordinary doses not excreted.
 - b) Chloroform: Excreted.
 - c) Barbiturates: Excreted, but amount generally too small to affect infant.
 - d) Chloretone: Excreted only after continuous administration in large doses.
 - e) Bromides: May cause skin eruption in infants.
 - f) Morphine: Not found in milk, even among addicts taking large amounts daily.
2. Autonomic drugs
 - a) Atropine: Markedly diminishes milk flow and, transmitted through milk, may affect the child.
 - b) Hyoscine: Only minute traces appear in milk.
 - c) Nicotine: Appears in milk, and may diminish lactation. Has caused poisoning in infant. Some investigators conclude that lactation and infant are little affected, owing to development of tolerance.
3. Purgatives
 - a) Phenolphthalein: May appear in minute quantities but has no obvious effect on infant's bowel movements.
 - b) Emodin: Transmitted in too small amounts for laxative action on child.
4. Antimicrobial agents
 - a) Sulfonamides: May be found in the milk in both free and conjugated form and is present for days after administration has ceased. However, even with levels in the milk slightly higher than blood levels of 4-7 mg. per 100 ml. no toxic effects have occurred in babies. Sulfathiazole has been found in milk in amounts one-half to one-third as great as blood levels in the mother.
 - b) Penicillin: Excreted in small amounts.

(1) J. Obst. & Gynaec. Brit. Emp. 54:426-431, August, 1947.

- c) Mandelic acid: Amount in women given 12 Gm. daily for six days varied considerably, but infants never received a dangerous amount.
 - d) Hexamine: Highest concentration reached after one hour.
 - e) Arsphenamine: Not excreted.
5. Other substances
- a) Iodine: Excreted only in very small amounts.
 - b) Fluorine: Small quantities found.
 - c) Quinine: Only traces found, even after large doses.
 - d) Salicylic acid: Has been detected even after giving of 10 Gm. sodium salicylate.
 - e) Ergot alkaloids: Excreted. Some infants have shown signs of intoxication.
 - f) Caffeine: Traces found.
 - g) Radioactive sodium: Found within 20 minutes of administration with maximal concentration in about 2 hours; still recoverable after 96 hours.
 - h) Colchicum: May be excreted.
 - i) Carotene: Excreted.

Effect of Methyl-Ergometrine on Human Puerperal Uterus was compared with that of ergometrine by R. C. Gill² (Univ. of Oxford), who made 24 tracings, using an intrauterine bag. The drugs were administered intravenously (0.1 mg. ergometrine and 0.1 mg. methyl-ergometrine).

Average delay before the initial sharp uterine contraction was 96 seconds after methyl-ergometrine and 55 seconds after ergometrine. Type, sequence, and frequency of contractions were the same in both series. Amplitude of contractions was considerably greater after methyl-ergometrine. Uterine tonus was greater after methyl-ergometrine, the ratio being 5:4, and of longer duration (average 72 minutes as against 54 minutes).

In no case was any toxic effect noted after administration of methyl-ergometrine, but no attempt was made to record effect on pulse rate and blood pressure. After-pains were produced in all patients who had already had them and in one who had not. They were transient and

(2) J. Obst. & Gynaec. Brit. Emp. 54:482-488, August, 1947.

not severe. In three cases retained membranes were expelled.

As an oxytocic methyl-ergometrine is weight for weight between one and one-half and two times as powerful as ergometrine. When methyl-ergometrine is given intravenously on the sixth to eighth day of the puerperium, delay before initial uterine contraction is slightly greater than with ergometrine, but it exerts a slightly more prolonged effect. Methyl-ergometrine is effective by intravenous injection or by mouth, but much less effective when given intramuscularly.

[J. E. Tritsch, E. Schneider and E. F. Longworth (New York State J. Med. 48:293, 1948) employed Methergine in 711 additional cases and found that it definitely reduced postpartum bleeding. When administered intravenously the drug accelerated delivery of the placenta. B. L. Gipstein (Am. J. Obst. & Gynec. 54:1065, 1947) found Methergine helpful also in the third stage of labor. Experience with 1,715 cases convinced O. Aguero (Rev. obst. y gynec. 7:274, 1947) of the usefulness of intravenous injection of ergonovine, at the moment the anterior shoulder of the baby is being delivered. Use of ergonovine intravenously did not increase the necessity for manual removal of the placenta.—Ed.]

Early Rising after Delivery. Edward L. Cornell and Joseph J. Mullen³ (Henrotin Hosp., Chicago) report their observations on 1,000 women allowed up on the sixth postpartum day or earlier, about 80 per cent being up before the fifth day. These patients were apparently in much better condition at discharge than if they had remained in bed eight days or more, as formerly practiced. Healing of the episiotomy wound was not adversely affected, nor was morbidity increased. There were five patients in whom various degrees of disruption of the episiotomy wound occurred. In two disruption was considered extensive enough to necessitate a return to surgery; wounds of the remaining three were allowed to heal by granulation. Vertigo was a frequent symptom but rarely occurred after the first day up.

(3) Am. J. Obst. & Gynec. 55:768-777, May, 1948.

No case of thrombophlebitis occurred in patients delivered vaginally. There were no cases of uterine prolapse, and rate of uterine involution was increased.

The postoperative course following cesarean section was more nearly uneventful. Distention was infrequent. The necessity for catheterization and enemas was lessened when the patient was allowed to use the toilet on the first postoperative day. One case of thrombophlebitis occurred 30 days postoperatively.

[The advantages of early rising after delivery and after operations are now so well established that practically all obstetricians and surgeons permit patients to have considerable freedom in bed immediately after delivery and operation and also early bathroom privileges. R. Keller and A. Ginglinger (*Gynéc. et obst.* 47:311, 1948) report that they have permitted early rising in their patients for 15 years and that the number of cases of prolapse of the uterus has diminished. In the Lund surgical clinic S. Borgstrom (*Acta chir. Scandinav.* 96:47, 1947) investigated whether, in women who are permitted to get out of bed early, dicoumarin prophylaxis protected against thromboembolic complications. He found that early rising helped dicoumarin prophylaxis.—Ed.]

Acute Puerperal Mastitis. H. Close Hesseltine, Charles G. Freundlich and K. Eileen Hite⁴ (Univ. of Chicago) observed six abscesses among 23 consecutive patients with acute puerperal mastitis receiving penicillin therapy. Twenty patients were given 20,000 units of penicillin intramuscularly every three hours; the other three received 15,000 units every three hours. Six patients in whom suppuration developed were admitted late in the course of the disease. Of the remaining 17, 11 were completely cured and 6 had residual induration.

A study of penicillin resistance of staphylococci from 11 breast abscesses was made. Four strains grew in 3.1 or more units per cc. penicillin. This concentration exceeds the blood levels achieved with usual antibiotic dosage.

Penicillin ointment containing 1,000 units per Gm. of oil base was used prophylactically in 865 lactating moth-

(4) *Am. J. Obst. & Gynec.* 55:778-788, May, 1948.

ers for six to eight weeks after nursing was begun. It had no effect on incidence of mastitis as compared with that in a control group. Nasopharyngeal cultures from mothers and babies were examined for *Staphylococcus aureus*. Of 30 babies, 21 were found to harbor the organism during the first 10 days of life. *Staph. aureus* was isolated from 20 of 30 mothers. Ten of these strains were resistant to 0.5 or more units per cc. penicillin. The authors conclude that the mother's or infant's nasopharynx may be an important source of breast infection.

[J. S. Jeffrey (*Edinburgh M. J.* 54:442, 1947) reports 40 cases of acute puerperal mastitis treated with penicillin. Even when only two daily injections were given results were good. The author insists that penicillin should be continued for at least three days. W. Neuweiler (*Praxis* 37:21, 1948) treated women with puerperal mastitis by means of intramammary injection of penicillin. Crystalline sodium penicillin, 50,000-80,000 Oxford units in 10-20 cc. isotonic sodium chloride solution, was injected around the focus of inflammation, and a few cubic centimeters was injected directly into the inflamed area. In cases of abscess formation the abscess was emptied by aspiration and the abscess cavity filled with penicillin solution. Treatment must be repeated daily for five to seven days. Recovery occurred within a few days without mutilating scar formation. L. Selberg (*Acta obst. et gynec. Scandinav.* 27:275, 1947) reports a case of fatal staphylococcus poisoning of an infant whose mother had mastitis. *Staphylococcus aureus* was found in the pus of the breast infection and in the intestinal contents of the baby. Selberg believes that when a baby is feeble and its nutritional state is poor, breast feedings should not be permitted in the presence of mastitis. E. C. Thomas (*Edinburgh M. J.* 54:436, 1947) believes that the prevention of mastitis is a nursing problem and recommends more attention to the breasts in the antenatal period, greater care in the puerperium and prompt treatment of painful nipples by cessation of suckling, sterile dressings, and manual expression of the breasts at each feeding time. I do not agree that prevention of mastitis is entirely a nursing problem. Many breast infections are hematogenous in origin and do not arise from the nipples. In times of influenza epidemics incidence of breast infections increases.

D. P. Nicholson (*Brit. M. J.* 2:1029, 1948) tried the Lugol treatment in 43 cases of failure to establish lactation, but the drug did not appear to affect milk yield. He also found that stilbestrol did not reduce lactation. C. A. Aldrich (*J. A. M. A.*

135:915, 1947) points out that human milk still remains the best milk for young infants, although it is not always a complete food after the first few weeks. Breast milk has definite preventive and therapeutic value. It is the safest food for premature babies who are mature enough to suckle at the breast. Further studies by J. P. Pratt, B. Munks and I. G. Macy (*J. Nutrition* 33:621, 1947) corroborated previous findings that the amount of vitamin C recommended by the Food and Nutrition Board for lactating women is sufficient if supplied by natural food in a diet adequate with respect to other dietary essentials and if, during pregnancy, the nutritional status of the mother has been satisfactory.—Ed.]

Postpartum Necrosis of Anterior Pituitary is an ischemic infarction of the gland probably due to thrombosis of its vascular supply following an obstetric complication leading to severe circulatory collapse. To the few cases reported to date, H. L. Sheehan⁵ (Liverpool) adds 22. Incidence and size of necroses are directly related to severity of circulatory collapse at delivery. However, two basic considerations determine the responsible obstetric factors: (1) the obstetric complication must make the patient gravely ill at the time of delivery, but not be fatal then or for 12 hours afterward; (2) early necroses are found at autopsies in the puerperium, so that those obstetric complications which predispose to death in the puerperium are relatively prominent. In his series, Sheehan found retained placenta and postpartum hemorrhage to be by far the most important factors, both in frequency and size of necroses. There is no evidence that pituitary necrosis causes the obstetric complication.

In the literature there are three cases of pituitary necrosis in which circulatory collapse occurred at the time of fetal death in utero but before actual delivery. There is no recorded case of pituitary necrosis in the presence of continuing pregnancy.

Pituitary necroses are found in women who survived the first 12 hours after delivery, but died in the puerperium. It appears that death of the anterior pituitary tissue occurs at about the time of delivery, but it is not

(5) *Irish J. M. Sc.*, pp. 241-255, June, 1948.

recognizable histologically earlier than 12 hours postpartum. Many women die of shock or hemorrhage during the first 12 hours after delivery. These patients presumably have very early pituitary necroses, too early to be histologically recognizable, but not necessarily physiologically ineffective.

In patients with large pituitary necrosis the breasts, instead of becoming hard or swollen in the early puerperium, become flaccid and shrink back to the prepregnant state without even colostrum secretion. Milk secretion fails completely. Estimation of blood sugar in a few cases has revealed values of 50-60 mg. per 100 cc. Spain and Geoghegan reported two cases in which polyuria developed, possibly owing to posterior lobe involvement. If pubic hair has been shaved at delivery, regrowth is slow.

Many patients with pituitary necrosis survive the puerperium. The lesion is replaced by scar tissue, and subsequent clinical course depends on size of the necrosis. With a small necrosis, the patient usually has no clinical evidence of loss of function of the gland, but return of menstruation may be delayed. A patient with a large necrosis, however, has permanent evidence of severe hypopituitarism.

Sheehan estimates that for each million of the population there are annually about eight large necroses and eight moderate or small necroses in women who die in the puerperium. This incidence will probably be reduced owing to: (1) improved midwifery with reduction in number of obstetric complications; (2) efficient treatment of hemorrhage and shock; (3) use of penicillin and sulfonamides.

Postpartum Necrosis of Pituitary from the standpoint of therapy is discussed by T. N. A. Jeffcoate⁶ (Liverpool). At present, pituitary hormone therapy is generally unsatisfactory. Replacement therapy at lower levels must

(6) Irish J. M. Sc., pp. 256-263, June, 1948.

therefore be utilized. Gonadotrophin therapy offers more chance of restoring ovarian function temporarily in this condition than in any other type of ovarian failure and amenorrhea. Luteinizing hormone may also have a place in treatment of Simmond's disease because it is possible that it may stimulate the adrenal cortex to produce androgens. In general, results with corticotrophin are disappointing. In one patient administration of thyroid and thyrotrophin produced good results. Desoxycorticosterone has been used without any significant effect. Intermittent estrogen therapy usually evokes estrogen-withdrawal uterine bleeding within three months. In conjunction with progesterone, a normal complete cycle may be produced. Testosterone stimulates growth of pubic and axillary hair better than any other single agent, but genital atrophy remains unaffected. Hair growth usually maintains the female pattern. A few patients commented on increased libido. The most striking effect is improvement in the patient's general health, muscular strength and energy and work capacity.

Studies in Biology of Cervix and Its Relation to Puerperal Infections were carried out by Muriel B. McIlrath and A. L. Hellestrand⁷ (Sydney) in 77 cases throughout pregnancy, puerperium and postpartum period. Twelve of the patients were normal, 7 were classified as "for observation" because of variations from strict standards for normal, and 37 were primigravidas and 21 multiparas with leukorrhoea. Biopsy findings in the 12 normal patients were similar to those commonly described. Deviations from normal were classified as hyperplastic, proliferative, secretory and of mixed type.

Inflammatory lesions developed in only two patients in the normal group, and both of these had traumatic lesions as well. In the observation (hyperplastic) group, inflammatory lesions developed in two patients who entered labor with active erosions, though no trauma. Among ab-

(7) J. Obst. & Gynaec. Brit. Emp. 54:746-777, December, 1947.

normal primigravidas inflammatory lesions developed in nearly half the patients (15), though only two had traumatic lesions as well. In about two thirds (14) of the abnormal multiparous group inflammatory lesions developed, and 8 of these had trauma as well.

Results indicated that these cervical lesions constitute a definite danger to the mother and increase the chances of low grade pelvic infection after confinement. Among abnormal primigravidas the added factor of cervical trauma seems to play an unimportant part. Among multiparas, on the other hand, pre-existing trauma and trauma during labor seem to aggravate the tendency to development of inflammatory lesions and to encourage spread to the uterus and adnexae. An afebrile puerperium is no guarantee that the patient will escape further trouble.

[McIlrath discussed her work with me and I saw many of her beautiful slides showing the profound changes during pregnancy in the endocervical mucosa and in the portio. The earliest change is thickening of the squamous epithelium. Decidual changes in the stroma often appear as early as 10 weeks and the glands begin to increase in size and number at 4 or 5 months. At this period there is evidence of secretion and slight hyperplasia of the epithelial cells. At five to six months the stroma shows a marked increase in vascularity, and edema begins to appear. At six to seven months the squamous epithelium begins to thin out and amount of stroma decreases, its place being taken by the increase in glands. Secretion and hyperplasia are marked at this time. Glands become racemose, elongated, dilated and filled with secretion. These changes progress to term. An astonishing finding was that the greater part of endocervical mucosa is shed during or immediately after labor and begins to regenerate about the seventh day, reaching an advanced stage by the fourteenth day. Metaplasia is a marked feature in nearly half of the cases. Inflammatory cells do not appear to be related to trauma, fever or interference. Changes in the cervical mucosa during the early puerperium continue, reaching their maximum at about the third postpartum month. Metaplasia is still present, and the endocervical elements have reached a resting stage or have formed what amounts to an erosion. The squamous epithelium has returned to its resting stage.

Women with cervical erosions were treated. Best results were

obtained with application of penicillin and sulfanilamide powder to the cervix and administration of vitamin B. I would hesitate to use drugs as potent as penicillin and sulfanilamide for a condition as relatively benign as cervical erosion. I prefer to wait until a few months after delivery and then if necessary treat the cervix by electrocautery.—Ed.]

Penicillin Prophylaxis of Infection after Intrauterine Maneuvers of Delivery. Maurice Mayer and Lanvin⁸ (Paris) present a study to show that the risk of infection after operative delivery and uterine invasion is real. Before there was any prophylaxis, over half the women had postpartum infection and over one-third severe infection. Preventive use of sulfonamides constituted progress, but penicillin affords true prophylaxis, having reduced incidence of severe infections to one tenth of that observed before any prophylaxis was used; incidence of slight infections has also been substantially reduced.

Penicillin must be given immediately after any intrauterine maneuver, at the rate of 25,000 units every three hours. When there is no temperature rise or clinical sign of infection, this dose is maintained for five days. When, despite prophylactic treatment, there is temperature rise or delay of uterine involution with fetid lochia, the dose is maintained until 48 hours after apyrexia and complete cure. If despite this treatment infection assumes a grave course, exceptional virulence of the pathogenic germs must be suspected and the dose increased to 400,000 or 600,000 units per day, using intramuscular perfusion instead of injection, and it may be advantageous to add local penicillin therapy. Treatment is always well tolerated but sometimes may cause an urticarial reaction. To be efficacious and free of later inconveniences, it must be intense and prolonged.

[J. León' (An. d. Serv. de obst. d. Hosp. Cosme Argerich 1:95, 1947) employed vaginal instillation of various sulfonamide powders in women during labor. In the women thus treated temperature was normal in 90.8 per cent as compared with 77.5 per cent in women not given vaginal instillations. R. R. Pierce (Am. J. Obst. &

(8) Gynec. et obst. 47:339-346, 1948.

Gynec. 55:313, 1948) employed vaginal penicillin suppositories at the time of delivery and found that this procedure definitely reduced puerperal morbidity. He believes that penicillin suppositories should be useful, particularly after early rupture of the membranes, long labor and when genital tract infection is suspected. The availability of sulfanilamide and penicillin should not lead us to carelessness or encourage us to take chances when we should not. R. F. Chesley (Bull. Margaret Hague Mat. Hosp. 1:59, 1948) performed in vitro experiments with penicillin and streptomycin and each in combination with sulfadiazine and sulfathiazole and concluded that penicillin in combination with sulfathiazole is usually superior to any other single agent or combination of agents.

Studies by J. Novak (Ceskoslov. gynaek. 12:422, 1947) showed that in most cases penicillin was present in sufficient amount in the maternal and fetal blood and in small amounts in amniotic fluid. He recommends that penicillin be used prophylactically in prolonged and infected labor, to prevent intrauterine fetal infections. Administration must begin at least 30-60 minutes before delivery, because after this interval the highest level in the maternal and fetal blood is reached. Injections must be repeated at 30-60 minute intervals in order to achieve a sufficient bacteriostatic level of penicillin in blood serum. I suggest that when penicillin is used during labor, sulfathiazole be added.—Ed.]

Etiology and Prophylaxis of Puerperal Sepsis. Joseph W. Bigger⁹ (Trinity College, Dublin) notes that the most important cause of puerperal sepsis is *Streptococcus pyogenes* and its main reservoir is the human throat, where it commonly occurs as a pathogen but more often lurks as a saprophyte. The organism never gives rise to the carrier state in the intestine and only rarely occurs there as a pathogen.

Direct transfer of organisms from an infected patient to the birth canals of others may be prevented by the following measures: as complete isolation of all patients as local conditions permit, disinfection by steam of all instruments and bedpans, limitation of vaginal examination, wearing of gowns by all attendants and strict ritual of hand and glove preparation. On first suspicion of sepsis isolation should be prompt and complete.

(9) Brit. M. J. 2:599-603, Oct. 18, 1947.

Hands are frequently contaminated by streptococci directly from the nose and throat or from handling articles contaminated by droplets from a carrier's throat. Doctors' hands are usually prevented from becoming the transmitting agent, but those of nurses and of patients themselves may transfer organisms to the vulva either directly or by contamination of vulval pads, bedclothes, bedpans or other articles which make direct contact with the vulval region.

Such contamination by droplets and dusts may be reduced by the wearing of adequate masks and by application of dust-controlling oil to floors and bedding.

Weekly throat cultures for *Str. pyogenes* should be made on each person regularly visiting an obstetric ward, and, if positive, carriers should be put off duty until three consecutive daily cultures are negative. Local application of a sulfonamide or penicillin may greatly reduce duration of the carrier period. Casual visitors should be reduced to a minimum, should wear masks and gowns and should not be allowed to approach the patient too closely.

Each new patient should be isolated until she is found not to be a carrier. Any throat carrier among the patients should be completely isolated so long as the carrier state persists. Local treatment should be promptly instituted, and if the patient is still a carrier at onset of labor, the uterus should be safeguarded by systemic administration of penicillin. If a case of puerperal sepsis should occur in a hospital, every woman admitted should receive penicillin systemically from onset of labor until five days after delivery.

Other organisms may be found in the birth canal, but only a few are pathogenic, and these are frequently found in normal lochia. Lactobacilli and coliform bacilli are usually considered saprophytes. *Clostridium welchii* and *Clostridium tetani* may contaminate the vagina from feces or from cotton wool. *Staphylococcus pyogenes*, rarely a cause of puerperal sepsis, has its reservoir in the

nose. Hemolytic streptococci other than *Str. pyogenes* usually act as saprophytes, but rarely may cause sepsis.

Anaerobic streptococci, second only to *Str. pyogenes* as causative organisms in puerperal sepsis, are often present in normal lochia. In sepsis they are rarely present in pure culture, but are usually accompanied by other organisms which alone are nonpathogenic. Whereas the streptococci are endogenous, the other bacteria are exogenous. Prophylaxis of such infection by application of antiseptic substances to the vagina has been tried. Antiseptics should be applied before onset of labor. For this purpose a combination of penicillin, a sulfonamide and proflavine is suggested.

[The study of E. G. Holmstrom and M. Murata (*Am. J. Obst. & Gynec.* 56:531, 1948) revealed that very few, if any, postpartum uteri are completely free of organisms after 48 hours postpartum. Eighty-three species of organisms were found in the 93 positive cultures; 61 per cent were anaerobic or facultative aerobes; only 5 per cent of the streptococci were anaerobic.—Ed.]

Gynecologic Sequelae of Puerperal Infection. Alfonso Alvarez Bravo and Carlos D. Guerrero¹ discuss factors which influence the progress and final results in puerperal infection. (1) Causative micro-organisms are streptococci (65-90 per cent of cases), staphylococci, gonococci (1-5 per cent) and various other less frequently encountered organisms. (2) In order of importance, portals of entry of the infection are the placental area and internal surface of the uterus, lacerations of the cervix, vaginal lesions and tears of perineum and vulva. (3) Routes of spread of infection may be circulatory (veins), lymphatic (by contiguity) or a combination of these. (4) Fifty per cent of the infections spread to some extent and may become general.

Gynecologic sequelae of puerperal infection may involve perineum and vulva (wide scars, diastasis of levator muscles, rectovulvar fistula), vagina (ulcerous vaginitis), cervix (tear, ectropion, chronic cervicitis, stenosis,

(1) *Ginec. y obst. de Mexico* 3:249-262, Aug. 31, 1948.

polyps), uterine body (chronic inflammatory processes, hypomenorrhea or amenorrhea from absence of endometrium, fibrosis, residual infectious foci), tubes (endosalpingitis, chronic hydro- and pyosalpinx, torsion, angulation, stenosis), ovaries (periovaritis, adhesions, cystic degeneration, loss of ovulation and of internal secretion), peritoneum (adhesions, chronic douglasitis, perisalpingo-ovaritis, sacrolumbar pain, dyspareunia, sterility) and conjunctivovascular tissue (fibrosis, abscess with or without fistula). Other gynecologic complications are those resulting from surgical treatment of puerperal infection.

Review of 467 clinical histories in cases of sterility showed that 21 per cent could be regarded as sequelae of puerperal infection.

THE NEWBORN

Response of Human Fetal Reproductive System to Administration of Diethylstilbestrol and Testosterone Propionate during Early Pregnancy was studied by M. Edward Davis and Edith L. Potter² (Univ. of Chicago). Sex hormones were given early in pregnancy to 15 women with normal gestations; 10 received diethylstilbestrol, 3 progesterone and 2 testosterone propionate. Six pregnancies were terminated by hysterotomy because of medical indications, and one patient had a spontaneous abortion. There were six male fetuses and one female. Five patients had received diethylstilbestrol and two testosterone propionate.

Complete histologic examinations of the genitourinary systems of the seven fetuses were made. Ten fetuses removed by hysterotomy with weights comparable to those in the experimental group were used as a control, and sections were prepared from corresponding levels of the genital system. There were no demonstrable changes in

(2) *Endocrinology* 42:370-378, May, 1948.

appearance of the genital organs of the six male fetuses. The authors conclude that these drugs administered in therapeutic doses early in pregnancy will not adversely affect development of the genital organs of the human male fetus. The material was inadequate for conclusions concerning the female fetus, although the one fetus examined was normal.

[These findings are at variance with those obtained experimentally by Greene, Burrill and Ivy in animals (1940 YEAR BOOK OF OBSTETRICS AND GYNECOLOGY, p. 585). Perhaps in the human experiments by Davis and Potter the timing was different or the dose insufficient. At any rate, here is further evidence that it is sometimes hazardous to draw conclusions from animal experiments.—Ed.]

Penicillin in Drops for Prophylaxis against Ophthalmia Neonatorum: Single Instillation Method. Multiple instillation of penicillin in drops has been found effective in ophthalmia neonatorum prophylaxis. This method requires four instillations: one immediately after birth and one daily for each of the first three days of life. Mechanical cleansing of the eyes is done before the first instillation.

H. Charles Franklin³ (Univ. of Tennessee) reports on the use of only one instillation of penicillin. For five months penicillin in drops was used in the eyes of each newborn infant delivered at John Gaston Hospital, Memphis. Crystalline sodium penicillin in a concentration of 2,500 units per cc. sterile isotonic sodium chloride solution was employed. The solution was kept in a sterile 1 oz. emerald green dropper bottle, was kept refrigerated below 59 F. when not in use and was not taken from the refrigerator for more than five minutes at a time. A fresh solution was made as needed but was not kept longer than five days.

In the delivery room within one hour after birth the eyelids and adjacent area of each newborn infant were cleansed of contaminating secretions by wiping with

(3) South. M. J. 41:320-326, April, 1948.

large ball of sterile cotton from the inner canthus outward, the eyes being closed at the time. With gauze on the fingers, the eyelids were held open while each eye was flushed thoroughly with sterile isotonic sodium chloride solution. Four drops of penicillin was then instilled into the conjunctival sac of each eye.

Of 1,177 infants studied, 13 (1.1 per cent) had pus in one or both eyes on the third to twelfth day of life after penicillin prophylaxis. This incidence is low compared with that after silver nitrate prophylaxis (6 per cent).

[F. Lepage, P. Halbron, C. Leconte and M. J. Mawas (*Gynéc. et obst.* 47:381, 1948) used penicillin instead of silver nitrate in 994 newborns and were satisfied with results. However, this procedure has inconveniences when used elsewhere than in a hospital.—Ed.]

Baby as Problem in Premature Delivery. N. W. Philpott and F. J. Tweedie⁴ (McGill Univ.) point out two major factors. Premature labor differs from that at full term in that the lower uterine segment has not thinned normally and must be dilated by painful contractions. This is a tedious process and causes greater hazards to an immature fetus. The second factor is excessive accumulation of organic acids in the blood of the premature infant. Renal immaturity decreases kidney function, and water available for urinary secretion is limited. Hepatic immaturity causes decreased liver function. Blood studies show comparative anemia with predisposition to anoxia and hemorrhage in the brain and liver. The immature lung is often associated with patchy atelectasis which predisposes to subsequent respiratory infection.

Obstetrician and pediatrician should work in harmony to obtain good results. At the authors' hospital a resident trained in care of the newborn is in charge of all babies and is responsible to the staff pediatrician as well as to the obstetrician in charge of the individual case.

(4) *Am. J. Obst. & Gynec.* 55:481-488, March, 1948.

This resident is present at all difficult deliveries—cesarean, difficult forceps, and those complicated by placenta previa or toxemia. He supervises and treats all babies from birth until discharge.

Prompt treatment is essential. Deaths in premature infants become progressively less frequent with each hour of life. Over 50 per cent of all neonatal deaths in premature babies occur during the first 24 hours after delivery.

In the premature nursery clysis of plasma or glucose and saline is given for dehydration or to stimulate weight gain. Hemoglobin value is estimated at least every seven days. Iron therapy is given when indicated. Whole blood transfusions are used when conditions warrant.

In three years of operation 912 babies weighing 1,000-2,000 Gm. have been treated. From 1941 to 1943 mortality was 24.3 per cent and from 1944 to 1946 21 per cent. Five babies under 1,000 Gm. survived.

Premature Survival Index and Conduct of Premature Labor. Several criteria for prematurity are now in use, but they are all variable factors. A. Louis Dippel, Herman W. Johnson and J. L. Cornelison⁵ (Houston, Tex.) offer a survival index based on five factors: (1) gestational period calculated from first day of last normal menstrual period regardless of regularity or irregularity of the cycle; (2) weight of the newborn; (3) crown-heel length obtained by measuring along the side of the body suspended at the ankles; (4) occipitofrontal circumference; (5) chest circumference at the level of the xiphisternal joint. The index is obtained by adding gestation in weeks, weight in ounces, crown-heel length in inches, head circumference in inches and chest circumference in inches, and then dividing the total by five. This resulted in indexes of 19.2-25.7 for 23 premature infants to whom this system was applied. All premature infants

(5) Am. J. Obst. & Gynec. 54:1004-1012, December, 1947.

with an index of at least 21 were reared, whereas only 50 per cent of those with a lower index survived.

The authors make a few suggestions for conduct of labor which should reduce premature infant mortality. Analgesics and inhalation anesthetics must be avoided after onset of true labor in the period of prematurity. Local or regional anesthesia should be substituted. Integrity of the fetal membranes should be preserved as long as possible, even through the second stage of labor. Maternal-fetal circulation should be maintained as long as possible. Prophylactic chemotherapy in the newborn premature infant is advantageous.

Experimental Use of Testosterone Compounds in Premature Infants is reported by E. Kost Shelton, Arthur E. Varden and Jerome S. Mark⁶ (Univ. of Southern California). Seventy-four premature infants of both sexes weighing under 2,000 Gm. were divided into three groups: 20 served as controls; 30 were given methyl testosterone, 5 mg. daily; and 24 were given testosterone propionate, 4 mg. daily.

Among infants in the 1,000-1,500 Gm. weight range, controls required an average of 14.7 days to regain birth weight, whereas infants on methyl testosterone required an average of only 9 days, and those on testosterone propionate 7.5 days.

Among infants in the 1,500-2,000 Gm. weight range, controls required 11.9 days to regain birth weight, in contrast to 7.8 days for the infants on methyl testosterone and 9.8 days for those on testosterone propionate.

Days required to reach 2,500 Gm. (American Academy of Pediatrics level for normal infants) were also tabulated. The 1,000-1,500 Gm. control group required 58.8 days, in contrast to 56.9 days for the methyl testosterone group and 55 days for the testosterone propionate group. The 1,500-2,000 Gm. controls required 42.1 days, as against 32.6 and 35.1 days for the groups

(6) J. Clin. Endocrinol. 7:708-713, October, 1947.

given methyl testosterone and testosterone propionate.

In four sets of twins the larger of the two was used as a control, and the smaller was given testosterone. All four of the twins on testosterone, who theoretically should have taken longer to regain birth weight, did so in a much shorter period than their larger, more mature siblings.

No untoward effects were observed in either treated group. There was no alteration in pitch of cry in either sex in the treated groups, no abnormal growth of hair and no objective enlargement of the genitalia. No instance of edema was observed. The weight gain up to 2,500 Gm. apparently represents a true somatic increment, since those infants followed after withdrawal of the hormone showed no sharp weight loss. The idea that administration of testosterone to infants, even for a few weeks, might interfere with future growth was refuted when roentgenograms of the wrists and knees of treated patients were compared at intervals throughout the first year with those of the controls; there was no difference.

Routine use of testosterone compounds in premature infants is not advocated, but is suggested as an adjunct in care of a selected group needing metabolic stimulation.

Reduction of Mortality from Premature Birth: Some Practical Measures are outlined by Lewis A. Koch, C. A. Weymuller and Elizabeth James⁷ (Long Island College Hosp.). Before 1940 fatality rate among premature infants at this hospital was 28.4 per cent. Since 1940 it has been 16.3 per cent. Improvement is ascribed primarily to the following changes in methods of caring for the infants.

Each nursery unit contains eight beds, seven for full term infants and one for premature, and these occupy the duties of one nurse. Nurses and physicians wear masks and gowns, and examinations are made in the

(7) J. A. M. A. 136:217-221, Jan. 24, 1948.

examining room connected with each unit, in which there is complete medical equipment. The central supply room has been abandoned, and each infant's supply of linen for the day is sterilized by autoclave and kept on a shelf under his crib. Visiting hours have been limited, and visitors in the wards are masked and gowned and separated from the bed by rope barriers.

The formula room is entirely removed from the nurseries and from ill patients, and all material and utensils entering it pass through a sterilizer. Each unit has its sterilizer, and all utensils are sterilized before they leave the unit.

All accepted diagnostic aids are liberally utilized in care of premature infants, including bedside roentgenograms, bronchoscopic and urologic consultations, hematologic and immunologic studies, blood chemical determinations and bacteriologic and pathologic studies.

Vernix Caseosa and Subnormal Temperature in Premature Infants. Despite modern methods of nursing and incubation the problem of persistent subnormal temperature in the premature infant is not completely solved. When a premature thermolabile infant is deprived of the vernix after birth, he is left with a highly hyperemic skin surface which possibly radiates considerably more heat than the infant's poorly developed resources can control. With this in mind, Colman Saunders⁸ (Nat'l Maternity Hosp., Dublin) did not remove the vernix, but allowed it to separate naturally in 90 cases of prematurity. After natural separation there was little, if any, of the superficial hyperemic condition seen after manual removal, and the skin showed good keratinization. Among the 90 infants, there were only 6 with temperatures persistently below 97 F. during the first seven days of life. In a control group of 122 premature infants in which the vernix was removed, there were 38 with subnormal temperature during the first week. It is inter-

(8) J. Obst. & Gynaec. Brit. Emp. 55:442-444, August, 1948.

esting to note that Lajos and Szontagh report that the vernix contains substances which may benefit the infant, notably estrogen.

Saunders reports that incubators have not been used in the hospital since 1940, with no deleterious effect on premature mortality.

Studies in Prematurity, Stillbirth and Neonatal Death: Delivery and Its Hazards are discussed by Cecil Mary Drillien⁹ (Dept. of Child Life and Health, Edinburgh) on the basis of statistical analysis of 7,599 births occurring in 1942-45.

Instrumental delivery appeared to be as safe as spontaneous vertex for premature infants, though it carried an increased risk for the mature. Breech delivery had considerably greater wastage rate than any other method for both premature and mature infants. Risk in cesarean section for both premature and mature infants was also great, especially for the latter.

An excessive number of instrumental deliveries was found in first births. Incidence of spontaneous vertex delivery fell markedly with increasing maternal age, but that of instrumental deliveries and cesarean section rose. Breech delivery was slightly more common in young mothers.

Surgical induction was performed most commonly in cases of hydramnios, antepartum hemorrhage and toxemia. The proportion of very small babies in cases of induction was much greater than in cases in which the mother went into labor without interference.

Of 204 deaths, 142 were of premature and 62 of mature infants. Of 373 stillbirths, 177 were in premature and 195 in mature or postmature infants.

Among premature infants commonest causes of death were prematurity alone, asphyxia and pneumonia. Congenital defects accounted for most deaths of mature infants. Congenital defects and asphyxia were the common

(9) J. Obst. & Gynaec. Brit. Emp. 54:443-468, August, 1947.

est pathologic findings in stillbirths for both premature and mature infants, but in over half the cases there was no pathologic diagnosis.

Death rates for infants with congenital defects are about the same for boys as for girls, but for every other cause boys show a higher rate. Total rates per 1,000 births were: deaths—males 34.4, females 19.4; stillbirths—males 50.6, females 49.1.

Intracranial hemorrhage was found in 65 of the 204 infant deaths. Subdural hemorrhage was commonest in larger babies and, unless mild, was associated with birth trauma. Subarachnoid, intraventricular and intracerebral hemorrhage occurred almost exclusively in premature infants and was associated with asphyxia. Death and stillbirth rates from congenital defects increased with increasing maternal age.

Primary cause of death or stillbirth was as follows: 24 per cent, congenital defects; 13 per cent toxemia of pregnancy; 16 per cent antepartum hemorrhage; 20 per cent hazards of delivery; 6 per cent all other causes.

[W. T. O'Connell (Am. J. Obst. & Gynec. 56:765, 1948) reported a series of 173 premature infants in which fetal mortality was highest (40.7 per cent) in cesarean sections and next highest (37.5 per cent) in breech extraction. It is unfortunate that there were only 9 autopsies among the 39 dead babies in this series.]

Premature babies require special and expert care. The younger and smaller the infant the greater the difficulty in keeping it alive. Incubators alone are not sufficient. The persons who care for the babies are much more important.

In cases of toxemia or other maternal illnesses in which induction of labor may be indicated, it is highly important in the interest of the baby to postpone induction as long as possible. Physicians must remember that development of cerebral hemorrhage in premature babies is a grave danger and that such babies are adversely affected by analgesic drugs. Therefore, unusual skill must be exercised in delivering tiny babies; the less analgesia and anesthesia given the mother the better are the baby's chances. When I deliver a premature baby I nearly always perform an episiotomy to prevent undue pressure on the baby's head. It is advisable to give vitamin K to the mother during the first stage

of labor and to the baby after birth. We must remember that in cases of prematurity cesarean section does not guarantee a living baby.

J. O. McCall (Bull. Margaret Hague Mat. Hosp. 1:9, 1948) advocates use of parenteral plasma by hypodermoclysis for premature newborn babies. It is well tolerated and completely absorbed. It is possible that parenteral plasma reduces severity of anemia in premature infants and thereby diminishes the number of blood transfusions necessary.

In the discussion of Ingall's paper W. C. Owens said that it is not clear whether the postulated causative factors are not related generally to prematurity rather than specifically to retrolental fibroplasia. His observations on the clinical course of retrolental fibroplasia do not support Ingall's postulate as to the significance of persistence of the hyaloid system. For the past three years he and E. U. Owens have routinely examined the eyes of infants in the premature nursery of Johns Hopkins Hospital. No infant had retrolental fibroplasia at birth. The disease was not related to persistence of the hyaloid system. Early postnatal examination of the eyes showed normal fundi.—Ed.]

Epidemiology of Encephalo-ophthalmic Dysplasia is discussed by Theodore H. Ingalls¹ (Harvard Univ.). Krause first established the association of retrolental fibroplasia and dysplasia of the brain. Incidence of the disease in any particular hospital or city is related to the number of premature infants born and surviving. An important attribute of premature infants is the patent hyaloid artery which nourishes the retrolental site. Involution of this structure is complete at the eighth month of fetal life, after which disease of the tunica vasculosa lentis cannot arise as a purely developmental defect. A second factor may be anoxia, as evidenced by the increased frequency of encephalo-ophthalmic dysplasia among twins and triplets and in cases of placental disease and hemorrhage. Such conditions are the usual precursors of prematurity itself. Of significance, however, is the occurrence of most of the antepartum hemorrhages from the fifth to seventh month of pregnancy. The association with placenta previa, antepartum hemorrhage and

(1) J. A. M. A. 138:261-264, Sept. 25, 1948.

eclampsia lends strength to the hypothesis of anoxia as a causative agent.

Ingalls suggests that further study be made of the relationship between anoxia and encephalo-ophthalmic dysplasia. If the hypothesis is confirmed, measures directed toward maintenance of maternal-fetal oxygen saturation during the antenatal period of stress are indicated.

Diagnosis and Treatment of Anemia of Newborn Caused by Occult Placental Hemorrhage. Alexander S. Wiener² (Jewish Hosp. of Brooklyn) calls attention to a previously unrecognized entity. The hazards to the mother of hemorrhage caused by abruptio placentae and placenta previa are well known, but while it is generally recognized that such cases are attended with high fetal mortality due to asphyxia, little or no cognizance is taken of the fact that infants born alive in such cases or even in apparently normal deliveries may have dangerous anemia due to occult hemorrhage from the placental or umbilical vessels. Such an anemia is usually considered a manifestation of erythroblastosis and is treated with exchange transfusions, although posthemorrhagic anemia calls for much more vigorous transfusion therapy. This undoubtedly results in loss of many infants who might otherwise have been saved by use of massive blood transfusions.

Wiener reports two cases of newborn infants with severe posthemorrhagic anemia. In both cases the mothers were Rh-positive, and isosensitization was ruled out by detailed serologic tests and absence of icterus of the cord serum. Anemia in one case was due to bleeding from central placenta previa. The child was delivered by section and was immediately transfused with large quantities of whole blood, with marked improvement and recovery. Source of placental hemorrhage in the second case was not evident, transfusion was delayed and the

(2) Am. J. Obst. & Gynec. 56:717-722, October, 1948.

child died. A third fatal case of severe anemia is reported in the newborn baby of a sensitized Rh-negative woman in whom anemia was due primarily to hemorrhage rather than hemolysis.

Intracranial Hemorrhage in the Newborn. The chief cause of intracranial hemorrhage is trauma, with asphyxia a secondary factor. Most hemorrhages are subdural. In 90 per cent of 50 cases observed by Colman Saunders³ (Nat'l Maternity Hosp., Dublin) there were tentorial tears. Trauma was associated with breech deliveries, with too short or prolonged a second stage and with difficult forceps extraction. Saunders has found that moderate occipitomenital traction puts no strain on the falx and tentorium. He therefore suggests the possibility of a specially designed forceps to apply traction at these points as a means of reducing tentorial tears in selected cases.

The birth history is helpful in making the diagnosis. Drowsiness and refusal to suck or extreme restlessness with a cephalic cry may be exhibited. A slow pulse and rapid, shallow breathing combined with coma or attacks of cyanosis may be associated with medullary hemorrhage. Convulsions are common. Absence or diminution of the Moro reflex is characteristic. Saunders does not advise lumbar puncture, except to relieve intracranial pressure when it is increased. Treatment consists of complete rest and use of vitamin K and sedatives. Oxygen may be indicated. Placing the infant in an upright position for 8-10 days is advisable.

Intracranial Disorders of Newborn Associated with Birth are discussed by Kate Campbell⁴ (Melbourne). Intracranial hemorrhage and anoxemia account for about 50 per cent of neonatal deaths. Intracranial hemorrhage may be subdural, extradural, subarachnoid or intraventricular. The subdural and extradural types are traumatic, the subarachnoid is associated with anoxemia, and the

³ J. Obst. & Gynaec. Brit. Emp. 55-55-61, February, 1948.

⁴ M. J. Australia 2-57-62, July 17, 1948.

intraventricular is associated with anoxemia and toxemia. Subdural hemorrhage is commonest and, when extensive, results in stillbirth. If less severe, the infant is born in a state of asphyxia pallida or livida. In either case, treatment consists of warmth, oxygen, clearing of the upper air passages and chemical stimulants. The infant with asphyxia livida requires cutaneous stimulation in addition. This may be supplied by application of cold to the skin or spanking. After birth the infant may be restless and agitated or stuporous and apathetic. There may be opisthotonos, projectile vomiting, sweating, rigidity of limbs and convulsions. Diagnosis is made on the obstetric history, symptoms, condition of the fontanel and results of lumbar puncture. In any case of difficult labor, vitamin K should be given prophylactically to the mother during labor and to the infant during the first four days of life. Lumbar puncture is a useful therapeutic procedure to reduce intracranial tension. If cyanosis is present, oxygen is a prime necessity. General supportive therapy by means of sedatives, fluids and adequate nutrition must be given.

Cerebral anoxemia may be local or part of general fetal anoxemia. Prolonged local pressure on the head during difficult spontaneous labor or as a result of difficult instrumental delivery may be responsible for local anoxemia. General anoxemia may be due to: interruption of placental circulation, postmaturity, premature separation of the placenta, maternal toxemia, massive maternal blood loss, erythroblastosis and analgesics and anesthetics used during labor. The infant may be born in a state of asphyxia or he may later exhibit cerebral symptoms similar to those associated with intracranial hemorrhage. Treatment consists of lumbar puncture and oxygen administration. Skull fracture is sometimes responsible for intracranial disorders in the neonatal period.

[Intracranial hemorrhage in fullterm babies is nearly always preventable. On the other hand, in premature babies cerebral hemorrhage and other intracranial damage cannot always be prevented. The most important preventive measure is good obstetrics. By

this I mean proper conduct of the first, and particularly of the second, stage of labor. Injudicious use of forceps, pituitary extract, version and extraction and other forceful measures often results in intracranial damage. Practically all analgesics administered during labor, if given in large amounts, produce asphyxia neonatorum. Nearly all anesthetics, except local infiltration anesthesia, given at the end of the first stage and in the second stage of labor result in some degree of asphyxia neonatorum. When spinal and caudal anesthesia are used results for the baby are practically ideal, but when there is an enormous drop in blood pressure the result may be bad for the baby.

The ideal would be for every newborn baby to cry spontaneously within a few seconds after it is born. Unfortunately this ideal is seldom achieved because of the use of anesthetics before delivery of most babies. Of course, under local, caudal and spinal anesthesia most babies do cry spontaneously. Usually nature provides the oxygen supply of the baby. However, if the baby is cyanotic and does not breathe or cry very shortly after birth it should be kept warm, with its head slightly lowered. The air passages should be cleared and oxygen supplied. This is most simply accomplished with a tracheal catheter, which not only clears the tracheal passages but permits oxygen to be given by the physician. I do not favor the use of carbon dioxide or believe that stimulatory drugs should be used; they are often harmful. For premature babies or babies who appear weak, all these procedures should be carried out as rapidly but as gently as possible. The baby should then be quickly placed in an incubator and given special attention. Such babies are usually given vitamin K and a constant supply of oxygen. When intracranial hemorrhage is suspected the baby should not be moved except for absolutely necessary procedures. Bathing is not essential.—Ed.]

Rubella in Pregnancy as an Etiologic Factor in Stillbirth is considered by Charles Swan⁵ (Univ. of London). There were 2,156 stillbirths registered in South Australia from 1939 to 1945. Questionnaires were sent to the mothers, with answers from 760. A history of rubella was given by 16 women (doubtful in one instance), and in 13 the infection occurred in the first four months of pregnancy. In only nine cases was the diagnosis of rubella made by a physician. Three patients had another virus disease associated with rubella: two had mumps and one varicella. One mother with mumps and rubella had a

(5) Lancet 1:744-746, May 15, 1948.

twin pregnancy. One child was stillborn, and the other was normal and healthy. It seems unlikely that the virus diseases played any part in the stillbirth.

In the 760 pregnancies studied, infectious diseases other than rubella were: morbilli, whooping cough, mumps and whooping cough, varicella, influenza or pneumonia, lobar pneumonia, tonsillitis, and gastric influenza, 1 case each; mumps, 2 cases; influenza, 21; influenza or coryza, 3; coryza, 7; bronchitis, 3. Influenza was the only infection with an incidence comparable to rubella, and it is relatively common. No infectious disease showed a predominance in the early months of pregnancy such as is manifest with rubella.

Maternal Measles, Mumps and Chickenpox as Cause of Congenital Anomalies. All notifications of these diseases to the Milwaukee Health Department in 1942-45 were examined, and as many as possible of the married women who had had these diseases were interviewed to determine the incidence of congenital anomalies among their offspring. M. J. Fox, E. R. Krumbiegel and J. L. Teresi⁶ report that of 346 women interviewed 297 had children; 589 children were born before the mothers had had one of the diseases, and 76 were conceived and born afterward. Six of these 665 children had congenital anomalies. The "normal" incidence of such anomalies was therefore 0.9 per cent. There were 33 women who had one of the diseases during pregnancy; one pregnancy, in a woman with mumps, ended in spontaneous abortion at two months. A mother with measles in the fourth month of pregnancy had a child with a harelip. The incidence of congenital anomalies among children of six mothers with measles was 14 per cent, and among the children of two mothers with measles in the first four months of pregnancy, 50 per cent. There were no anomalies associated with maternal mumps or chickenpox. This series is small, and further investigation is required before any definite conclusions can be drawn.

(6) Lancet 1:746-749, May 15, 1948.

[Many additional reports on the relation of rubella to monstrosities have appeared. P. R. Patrick (*M. J. Australia* 1:421, 1948) sent questionnaires to 9,674 women who gave birth to infants in 1941. There were 262 cases in which mothers were certain they had rubella during pregnancy. Of these 129 were examined clinically and are the basis of Patrick's report. Of the 129 children, 51 had some abnormality, 37 being serious defects which included deaf-mutism, mental deficiency, congenital cardiac disease and cataract. Patrick suggests as possible preventive measures: addition of rubella to the list of notifiable diseases; deliberate exposure of all girls to the disease; inoculation with rubella; treatment of exposed pregnant women with immune globulin; termination of pregnancy if rubella is contracted in the first four months, a certain method with debatable justification; warning of pregnant women about the dangers of exposure to rubella. P. H. G. Van Gilse (*Nederl. tijdschr. v. geneesk.* 91:404, 1947) reports a case of congenital cataract, congenital heart defect, deafness and mental backwardness in a boy born of a mother who had rubella. He mentions a survey of patients in a deaf-mute institution. Of 135 cases of unexplained deafness the mother had suffered from rubella when pregnant in 14. He suggests that girls be inoculated with rubella before marriage. C. Wesselhoeft (*New England J. Med.* 236:978, 1947) believes that other virus diseases, such as measles, mumps, chickenpox, herpes zoster and influenza, may also cause defects. He questions whether children should be deliberately exposed to rubella, because the infection does not always give permanent immunity. He says that therapeutic abortion, though illegal, is recommended from a medical point of view. He believes that a woman who contracts rubella during pregnancy has about a 10 to 1 chance of subsequently being delivered of a congenitally defective child. M. Bardram and P. Broendstrup (*Acta ophth.* 25:353, 1947) report eight infants with cataracts and other congenital defects born of mothers who had rubella during the first months of pregnancy. L. H. Ehrlich (*Arch. Ophth.* 39:205, 1948) reports a hitherto undescribed element in congenital cataract following maternal rubella—its spontaneous absorption leaves only a membrane. In an editorial (*J. A. M. A.* 138:653, 1948), it was pointed out that "Fetal injury is believed to occur as a result of passage of rubella virus through the placental barrier, thereafter exerting a direct effect on early somatic fetal development. Paradoxically, rubella produces the same result when it occurs and subsides even before conception. Retention of the virus in maternal tissues and its later passage through the placenta to the fetus may occur. Other diseases occurring in early pregnancy and in the immediate preconception period, particularly infectious mononucleosis, are stated to result in congenital defects. Both restricted maternal diet and

fetal irradiation are known to be capable of causing anomalous development in offspring of laboratory animals.

"Recent experiments reported by Gillman, Gilbert and Spence should shed new light on the many unknown physiologic factors which bear on the problem of congenital anomalies. Believing that later effects of chronic malnutrition were causally related to a metabolic disorder induced by entry of abnormal particles into and by qualitative changes in plasma proteins, these investigators treated female rats with trypan blue because of its plasma albumin-binding properties. . . . In a total of 697 offspring born in 118 litters, 19.2 per cent presented gross microscopic malformation detectable at birth. Malformations such as hydrocephalus, spina bifida, tail defects, eye defects and defects of other systems ranged in decreasing numbers, averaging 1.4 anomalies per rat. Timing of dye injection was extremely significant. In female rats that received injections before conception as well as one additional injection during pregnancy, incidence of abnormal pups was 25 per cent. Mother rats given injections the seventh day before conception as well as on the seventh day of pregnancy had an 80 per cent incidence of abnormal pups. . . . The authors cite what they consider to be an apparent parallel in the development of congenital defects in offspring of trypan blue-treated rats and defects in infants following maternal rubella infection. It is suggested that the supposed mode of action of the rubella virus on the human fetus be re-examined, as passage of virus through the placental barrier is debatable and as they have demonstrated that the trypan blue in maternal rats did not enter the fetus, the amniotic epithelium or amniotic fluid. . . .

"If, as the experiments of Gillman and associates tend to demonstrate, the effects of trypan blue and, by inference, rubella virus, are not direct effects on the fetus but cause remote preceding metabolic states which subsequently interfere with fetal development, the speculative number of viruses, bacteria and chemicals which may produce such metabolic effects are legion. Additionally, the reported occurrence of congenital deformities from preconception effects of rubella infection and trypan blue definitely reduce the nature-nurture or heredity-environment argument regarding developmental influences to the preconception period, wherein affective metabolic states in the male must also be properly considered. While this does not diminish the absolute importance of gene influences, it most certainly increases the relative importance and scope of environmental factors to be considered in human development.

"Also, of major importance is the fact that an azo dye compound (trypan blue) formerly considered essentially nontoxic and recommended for use in human therapy, has been demonstrated to have serious consequences on development of animal offspring.

Establishment of a wider field for testing toxicity of drugs for human use must now be carefully considered."

A few authors have ascribed congenital defects of the eye and ear in children to the fact that their mothers took quinine during pregnancy. According to C. W. F. Winckel (*Trop. Med. & Hyg.* 51:2, 1948) it is by no means sure that quinine was the cause of these defects, because the cases are extremely rare. The world consumption of quinine is from 600,000 to 800,000 kg. yearly which, if quinine is so toxic, ought to have produced many more cases than the few cited. Deaf-mutism is no more frequent in endemic malarial states with a large consumption of quinine than in states without malaria, where the amount of quinine used may be negligible. Finally, it should not be forgotten that all 17 reported cases were published before there was any suspicion of the deleterious influence of rubella. C. G. Lennon (*J. Obst. & Gynaec. Brit. Emp.* 54:831, 1947) reviewed the literature on congenital malformations with special reference to the significance of amniotic bands. He describes and illustrates four cases of these bands in living children. In 8 of 10 cases of fetal abnormality maternal blood was Group A. The Rh factor in the mother was negative in 7 of the 10 cases.—Ed.]

Rh Factor in Obstetrics: Report of 572 Cases of Infants of Rh-Negative Mothers, 232 of Whom Received Transfusions of Mother's Blood. Since difference of Rh factor in mother and infant is assumed to cause erythroblastosis in the newborn, great stress has been laid on giving the child, not its mother's blood, but that of an Rh-negative group O donor. Harry W. Mayes⁷ (Methodist Hosp., Brooklyn) contends that the mother's blood can and should be given.

Of 232 infants delivered in 1944-46, who received mother's blood (229 by cord transfusion at birth), none died of erythroblastosis. Of 340 in the same period who either had no transfusion or received transfusions of Rh-negative compatible donor's blood, 5 infants (4 of whom had donor's blood and 1 no transfusion) died of erythroblastosis.

Of the infants transfused with mother's blood, 13 had erythroblastosis or suspected erythroblastosis. In 10 transfusion was by cord at birth; 3 were given blood in-

(7) *Surg., Gynec. & Obst.* 85:432-446, October, 1947.

travenously later. There were no reactions. In infants not transfused with mother's blood there were 18 cases of erythroblastosis. One infant died without receiving a transfusion. Of the 17 who received Rh-negative group O donor's blood, 4 died. In 9 of the 17 more than one transfusion was necessary.

In 100 babies who received cord transfusions of Rh-negative mother's blood, number of red cells after transfusion averaged 6,465,000. In 100 babies who did not receive cord transfusions with Rh-negative mother's blood, average number of red cells was 5,787,000.

Observations were compared with those in 10 cases in 1936-42 in which father's blood was used for transfusion. Of nine babies who received father's and donor's blood, only three survived. A total of 29 transfusions was given. One baby who received three transfusions of mother's blood and one of father's blood survived. Apparently in this case there was no help from the father's blood. Results from Rh-negative donor's blood and father's blood were somewhat similar. More reactions immediately followed transfusions with donor's blood, but with both donor's and father's blood more transfusions were needed and more reactions occurred than with mother's blood.

Role of Transfusion in Etiology of Erythroblastosis: Warning to Physicians is given by L. M. Hellman and G. R. Vosburgh⁸ (Johns Hopkins Univ.). Administration of an Rh-positive transfusion to an Rh-negative woman will produce no outward reaction if she has not been previously immunized, but it serves as a much more powerful immunizing agent than repeated bearing of Rh-positive children. Even a small transfusion will give a high and persistent antibody titer. Women so sensitized produce Rh-positive children with the severest form of erythroblastosis, who usually do not survive.

Incidence of erythroblastosis in 1937 at Johns Hopkins Hospital was 1 in 1,732 deliveries, whereas in 1946 it was 1 in 348 deliveries. Such an increment in incidence

(8) J. A. M. A. 136:79-81, Jan. 10, 1948.

of the disease must be due to an increase in incidence of maternal sensitization, and such a phenomenon may well be related to the known increased incidence of transfusion. A history of previous transfusion occurs in only 2 per cent of obstetric patients, but in the 27 instances of erythroblastosis during this interval, a history of transfusion was present in 7 women (26 per cent).

Since unwitting administration of Rh-positive blood to Rh-negative women may be disastrous to future childbearing, transfusion should never be given to a female child or to women of childbearing age without first determining Rh-compatibility. In emergencies only Rh-negative blood should be given.

Microscopic Observations of Placental Barrier in Transplacental Erythrocytotoxic Anemia (Erythroblastosis Fetalis) and in Normal Pregnancy. On microscopic examination of placentas in all of 15 cases of erythroblastosis fetalis during the last half of pregnancy, B. S. Kline⁹ (Mt. Sinai Hosp., Cleveland) found numerous breaks in the barrier, associated with hemorrhage from fetal circulation into maternal intervillous spaces. Nucleated red blood cells were observed in intervillous spaces in areas of very recent hemorrhage. Coincidentally, maternal blood was afforded access to fetal circulation. Mixture of bloods was stopped quickly, apparently by clot formation at the site of injury.

Numerous similar breaks in the placental barrier were found in all placentas from 213 patients in the last half of normal pregnancy. In 130 placentas from the first half of pregnancy, these changes were not observed until the third month, and then only occasional villi were involved.

These findings confirm the studies by Levine, which established erythroblastosis fetalis as a disease resulting from destruction of fetal red blood cells by antibodies produced in the mother to some incompatible factor which fetal red blood cells contain. It has been shown that destruction of the incompatible fetal red blood cells

(9) Am. J. Obst. & Gynec. 56:226-237, August, 1948.

occurs in part by phagocytosis. For these reasons Kline suggests that transplacental erythrocytotoxic anemia is a better name for the disease than erythroblastosis fetalis or congenital hemolytic anemia.

Graphic Method of Prognosis for Infant in Antenatal Care of Rh-Isoimmunized Pregnant Women is defined by T. Primrose, G. J. E. van Dorsser and N. W. Philpott¹ (McGill Univ.) on the basis of observations made in 4,569 cases during 1946. Titer of agglutinating and blocking antibodies is charted in relation to progress of the pregnancy. Five grades of Rh-isoimmunization were determined.

Grade I—Very slight immunization (not above dilution 1:2) after 30 weeks' pregnancy. Babies do well even without treatment in the immediate postnatal period.

Grade II—Late appearance (after 30 weeks) of antibodies, with rise in blocking antibodies in last few weeks not above dilution 1:8. Babies born at term show some clinical signs of moderately severe erythroblastosis, and blood studies confirm this. Infants are usually easily saved.

Grade IIIa—Late appearance of antibodies with sharp rise in blocking antibodies to dilution 1:32, often with a sharp drop in the last two weeks. Babies are severely damaged, but may be salvaged by prompt action immediately after birth.

Grade IIIb—Antibodies demonstrable relatively early, rising to dilution 1:32, sometimes with a sharp drop in last two weeks. Prognosis for the baby is poor. Term infants are often born dead.

Grade IVa—Very sharp rise in blocking antibodies in later months to and above dilution 1:64, with some agglutinating antibodies. Prognosis for the baby is poor, with severe anemia and edema. They are usually born dead at term or a week or so before.

Grade IVb—Very early appearance of antibodies in heavy concentration at or about the period of theoretical viability. Prognosis is macerated dead fetus, premature by several weeks.

Grade V—Appearance of blocking antibodies (and sometimes agglutinating antibodies) in dilutions 1:4 and over before the twentieth week. Prognosis is hopeless for an Rh-positive baby. Result is abortion or early miscarriage. Prognosis for subsequent birth of normal children if the husband is homozygous Rh-positive is almost uniformly poor.

(1) Am. J. Obst. & Gynec. 54:662-667, October, 1947.

Study of the curves shows that in Grades I and II cesarean section a few weeks before term may be justified. In Grades IIIb and IV it is questionable whether increased risk to the mother is justified when prognosis for the baby is so poor. Patients in Grades IV and V whose husbands are homozygous Rh-positive should be advised against attempting future pregnancies.

In 2,960 clinic patients examined routinely 391 (13.2 per cent) were Rh-negative. Number immunized was 33 (8.45 per cent of Rh-negative mothers and 1.12 per cent of the total).

Breast Feeding in Erythroblastosis Fetalis was investigated by I. A. B. Cathie² (Hosp. for Sick Children, London) to determine whether maternal antibodies were destroyed by gastric juice or were absorbed into the circulation. He found that Rh antibodies are not readily destroyed by the gastric juice, but that feedings of high titer serum failed to sensitize the recipient's red blood cells and that no antibody absorption could be demonstrated.

Some erythroblastotic infants respond to a single transfusion by attaining and maintaining a satisfactory blood level. In others the hemolytic process appears to continue after the red cells are no longer sensitized by agglutinin and even when all original cells have been demonstrably replaced by group O Rh-negative blood. Yet even in these cases there is a point when lysis ceases, cells are maintained and blood count starts to rise of its own accord. This happens in the second month of life, when withdrawal of breast milk has appeared to effect improvement. But, in view of the failure to demonstrate absorption of mouth-fed antibody into the infant's blood, Cathie believes that in these cases weaning simply coincided with spontaneous recovery. Therefore weaning of infants with hemolytic disease because maternal milk contains antibodies is unjustified.

[I. Davidsohn and K. Stern (Am. J. Clin. Path. 18:690, 1948)

(2) Brit. M. J. 2:650, Oct. 25, 1947.

also studied the prognosis for children born with erythroblastosis. A study of the Rh antibodies in 182 mothers of babies with erythroblastosis showed blocking antibodies in 73.6 per cent of mothers of stillborn and hydropic infants, and in only 27.2 per cent of mothers of infants with icterus gravis. In the presence of blocking antibodies probability of a stillborn or hydropic baby was 50 per cent and in their absence 13.5 per cent. Probability of icterus gravis in the presence of blocking antibodies was 38.5 per cent and in their absence 76.9 per cent. There was an inversely proportionate relation between the height of the titer during pregnancy and the chances of survival of the infant. The latter were further reduced by presence of blocking antibodies. A very high incidence of blocking antibodies (84.2 per cent) was found in women who had received transfusions prior to birth of the affected child. The authors conclude that the prognosis of pregnancy and chances of survival of the infant are less favorable in presence of blocking antibodies, except when there is a history of a blood transfusion or a possibility that they may have been carried over from a previous pregnancy. Heterozygosity of the father with regard to the Rh factor permits the consoling possibility of a healthy Rh-negative baby, even with a bad obstetric history and with Rh antibodies during pregnancy, provided that the antibodies were found during the first trimester. High titers of Rh antibodies reduced the chance of survival.

In an answer to a query (*J. A. M. A.* 137:1179, 1948) it is said that erythroblastosis is not ruled out because the mother's blood is Rh positive. From 5 to 15 per cent of babies with erythroblastosis are born of mothers with Rh-positive blood. In these cases the Rh factor is of no etiologic importance, although the mechanism is similar. Antibodies develop in the mother against the baby's blood, the type of which was inherited from the father. If by passive transfer this antibody titer becomes sufficiently high in the baby's blood stream, blood destruction and erythroblastosis develop. A. S. Wiener, I. B. Wexler and A. Shulman (*Am. J. Clin. Path.* 18:141, 1948) reported two cases in which antepartum tests indicated that stillbirths were inevitable if the pregnancies were allowed to go to term. Pregnancies were terminated prematurely by cesarean section and infants were treated by exchange transfusions. The first baby was given 500 cc. blood. When disease progressed despite treatment, a second exchange transfusion was given the next day. Disease was arrested and the baby recovered. The second infant received 1,000 cc. blood as a massive exchange transfusion and 950 cc. was removed. This infant became jaundiced but showed no signs of toxicity. Jaundice disappeared in two weeks. The gratifying results obtained in these two difficult cases can probably be explained by the complete replacement by Rh-negative cells of Rh-positive cells coated by antibodies. These authors describe

simplifications in the technic of exchange transfusion. L. Lande (J. Pediat. 32:693, 1948) studied eight cases of kernicterus due to Rh sensitization. Four patients were deaf. That kernicterus develops only in some patients with malignant jaundice suggests that in addition to the mother's Rh allergy there may be another constitutional hereditary factor predisposing the fetal brain to damage. There are families in which the nervous system seems to be abnormally susceptible to damage from infection and toxic or emotional disturbance.—Ed.]

Chondrodystrophia Foetalis. The literature reports only two instances in which a baby and both parents were chondrodystrophic. Edith L. Potter and V. A. Coverstone³ (Univ. of Chicago) now report a third case.



Fig. 24.

(3) Am. J. Obst. & Gynec. 56:790-793, October, 1948.

Chondrodystrophic woman, 28, primigravida, first reported for antepartum care on Nov. 29, 1946. She was escorted by her husband, who was also a typical chondrodystrophic dwarf. Neither parent had a family history of dwarfism. The patient's menses appeared at age 15, the cycle was 28 days, and the duration was 2 days. Her last menstrual period was August 20 and was normal. Estimated date of confinement was May 27, 1947. Physical examination showed the patient to be in good health. Height was 116 cm. and weight 33.7 kg. Pelvic examination revealed normal external genitalia, nulliparous introitus and normal vagina; the cervix was above the pelvic inlet and could not be palpated because of the pelvic deformity; the sacrum was displaced anteriorly so as to lie almost against the symphysis. Pelvic measurements were intercrystal, 21 cm.; interspinous, 20 cm.; bitrochanteric, 27 cm.; external conjugate, 13 cm., and bischial, 6 cm.; the pubic arch was narrow, and the angle at the symphysis was acute; the conjugata vera was no more than 2 cm. It was anticipated that pregnancy would be terminated by laparotrachelotomy at about the thirty-eighth week of gestation.

The antepartum course was uneventful until April 22, when active labor began and the membranes ruptured spontaneously. Cesarean section was performed immediately, using 0.5 per cent Novocain for local anesthesia. A living, female, premature chondrodystrophic infant was delivered weighing 2,310 Gm. and measuring 43 cm. in total length. She cried spontaneously and appeared to be in good condition. The mother's postoperative course was normal, and she was discharged on the twelfth hospital day. The infant's hospital course was not unusual except that weight gain was slow. The baby was discharged on the twenty-first postnatal day weighing 2,510 Gm. (Fig. 24).

Fetal and Infant Mortality for Chicago Lying-In Hospital: 1941-46 is analyzed by Edith L. Potter and William J. Dieckmann⁴ (Univ. of Chicago). During this period 17,657 infants and fetuses weighing over 1,000 Gm. were delivered, with a total mortality of 2.5 per cent (440), equally divided between 1.25 per cent (221) for stillbirths and 1.24 per cent (219) for deaths occurring in the first 10 days of life.

Among 17,436 infants born alive, 1,015 weighed 1,000-2,500 Gm., an incidence of prematurity of 5.8 per cent. Of premature infants, 133 died, a mortality of 13.1 per

(4) Am. J. Obst. & Gynec. 56:593-597, September, 1948.

cent. Of 16,421 infants born alive and weighing over 2,500 Gm., only 86 died, a mortality of 0.5 per cent. Total death rate among all liveborn infants was 1.25 per cent. Although premature infants comprised less than 6 per cent of the total number of infants, deaths in that group were 60 per cent of all deaths; rate for premature infants was 26 times as great as that for infants at term.

When total loss of life is considered, both before and after birth, anoxia caused by interference with passage of fetal blood into the placenta, or failure of fetal blood to obtain oxygen from the placenta, is responsible for more deaths than any other condition. The principal pathologic state causing such a disturbance is premature detachment of the placenta.

The second largest group of deaths are those occurring before onset of labor, for which no adequate lethal factors can be demonstrated. In the third group malformations are responsible.

Deaths generally considered due to prematurity make up the fourth group and actually account for only one death in every 250 births. Erythroblastosis fetalis is fifth in the present study and is responsible for one death in every 400 deliveries, almost as many as is prematurity.

Birth trauma and syphilis, once considered the two primary causes of stillbirths and neonatal mortality, are responsible for only 1.3 deaths per thousand deliveries. These two conditions are more amenable to adequate prenatal care and the skilful conduct of labor and delivery than are the other factors leading to death.

Fetal and Neonatal Mortality are analyzed by J. P. Greenhill⁵ (Chicago) for the purpose of establishing the possibility of reducing the number of deaths. Careful autopsy studies have shown that the chief causes of death are prematurity, asphyxia, birth trauma, malformations, pneumonia and maternal toxemia. These six specific conditions are responsible for more than 70 per cent of fetal and infant deaths.

(5) J. Obst. & Gynaec. Brit. Emp. 54:577-591, October, 1947.

Monstrosities constitute more than 10 per cent of all such deaths, and there is no way as yet of preventing these. Previabile infants cannot be kept alive, but in some instances of placenta previa and toxemia, pregnancy can be maintained long enough for the fetus to attain viability. Placenta previa cannot be eliminated, and abruptio placenta cannot be prevented, except in some cases by proper treatment of toxemia and prevention of trauma. There is, in addition, a small group of babies for which no cause of death can be determined clinically or at autopsy. Aside from these, available measures of prevention and treatment can salvage more than half the lives lost.

Of greatest importance is proper supervision of the pregnant woman so that she will be able to pass through pregnancy and labor without detriment to herself and so that her baby will be healthy. Ideally, every woman should have a thorough examination before she plans to become pregnant, but certainly it is important for her to see a physician as soon as she knows she is pregnant.

Prevention and treatment of prematurity ranks second. The only causes which are preventable or can be treated are toxemia, syphilis, some serious medical illnesses in the mother, mild placenta previa and some instances of habitual abortion. The physician also must possess the knowledge necessary to keep the premature infant alive, its management being far different from that of a full term baby.

Birth injuries—including asphyxia, hemorrhage into the brain and elsewhere, paralyzes, fractures, distortions and injuries to the viscera—must be prevented. Whereas a few of these occur in spontaneous unassisted labor, the vast majority result from lack of skill, poor judgment, haste, injudicious use of analgesia and anesthesia and deliberate carelessness and disregard for human life.

Acute infections in the newborn can be reduced by strict asepsis and antisepsis during and after labor, judicious use of analgesia and anesthesia, proper handling

of the baby after delivery and early diagnosis and prompt treatment of infections with penicillin and sulfonamides.

Eclampsia can be almost eradicated by giving proper antepartum care.

The number of babies lost because of erythroblastosis is not large, but it can be reduced by routine determination of the Rh factor in all pregnant women. The newer tests for the Rh-Hr types, as well as the development of methods of detecting presence or absence of sensitization, now permit more accurate forecasting of the disease.

The vast majority of pregnant women all over the world are cared for by general practitioners. Only through diligent training can the excessively high maternal mortality and the frightful number of fetal and neonatal deaths be reduced.

Fetal and Neonatal Mortality: Causes and Prevention are discussed by William F. Mengert⁶ (Southwestern Med. College). About 4 per cent of all fetuses and newborn children reaching a size and development compatible with extrauterine existence die before, during or soon after birth. Almost one-third die in utero and one-fifth perish during birth. About one-half are born alive but die in the neonatal period. The principal over-all cause is anoxia, with prematurity ranking second. Analgesic and anesthetic drugs are the chief cause of anoxia during and immediately after labor. Principal causes of prematurity include toxemia, multiple pregnancy, antepartum hemorrhage, nonspecific maternal illness and dietary and economic influences. About 5-10 per cent of all infants are immature. Almost three fourths of all neonatal deaths occur within the first 24 hours.

Prematurity may be prevented by treating the conditions which may lead to it. Birth injury is largely preventable. Mengert believes that abdominal delivery is used in too many instances in which it is not indicated. Anoxia may be avoided by withholding sedatives and using nerve block anesthesia.

(6) Am. J. Obst. & Gynec. 55:660-668, April, 1948.

Social Class and Fetal Mortality relation was investigated by Dugald Baird⁷ (Univ. of Aberdeen). It was established that the health, physique and diet of higher income groups (classes I and II) are much better than that of lower income groups (classes III, IV and V).

That the "reproductive performance" of classes I and II is superior to that of others is shown by the fact that, other things being equal, stillbirth rate in classes III, IV and V was between two and three times that in classes I and II.

The rise in stillbirth rate which accompanies increased age in primigravidas begins at age 20 in classes III, IV and V, but is postponed until age 30 in class I.

Stillbirth and neonatal mortality rates from all causes are higher in classes III, IV and V. Further classification of patients into group A (social classes I and II—national figures) and group A1 (social classes I and II—specialist figures); group B (social classes III, IV and V—national figures) and group B1 (social classes III, IV and V—specialist figures) clarified this statement. Neonatal mortality in primiparas is nearly three times higher in B1 than in A1. The main reason for this is evidently the greater incidence of prematurity, birth trauma, toxemia and infection in group B1. Since the standard of obstetric care is high in both groups, the difference must be due to great differences in the mothers' physique, health and diet.

Group B1 constitutes about 90 per cent of the population; therefore the most effective means of lowering national stillbirth and neonatal death rates would be to raise the standard of living and diet of this 90 per cent to the standard of the other 10 per cent.

The striking fall in stillbirth rate and in neonatal mortality ascribed to prematurity and "congenital debility" during the war years, 1939-44, can be attributed to the only wartime change likely to affect these results—improvement in the diet of poorer sections of the commu-

(7) *Lancet* 2:531-535, Oct. 11, 1947.

nity. This is strong evidence of the importance of good diet during pregnancy.

Statistics of Stillbirths and Early Mortality for 1947. Lévy-Solal and Lautmann⁸ (Paris) report that in 3,687 confinements at Baudelocque Clinic 83 children were born dead: 34 macerated and 49 stillborn (22.7 per 1,000). Of the 3,604 living children, 35 died during the first 12 days (9.71 per 1,000), 15 of them during the first 24 hours after birth (4.16 per 1,000). Of all the living children, 255 weighed less than 2,500 Gm. at birth, and 33 of these died (129 per 1,000). But among these underweight children there were some born prematurely at 6 and 6½ months and weighing about 1,000 Gm., and who were consequently at the limit of viability.

Causes of death among the 35 children who died during the first 12 days of life included obstetric trauma, malformation, debility, severe diarrhea, Rh incompatibility, amniotic infection, severe icterus and pulmonary edema. Among the 35 were 26 children whose birth weight was below 2,500 Gm.

Compared with older statistics of stillbirths for France and for Baudelocque Clinic, the figure of 22.7 per 1,000 for 1947 indicates considerable progress. The 9.7 per 1,000 rate for early mortality also represents notable progress, which is due to several factors—prenatal consultations, organization of an otorhinologic service, special wards for premature children to which the service personnel alone has access, isolation pavilion for children with infections, and systematic use of penicillin.

Rooming-In Plan for Mothers and Infants is that form of hospitalization in which the mother and newborn infant room together and the mother takes as much care of the baby as possible. Herbert Thoms, Edith B. Jackson, Lyman M. Stowe and Frederick W. Goodrich, Jr.⁹ (Yale Univ.) review one year's experience with a four-bed unit at Grace-New Haven Community Hospital.

(8) *Gynec. et obst.* 47:302-309, 1948.

(9) *Am. J. Obst. & Gynec.* 56:707-711, October, 1948.

Records were available on 190 patients: 102 primiparas, 81 multiparas and 7 whose parity was not listed. The mothers were selected in the antenatal clinic on the basis of their desire to have the baby with them after birth and the desire to nurse. Most patients spent the entire period of hospitalization in the unit. The husband was encouraged to be with his wife during the early part of labor and after delivery to go to the unit for a brief bedside visit. He was allowed to hold the baby at this time, after washing his hands and putting on a hospital gown.

Only 12 patients did not nurse their infants in the hospital. Of those who nursed their infants from birth, the length of time this was continued was variable. Eighty-four patients continued to nurse their infants beyond the sixth week. None of the infants developed the usual nursery infections. An earlier type of ambulation was tried in the last three months of the study. In 54 patients, who were completely ambulatory at least three days before discharge, there were no ill effects. The authors believe there will be an increased demand for this kind of hospitalization.

[Rooming-in is the term used for the hospital arrangement whereby a mother may have her baby in a crib beside her bed. E. B. Jackson (*Am. J. Pub. Health* 38:689, 1948) summarizes the reactions of mothers and nurses to rooming-in during 11 months on the Maternity Service Ward of the Grace-New Haven Hospital. Of 331 mothers 55 per cent expressed themselves as favorable to this, 26.5 per cent as unfavorable and 18.5 per cent as indifferent. As the author explains, rooming-in is not applicable to all mothers and should not be imposed on one who is hesitant or unwilling. L. H. Bartemeier (*J. Michigan M. Soc.* 47:617, 1948) describes the Cornelian Corner, an organization of pediatricians and clinical psychologists whose aim is the promotion of healthy parent-child relations. The organization sponsors re-establishment of infant care as it was when babies were born in the home. It was then customary for mothers to nurse their babies, to feed them as often as they seemed to need nourishment and to give them a great deal of mothering. Bartemeier believes that the separation of infants from their parents in modern hospitals is unhealthy for both parents and offspring and that it prepares the way for difficult parent-child relationship. Attempts to keep mother and baby together may be thwarted by Board of Health regulations.—Ed.]

Now and Then: Statistical Review of Progress of Midwifery during Last 20 Years with Thoughts for the Future. W. F. T. Haultain¹ (Edinburgh) reviewed the records of five of the largest maternity hospitals in the British Isles and of New York Lying-In Hospital. Maternal mortality and morbidity and stillbirth and neonatal death rates were uniformly lowered over this period for all the hospitals. New York Lying-In has a markedly lower rate than the British and Irish hospitals. This is explained by the large number of ante- and intrapartum emergency cases received at the latter hospitals from general practitioners.

Incidence of puerperal sepsis has decreased in all hospitals except one in Dublin. Death rate from sepsis has also decreased except in a Glasgow hospital, where it has remained stationary for the past 15 years. Though the morbidity rate in New York Lying-In Hospital is higher than in the British hospitals, no deaths from sepsis have occurred at the former during the past five years. Use of sulfonamides has contributed greatly to the over-all reduction in sepsis. The greatest reduction occurred in the British, as distinct from the Irish, hospitals, at a time when Britain was at war. This is explained by the fact that to get special food certificates a pregnant woman had to visit her doctor or an antenatal clinic, and when she realized she was getting something no one else could obtain she took full advantage of her dietary. The general practitioners were overworked, and many of their patients had to go to clinics where they came under skilled observation. Extended use of lower uterine segment cesarean section and more frequent use of blood transfusion also contributed.

Though there has not been much change in the general incidence of eclampsia, there has been a decrease in mortality rate in most of the hospitals. This is due to improved antepartum care and to adoption of Stroganoff's method of treatment. The number of pre-eclamptic pa-

(1) Am. J. Obst. & Gynec. 55:733-757, May, 1948.

tients admitted to the hospitals has increased, with a resulting increase in the number of pregnancies terminated by induction of premature labor, cesarean section and abdominal hysterotomy. Morbidity and mortality from hyperemesis gravidarum has generally decreased with improvement in the quality of antepartum care.

Deaths from placenta previa have diminished considerably, though the case incidence has remained fairly stationary. Haultain believes that this is due to greater use of cesarean section and Willett's forceps and the almost routine use of blood transfusion. Education of medical students regarding this condition has been an important factor. Accidental hemorrhage as a cause of maternal death has diminished considerably. Nearly all patients are now treated expectantly, and cesarean section is practically never required.

Haultain presents a number of suggestions for future improvement of midwifery. Adequate and efficient antepartum care for all pregnant women is essential. A sufficient number of well trained nursing and medical personnel is required along with an increase in present facilities. Students who are going to undertake midwifery in general practice must have more practical and clinical training. The blood of every pregnant woman should be typed and an Rh determination made. Flying squads equipped with plasma and blood should be available at all times to deal with cases of hemorrhage or shock and retained placenta in the area served by the hospital. Penicillin gives promise of improving maternal morbidity and mortality from sepsis.

[According to M. Kerr (*Am. J. Obst. & Gynec.* 55:396, 1948), the death rate in Canada has shown an encouraging improvement. In 1934 it was 5.3 per 1,000 and in 1944 only 2.7. As elsewhere, hemorrhage was the leading cause of maternal mortality (21.3 per cent in 1943). Arnaldo de Moraes (*An. brasil. de ginec.* 25:1, 1948) reports that in his private Maternity maternal mortality was 0.16 per cent among 3,031 pregnant women. Combined still-birth and neonatal mortality was 2 per cent. Eighty per cent of the babies were delivered spontaneously and 3.7 per cent by cesarean section. R. H. Fagan (*West. J. Surg.* 55:584, 1947) states that in

14,908 labor cases at the Good Samaritan Hospital maternal mortality was 0.19 per cent and infant death rate 2.35 per cent. We are informed by L. F. McLean, H. C. McDowell and M. G. Sadugor (New York State J. Med. 48:1368, 1948) that at the Millard Fillmore Hospital among 15,371 deliveries, there were 33 deaths, 18 of which were due to postpartum hemorrhage and shock. However, with use of a recovery room there have been only 2 deaths. There were no deaths from postpartum hemorrhage, although 11 cases of late postpartum hemorrhage were detected in the recovery room and return at once to the delivery room for packing and treatment.

According to the *Statistical Bulletin of the Metropolitan Life Insurance Company* (28:4, 1947), stillbirths number about 65,500 a year. Chances of being born alive are best for the second baby and decrease progressively for each child. The stillbirth ratio for second children in this country from 1940 to 1944 was 18.5 per thousand live births, whereas the ratio for the first born was 24.4. Births of the seventh order were twice as likely to be stillborn as those of the second order, while for the tenth and later born the ratio was three times as great. The stillbirth ratio tends to rise with increased age of the mother. The stillbirth ratio is relatively high among mothers who bear a large number of children in quick succession.—Ed.]

