OBSTETRICS

PREGNANCY

Physiology

Fibrous Nature of Human Cervix and Its Relation to Isthmic Segment in Gravid and Nongravid Uteri. D. N. Danforth[1] (Chicago) made a thorough histologic study

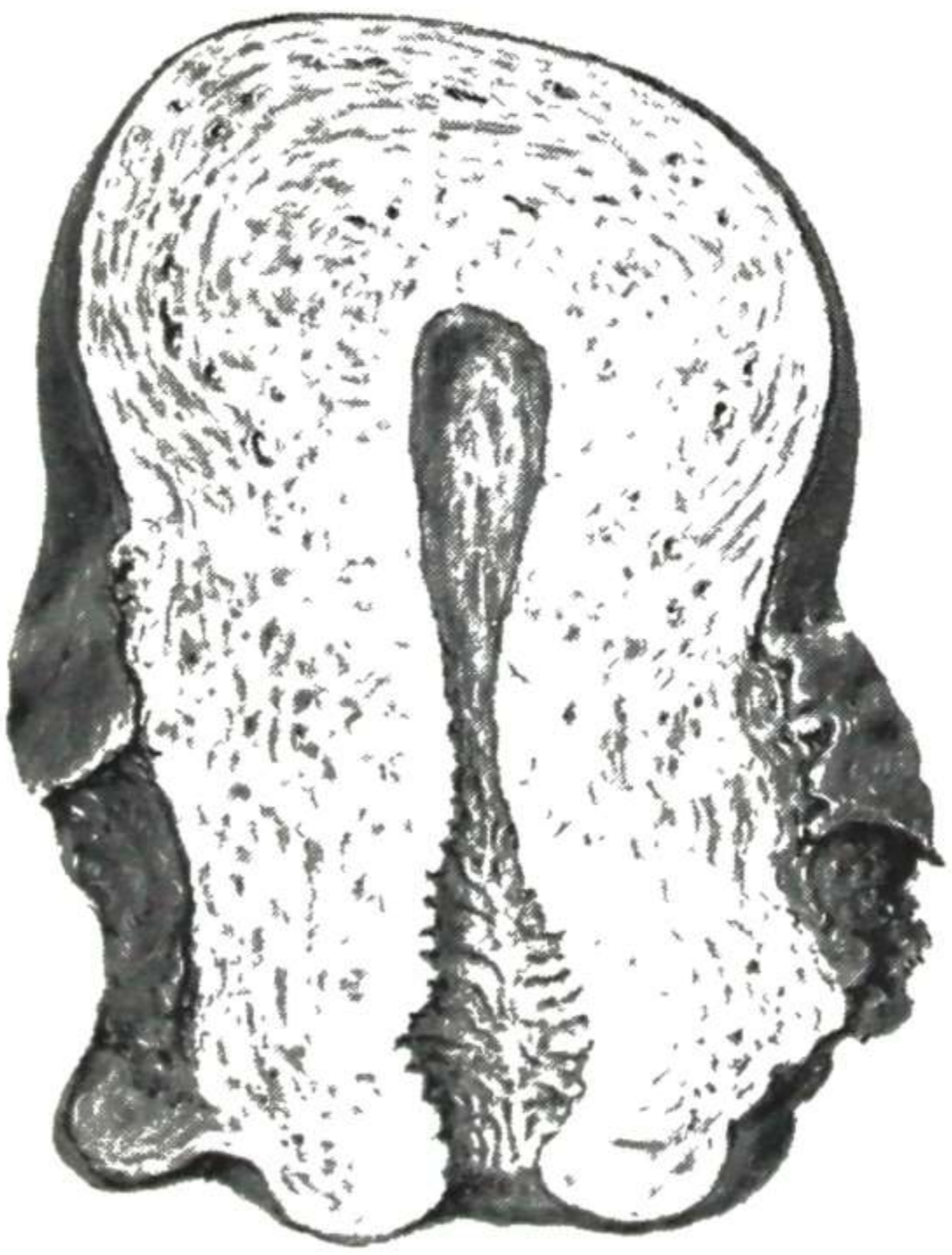

Fig. 1.—Frontal section of a normal human uterus; × 1. Constriction in uterine cavity is gradual. Precise level of anatomic internal os is indefinite. (Courtesy of Danforth, D. N.: Am. J. Obst. & Gynec. 53:541-560, April, 1947.)

of 12 pregnant and 46 nonpregnant uteri and found that in the nonpregnant uterus the cervix is predominantly fibrous connective tissue. The tissue superior to the cervix is predominantly smooth muscle, and the transition is

(1) Am. J. Obst. & Gynec. 53:541-560, April, 1947.

usually abrupt. The superior border of the isthmus uteri, or the anatomic internal os of Aschoff, is not sharply demarcated, and in 45 per cent of cases its lower border cannot be precisely marked (Fig. 1). The histologic internal os may lie within the constricted area known as

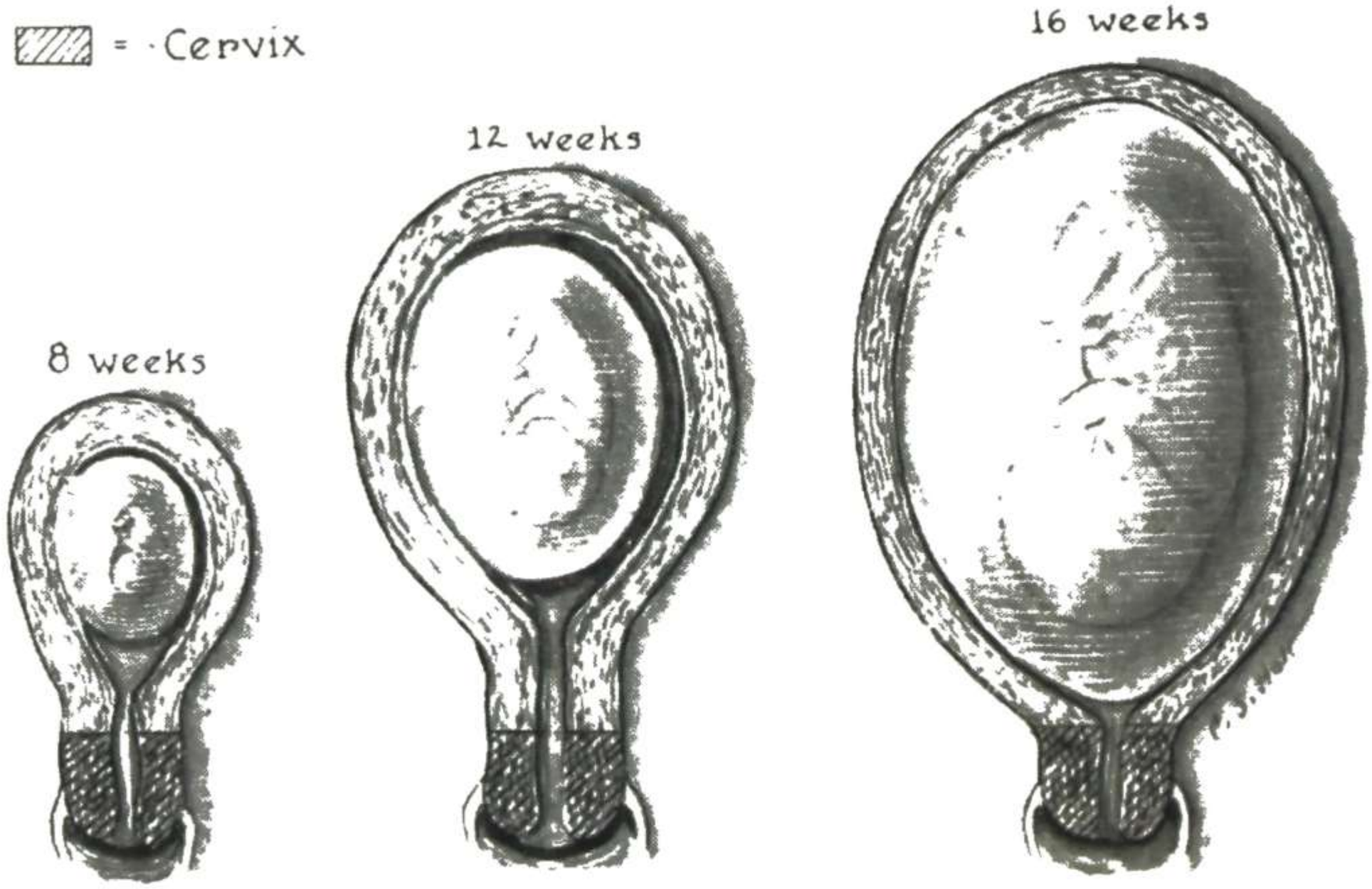

Fig. 2.—Changes in uterus during early pregnancy. Cross-hatched area represents portion which is chiefly fibrous, remainder of uterine wall being chiefly muscular. At eight weeks, general configuration of uterus is similar to that before pregnancy. At 12 weeks, there is general hypertrophy throughout muscularis, manifest in isthmic section as elongation and slight thickening, proportional to similar changes elsewhere in muscularis. Products of conception do not yet utilize all available space. At 16 weeks, products of conception have grown sufficiently to require more space than is available superior to isthmic section. (Courtesy of Danforth, D. N.: Am. J. Obst. & Gynec. 53:541-560, April, 1947.)

the isthmic canal or as far as 13 mm. below the constriction. The nonpregnant isthmus is an indefinite, variable segment, composed principally of smooth muscle, bounded below by the fibrous cervix and above blending imperceptibly with the remainder of the uterine musculature.

The length of the cervix does not change greatly during early pregnancy (Fig. 2). In the third month, the isthmus elongates as a hypertrophic response to pregnancy, and the products of conception are confined to

the portion of the uterus superior to the isthmic canal. When more space is required, the isthmic musculature unfolds and thus makes up part of the wall of the ovum chamber. The unfolding is limited inferiorly by the fibrous cervix and is determined by the abruptness of the transition from muscular to fibrous tissue. It is not possible to distinguish the unfolded isthmic segment from the rest of the corpus, except that the wall may be thinner where most dilation has occurred.

Since the isthmus forms a unit with the remainder of the uterine musculature, the concept of it as a separate, distinct entity should be discarded. Rather, the uterus should be considered as being composed of two parts, corpus and cervix, according to whether the fundamental structure is chiefly muscular or fibrous. The isthmus should be considered to be that part of the corpus which lies between the level of the fibromuscular junction of the cervix with the corpus and the plane of the inferior level of the uterine cavity.

[This is a most important contribution, and I hope Danforth will continue his study. There is no doubt that he has proved that the boundaries between the three parts of the uterus described and illustrated in nearly all textbooks of obstetrics and gynecology are not clearly defined. Since Danforth has shown that the cervix is composed chiefly of fibrous tissue and both isthmus and corpus are made up essentially of muscle tissue, I agree that the isthmus and corpus should be considered as one organ anatomically. Further support for this view is the fact that the mucosa of the isthmus is definitely unlike that of the cervix, being similar to that of the corpus but less well developed. However, there appear to be some physiologic and biochemical differences between the part of the uterus called the isthmus and the corpus uteri proper. O. Frankl, one of the foremost obstetric and gynecologic pathologists in the world, who committed suicide when the Nazis took over Vienna, showed that the isthmus does not react to hormones (Zentralbl. f. Gynak. 58:467, Feb. 24, 1934). Hence, it does not develop premenstrual hypertrophy or a predecidual compacta. The isthmus fails to respond not only to physiologic stimuli but also to pathologic hormonal influences, particularly those responsible for hemorrhagic metropathies and adenomyosis. If all this is true, there should be a biochemical difference between the mucosa of the isthmus and the mucosa of the body of the uterus. Hence Frankl undertook with H. Simon (Zentralbl. f. Gynak. 58:32, Jan. 6, 1934) a study of the glycogen content of the isthmus. They found that even when the isthmus glands showed some dilatation in the premenstrual

period, there was no glycogen at all or only a small amount. Since glycogen is nourishment for the early ovum, its absence may account for the infrequency of the embedding of an ovum in the isthmus. These workers also studied the arterial vascularization of the isthmus. They injected the arteries of 25 uteri with barium sulfuric acid and took roentgen ray pictures. The latter showed in most cases a separate arterial supply for the isthmus. These facts convinced Frankl and Simon that the isthmus of the uterus has a separate function. Danforth has shown that the isthmic segment hypertrophies and is incorporated in the wall of the ovum chamber. He admits that many more specimens must be studied before the changes he describes may be considered as unequivocally typical. —Ed.]

Uterine Accommodation of Products of Conception: Physiologic Considerations are reviewed by S. R. M. Reynolds[2] (Baltimore). Local circulation of maternal blood in the uterus decreases gradually as the products of conception increase in size. Suddenly, as the conceptus reaches maximum ovoid size at the beginning of the last trimester of gestation, uterine ischemia occurs. The conceptus abruptly elongates and, coincidentally, rapid circulation of the maternal blood through the uterus returns. These changes have been shown in the rabbit by studies of blood flow rates and distribution of dye injected into blood vessels. Incidence of fetal death in late pregnancy is greatest in these animals at the period when the shape of the conceptus changes from spheroid to cylindric.

Uterine growth is stimulated by tension on the walls created by the growing conceptus. When one uterus of a rabbit was made sterile by ligation of the fallopian tube, that nonpregnant uterus did not increase appreciably in size throughout the first two thirds of pregnancy in the opposite uterus. Uterine growth has also been found to result from distention of the uterine cavity in conditions other than pregnancy.

[In another article (Am. J. Physiol. 148:77-85, January, 1947) Reynolds concludes that the local circulation of maternal blood within the uterus varies in an orderly and progressive way, diminishing as the radius of the spherically shaped conceptus increases, and increasing again (at least at first) as the conceptus becomes cylindrical in the last trimester of pregnancy. The author tentatively concludes that the physical factor governing the local flow of maternal blood within the uterine wall is local tension within

(2) Am. J. Obst. & Gynec. 53:901-913, June, 1947.

the uterine tissues, the pattern of which varies during pregnancy with the shape of the conceptus in a way that parallels the blood flow rates measured in this study.—Ed.]

Value of Plasma Pitocinase Determinations in Obstetrics, according to Ernest W. Page[3] (Univ. of California), is that the level of plasma pitocinase is a guide to both the existence and duration of pregnancy and that variations from normal range point to a basic enzymatic disturbance associated with eclampsia.

Plasma samples from 20 nonpregnant subjects, including women with amenorrhea and those past the menopause showed traces of pitocinase activity between 0.01 and 0.06 unit per ml. plasma. Values vary with the phases of the menstrual cycle, being high at ovulation and low during menstruation. Samples from 52 pregnant women were positive in 51 instances and doubtful in 1 who was only 16 days past the date of conception as judged from her basal body temperature curve.

From the fourth to the thirty-eighth week after conception, plasma pitocinase concentration increases a thousand fold, and this high level is maintained during labor. After delivery, the enzyme decreases logarithmically at the rate of about 25 per cent per day, until it disappears in four weeks. From the third to the sixteenth week after conception plasma pitocinase concentration increases 100 per cent every 12 days.

When true pre-eclampsia or eclampsia supervenes, plasma pitocinase levels are scattered on both sides of the normal range, indicating that an enzymatic disturbance is associated with this disease. Of 16 patients studied only 3 had levels within normal range, 7 were high and 6 were low. No correlation was apparent between severity of the disease and plasma pitocinase level. In two cases of pregnancy complicated by severe arteriolar hypertension, values were normal.

The probable error of Page's bioassay is within 25 per cent. Even with 50 per cent margin for error the date of conception within plus or minus six days may be calcu-

(3) Am. J. Obst. & Gynec. 52:1014-1022, December, 1946.

lated. There appears to be little individual variation among women less than four months pregnant. During the last four months the scatter is too great for accurate prediction of the date of confinement.

Since the uterine horns of female rats too old to breed may be used for many tests, determination of plasma pitocinase may prove to be a rapid and economical test for pregnancy. With careful technic, the test has the additional advantage during the first four months of determining the week of pregnancy, and during the last four months it may be of value in the differential diagnosis of pre-eclampsia from other hypertensive disorders.

[In a later paper (Science 105:292-293, Mar. 14, 1947) Page reported that the concentration of the enzyme, pitocinase, in the blood increases in a linear fashion for the first 16 weeks after conception, and only during this period is quantitative determination reasonably accurate. Fortunately it is during the first half of pregnancy that such information is usually desired.—Ed.]

Values and Rare Curves in Estimation of Gonadotrophins during Pregnancy and Allied Conditions. Silvestre L. Sala[4] (Univ. of Buenos Aires) shows that the diagnostic and nearly pathognomonic importance attached to the estimations of these substances is exaggerated. The values do not always accord with the clinical facts. For example, the circulating hormones may vary from zero to excessive amounts in normal pregnancy. In intrauterine death of the fetus, the gonadotrophins may be more abundant than usual and may disappear slowly. In vesicular mole, the hormonal reaction may be slight or even absent. After evacuation of the mole, there may be prolonged positivity without degenerative evolution, or evolution toward chorionepithelioma with a negative phase, slight amounts of gonadotrophins and a negative reaction.

These abnormal manifestations are sometimes false but sometimes have an explanation or are the expression of the true condition, even when the clinical observations suggest another orientation. In cases without histologic diagnosis in which the clinical and biologic diagnoses do

(4) Semana med., no. 22, 1946.

not agree, the clinical diagnosis is accepted in most instances and the biologic signs are subordinated.

[The clinical signs and symptoms should not be subordinated to the hormone determinations because, as Sala has shown (and I agree with him), hormone tests for pregnancy or for gynecologic disturbances are by no means always accurate or entirely dependable.—Ed.]

Nutrition of Expectant and Nursing Mothers in Relation to Maternal and Infant Mortality and Morbidity was studied by a special committee[5] appointed by the People's League of Health. A total of 5,022 women were studied from March, 1938, to the end of 1939. The following daily supplements were given to the treated group: 18 gr. saccharated iron carbonate; 30 gr. calcium lactate; minute quantities of iodine, manganese and copper; 15 gr. adsorbate of vitamin B_1 containing all factors of the B complex; 100 mg. vitamin C and 6 minims halibut liver oil.

Incidence of toxemia among primigravida in the treated group was 5.4 per cent, compared with 7.4 per cent in the control group. Among treated multiparas the incidence was 3.6 per cent, compared with 5.2 per cent for the control group.

Inverse relation between duration of treatment and morbidity rate was not found. Results suggested the existence of a saturation level, best results being obtained after 16-20 weeks of treatment. Results also indicated that incidence of sepsis is related to parity; there was no evidence that it was affected by treatment.

So far as duration of labor was concerned, there was no significant difference between the treated group and the controls. There was, however, a significant difference in length of gestation, the lower incidence of prematurity occurring among the treated women.

It was found that of the treated mothers, only those who had the supplementary diet for 24 weeeks and more could breast feed their infants better than the controls. Incidence of breast feeding depends on hospital practice.

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(5) J. Obst. & Gynaec. Brit. Emp. 53:498-509, December, 1946.

Infants of treated mothers had a longer period of gestation and greater weight at birth. Incidence of stillbirth was lower for treated mothers than for controls. However, neonatal mortality was higher for infants born to treated primiparas and slightly higher for treated multiparas.

Nutrition in Pregnancy: Effects of Dietary Deficiency in Pregnancy and Detection and Treatment of Nutritional Deficiency Diseases. According to Carl F. Vilter, Dorcas Morgan and Tom D. Spies[6] (Birmingham, Ala.), because of increased metabolic demands during the latter half of pregnancy and during lactation, nutritive failure is more apt to occur at these times than at any other period of a woman's life. The woman whose diet before pregnancy just met the requirements of her state of activity must alter her eating program to escape deficiency, since the fetus is able to drain the maternal tissues of required materials. Other factors predisposing to nutritional disease in the mother are economic status (which influences quality and sometimes quantity of food), nausea and vomiting of the first trimester and food idiosyncracies, which have no immediate clinical effect but may inaugurate poor dietary habits.

With an adequate maternal diet, miscarriage, stillbirth, premature birth and complications of pregnancy are less likely. Infant mortality is lower among infants of mothers on adequate diets.

A single deficiency syndrome always points to an overall nutritional deficiency. Macrocytic anemia from deficiency of antianemic principles in animal protein also implies protein and niacin deficiency. Treatment of the single deficiency without dietary control and combined therapy results in incomplete recovery.

Polyneuritis of pregnancy is actually beriberi. Synthetic thiamine, 5-20 mg. daily, brings improvement. However, if the diet contains adequate thiamine, the syndrome does not develop. Signs and symptoms of the

(6) Surg., Gynec. & Obst. 83:561-571, November, 1946.

deficiency often follow hyperemesis gravidarum and hence may appear early. The daily thiamine requirement during pregnancy has been put at 1.8 mg., but this is not an absolute figure.

Macrocytic anemia of pregnancy cannot be differentiated morphologically from the anemia of sprue, nutritional macrocytic anemia or pernicious anemia. Clinically it resembles nutritional macrocytic anemia. Liver extracts are often of no value given parenterally but have been effective given orally. Synthetic folic acid has recently proved effective in treatment of all varieties of macrocytic anemia due to deficiency of liver principle. Adequate daily doses (approximately 10 mg.) given orally or parenterally are followed by appearance of reticulocytes in the peripheral blood and restoration of blood counts to normal.

Niacin deficiency produces the signs and symptoms of pellagra. The "initial nervous syndrome" is probably a sign of mixed vitamin B complex deficiency in which thiamine and niacin are of greatest importance. Hallucinatory, paranoid and negativistic states in pregnancy and the puerperium may be related to B complex deficiency. The signs and symptoms of pellagra may occur singly or in any combination and tend to recur in spring and fall.

Riboflavin deficiency has been correlated experimentally with production of congenital abnormalities in animals, but no correlation between congenital anomalies in human beings and diet low in riboflavin has been made.

Other members of the B complex are of uncertain value in human nutrition. Amelioration of symptoms in nausea and vomiting of pregnancy have been reported after daily use, both oral and parenteral, of pyridoxine. No evidence has been presented, however, to prove that a vitamin B_6 deficiency existed. The authors consider the results of this therapy to be due to action of pyridoxine as a gastric sedative.

Scurvy rarely occurs in pregnancy, although it may be

induced by protracted hyperemesis gravidarum in a patient whose reserves of vitamin C were low before pregnancy.

The reason for vitamin K or prothrombin deficiency in the newborn is not thoroughly understood, but the practice of administering vitamin K parenterally to the mother an hour or so before delivery or to the infant on delivery has almost eradicated hemorrhagic disease of the newborn.

There is no clinical evidence that the course or product of human pregnancy is embarrassed by deficit of vitamin A.

Vitamin D deficiency is seldom recognized. Fetal rickets is rare. The fetus usually draws enough calcium from maternal stores without causing the mother to become osteoporotic. The mother's teeth do not become more carious in pregnancy regardless of the degree of negative calcium balance. In moderate maternal calcium deficiency there is likely to be poor calcification of the bony structures of the fetus and maldevelopment of the deciduous teeth. Supplements of dicalcium phosphate and vitamin D in the latter months of pregnancy prevent decrease in maternal blood calcium levels and increase calcification of fetal bones. There may be some danger in the administration of an excess of vitamin D and calcium, since some instances of extensive calcification of the placenta and of the fetal kidney have been attributed to such supplementation.

Vitamin E has been suggested as a preventive and therapeutic measure for abruptio placentae and threatened abortion, but these observations have not been confirmed.

The common form of true anemia due to dietary iron deficiency and chronic blood loss in pregnancy responds readily to ferrous sulfate or ferrous gluconate, 1 Gm. daily given in divided doses, although occasionally the dose must be doubled or trebled. Liver extract has no place in treatment. The fetus is apparently unharmed,

but the mother's general efficiency is reduced. There is probably no relation between hypochromic anemia and toxemia, although this association has been suggested.

Maintenance of adequate protein intake (85+ Gm. daily) is apparently a major factor in efficient pregnancy and lactation. With a low protein diet the natural fall of plasma proteins is exaggerated, and nutritional edema may appear. Hemoglobin is poorly formed, and the available calcium absorbed is reduced along with the ingested protein. The opinion that high protein intake induces toxemia has given way to the idea that the woman whose protein intake during pregnancy has been adequate usually does not have toxemia. An adequate diet includes a quart of milk, two moderate servings of meat and one to two eggs daily.

Obesity and progressive and excessive weight gain during pregnancy may result in mechanical difficulties in delivery. Unwarranted gains can be eliminated by reduction of fat and carbohydrate intake without reduction of essential nutrients. Daily intake of one quart of milk, two servings of meat, an egg, green and yellow vegetable, citrus fruits and a whole grain cereal should be maintained. Skimmed milk may be substituted for whole milk, but the total amount should not be reduced.

The treatment of nutritive failure in pregnancy is identical with that under any other circumstances. Of first importance is a diet providing 3,500-4,000 calories including 120-150 Gm. protein and adequate vitamins and minerals. Synthetic vitamins in balanced amounts should be added: thiamine 10 mg., riboflavin 5 mg., niacin 50 mg. and ascorbic acid 75 mg. Specific therapy should be directed toward the predominant symptoms.

[J. M. Lewis, O. Bodansky, M. C. C. Lillienfeld and H. Schneider (Am. J. Dis. Child. 73:143-150, February, 1947) gave 10,000 units of vitamin A or carotene to 74 women during the last few months of pregnancy in order to determine whether these supplements would prevent the fall of vitamin A in the blood which normally takes place in the last trimester. Their results indicate that these supplements maintained good levels of vitamin A during the last phase of pregnancy. On the other hand, the vitamin A and

carotene values of cord blood were no higher in the infants whose mothers received daily supplements of vitamin A or carotene than in those whose mothers received no supplements. Furthermore, large amounts of vitamin A (200,000-500,000 units) administered during labor had no appreciable effect on the vitamin A content of cord blood despite the fact that the vitamin A values in the maternal blood were considerably elevated.

L. Rauramo (Acta obst. et gynec. Scandinav., supp. 2, vol. 27, 1946) wrote an extensive monograph on tocopherol (vitamin E). He proved that the tocopherol content in the serum increased during pregnancy up to the time of labor. The level remains high during the first week after delivery, but during the first two months of breast nursing the content decreases.

In my opinion the value of vitamin E in obstetrics and gynecology is overrated beyond reason. Since Evans and Burr 25 years ago showed that rats on a vitamin E-deficient diet were unable to carry their pregnancies to full term, it has been assumed that not only sterility and abortion but also premature labor, abruptio placentae, toxemia of pregnancy and other conditions can be treated successfully by vitamin E. At first huge amounts of wheat germ oil were prescribed, particularly for sterility and threatened miscarriages. In fact, for a while the Chicago Board of Health distributed wheat germ oil free of charge to all physicians, but fortunately this handout was soon stopped. More recently commercial preparations of vitamin E (tocopherol) have been prepared and large amounts are being sold despite the fact that there is no satisfactory proof that there is a vitamin E deficiency in cases of sterility, abortion, premature labor and the other obstetric and gynecologic conditions for which vitamin E is prescribed.

A. Brzezinski, Y. M. Bromberg and K. Braun (J. Obst. & Gynaec. Brit. Emp. 54:182-186, April, 1947) analyzed the amount of riboflavin excreted in the urine of 326 pregnant women divided into four groups according to the amount excreted. They found no significant differences among the groups in the incidence of toxemia of pregnancy or of hemorrhagic and infectious complications during pregnancy, labor and the puerperium. However, a significant relationship was found between low riboflavin excretion in urine and the following complications: vomiting during the second half of pregnancy, prematurity, antenatal fetal death, hypogalactia and agalactia.

The question of whether a deficient diet exerts a harmful effect on the mother or baby or both is by no means settled. At the Rotunda Bicentennial Anniversary in Dublin in July, Dugald Baird stated that improvement in the standard of health and nutrition of the mothers in Aberdeen favorably influenced the infant mortality. He had previously discussed the influence of social and economic factors in stillbirths and neonatal deaths (see 1945 YEAR BOOK, p. 298). A. N. Antonov (J. Pediat. 30:250-260, March, 1947) reported that during the severe hunger period at the time of the siege of Leningrad in the first half of 1942, the stillbirth rate rose to 5.6 per cent, which was twice the normal rate. Premature labors rose to 41.2 per cent. The average weight of infants born at term in the first half of 1942 was 500-600 Gm. less than normal.

Mortality of the newborn was unusually high, 9 per cent for those born at term and 30.8 per cent for those born prematurely.

These statistics appear to prove that undernourishment of the mother is definitely harmful to the offspring, but it is necessary to have much more data before we can accept such a conclusion. For example, many fetal and neonatal deaths in Leningrad may have been due to lack of physicians, nurses, incubators, mother's milk, sanitary surroundings and to other conditions. C. A. Smith (J. Pediat. 30:229-243, March, 1947) investigated conditions in Holland. During the six or seven months before the liberation of northwestern Holland in May, 1945, severe generalized undernutrition was prevalent in urban areas. The effects of this nutritional crisis on the infant at birth were investigated, especially in Rotterdam and The Hague. Apparently because of the low food supply, about 50 per cent of urban women became amenorrheic and presumably infertile. The birth weights of infants decreased, and rose after restoration of food, in a manner indicating that fetal weight gain is particularly related to the maternal diet of the last half or last trimester of pregnancy.

No conclusions could be drawn with regard to the frequency of abortion; that of prematurity was insignificantly increased. Stillbirth was definitely not increased, nor was neonatal mortality among infants born in hospitals. The sharp fall in conception rate associated with amenorrhea resulted in so few pregnancies that data were inconclusive as to the relation between undernutrition in early pregnancy and malformation of the fetus. A slight but statistically significant increase in malformations did occur. The percentage of mothers feeding their infants from the breast was not significantly altered during the hunger period.

Several of these results are so widely at variance with those of other studies as to indicate that great caution must be used in evaluating the maternal-fetal aspects of nutrition. Data as to the duration of maternal nutritional depletion and the specific dietary elements involved would appear to be of essential importance in any study of this problem.—Ed.]

Role of Nutrition in Pelvic Variation. Herbert Thoms[7] (Yale Univ.) believes that the anteroposteriorly elongated pelvis of childhood is converted to the more nearly round pelvis of adulthood chiefly by incomplete development of the anteroposterior diameter. The long pelvis may therefore be referred to as the childhood conformation and the transversely broadened pelvis as the adult conformation. The cause of this change in shape is not definitely established. The finding of a long pelvis at postmortem examination of a girl, 18, who had had precocious puberty and menstruated since age 3, indicates that

(7) Am. J. Obst. & Gynec. 54:62-72, July, 1947.

the change in pelvic shape is not caused by the female sex hormone.

Designation of the round or broadened pelvis as normal was made on the basis of measurements determined many years ago. Recent measurements indicate that only about one third of adult women have the round or broadened pelvis. Rickets is characterized by shortening of the anteroposterior diameter of the pelvis. Improved diets and more exposure to sunlight have diminished the incidence of rickets in women, and it is postulated that this is the cause of the reduced incidence of anteroposteriorly shortened pelves today.

It is suggested that if knock knees were present in early childhood the pelvis in adolescence is more likely to show the deformities of rickets than if bowlegs were present at that time.

Early Diagnosis of Pregnancy. The contributions of Zondek and Rozin and of Ludwig Seitz led M. A. Hady Gediz[8] to treat many patients with cyclically normal and cyclically abnormal amenorrhea with progesterone. Originally, he gave injections of 10 mg. progesterone every day for five days and brought about menstruation-like bleeding within two to seven days. Later, he injected 30, 50 and 100 mg. progesterone within 48 hours and produced uterine bleeding in the same time as before. Failure of bleeding to appear when this treatment was given appeared to be a diagnostic sign of pregnancy and led to further investigation. Gediz found that by injecting the hormone directly into the portio he could obtain a more rapid reaction (in 24-48 hours). He concluded that intravenous injection of hormones would shorten the reaction time, but so far has not been able to obtain a preparation for intravenous use.

Zondek substantiated the theory of Hady Gediz but declared that the method had two disadvantages—delay in reaction and high cost of the necessary medicine. Subsequently, Hady Gediz shortened the reaction time to 100

(8) Turk Arch. f. Gynak. 13:1575-1580, Feb.-May, 1947.

hours and, by reducing the hormone dose to 30 mg., lowered the cost considerably. The practical advantage of the method is its simplicity. It can be used anywhere, as a laboratory is not required.

As in every biologic pregnancy test, uterine bleeding is absent under the following special circumstances: (1) before the menarche or in the climacteric, (2) in intra- or extrauterine pregnancy, (3) in extrauterine pregnancy which is already interrupted but has not yet caused uterine bleeding and (4) in severe endocrine disturbances which cannot be overcome by progesterone medication, in genital tuberculosis, in advanced carcinoma, in pelvic inflammation, in toxic goiter and in malaria.

New Rapid Technic of Modified Aschheim-Zondek Test: Ovarian Hyperemia in the Rat; Reiprich Reaction Modified by Kelso and Salmon-Geist is described by H. Hinglais and M. Hinglais[9] (Paris).

TECHNIC.—Immature albino rats, aged 3-5 weeks and weighing no more than 25-35 Gm. are used. Four cc. of urine (or serum) is injected subcutaneously in two fractions, to the right and left of the spine. Three animals are inoculated at each test with the same dose, the animals being killed by gas or ether at 6, 15 and 24 hours, respectively, after the injection. Bleeding must be avoided at autopsy, as the slightest bleeding will cause decongestion of the ovaries and blot out the positive reaction. The reaction should be read by gently pulling on the ovary at the uterine cornu. A typical positive reaction is bilateral and occurs in all animals. An intermediate reaction, in which the ovary is pink, is not conclusive.

From the results in 340 cases, the authors conclude that this technic permits a rapid diagnosis of pregnancy to be made within six hours or less in many cases. With specimens of urine containing a normal concentration of gonadotrophic hormone and especially with those containing abundant amounts, positive reactions occur in 96-97 per cent of cases. Under the most favorable conditions, i.e., in simple cases, the method is less reliable than the classic methods in 3-4 per cent of instances. In difficult cases this difference is still greater. Therefore, this reaction should no more be relied on exclusively than

(9) Gynec. et obst. 46:86-93, 1947.

that in any other pregnancy test. The results should be compared with those of approved tests. The reliability of the method becomes still less if reading of the results is delayed or if the animals are older than 5 weeks. Prolan B seems to be the determining factor in the reaction, although certain variations in the results imply that a more complex mechanism is involved. For this reason and in view of the unequivocal results obtained with the rabbit's ovary, it is doubtful whether the modified test could be used as a precise quantitative reaction except in simple problems like that of a very active hydatiform mole.

Evaluation of Guterman Pregnancy Test in Clinical Practice is made by H. L. Reinhart and A. C. Barnes[1] (Ohio State Univ.) on the basis of results in 130 cases.

The test was applied routinely in hospital and outpatient practice whenever a laboratory test for pregnancy was indicated. It was negative in 16.4 per cent of pregnant women and positive in 42 per cent of those not pregnant. Of all positive reports, 27.7 per cent were false and of all negative ones, 27.5 per cent were false. Patients with vaginal bleeding and those who had received progesterone therapy were not included in computing these figures.

Since the color reaction is definite and is easily read by experienced technicians, the source of error apparently lies in individual variations of progesterone metabolism both in pregnant and in nonpregnant women.

Diagnostic Pregnancy Test Using Male Toad As Test Animal. Carlos Galli Mainini[2] (Buenos Aires) describes a new pregnancy test based on the fact that injection of pregnancy urine into a male toad (Bufo arenarum Hensel) causes migration of spermatozoa from the testis into the bladder, and they can be observed under the microscope in a drop of urine. Ten cc. of morning urine from a presumably pregnant woman is injected into the lateral lymph sac of the toad. The spermatozoa appear in the urine within two to three hours, within 22 hours

(1) J. Clin. Endocrinol. 6:664-667, October, 1946.
(2) Semana med. 54:337-340, Mar. 20, 1947.

at the latest. The toad's urine is obtained by introducing a pipet into the cloaca.

Galli Mainini performed 99 tests and compared the results with those of Friedman tests made simultaneously. There was agreement in 94 instances. In 86 control experiments, in which urine of nonpregnant subjects and various hormones were used, the results were negative throughout. Under the conditions of the present experiments (warm season and warm environment), this new pregnancy test offers the advantage of rapidity, simplicity, economy and accuracy of results.

[Those interested in the Mainini toad test may read an article prepared by Mainini in English (J. Clin. Endocrinol. 7:652-658, September, 1947). The ovarian hyperemia pregnancy test was employed by C. A. Bunde (Am. J. Obst. & Gynec. 53:317-320, February, 1947) who obtained an accuracy of 84.5 per cent when two rats were used and an accuracy of 90.5 per cent when three rats were employed. All errors were failures to obtain a positive reaction from urine of pregnant women. P. H. Freed (Am. J. Obst. & Gynec. 54:689-693, October, 1947) found the two hour rat pregnancy test noteworthy because of the rapidity of results, greater accuracy in cases of disturbed pregnancy, rarity of false positive tests, increased tolerance of the rats to toxic specimens of urine and convenience of the test and test animals. However, further investigation is necessary to increase the accuracy of the test, to obviate the large number of false negative and doubtful reactions, to increase the intensity of positive reactions and to lessen the need for three rats per test.

C. B. Sanders (Texas State J. Med. 42:375-376, October, 1947) found only two errors in 150 cases of pregnancy where the frog test was used. C. D. Joel (Schweiz. med. Wchnschr. 76:1106-1107, Oct. 26, 1946) maintains that the frog test is negative up to the sixth week of pregnancy because of the small amount of chorionic gonadotrophin in the serum. The test, however, is very useful after the seventh week of pregnancy.

The Aschheim-Zondek test is known throughout the world, both by physicians and the laity. I should like to call attention to the fact that A. C. Siddall (J. A. M. A. 40:380-381, Feb. 4, 1928) suggested a test for pregnancy based on the action of the gravid female blood serum on the mouse uterus at about the same time the Aschheim-Zondek test was made known and independently of the German investigators.—Ed.]

Abortion

Significance of Decidual Polyps in Otherwise Normal Pregnancies. Decision as to whether a threatened abortion has become inevitable is sometimes difficult. Passage

of tissues from the uterus is commonly assumed to mean that continuation of pregnancy is no longer possible, and therefore curettage is often performed. R. L. Haas[3] (Univ. of Michigan) presents three cases that emphasize the importance of determining the nature of any tissue passed. All three patients were seen during early pregnancy; all were threatened with abortion as indicated by uterine bleeding and passage of tissue. However, the tissue proved to be decidua, and all three pregnancies progressed to term with delivery of normal infants.

It is suggested that origin of decidual tissue passed by these patients may have been either excess development of decidua with protrusion of some tissue through the cervical canal or ectopic decidua in the cervical canal with extrusion of some of it. Since no bleeding occurred in the latter part of pregnancy, as would be expected in the presence of diffuse decidual hyperplasia, ectopic decidua is considered more likely.

Passage of decidua in early pregnancy is often assumed to indicate ectopic pregnancy. Absence of palpable adnexal abnormality and the subsequent course of pregnancy in these patients eliminated this diagnosis. Positive Aschheim-Zondek tests were obtained in all three patients, as further confirmation that an otherwise normal pregnancy was present.

[Even though the passage of decidua alone is unusual, particularly without continued bleeding and expulsion of part or all of the ovum, Haas deserves great credit for emphasizing the necessity of examining all tissue histologically before concluding that an abortion is inevitable or actually in progress and that emptying of the uterus is advisable.—Ed.]

Abortions Treated Conservatively: A 12 Year Study Covering 3,739 Cases. P. B. Russell, Jr.[4] (Memphis, Tenn.) obtained results proving the value of a conservative plan.

TREATMENT.—The vulva is prepared with sterile soap and shaved, and a perineal douche of 1:1,000 mercuric cyanide solution is given. A vaginal speculum is introduced under aseptic conditions and material protruding is removed, but exploration does not go beyond the internal cervical os. Posterior pitui-

(3) Am. J. Obst. & Gynec. 54:124-126, July, 1947.
(4) South. M. J. 40:314-324, April, 1947.

tary solution, 0.5 cc., is given intramuscularly to the patient on admission if abortion is complete or incomplete. In threatened abortion, it is omitted.

In febrile or possibly criminal abortion, cervical smears and culture materials for aerobic and anaerobic organisms are taken from the uterine cervical canal, which should not be penetrated more than ½ in. internal to the external cervical os. Plasma is given on admission if needed. Daily transfusions may be given to combat infections, with proper consideration for the Rh factor.

The entire head of the bed is elevated about 6 in. for postural drainage and the patient is placed on her abdomen for an hour twice daily.

For any patient with abnormal bleeding and complete or incomplete abortion, 0.4-1 cc. pitocin, ergotrate or obstetric pituitary extract solution is injected every hour into the deltoid muscle for three doses and followed by a 1/320 gr. ergotrate tablet by mouth every four hours for six doses.

The purpose of treatment was to minimize extrauterine infections, because these were found to be more dangerous than the presence of an infection within the uterine cavity.

Second trimester patients received the same treatment as those in the first trimester. The more mature placenta presented no greater problem under the conservative regimen than did the immature.

Separated products of conception become foreign bodies within the uterus, accelerating catabolic processes. Most retained placentas after abortion are held by ring formations which are the direct result of an acidotic condition. Oxytocics cause the retained products to be expelled with little difficulty when rings are not present, regardless of the trimester. Failures were few—only 35 in 2,406 cases of incomplete abortion. Operative incidence was only 5.4 per cent in 3,739 cases.

Dilation and curettage with packing are dangerous to the patient and should be resorted to only when oxytocics fail. A sponge stick is the sharpest instrument to be used in curetting, when this is necessary. In cases of suspected criminal induction, cervical smears and cultures should be made routinely.

[I use a sharp curet to empty the uterus after an incomplete abortion. Despite this, on one occasion a piece of placental tissue

was left in the uterus and the patient had to be curetted a second time. I do not see how a sponge stick can remove all the tissue attached to the uterine wall, sometimes tenaciously.—Ed.]

Abortions: Study with Emphasis on Treatment. Paul Peterson[5] (U.S.N.R.) has studied 937 patients with spontaneous abortions at various naval maternity services during the past 10 years. Of 581 patients on whom studies were completed, 89.5 per cent were carried through successful pregnancies after the study. Of these, 27.3 per cent were subject to habitual abortion.

Though only 27 per cent of those subject to habitual abortion were expected to have normal full term deliveries, after treatment successful pregnancies occurred in 64.1 per cent. When it was possible, patients subject to habitual abortion were studied between pregnancies. Abnormalities of the uterus were discovered by pelvic examination. Determinations of basal metabolic rate, glucose tolerance tests, biopsies, vaginal smears and, in a few patients, endocrine assays were done for detection of pituitary and other endocrine abnormalities. Treatment resolved itself into three periods: before conception, after conception and at the period of threatened abortion.

Before conception patients with infantile uteri were given 0.5 mg. diethylstilbestrol in the first half of the cycle and 10 mg. progesterone daily plus 1 mg. diethylstilbestrol from the time of ovulation until three to five days before menstruation. This treatment was continued for three months and was followed by curettage. Treatment was discontinued for three months, curettage repeated, medication reinstituted and the patient advised to attempt pregnancy.

Retrodisplacement of the uterus was corrected by a pessary if the uterus was movable or by surgery if the uterus was fixed. Pessaries were not inserted during pregnancy.

Patients with low prothrombin levels were given 2 mg. synthetic vitamin K intravenously daily during the week preceding menstruation and before the estimated time of menstruation throughout pregnancy. If spotting occurred

(5) Am. J. Obst. & Gynec. 54:251-258, August, 1947.

during pregnancy these patients were given vitamin K in 4 mg. doses intravenously daily until prothrombin time was normal.

Patients with a low estrogen effect were given 0.5 mg. diethylstilbestrol during the proliferative phase and 1 mg. during the secretory phase until five days before menstruation. When pregnancy was attempted, 1 mg. daily doses were given without interruption. If a menstrual period was a week late, the dose was increased to 5 mg. daily and increased 5 mg. every two weeks until the beginning of the seventh month and then reduced 5 mg. every 10 days until withdrawal was complete or delivery occurred. If symptoms of low estrogen level or bleeding occurred, the dose was increased 5 mg. daily until symptoms were relieved.

Before pregnancy was attempted, patients thought to have low pituitary effect were treated for three months with 300 units of chorionic gonadotrophin, given twice a week during the proliferative phase, plus 0.5 mg. diethylstilbestrol daily. During the secretory phase the dose of diethylstilbestrol was changed to 1 mg. and 10 mg. progesterone daily was added until within five and three days, respectively, of menses. When pregnancy occurred, the dose of chorionic gonadotrophin was increased to 500 units twice a week, diethylstilbestrol to 5 mg. twice a day and progesterone to 10 mg. three times daily.

Before pregnancy was attempted patients with low progesterone effect were treated for three months with 300 units of chorionic gonadotrophin twice a week plus 10 mg. progesterone a day during the secretory phase. Ephynal acetate was given daily in 25 mg. doses. After conception chorionic gonadotrophin, 500 units twice a week, progesterone, 10 mg. orally three times a day, and ephynal acetate, 50 mg. a day, were given until the fetus was viable.

Patients with low estrogen-progesterone were given 5 mg. diethylstilbestrol three times a day and 10 mg. progesterone three times a day from the twenty-first to the twenty-third days of the cycle for three months.

When the patient attempted pregnancy, diethylstilbestrol was given in 0.5 mg. doses during the proliferative phase and in 1 mg. doses during the secretory phase, plus 10 mg. progesterone daily. Specimens of urine were collected every five days for pregnancy tests and when these were positive diethylstilbestrol was increased to 10 mg. a day and progesterone to 10 mg. three times a day for three to four months.

[Despite Peterson's phenomenal incidence of successful pregnancies after abortion (89.5 per cent, including many cases of habitual abortion), I have no faith in the success of estrogens, progesterone, gonadotrophins and vitamins E and K administered during the nonpregnant state to increase the chance of conception and to avoid abortion and premature labor. Also, I rarely use a pessary to elevate a retroflexed uterus to help overcome sterility. When sperm can be found in the cervical canal after coitus in cases of retroflexion, there is surely no need to anteflex the uterus.

The one hormone not mentioned by Peterson and the one which, in indicated cases, often helps conception and maintenance of gestation is thyroid. Peterson observed that patients treated with stilbestrol for low estrogen effect alone usually went beyond term if medication was not stopped at least three weeks before the expected date of confinement. I have observed a similar delay in onset of labor in my patients with threatened abortions and those with a history of habitual abortion who had stilbestrol therapy. Hence during the past few years I have stopped stilbestrol medication after the thirty-fourth week. Progesterone also tends to prolong pregnancy. In a case reported by H. Vignes (Semaine d. hop. Paris 23:2157, Sept. 21, 1947), the decidua after two spontaneous abortions showed unusual thickening. This patient had received large doses of progesterone, and Vignes believes this hormone can produce an abnormal defense against an ovum and prevent penetration of villi.—Ed.]

Treatment of Inevitable, Incomplete and Septic Abortion: Analysis of 610 Consecutive Cases. J. McD. Corston and John Stallworthy[6] (Oxford) believe that surgical evacuation of the uterus, if carefully performed, provides an efficient method of treatment which is at least as safe as the conservative method. They analyze 600 consecutive cases.

For all patients with infection, of whom there were 42, sulfonamide therapy was started before evacuation of the uterus. Two patients with Clostridium welchii infections were also given specific serum. Seventy-one patients were given blood transfusions; these were started

(6) Brit. M. J. 2:89-92, July 19, 1947.

before operation and continued during surgery. If hemorrhage was not severe, operation was postponed 12-24 hours after admission in order to obtain a satisfactory level of sulfonamide in the blood.

After the vulva had been shaved and the vulva and vagina gently swabbed with 1:1,000 alcoholic solution of flavine, the pelvis was gently examined to determine the exact position of the uterus and the condition of the cervix. If the placental tissue could not be gently removed with the gloved finger, an oxytocic drug was injected into the cleaned cervix under direct vision, the cervical canal was dilated to the size of a no. 14-16 Hegar dilator, and sponge forceps were carefully introduced, opened, rotated through 90 degrees, closed and withdrawn, until no more placental tissue could be removed in this way. After the cavity had been gently flushed with a slow stream of dettol (7 cc. dettol to 568 cc. solution) at 110 F. to remove small fragments missed by the forceps and to stimulate uterine contractions, the cavity was packed with a sterile 2 in. gauze roll which was removed six hours later. In cases of sepsis the pack was impregnated with 10 Gm. sulfathiazole powder. By promoting uterine contractions and by direct pressure on the placental site the pack safeguarded against further bleeding during recovery from the anesthetic, and when it was removed it cleared small fragments or clots which could have promoted discharge, further hemorrhage or possibly infection.

There was only one death in the series—that of a patient with Cl. welchii septicemia—giving a mortality of 0.17 per cent. Average hospital stay for the 500 nonprivate patients was 7.5 days. The authors point out that this is a considerable reduction from average hospital stay for conservatively treated patients.

[There is no unity of opinion concerning the proper way to treat septic abortions. Some obstetricians empty the uterus mechanically despite fever, whereas most obstetricians refrain from invading the uterus in the presence of infection. I prefer the conservative régime. However, the truth is that the results of emptying the uterus are generally not much worse than are the results of conservative treatment, and hospitalization is definitely shorter for women treated

perium. The type of delivery was unaffected. Cesarean section was performed in four cases. In no case did labor begin earlier than 10 days after discontinuance of injections, and in most there was a lapse of about 3 weeks.

The authors point out that at a time when she is not pregnant, every woman who has miscarried twice or in whom there is evidence of endocrine disturbance should have (1) determination of basal metabolic rate, (2) a three hour sugar tolerance test, (3) premenstrual endometrial biopsy and (4) general physical and vaginal examination to determine whether genital hypoplasia is present. Examination of the husband's semen should also be made.

[M. E. Davis and N. W. Fugo (Proc. Soc. Exper. Biol. & Med. 65:283, June, 1947) administered large amounts of diethylstilbestrol and testosterone propionate daily during the first 16 weeks to 15 patients with normal pregnancy and found that these hormones did not alter the normal excretion of pregnandiol. Administration of progesterone was followed by prompt recovery of a considerable portion of the injected steroid as pregnandiol. If it is desirable to increase the amount of progesterone available during early pregnancy, it is more logical to administer it in liberal amounts rather than stilbestrol, which some obstetricians and endocrinologists believe stimulates the increased production of progesterone. Davis and Fugo believe that there is no lack of progesterone in most of the pregnancies which threaten to end during the early months. With this, I fully agree. Before giving large and expensive doses of progesterone, the pregnandiol tests of Guterman or Venning and Browne should be used to determine need of progesterone.

Theoretically, estrogens should stimulate the uterus, and because of this many physicians have tried to produce abortions by giving large doses of estrogens. They have failed. One who recently tried to expel dead retained fetuses was P. Bader (Gynéc. et obst. 40:56-61, 1947). He too failed in his three cases. On the other hand, the estrogens are being used more and more to *prevent* abortions. This therapy was first advocated by Karnaky in 1942 (the 1942 YEAR BOOK, p. 56). Unlike nonpregnant persons, pregnant women tolerate even large amounts of estrogens without having any toxic symptoms. Karnaky (Am. J. Obst. & Gynec. 53:312-316, February, 1947) gave 35 pregnant women from 789 to 24,050 mg. estrogen without producing an abortion or any apparent harm. Pregnant women did not experience nausea and vomiting until 500 mg. diethylstilbestrol was given in a single dose. Hence pregnant women tolerate approximately 1,000 times the dose of stilbestrol that nonpregnant women do. Because of this, estrogens can sometimes be used as a test for pregnancy.—Ed.]

Study of Pathology of Habitual Abortion was made in 33 cases by Bertil Falconer[9] (Stockholm) in an attempt to show possible changes in the uterine mucosa. Endometrial biopsy was done in all cases.

Cases were evaluated on the basis of the following factors: history, status, microscopic picture of the endometrium, results of hormone test, basal metabolic rate and results of examination of the husband's semen.

Four cases could not be classified as typical because each patient had a normal delivery between several miscarriages. In 14 of the remaining 29 cases agents generally believed to have an abortifacient effect were present. In four the factor could be inferred from the history (surgical interventions and oophoritis), in three from the status on examination (a deformity, tumors and tubal contractions) and in three from observations on examination of the husband's semen.

In the remaining four cases, the endometrium showed histologic abnormalities: in one typical cystic glandular hyperplasia; in one tuberculosis of long standing, though not active at the time of examination, and in two dilated and cystic glands indicating ovarian insufficiency.

Habitual miscarriages may be classified in three broad categories: (1) constitutional failures or ill health which, if manifested by the father, may be transmitted through the semen or, if manifested by the mother, may be passed on by way of the nonfertilized ovum; (2) malnutrition and poor implantation, and (3) ill health or a local pathologic condition in the mother, which may have a deleterious effect on the fetus.

Specific Treatment (Antisyphilitic) of Habitual Abortion, Missed Abortion, Partus Prematurus and Stillbirth was given by A. Sadovsky and S. Kaplan[1] (Hadassah Univ. Hosp.) to 42 pregnant women with positive Wassermann reactions and to 42 women with negative ones.

In the seropositive group there were 160 pregnancies

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(9) Acta obst. et gynec. Scandinav. 26:496-524, 1946.
(1) Acta med. orient. 6:95-97, March, 1947.

before treatment, with 32 per cent normal deliveries; after treatment there were 132 pregnancies, with 66.6 per cent normal deliveries. The percentage of abortions, stillbirths and deaths during the first year of life decreased proportionately.

In the seronegative group there were 235 pregnancies before treatment, with 26.3 per cent normal deliveries; after treatment there were 113 pregnancies, with 63.7 per cent normal deliveries. The percentage of abortions, stillbirths and deaths during the first year of life decreased proportionately in this group also.

Analysis of patients having no serologic or clinical evidence of syphilis who were given antisyphilitic therapy did not establish the diagnosis of syphilis for the following reasons.

1. No symptoms appeared despite long observation.
2. Microscopic examination of the placenta failed to reveal evidence of syphilis.
3. Normal gravidity on change of partners was demonstrated by patients who gave birth to living children despite lack of treatment after remarriage.

Therefore, habitual abortion, missed abortion or stillbirth cannot be regarded as a pathognomonic symptom of syphilis.

Neosalvarsan and bismuth are used successfully in many other diseases, and the beneficial effect of antisyphilitic treatment may not be a specific one. The authors believe that the good results obtained justify antisyphilitic therapy for pregnant women with negative serologic reactions who have had premature deliveries, stillbirths or abortions in the second part of pregnancy.

Rh Factor in Abortion. Arthur B. Hunt[2] (Mayo Clinic), after studying a group of 93 women who had had recurrent abortions, concludes that the Rh factor has been overemphasized as a cause. More common causes, such as dysfunction of the ovaries, pituitary body, thyroid gland and, possibly, the testes of the husband, have been overlooked. Casual or ordinary abortion seems un-

(2) Am. J. Obst. & Gynec. 53:467-473, March, 1947.

influenced by the mechanism of the Rh factor, but the incidence of stillbirths and neonatal deaths is higher among women who do not possess the Rh factor than among those who do.

In a group of 93 women whose blood did not contain the Rh factor, the incidence of recurrent abortion and miscarriage was somewhat higher than in the general population. However, there was no striking increase in the frequency of abortion after maternal involvement by the Rh factor as evidenced by the occurrence of erythroblastosis foetalis, although such an increase in the casualties of late pregnancy does occur among women whose blood does not contain the Rh factor. In a small series of women who gave birth to a normal child and then began to experience abortions, there were fewer women whose blood did not contain the Rh factor than are found in the general population. Hence a woman subject to habitual abortion whose blood does not contain the Rh factor deserves a chance to attempt another pregnancy under the more nearly ideal physiologic environment that proper therapy may provide.

Does Rh-Isoimmunization Cause Early Abortion? E. W. Overstreet, H. F. Traut, Marjorie Hunt and S. P. Lucia[3] (Univ. of California) have compared the outcomes of 1,038 pregnancies of 512 Rh-negative mothers with those of 1,129 pregnancies of 534 Rh-positive mothers. The total abortion rate for Rh-negative mothers was 12.4 per cent, that for Rh-positive mothers 15.2 per cent. The difference in rate, opposite to that expected if Rh-isoimmunization played a role in causing early abortion, is explainable only on the basis of error in sampling. Since Rh-isoimmunization and fetal damage become more manifest in succeeding pregnancies, it would be expected that if isoimmunization played a role in early abortion, the abortion rate in multigravid pregnancies should be higher than that for Rh-positive multigravid controls. No evidence of this was found in the present series, the abortion rate in multigravid pregnancies of Rh-negative

(3) Am. J. Obst. & Gynec. 54:235-241, August, 1947.

mothers being 13.9 per cent and that of Rh-positive mothers 17.8 per cent. Similarly, the abortion rate in Rh-negative mothers who had borne at least one infant with hemolytic disease of the newborn was no higher than the abortion rate in multigravid pregnancies of Rh-positive mothers. In addition, recovery of viable infants from pregnancies of Rh-negative mothers was equal to or greater than recovery of viable infants from an equal number of pregnancies of Rh-positive mothers.

The evidence presented casts doubt on the assumption that Rh-isoimmunization is an etiologic factor in early abortion. Since present evidence indicates that maternal antibodies must be produced for approximately 10 weeks before clinically appreciable fetal damage occurs, it seems likely that several weeks more than the 10 week period might be required to produce damage extensive enough to result in expulsion of the fetus, thus bringing the time factor to about 20 weeks, the onset of viability.

[A. Stadtmueller (Deutsche med. Wchnschr. 71:302-304, Dec. 13, 1946) also failed to find a causal relationship between the Rh factor and abortions and toxemia of pregnancy. A. Sadowsky, A. Brzezinski, and Z. Polishuk (J. Obst. & Gynaec. Brit. Emp. 54:340-344, June, 1947) found no relationship between Rh incompatibility and habitual abortion (41 cases), other forms of abortion (93 cases) stillbirth, maceration and premature deliveries (48 cases) and other pathologic obstetric conditions (21 cases). On the other hand, Lévy-Solal and Grasset (Gynéc. et obst. 45:721-724, 1946) reported that among 19 women who had had abortions, 9 had proved Rh incompatibility with their husbands. This 9:19 ratio is in striking contrast to the 1:10 to 1:13 ratio of Rh incompatibilities in the general population in Paris. M. B. Sacks, W. J. Kuhns and E. F. Jahn (Am. J. Obst. & Gynec. 54:400-414, September, 1947) in an excellent and comprehensive article on Rh isoimmunization in pregnancy maintain that the current belief that Rh heterospecificity has little if anything to do with the occurrence of spontaneous abortion is based largely on work done before introduction of the more sensitive tests for isoimmunization.

It is my impression and probably the experience of others that relatively more spontaneous abortions occur in Rh-negative women than in those who are Rh positive. Sacks and his colleagues found a statistically significant higher incidence of spontaneous abortion in Rh-negative sensitized women. Undoubtedly careful analysis by others of large groups of cases will reveal that there is some connection between the Rh factor and abortions. Even though we cannot detect any damage which Rh incompatibility may do to the fetus early in pregnancy, I believe this can occur. If this is so, nature will expel a large proportion of such injured fetuses, just as it expels fetal monsters early in their development.—Ed.]

Rh Factor in Infertility, more broadly defined as the inability to produce normal living offspring, plays a significant role in a sharply defined group of women, according to Philip Levine[4] (Ortho. Research Found.). The obstetric history of many immunized Rh-negative women reveals that conception occurs despite the presence of antibodies and that pregnancies go to or near term. Usually the result is either fetal death or neonatal morbidity. The prognosis is worse if the mother has already given birth to an affected infant. Until methods are found for neutralization of previously formed antibodies and prevention of renewed antibody production the following recommendations can be made: contraception and adoption or artificial insemination with the sperm of an Rh-negative donor.

The outlook in a succeeding pregnancy in an intensively immunized Rh-negative woman depends on the genotype of the Rh-positive husband. If he is heterozygous, there is a 50 per cent chance for having normal Rh-negative offspring. If he is homozygous, then all offspring must be Rh-positive, and there is ample justification for recommending artificial insemination with the sperm of an Rh-negative donor. Donors should be chosen whose blood also fails to react with anti-Rh′ and with anti-Rh″. Only donors of group O should be selected, to exclude possibility of isoimmunization by the dominant blood properties, A and B.

Intensity of isoimmunization may be inferred from the obstetric history and more specifically can be determined by certain serologic tests (tests for anti-Rh agglutinins with saline-suspended cells and for blocking antibodies with bovine albumin-suspended cells).

Levine recommends therapeutic abortion for Rh-negative women who become pregnant while still immunized after delivery of a severely affected infant. The antibodies in intensively immunized women may persist for several years. Should an Rh-negative woman become pregnant after the complete disappearance of all anti-

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(4) West. J. Surg. 55:462-467, August, 1947.

bodies the prognosis is still poor. However, Levine does not recommend therapeutic abortion under these conditions.

[It is worth emphasizing that once a woman has given birth to an erythroblastotic baby, practically all of her subsequent children will be erythroblastotic if her husband is homozygous. Another important fact is that if a pregnant woman shows isoimmunization, it does not necessarily follow that her baby will have erythroblastosis. There is an extensive discussion of the subject of the Rh factor in the chapter on the newborn.—Ed.]

Psychologic Factors in Gynecology and Obstetrics: Spontaneous Emotional Abortion is described by Silvestre L. Sala[5] (Buenos Aires) in a report on the work of Enrique Salerno in this field. A case of multiple spontaneous abortions is reported.

Woman, 37, married 10 years, had not succeeded in having a living infant, despite seven pregnancies. Vomiting, marked irritability, nervous tension, sadness and the belief that she "would never bear a living child," were present in each pregnancy. Other symptoms were insomnia, sudden emotional crises, palpitation and fear.

Aside from these factors, results of all physical examinations and laboratory tests of both the patient and her husband were normal.

Salerno instituted psychotherapy, without any medication, and at the seventh month of pregnancy sent the patient to Sala for obstetric aid.

The psychotherapy was continued until the pregnancy ended with the normal birth of a healthy infant, who was 5 months old and well at the time this report was written.

This case emphasizes the psychosomatic interdependence of certain conditions in obstetric and gynecologic practice. Menstrual disorders, such as amenorrhea caused by emotional crisis, pruritus vulvae, leukorrhea and dyspareunia can be produced by psychogenic factors. The influence of the emotional state on the neuromuscular system is observed during delivery. However, the best example of psychosomatic correlation is spontaneous abortion. Many cases in which explosions and bombings have caused women to abort spontaneously have been reported, and many other reports reveal the correlation between emotional states and abortions. In one case, in

(5) Bol. Soc. de obst. y ginec. de Buenos Aires, 1946.

which a woman was obsessed by the fear of abortion and had had frequent abortions, pregnancy proceeded to term when assurances that she was not really pregnant were continued until the period in which abortion usually occurred had passed.

[Psychosomatic medicine is now one of our leading medical subjects, and in obstetrics and gynecology we have more evidence of its importance than in most other branches of medicine. However, at times the pendulum is swung too far and the psyche is blamed for unrecognized organic disturbances. We must also remember that even though physical disturbances are found, the symptoms of which a patient complains may be entirely psychic in origin, and treatment must also be directed toward the mind.—Ed.]

Management of Postabortion Peritonitis. The first patient to recover from postabortion peritonitis at Harlem Hospital was encountered in 1940. She was thought to have an ectopic pregnancy, and supracervical hysterectomy and bilateral salpingectomy were performed. Eight other patients with postabortion peritonitis died that year under conservative treatment including use of antibiotics, blood transfusion, vaccine, oxytocics and Wangensteen drainage. Henry C. Falk and Geo. Blinick[6] (New York City) report that at that time it was decided that postabortion peritonitis should be treated surgically.

During the next two years, 3 of the 12 patients with postabortion peritonitis were treated with abdominal incision and drainage and 9 were treated medically; all died. From 1943 until early in 1946, 24 patients with the condition were seen. The 13 patients treated medically died. Of the 11 treated by total or subtotal hysterectomy, 7 recovered.

The operation thought most likely to succeed consists of hysterectomy and bilateral salpingo-oophorectomy with splitting of the cervix and vaginal drainage. When shock is pronounced, the tubes and ovaries are not removed. Medical treatment supplements surgical procedures. Since autopsies did not indicate that thrombophlebitis in these patients was a cause of generalized sepsis or major embolic phenomena, veins were not tied.

[Falk and Blinick present satisfactory evidence in favor of hysterectomy and vaginal drainage for postabortion peritonitis. Per-

(6) Am. J. Obst. & Gynec. 54:314-320, August, 1947.

haps some new antibiotics will be found which will cure patients without operation. The easy availability of the sulfonamides and penicillin embolden women lightly to undergo induced abortions. But deaths will continue despite these useful drugs. W. Kulka (Am. J. Clin. Path. 17:723-727, September, 1947) reports two deaths following use of abortifacient pastes. Many years ago I pointed out the dangers of such pastes (J. A. M. A. 98:2155, June 11, 1932). Despite such articles and efforts on the part of the American Medical Association and the United States Government, physicians and midwives have continued to use abortifacient pastes. Of course, mechanical measures are still the common means of inducing illicit abortion, chiefly curettage but also the use of a variety of objects. J. B. Dawson (New Zealand M. J. 46:316-317, August, 1947) removed a knitting needle from the abdomen of a woman who had inserted the needle into the vagina with the intention of producing an abortion. The patient recovered. —Ed.]

Anuria Following Criminal Abortion. James Young and A. Harold C. Walker[7] (British Postgraduate Med. School) report a case.

Woman, 31, in an attempt to produce abortion, was given an injection of a solution of soap and dettol (2 oz.) with 10 oz. of water by means of a Higginson syringe with an adapted nozzle adding 2½ in. to its length. Nine hours later, the patient was admitted to the hospital in a state of collapse. She had passed no urine during the nine hours.

The abdomen was tender and rigid and a tender mesial swelling extended from the pelvis to within about 2 in. of the umbilicus. By catheter 3 oz. brownish red urine was removed. An intravenous glucose-saline drip was commenced and was replaced by 1 pt. Rh-negative, group O (IV) blood.

Laparotomy performed the following day revealed a few ounces of dark sanguineous fluid in the peritoneal cavity. The uterus was enlarged to the size of an 18 weeks' pregnancy and had the "apoplectic" appearance found in concealed accidental hemorrhage. The right fallopian tube and ovary were congested and purplish black; the left tube and ovary were slightly congested. Extravasation of blood extended along the right broad ligament to the pelvic wall on the right side and involved the uterovesical pouch and the wall of the bladder. Subtotal hysterectomy and removal of the right tube were done. A pint of Group O (IV) Rh-positive blood and 2 pt. plasma were given. The patient's blood was group O (IV), Rh-positive.

Oliguria persisted. Only 8½ oz. urine was excreted from the time of injection of dettol and soap to death, 5¾ days later.

Pathologic examination revealed massive uteroplacental injury and suggested that much of the necrosis was due to direct

(7) J. Obst. & Gynaec. Brit. Emp. 54:196-202, April, 1947.

action of the inoculum. The kidneys presented the classic picture of a "transfusion" or "crushing" injury.

The authors point out the resemblance of the condition in this case to that in crush syndrome, mismatched blood transfusion, extensive burns, obstetric trauma, concealed accidental hemorrhage and eclampsia, in all of which there is tissue damage followed quickly by shock, anuria or oliguria and tubular degeneration, with azotemia, hemoglobinemia and hemoglobinuria. They find no evidence to suggest that the blood transfusion was the responsible factor in this case. It is clear that the kidneys were gravely affected before the first blood transfusion was given.

[Four additional cases of extreme oliguria after abortion were reported from London by J. H. Humphrey and F. A. Jones (Clin. Sc. 6:173-186, July, 1947). All the patients were treated conservatively, and all recovered. N. E. Berry (J. Urol. 58:239-243, October, 1947) reported two cases of anuria following blood transfusion, in both of which decapsulation of one kidney was done. One patient recovered and the other died. L. A. Grossman, E. M. Ory and D. H. Willoughby (J. A. M. A. 135:273-275, Oct. 4, 1947) and G. J. Strean, M. Korenberg and J. C. Portnuff (J. A. M. A. 135:278-279, Oct. 4, 1947) successfully treated patients with acute uremia by peritoneal irrigation.—Ed.]

Significance of Cervical Implantation of Placenta in Etiology of Abortion and Cervicovaginal Fistula Formation (Fistula Cervicis Uteri Laqueatica). According to Olli Kannel[8] (Helsinki), placenta praevia cervicalis occurs more frequently than the number of cases reported would indicate. He suggests that two types of placenta praevia cervicalis be distinguished—primary and secondary—according to whether or not the implantation of the ovum was primarily in the cervix.

Usually the condition is not diagnosed, since as a rule cervical pregnancy results in early miscarriage. If implanted in the cervical canal, the ovum as it grows widens the external os of the uterus abnormally. A weak spot that can no longer support the fetal membranes soon develops; this leads to abortion. Four such cases which occurred within a half year at the Women's Clinic at the University of Helsinki are reported.

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(8) Acta obst. et gynec. Scandinav. 26:608-626, 1946.

In Kannel's opinion, cervicovaginal fistula (fistula cervicis uteri laqueatica, Neugebauer) is the result of miscarriage caused by cervical placentation. In some cases, the chorionic villi with their eroding effect have already perforated the thin wall of the cervix. When abortion occurs, a fistula is formed. The occurrence of such fistulas only in the posterior wall of the cervical canal is explained by the fact that, owing to the muscular connective tissue of the vesicovaginal septum, the anterior wall is firmer than the posterior one.

Two cases of full term cervical pregnancy in which delivery had to be terminated by cesarean section are reported. It was not until then that the diagnosis was established. Extirpation of the uterus was done immediately. These two cases were of the secondary type. In both, mother and child made a good recovery.

Analysis of Therapeutic Abortion, Bellevue Hospital 1935-1945 has been made by Irving K. Perlmutter[9] (New York Univ.). During this period, 199 therapeutic abortions were performed. Tuberculosis was the major indication for abortion in 47.8 per cent. Many patients with tuberculosis are admitted to Bellevue Hospital. Since rest is essential for treatment of this disease and most of these patients are poor, abortion is often necessary to insure rest for the patient.

Cardiac disease was the indication for abortion in 16 per cent. For all class III cardiac patients with decompensation which did not respond to therapy, interruption of pregnancy was considered. For class IV cardiac patients with decompensation, careful attention to medical therapy preceded therapeutic abortion. Auricular fibrillation and certain congenital heart lesions were considered to confer greater risk in pregnancy. Neurologic and psychologic disease necessitated abortion in 13 per cent, the most common diseases being epilepsy, parkinsonism, multiple sclerosis, psychosis and poliomyelitis. Toxemia was the indication for abortion in 10 per cent. Therapeutic abortion is warranted for Rh-negative women who have

(9) Am. J. Obst. & Gynec. 53:1008-1018, June, 1947.

had one or more erythroblastic infants and whose husbands are of types excluding the possibility of an Rh-negative infant and for women who have had rubella in the early months of pregnancy.

Incidence of therapeutic abortion was less in the last five years of this study than in the first five. That this is not an entirely commendable trend is indicated by the fact that one fourth of maternal deaths during the entire period resulted from medical complications for which therapeutic abortions could have been performed.

[The usual method of emptying the uterus in a case of early pregnancy is to dilate the cervix and perform a curettement. In women more than 14-16 weeks pregnant it is advisable to perform an anterior vaginal hysterotomy. In the customary operation the cervix is incised from the external os upward. However, Bo von Friesen (Acta obst. et gynec. Scandinav. 27:80-83, 1947) begins the incision below the internal os and continues to cut upward, thus avoiding incision of the external os.—Ed.]

Complications

Anemia in Pregnancy: Clinical Management. According to John R. Wolff[1] (Univ. of Illinois), routine hemoglobin determination, erythrocyte and leukocyte counts, differential smear, Kahn or Wassermann test, blood typing and Rh factor determinations are necessary at the first antepartum visit. Hemoglobin level should be rechecked at the seventh month and close to term.

The following results are usual during the three trimesters of pregnancy and illustrate the fact that the so-called physiologic anemia of pregnancy is normal: first trimester—hemoglobin 12 Gm., erythrocytes 4,000,000, differential smears normal; second trimester—hemoglobin 10 Gm., erythrocytes 3,500,000, differential smears normal; third trimester—hemoglobin 12.5 Gm., erythrocytes 4,250,000, differential smears normal; seventh day post partum—hemoglobin 10 Gm., erythrocytes 3,500,000, differential smears normal.

If anything in the clinical history, examination or laboratory data suggests a blood disorder, more thorough examination is indicated. It should include repetition of

(1) Illinois M. J. 90:282-285, November, 1946

the previously mentioned tests in addition to hematocrit reading, icterus index and sedimentation rate determinations. Should these examinations reveal definite anemia or blood disorder, bone marrow analysis by sternal puncture is indicated. Correlation of all observations should lead to accurate diagnosis and point to the right therapy.

Iron deficiency anemia, the most common type of blood disorder encountered in pregnancy, is usually noted at the first antepartum visit but may develop later in pregnancy. It is a microcytic hypochromic anemia with normoblastic bone marrow. When this condition is found, a source of chronic blood loss should be sought. Treatment consists of removing the cause, insuring a high caloric, high protein diet and administering ferrous sulfate (15 gr. daily). Transfusions are helpful when the condition is discovered late in pregnancy.

Pernicious anemia of pregnancy (megaloblastic anemia) is to be suspected if anemia develops during pregnancy without cause, is severe or fails to respond to iron therapy. The diagnosis depends on finding megaloblasts in the bone marrow. Typically the peripheral blood shows severe macrocytic anemia, but it may simulate other types of anemia. Complete recovery follows delivery, and the child is healthy; the problem is therefore control of the anemia during pregnancy. This consists of repeated blood transfusions and administration of liver orally and parenterally. Iron is administered only if the hemoglobin concentration is low.

Alterations of the hemoglobin and erythrocyte count are also associated with other blood dyscrasias which rarely occur in pregnancy. These should be readily diagnosed, however, with adequate study of the peripheral blood and bone marrow.

In general, restoration of normal erythrocyte and hemoglobin levels during and after pregnancy is easily and swiftly accomplished by liberal use of transfusions with compatible blood. The amount of blood used should be determined by the effect of transfusion on the blood count.

[There should be no need to emphasize the first paragraph of this article, but unfortunately there is. There are innumerable pregnant women, even under the care of physicians, who go through pregnancy without any blood studies at all. Health departments in every state should make an Rh determination and blood grouping as compulsory as is the Wassermann or Kahn test in many states.

S. C. Callender (J. Path. & Bact. 58:586-589, July, 1946) examined the sternal marrow of 19 healthy pregnant and puerperal women and 10 nonpregnant women. There was no evidence of an erythroblastic reaction in pregnancy, but there may be slight hyperplasia in the late weeks of pregnancy and early days of the puerperium. J. H. Hodges and J. B. Bernstine (Am. J. Obst. & Gynec. 54:108-113, July, 1947) add 4 cases of sickle cell anemia in pregnancy to the 20 already reported.—Ed.]

Retrodisplaced Gravid Uterus is discussed by H. H. Fouracre Barns[2] on the basis of observations in 66 cases. Abortion is no commoner in patients with retrodisplaced gravid uteri than in those with the uterus in other positions. Operative correction of retrodisplacement because of previous abortion is not warranted. Patients with this condition should be observed and treated as for habitual abortion with additional measures directed at preventing incarceration.

Incarceration may occur between the thirteenth and the sevcnteenth week of pregnancy. Its cardinal symptom is urinary retention of sudden onset with lower abdominal pain.

No active treatment is necessary before the twelfth week of pregnancy, but passive postural measures should be adopted before this time. Spontaneous anteversion occurs in many patients during the early weeks with or without the aid of postural correction. Patients should sleep in the Sims or in the full prone position during this period.

If retroversion persists to the twelfth week, the patient should be hospitalized, a large rubber watch spring pessary inserted and postural treatment continued under supervision. If such measures fail after a few days' trial, manual reposition should be attempted, with or without use of an anesthetic. Once the uterus is anteverted, a watch spring pessary is inserted to help retain anteversion and is worn until the fundus approaches the umbili-

(2) Brit. M. J. 1:169-172, Feb. 1, 1947.

cus at about the twentieth week. There are few cases in which these measures are not successful.

If incarceration occurs, treatment is directed to the bladder, which is decompressed slowly by continuous catheterization. Beginning immediately, successive 24-48 hour trials of postural treatment and pessary are made, followed by manual reposition if necessary. Urinary antiseptics should be given in all cases.

[I have rarely had to elevate a retroflexed pregnant uterus and insert a pessary and have done so only in cases of obstruction of urine. I have operated only once for an adherent retroflexed uterus with blockage of urine. In nearly all pregnant women the retroflexed uterus rises out of the pelvis spontaneously and there is no need to manipulate the uterus. I believe much more harm has been done by forcible efforts to elevate retroflexed pregnant uteri than by leaving them entirely alone.—Ed.]

Report from Cardiac Clinic of Boston Lying-in Hospital for First 25 Years is made by Burton E. Hamilton,[3] who reports that during this period 1.8 per cent of all pregnant women treated at this hospital had heart disease. The maternal death rate in this group of 1,335 patients was 3.9 per cent.

Maternal mortality of cardiac patients dropped suddenly when modern methods for control were made effective. This indicates that in pregnant women with chronic rheumatic heart disease treatment rather than the vagaries of rheumatic fever is the greatest factor in prognosis.

Patients with chronic rheumatic heart disease comprised 93 per cent of the cardiac group. These patients were divided into favorable and unfavorable groups. A woman with minimal or more than minimal signs of rheumatic heart disease who is able to carry on moderate activity without having heart failure and who has no dangerous complicating condition is classified as favorable.

Statistically, pregnancy costs favorable patients little, if any, more risk than their risk of death in one year of ordinary life, but it costs unfavorable patients a risk nearly three times greater and those with auricular fibrillation a risk four times greater.

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(3) Am. Heart J. 33:663-668, May, 1947.

Congestive heart failure accounted for 64 per cent of the deaths among unfavorable patients but only 12 per cent among favorable ones.

By direct study of physiologic changes in circulation attributable to a normal pregnancy, it has been determined that the load is small until the sixth calendar month, when it rises steeply to roughly 50 per cent above normal. Usually this level is maintained until the last calendar month, when it falls off until term. This fall amounts to approximately half the greatest rise. This lightening of the load in the last month has led to a general principle that in patients with severe heart disease, even when they have had or have congestive failure, pregnancy is not to be interrupted for cardiac reasons after the load on the circulation has once grown heavy. This is a major change in obstetric practice. The mothers have done better and certainly infant mortality has improved since the present rule was adopted. Cardiac patients are allowed to go into labor and are delivered vaginally unless there is an indication for hysterotomy that is not related to heart disease.

Obstetric Management of Pregnancy Complicated by Heart Disease. D. Nelson Henderson[4] (Univ. of Toronto) reviews 200 pregnancies complicated by heart disease, the patients being divided into three groups according to the severity of the heart disease: group 1, patients without impairment or with very slight impairment of exercise tolerance; group 2, those with moderate to severe impairment of exercise tolerance, and group 3, those with extreme impairment or cardiac failure. In 30 patients, all in group 2 or 3, pregnancy was terminated before the sixth month; in 22 of these, sterilization was combined with therapeutic abortion. Of the 170 patients who reached the period of fetal viability, 87 were in group 1, 62 in group 2 and 21 in group 3; in 40, onset of labor was premature, resulting in a fetal mortality of 17 per cent.

Management during labor consists of giving sufficient

(4) Am. J. Obst. & Gynec. 53:494-499, March, 1947.

sedation during the first stage to relieve pain and anxiety and to provide adequate rest. The exhausting second stage is frequently shortened by forceps delivery under ether and oxygen or cyclopropane anesthesia. Since 1933 cesarean section has not been performed because of heart disease. The avoidance of a serious abdominal operation, with an appreciable operative mortality in a "poor risk" patient, probably has contributed to lower morbidity and mortality rates. During the puerperium, all patients are advised to remain in bed for 14 days. Those in groups 2 and 3 are given more prolonged bed rest, the time varying according to individual requirements.

The mortality rate for the whole series was 4 per cent, and for those under control throughout pregnancy, the rate was 2.2 per cent. The high fetal loss (17 per cent) in the 40 cases of premature labor is disturbing, since repeated pregnancy is inadvisable in this group of patients. The only apparent solution is more rest in bed during the seventh and eighth months for all patients in group 2.

[In every maternity hospital and in all properly conducted obstetric departments of general hospitals there are now expert cardiologists who look after the charity patients with heart disease. The supervision of these women has resulted in a drastic reduction in maternal mortality from cardiac disease. Surely private patients with heart disease should also be under the care of cardiologists. Co-operation between obstetricians and heart specialists not only will result in the saving of many lives but will prevent painful surprises in the form of cardiac decompensation during labor and the early puerperium.

E. Brown, J. J. Sampson, E. O. Wheeler, B. J. Gundelfinger and J. E. Giansiracusa (Am. Heart J. 34:311-333, September, 1947) found that even though the evidence as a whole is inconclusive, the close analogy which has been demonstrated between the changes in blood volume, hematocrit and venous pressure taking place at delivery and changes known to follow obliteration of large arteriovenous fistulas suggests that the uterus at term contains a shunt of important proportions. The repeated uterine contractions of normal labor by temporary occlusion of the placental circulation may prepare the cardiovascular system for permanent occlusion of the shunt. This may explain the clinical impression that vaginal delivery is tolerated as well as or better than cesarean section by patients with serious heart disease.

V. M. Aviles (Obst. y ginec. latino-am. 4:571-584, August, 1946) reports 472 cases of cardiac disease among 52,485 pregnant women. There were 49 cases of heart failure, but only 5 women died. Abor-

tion was induced in only five cases. M. E. Davis and R. F. Wortmann (Am. J. Obst. & Gynec. 53:878-880, May, 1947) report apparently the first case of subacute bacterial endocarditis which developed during pregnancy, was cured by penicillin and was followed by birth of a living child.—Ed.]

Pregnancy Complicating Tuberculosis: Survey for 11 Year Period. C. J. Barone, J. A. Fino and L. H. Hetherington[5] (Univ. of Pittsburgh) report that in 11 years 28,846 patients were delivered at Elizabeth Steel Magee Hospital. The group included 103 patients with known pulmonary tuberculosis, an incidence of 0.35 per cent. Clinical surveys for a 5-15 year period were available for 62 of these patients, and they provide the basis for the present report.

Gross mortality was 33.8 per cent (21 deaths). The corrected final mortality was 30.6 per cent after two deaths were excluded, one being due to tertiary syphilis and the other to collapse during a thoracoplasty. Mortality for the primiparas was 21 per cent and that for multiparas 32.5 per cent. Twenty-six patients delivered spontaneously, with a mortality of 19.2 per cent. There were 11 cesarean sections, with a mortality of 36.3 per cent, and mortality was 38.5 per cent in 25 patients for whom therapeutic abortions were performed.

Of the 62 patients, 61.5 per cent had moderately advanced or far advanced active tuberculosis. The mortality in this group was 44.8 per cent, including that for therapeutic abortions and all types of deliveries. Fetal mortality was 1.34 per cent, the 62 patients giving birth to 149 viable infants. In both primiparas and multiparas, mortality was higher in the younger groups.

In this survey the best results were obtained in patients whose delivery was spontaneous regardless of extent of tuberculosis.

[Perhaps some day, *every* pregnant woman will have an x-ray picture of her chest, just as I hope the day will arrive when *all* gravida will have complete blood counts, Rh determinations, Wassermann or Kahn determinations and proper prepartum care. I am afraid that day is far off unless socialized medicine becomes a reality and is the medium for carrying out this program. Recently a law was passed in Buenos Aires (J. A. M. A. 134:1505, Aug.

(5) Am. J. Obst. & Gynec. 54:475-487, September, 1947.

23, 1947) making a pulmonary x-ray examination of pregnant women obligatory and free of charge for all who visit the municipal maternity hospitals.

It is now almost universally recognized that pulmonary tuberculosis is not harmed by pregnancy if the prospective mother secures proper care. A study made by E. Bridge (Am. Rev. Tuberc. 55:471-475, May, 1947) of 97 women who were discharged from the Iola Sanatorium, Rochester, N. Y., and who had 152 children revealed results comparing favorably with those in women who have never had children. L. Bluhm (Acta med. Scandinav., supp. 197, vol. 128, 1947) studied 121 cases at the Central Dispensary, Stockholm, and found that since pregnancy hardly influences the course of tuberculosis, abortion is not necessary even in cases of active pulmonary tuberculosis. Of great importance, however, is proper control, sanatorium care and, if necessary, collapse therapy. Most obstetricians and phthisiologists agree on these recommendations.

There is a fairly common belief that tuberculosis is often associated with twins. L. Portes, A. Granjon and Heuville (Gynéc. et obst. 46:112-115, 1947) studied 3,011 tuberculous women observed at the Baudeloque Obstetric Clinic in Paris and found that this belief is false.—Ed.]

Routine Chest Roentgenograms in Pregnancy: Supplementary Study. From results in 2,067 cases, Hervey K. Graham[5a] (Rees-Stealy Clinic, San Diego, Calif.) believes the effort and expense involved in this procedure are justified. He summarizes the findings in these cases, 800 of which were previously reported.

Of the original 800 patients, 1 per cent had active tuberculosis, 3 per cent had clinically significant chest lesions, and 26.1 per cent evidenced tuberculous contact (calcifications with or without fibrosis). Evidence of former pleurisy was found in 5.8 per cent and of upper and lower respiratory tract infection in 9.1 per cent. Roentgenograms were negative in 55 per cent.

In the present series of 1,267 patients, 0.6 per cent had active tuberculosis, and 3.6 per cent evidenced clinically important lesions. Calcifications and, occasionally, slight fibrosis were found in 45 per cent of cases. More detailed reporting might account for this increased percentage over that found in the first series. No attempt was made to determine incidence of positive reactions to intradermal histoplasmin, but this factor might explain the high incidence of calcifications. Evidence of old pleurisy

(5a) West. J. Surg. 55:438-440, August, 1947.

was present in 8.3 per cent of this second series and of repeated respiratory infection and bronchial allergy in 10.3 per cent.

Of the 2,067 patients, then, 0.77 per cent showed active tuberculosis, 3.44 per cent clinically significant lesions and 37.69 per cent calcifications. Evidence of old pleurisy was found in 7.45 per cent and of repeated respiratory infection in 9.87 per cent.

Fibroids in Pregnancy: Analysis of 122 Cases Treated in University College Hospital, London, from 1934 to 1945, is reported by E. W. C. Buckell[6] (Univ. of London). Incidence was 0.79 per cent, or 122 cases in 15,313 deliveries. Average age was 34.3 years, and 20.5 per cent were primigravidas, aged 36 years or older.

Only 40 per cent of the patients had normal pregnancies. Abortion took place in 17, and premature labor occurred in 10. Thus, premature interruption of pregnancy took place in 22.1 per cent of the cases, and fetal mortality in these cases was 79.3 per cent.

Red degeneration was the most frequent complication, occurring in 18 per cent of the patients. All except two were treated conservatively. In these two myomectomy was performed at the twelfth and eighteenth weeks, respectively, without disturbing the pregnancy. One of these patients was not delivered at this hospital, and the other had a forceps delivery of a healthy child at term.

Effects of fibroids on labor are summarized. Of 88 patients delivered at this hospital, 50 had normal labor (57 per cent), although it was premature in 7. In the remaining 38 patients, primary uterine inertia occurred in 9.1 per cent; forceps deliveries were made in 12.5 per cent, and cesarean section was performed in 25 per cent.

Postpartum hemorrhage occurred in only 2 (3 per cent) of the 66 patients delivered vaginally.

Puerperal morbidity was noted in seven patients but could be attributed to presence of fibroids in only two.

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(6) J. Obst. & Gynaec. Brit. Emp. 54:70-76, February, 1947.

There were three maternal deaths, all resulting from operative intervention. The fetal and neonatal death rate was 11.1 per cent.

Frequency of complications in pregnancy, labor and the puerperium and the high fetal and maternal death rate show that the presence of fibroids is a serious complication.

[This report is unusually pessimistic. Unless fibromyomas obstruct delivery, and this is rare, there are few serious complications for the mother, but the fetus is more endangered than in cases without neoplasms. Three maternal deaths in 122 cases is high. Also, the incidence of 25 per cent for cesarean section is excessive unless only patients with large and degenerative tumors were included in this series. Myomectomy during pregnancy is rarely necessary. There were only two in this series, and in these cases pregnancy continued. On the other hand, E. F. Anderson (West. J. Surg. 55:273-277, May, 1947) reported five myomectomies during gestation; three women aborted, and two had living children. —Ed.]

Edema in Pregnancy is considered by Willard R. Cooke[7] (Univ. of Texas) to be divisible into two groups: the insignificant and the significant, using these terms in their basic definition and not as a measure of the degree or amount of edema.

Among insignificant edemas may be classified: (1) the physiologic edema of pregnancy, (2) edema from venostasis of the lower extremities, (3) edema incident to simple hypertension and (4) edema of apparently allergic origin.

Among significant edemas are the following.

1. Pre-eclampsia and eclampsia. Although edema is ordinarily the earliest and, therefore, the most valuable warning of eclampsia, it is not diagnostic nor is it a quantitative index to the severity or the rapidity of progress of the toxemia. The most highly fatal type of eclampsia is the so-called dry type, in which gross evidence of edema may be entirely lacking. The edema of eclampsia may be reduced, but little is accomplished thereby, and the physician must guard against being misled as to the actual progress of the disease.

2. Nephritis. Presence or absence of edema has ceased

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(7) Texas Rep. Biol. & Med. 5:22-25, 1947.

to be significant, since the consensus is that pregnancy should be always terminated in severe or progressive nephritis.

3. Cardiac incompetency. Edema is relatively insignificant among the many criteria.

4. Edema incident to varices.

Occurrence of edema should always indicate prompt and intensive search for its cause.

Survey of Relation between Epilepsy and Pregnancy was made by C. W. F. Burnett[8] (West Middlesex County Hosp.), who concluded from the literature that pregnancy has a completely unpredictable influence on epilepsy. Records of 19 pregnancies of 16 epileptic patients were analyzed, only 1 of whom had a family history of epilepsy. None of the infants showed evidence of inheriting the disease. Of four patients with menstrual epilepsy, three became worse during pregnancy and one remained unaffected. Gestational epilepsy occurred in two patients, and seizures continued after delivery. With inclusion of these 2 patients, 8 became worse during pregnancy; 1 was improved, and 10 were unaffected.

Six patients had one or more signs of toxemia; three of these became worse during pregnancy, and three were unaffected.

Premature interruption of pregnancy did not occur. Labor and the puerperium were normal in all but one patient, who had a postpartum hemorrhage with blood loss of 35 oz.

Fourteen of the infants were breast fed, and in no case was the epilepsy aggravated by lactation.

The mechanism by which the adverse strain of pregnancy might affect the susceptible person with cerebral dysrhythmia includes the following factors: water retention, carbon dioxide deficiency, hypocalcemia and, possibly, altered hormonal relations.

On the other hand, improvement in the epileptic pregnant woman might conceivably result from ketosis occurring in early pregnancy or alterations in function of

(8) J. Obst. & Gynaec. Brit. Emp. 53:539-556, December, 1946.

ammonium chloride a day, if the patient has edema, and substitutional estrogen and progesterone therapy. Intramuscular injections of stilbestrol and progesterone are advocated. The plan for dosage is as follows: up to the twentieth week, 5 mg. of each given intramuscularly every day; between the twentieth and twenty-fourth weeks, 10 mg.; between the twenty-fourth and twenty-eighth weeks, 15 mg.; between the twenty-eighth and thirty-second weeks, 20 mg.; between the thirty-second and thirty-sixth weeks, 25 mg., and from the thirty-sixth week to delivery, 30 mg. In the past two years early and aggressive treatment has coincided with a drop in abortion and miscarriage incidence to zero. The 90 per cent survival rate represents the entire pregnancy.

Premature delivery (end of the thirty-seventh or early in the thirty-eighth week) is advocated. Two thirds of the patients were delivered by cesarean section performed under spinal anesthesia without preliminary sedation. If normal delivery occurs, medication should be kept to a minimum. Special care is required for the infant.

[B. S. Tenberge and F. J. J. Van Assew (Nederl. tijdschr. v. geneesk. 91:1229-1233, May 17, 1947) reported a series of 20 pregnancies in 16 diabetic women kept on a rigid diet and, when necessary, treated with insulin. Seventeen children were born normally. Only three patients showed signs of intoxication. The authors advise induction of labor if symptoms of intoxication do not disappear after a salt-free diet and bed rest.

In a report of the cases of pregnancy associated with diabetes observed at the Mayo Clinic, Randall (Am. J. Obst. & Gynec. 54:618-625, October, 1947) mentions that his experience with Priscilla White's correlation of hormone imbalance is limited to eight cases. In six of these, the babies survived. Cesarean section was performed in two cases associated with toxemia, and both infants lived. In the entire series of Mayo Clinic cases, the fetal survival rate was 96.2 per cent for the cases in which cesarean section was performed, and 62.5 per cent for those who had vaginal deliveries. All of these mothers survived. I wish others would report their experience in treating diabetic, pregnant women with hormones.—Ed.]

Hydatidiform Mole: Pathologicoclinical Correlation of 200 Cases is presented by Arthur T. Hertig and Walter H. Sheldon[1] (Harvard Univ.), who graded these

(1) Am. J. Obst. & Gynec. 53:1-36, January, 1947.

Fig. 3 (top).—Benign hydatidiform mole, showing portions of three villi in varying stages of hydatid degeneration; reduced from × 110. The trophoblast is normal or at most only slightly hyperplastic. Patient was well 11 years later.
Fig. 4 (bottom).—Probably benign hydatidiform mole, showing moderate trophoblastic hyperplasia, mostly confined to the syncytium; reduced from × 110. Patient had child five years later.
(Courtesy of Hertig, Arthur T., and Sheldon, Walter H.: Am. J. Obst. & Gynec. 53:1-36, January, 1947.)

cases histologically to determine whether or not a correlation exists between the histologic appearance and subsequent development of chorionic malignancy.

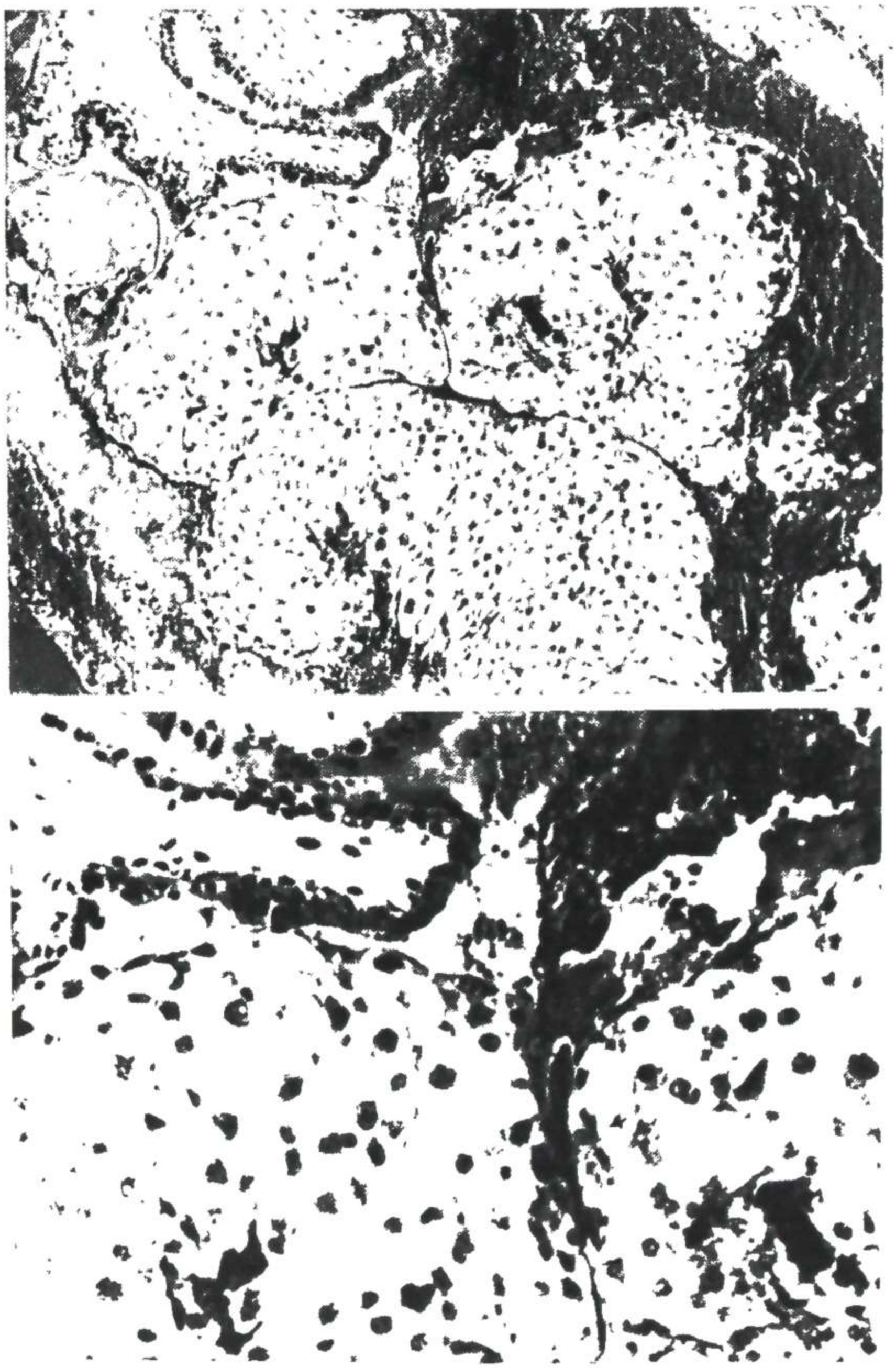

Fig. 7 (top).—Material removed by curettage from malignant mole obtained day after spontaneous delivery of probably malignant hydatidiform mole; reduced from × 110. This is second instance of original molar tissue resembling morphologic chorioncarcinoma. High power detail is seen in Figure 8. Patient died one year later of chorioncarcinoma.

Fig. 8 (bottom).—Higher power detail of malignant trophoblast shown in Figure 7 reduced from × 250. Note benign-appearing villus at upper left. Large pale epithelial cells are malignant cytotrophoblasts, whereas occasional dark cells are syncytiotrophoblasts.

(Courtesy of Hertig, Arthur T., and Sheldon, Walter H.: Am. J. Obst. & Gynec. 53:1-36, January, 1947.)

eral activity and moderate anaplasia of the trophoblast.

5. Probably benign (39 cases, 20 malignancies). These are characterized by variable hyperplasia and marked anaplasia.

6. Malignant (17 cases, all showing various degrees of morphologic and/or clinical malignancy). These are marked by exuberant hyperplasia and marked anaplasia of the trophoblast, often invading the endometrium. Included are the following: (1) chorionepithelioma in situ—morphologic malignancy plus endometrial invasion; (2) syncytial endometritis—accentuation of syncytial placental site giant cells plus chronic infection; (3) chorionadenoma destruens—invasion of myometrium by malignant mole without metastasis, and, (4) chorioncarcinoma—variable picture in uterus (Figs. 5-8) but invariable metastases cause death.

In view of the proved curability of all grades of chorionic malignancy except chorioncarcinoma, it seems reasonable to adopt a conservative attitude regarding the pathologicoclinical approach to hydatidiform moles. Adequate pathologic examination of molar tissue and tissue removed by curettage, done at the time of operation, is valuable but not of absolute diagnostic or prognostic significance. The more malignant the mole appears morphologically, the more likely it is that some form of chorioma will develop. Therefore, clinical malignancy is in proportion to the degree of apparent pathologic malignancy. Such clinical malignancy (except in some chorioncarcinomas) is usually indicated by subinvolution of the uterus and bleeding, which indicates the need for repeated curettage and, probably, hysterectomy. Chorionic gonadotrophic hormone tests are of slight or equivocal value during the period when treatable clinical malignancies are first developing, i.e., about 35 days after expulsion of the mole. By the adoption of a conservative attitude, many uteri will be saved that are now needlessly removed.

[This is a very important contribution by two outstanding pathologists, and I hope the authors will continue their studies. As they emphasize, the incidence of neoplasms which lead to

Es for enlargement and softening of the uterus. These criteria may be used as early as three or four weeks after abortion or mole expulsion.

Rapid development of ovarian cysts within three weeks after mole expulsion or their nonregression, especially when accompanied by an enlarged uterus, is another clinical sign of chorionepithelioma.

The Friedman test is of value in the follow-up or in determining the presence of metastasis after the primary site of the tumor has been removed radically. It should be used routinely in all follow-ups.

Diagnostic curettage is done in cases in which diagnosis cannot be made on the basis of HBEs.

Negative diagnostic curettage in the presence of HBEs is not significant, because the chorionepithelioma may be in the myometrium beyond the reach of the curet.

[In most instances of suspected hydatid mole and chorionepithelioma, Aschheim-Zondek and Friedman tests are carried out because they are reliable. A. I. Weisman and C. W. Coates (J. Clin. Endocrinol. 7:289-292, April, 1947) successfully diagnosed hydatid mole by using the South African frog. Generally, the Friedman test performed on the cerebrospinal fluid is positive in the presence of hydatid mole. M. Garcia-Huidobro and L. Paredes (Bol. Soc. chilena de obst. y ginec. 11:31-34, June, 1946) obtained one negative Friedman test among 4 cases of hydatid mole, but they attribute this to the small amount of spinal fluid used for the test. Ten cc. spinal fluid should be used. At the San Borja Maternity, S. H. Cabrera (Bol. Soc. chilena de obst. y ginec. 11:107-111, August, 1946) found 94 cases of hydatid mole among 77,947 pregnancies. In no case has a chorionepithelioma developed. L. Gohstand (M. J. Australia 1:434-435, Apr. 5, 1947) reports hydatid moles in females 49 years and 55 years 4 months (verified by the Registrar-General's Department). Essen Moeller and others believe that hydatid moles which occur after 40 years of age are more likely to be followed by chorionepithelioma than moles expelled by younger women, hence after age 40 and especially after 45, hydatid mole is treated by hysterectomy.

Whereas it is well known that hydatid moles are not infrequent after 40 years of age, it is not generally recognized that chorionepitheliomas can occur at a very early age. M. A. Van B. Bastiaanse and W. P. Plate (Nederl. tijdschr. v. verlosk. en gynaek 44:47-71, 1941) reported a chorionepithelioma of the ovary in a virgin, 15. They reviewed the literature and found cases of chorionepitheliomas in girls, 6, 7 and 8 years old.—Ed.]

Fissura Uteri Peritonealis from Spontaneous Rupture of Subserous Vessels in General Weakness of Veins. Several cases of rupture of internal varices have been re-

ported and a few cases of fissura uteri peritonealis, in which, after premature expulsion of the placenta, rupture of the perimetrium occurred, in one case associated with rupture of a part of the uterine musculature. The mechanism of the rupture was explained as due to excessive stretching of the uterus. H. K. v. Rechenberg[7] reports a case of intra-abdominal hemorrhage with partial rupture of the uterus in pregnancy.

Woman, 36, who had had two normal deliveries and two abortions, was treated during her fifth pregnancy for varices first in the legs and later in the vagina. At the end of pregnancy, but before onset of labor, she had severe abdominal pains unlike normal labor pains. Uterine tetanus set in, and cesarean section was performed. In addition to signs of old and fresh bleeding in the peritoneum, a rupture was found in the posterior surface of the cervix extending into the uterine musculature. There was profuse venous bleeding from the rupture. After ligation of the uterine artery, the postoperative course was satisfactory. Mother and child were discharged in good condition.

The author believes there are no grounds for assuming that in this case the myometrium was damaged. His explanation is that a spontaneous rupture occurred in the region of the internal varices which caused the vaginal bleeding. At first there was a small rupture, then a large one which caused hemorrhage into the myometrium. Then with the internal pressure on the myometrium increasing to the bursting point, the rupture proceeded in the direction of least resistance, that is, toward the free abdominal cavity and into the peritoneum.

The maternal mortality in fissura uteri peritonealis is estimated at 65 per cent. The infant mortality is not known, but most of the children died.

[C. T. O'Connor and J. J. Bradley (New England J. Med. 235:648-650, Oct. 31, 1946) report a case of retroperitoneal hemorrhage complicating pregnancy. This is the only case in which recovery took place. The hemorrhage produced dystocia, necessitating cesarean section.—Ed.]

Management of Ovarian Tumors Complicating Pregnancy is discussed by Henry C. Falk and Irving A.

(7) Schweiz. med. Wchnschr. 77:357-359. Mar 22, 1947.

Bunkin[5] (New York City). Ovarian tumors occur most frequently during the childbearing period but do not necessarily prevent conception or complicate pregnancy. The commonest complications during pregnancy are torsion of the pedicle, intracystic hemorrhage and suppuration. Appropriate treatment of an ovarian tumor depends on time of discovery of the tumor in relation to pregnancy.

Of tumors discovered preconceptually, the small ovarian cyst (5 cm. or less in diameter) is usually one of the group of functional cysts and is rarely a cause for concern. Larger cysts should be removed, as should suspected dermoids or solid tumors, regardless of size. If the solid tumor is single and encapsulated, conservative oöphorectomy is the best procedure in the young nulliparous woman desirous of having a child. Radical operation is reserved for patients beyond the age of reproductivity, or for those in whom both ovaries are involved.

Since an ovarian tumor discovered in the first trimester of pregnancy may contain the corpus luteum, it is wise to delay extirpation until the placenta has definitely superseded the corpus luteum. However, such tumors may be removed safely during the first trimester under general anesthesia, preferably with cyclopropane.

In the second trimester of pregnancy, surgery is indicated as soon as the diagnosis of ovarian tumor is made. Possible endocrinologic deficiencies do not confuse the issue in this trimester.

Medium-sized and large cysts discovered in the third trimester should not be removed unless an emergency arises. If such a cyst creates the problem of dystocia, it should be removed at term at the time of elective cesarean section. If delivery occurs naturally, the cyst should be removed soon afterward because of the potential danger of torsion and infection.

Cancer of Cervix and Pregnancy. Among 4,000 cases of cancer of the cervix, Conrado Zuckermann[6] found co-

(5) Am. J. Obst. & Gynec. 54:82-87, July, 1947.
(6) Ginec. y Obst. de Mexico 2:263-272, July-Aug., 1947.

incident pregnancy in 7, an approximate incidence of 1 in 600. The last two cases are reported.

Case 1.—Woman, 25, had had five previous pregnancies. Clinical manifestations of cervical cancer were not noted until the onset of the sixth pregnancy. Treatment consisted of panhysterectomy during the fifth month, followed by radiotherapy.

Case 2.—Woman, 42, who had had 15 previous pregnancies, had been delivered of a living infant by cesarean section 2½ months before admission. Cancer of the cervix apparently developed during this last pregnancy. Panhysterectomy was followed by radiation. Histologic examination of the uterus revealed that neither pregnancy nor puerperium had aggravated the condition, as the lesion was limited to the cervix.

Zuckermann reviews the literature and presents the views of various authors on the subject of cervical cancer coincident with pregnancy. His management of cervical cancer associated with pregnancy is described. In operable cancer (restricted to the cervix) before the end of the sixth month, the patient is treated by radical surgery and radiotherapy, without considering the fate of the fetus; after the sixth month, an attempt is made to save the infant. In inoperable cancer (with invasion of extracervical regions) before the sixth month, radiotherapy is given to improve the mother's condition; after the sixth month, the fetus is removed before the mother is given radiotherapy. In every case of cancer of the cervix associated with pregnancy, the physician should study scrupulously all the pertinent conditions before deciding on the course of treatment. He should aim at saving both lives, giving preference to the mother if there is possibility of curing her and if it is almost certain that the fetus will not attain viability.

[Carcinoma of the cervix associated with pregnancy is one of the rarest combinations, despite Zuckerman's high incidence of 1 in 600. George Gray Ward (J. Mt. Sinai Hosp. 14:674-678, Sept.-Oct., 1947), one of the foremost gynecologists in the world, reported that in the Woman's Hospital in New York during the last 19 years there were 10 cases of malignancy of the cervix among 36,274 obstetric cases, an incidence of 0.032 per cent.—Ed.]

Genital Cancer and Pregnancy. Jorge de Rezende[7] (Rio de Janeiro) believes that there is a hereditary general predisposition to cancer which ordinarily associates

(7) Sixth Argentine Congress of Obstetrics and Gynecology, 1946.

itself with an organ or anatomic system. The extrachromosomal theory of breast cancer deserves consideration. Women with familial histories of breast tumors or with tumors should never nurse their girl infants.

Association of genital cancer with pregnancy is rare. Cancer of the cervix coinciding with pregnancy is the most infrequent of all malignant tumors situated in the female genital apparatus. The incidence of cervical cancer in women within the reproductive cycle is 0.02 per cent. The incidence of pregnancy in women with cervical cancer is 0.34 per cent. The percentage of tumors in other parts of the female genital apparatus is without importance because they are extremely rare.

The oncogenetic action of pregnancy has not been proved satisfactorily. The influence of pregnancy on genital cancer varies with individuals and types of tumor; thus pregnancy may accelerate, retard or have no influence on the evolution of cancer. The influence of genital cancer on pregnancy, labor and puerperium is harmful. Transmission of some tumors to the fetus is possible but rare.

The general rules of treatment of cervical cancer during pregnancy must be eclectic, taking into consideration the operability of the tumor and the viability of the fetus. In view of the complexity of the problem, it is difficult to suggest a therapeutic procedure which should be modified according to cases, but the following scheme will serve as a guide: (1) for operable cancer and nonviable fetus, Wertheim's operation and roentgen therapy; (2) for operable cancer and viable fetus, Wertheim's cesarean section and, subsequently, roentgen therapy; (3) for inoperable cancer and viable fetus, cesarean section followed by subtotal hysterectomy and by radium and roentgen therapy when the patient's condition permits; (4) for inoperable cancer and nonviable fetus, radium therapy by the vaginal route until death of the fetus, when cesarean section must be performed, followed by subtotal hysterectomy and, later, radium and roentgen therapy. Irrespective of the condition of the cervix, de-

livery by the natural route must be avoided; cesarean section is preferred. Although radium therapy during pregnancy offers less risk than deep roentgen therapy, it must always be given through the vagina, and technical precautions to diminish danger to the fetus should be used.

Effect of Diphtheria on Pregnancy, with Report of Five Cases. In five cases of diphtheria gleaned from the records of 50,000 deliveries in Johns Hopkins Hospital in the past 50 years, David Robinson, Paul Hardy and L. M. Hellman[8] (Baltimore) found no evidence that the disease altered the course or outcome of pregnancy. Nor did pregnancy alter diphtheria. The authors believe that pregnant patients with diphtheria should be treated similarly to nonpregnant patients with diphtheria, antitoxin being given and chemotherapy used for secondary infection. Though the incidence of abortion among patients with diphtheria has been reported to be as high as 33 per cent, no abortion occurred among the authors' patients. No evidence was found in the literature or in these cases to suggest that diphtheria toxin passes the placental barrier.

Treatment of the Syphilitic Pregnant Woman with Penicillin in Oil-Beeswax: Comparison with Results Obtained Using Aqueous Sodium Penicillin. In an extended study made by Norman R. Ingraham, Jr., Elizabeth Kirk Rose, Herman Beerman, Virgene S. Wammock, John H. Stokes and Paul György,[8a] aqueous sodium penicillin in total dosages of 1.2 and 2.4 million Oxford units given at three to four hour intervals for 8-10 days showed better results than any previously employed method of treatment. Included in the study were 44 cases of symptomatic early, 36 cases of early latent and 12 cases of late syphilis. Of the 92 mothers, all but 13 were followed for from six months to more than two years after treatment.

The clinical response to aqueous sodium penicillin in pregnancy was at least equal to that found generally in

(8) Am. J. Obst. & Gynec. 53:1029-1035, June, 1947.
(8a) J. Ven. Dis. Inform. 28:155-161, August, 1947.

the treatment of symptomatic early syphilis with 1.2 or 2.4 million units. The incidence of clinical relapse was 5.4 per cent. Two patients were reinfected after more than two years.

Forty-five mothers were treated with a total dosage of 4.8 million Oxford units of amorphous calcium penicillin in peanut-oil beeswax over a period of nine days. The results were almost as good as with aqueous sodium penicillin. In the penicillin in oil-beeswax series there were 2 syphilitic among 41 living offspring as compared with 2 among 89 in the aqueous penicillin group.

Penicillin in oil-beeswax appeared to be a satisfactory substitute for aqueous penicillin when hospitalization was not possible or in latent stages of the disease. For symptomatic early syphilis in late pregnancy, better results are obtained more uniformly by hospitalization and use of aqueous penicillin.

[There is no doubt that penicillin is the most effective drug we possess for the treatment of syphilis in pregnancy, as well as in the nonpregnant state. However, in pregnant women at least 2,400,000 units should be given over several days if penicillin is the only drug used. M. Speiser, G. Pflaum, D. Moon-Adams and E. W. Thomas (J. Ven. Dis. Inform. 28:108-120, June, 1947) report that at Bellevue Hospital they are using a total dose of 4,000,000 units (40,000 units every three hours for 100 doses). Nonsyphilitic babies may be born regardless of the period of gestation in which penicillin therapy is started. In a series of 81 infants delivered of women treated with penicillin for early infectious syphilis in pregnancy H. C. S. Aron, R. L. Barton and T. J. Bauer (Arch. Dermat. & Syph. 56:349-356, September, 1947) reported that there was only one infant death, possibly due to syphilitic infection, a death rate of only 1.24 per cent. This is indeed a remarkable record. H. Vignes of Paris (An. brasil. de ginec. 12:1-3, January, 1947) maintains that early and intensive treatment of syphilis in pregnancy will decrease the incidence of monsters. I do not agree with this statement because it has not been shown that syphilis plays an important role in the causation of fetal monstrosities.

Although the Wassermann and Kahn tests are important diagnostic aids, they must be properly evaluated because, after all, they are not infallible. Errors in technic and in reporting may occur. Certainly if one of the tests is reported as positive, it should be repeated, preferably in two different laboratories. In an extensive monograph, K. Penttinen (Acta obst. et gynec. Scandinav., supp. 3, vol. 27, 1947) reported the Wassermann and Kahn reactions in 20,145 women in Finland. He concluded that pregnancy does not interfere with the reliability of these tests. False posi-

tive tests appeared in pregnant as well as in nonpregnant women. Although the percentage of false positive results based on the total number of cases is small, the incidence based on only the positive cases was relatively high. Thus 25.1 per cent of all the positive reactions were misleading, and at least 28 per cent of the positive tests of the cord blood were wrong.—Ed.]

Pregnancy and Typhoid-Paratyphoid Fever. Hannes Sauramo[9] (Helsinki) reports 24 cases of paratyphoid and 3 of typhoid occurring in women during pregnancy and the puerperium during an epidemic in 1945. None of the patients had been vaccinated previously. Only a few cases were typical of typhoid or paratyphoid disease. Fever was often the only symptom suggestive of typhoid or paratyphoid during the epidemic. In 16 patients whose illness developed in the last stages of pregnancy, delivery took place 1-11 days after the first symptoms appeared, except in 1 patient in whom it occurred 4 weeks thereafter and in 1 patient on whom cesarean section was performed because of threatened fetal asphyxia. There were no puerperal disturbances, and all but one patient recovered. Of the 16 infants, 9 were premature; 3 of these died. Sulfathiazole, given prophylactically because of the difficulty in making a differential diagnosis between puerperal fever and paratyphoid, had no effect and thus served as a more rapid diagnostic means than serobacteriologic examination. Laboratory tests showed paratyphoid in all 16 patients.

Three additional patients became ill during the puerperium, one with typhoid and two with paratyphoid. The puerperium was normal.

In seven patients, the disease (paratyphoid in five and typhoid in two) led to abortion in the first or second week after appearance of symptoms.

Pregnancy neither prevents typhoid or paratyphoid infection nor furthers it. The pregnancy is usually interrupted.

Lymphopathia Venereum Complicating Labor: Analysis of 38 Cases. Extensive scarring of the soft tissues of the pelvis, particularly the rectum, due to lymphopathia venereum presents problems unique in obstetrics. Irwin

(9) Acta obst. et gynec. Scandinav. 27:58-69, 1947.

H. Kaiser and Edward L. King[1] (Tulane Univ.) review the experience at Charity Hospital with 38 labors in 26 patients with pelvic lymphopathia venereum. There were no maternal deaths, and no patient was known to have had an exacerbation of lymphopathia in association with pregnancy. There were 23 spontaneous deliveries, 10 forceps deliveries, 1 breech extraction and 3 cesarean sections. Total duration of labor was not increased. Colostomies presented no special obstetric problems.

From a study of the 162 labors under similar conditions, recorded in the literature, the authors conclude that the estimated 6 per cent maternal mortality exaggerates the actual risk. Use of force in delivery has played a large role in reported fatalities. Forceful delivery should be avoided in any patient with pelvic lymphopathia who shows evidence of dystocia. Version and extraction technic is absolutely contraindicated. If soft tissue scarring is widespread, the patient should be delivered by cesarean section. If the patient delivers per vaginam, she should be watched for signs and symptoms of rupture of the uterus or rectum, the usual cause of death in such patients.

[C. M. Steer (Am. J. Obst. & Gynec. 54:230-234, August, 1947) reports a series of cases seen in the north, where lymphopathia venereum is much less common than in the south. At Presbyterian Hospital, New York City, among the 45 patients seen in the past 15 years, 92 pregnancies occurring before onset of the disease resulted in 62 living children, 3 stillbirths and 27 abortions, whereas 17 pregnancies occurring after onset of disease resulted in 7 living children, 2 stillbirths, 8 spontaneous abortions and 1 therapeutic abortion.

Lymphopathia venereum or lymphogranuloma venereum must be differentiated from granuloma inguinale or granuloma venereum. The former venereal disease involves the lymphatic structures, gives a positive Frei test and has been treated successfully with the sulfonamides. Granuloma inguinale, on the other hand, is a localized infection of the skin of the external genitals. The diagnosis is established by finding Donovan bodies and pathognomonic cells. Treatment is by means of fuadin or tartar emetic.—Ed.]

Abdominoperineal Proctosigmoidectomy for Rectal Cancer Complicating Pregnancy: Report of Four Cases is presented by Harry E. Bacon and Robert J. Rowe[2]

(1) Am. J. Obst. & Gynec. 54:219-229, August, 1947.
(2) South. M. J. 40:471-479, June, 1947.

(Temple Univ.), who discuss treatment on the basis of these and 70 cases collected from the literature.

In early pregnancy (three months or less) the authors recommend radical surgical extirpation of the cancerous rectum and gland-bearing areas with relative disregard for the pregnancy. Corpus luteum hormones should be used in an effort to prevent abortion. Induced abortion is contraindicated. The operation of choice is abdominoperineal proctosigmoidectomy without colostomy and with preservation of the sphincter musculature. That of second choice is a Miles abdominoperineal extirpation, especially when the lesion is less than 6 cm. from the anal margin.

In the second trimester when the fetus is viable and the size of the uterus interferes with removal of the cancerous growth, the recommended procedure is a Porro section in conjunction with abdominoperineal proctosigmoidectomy or Miles type of resection. This prevents intrauterine sepsis and removes the large soft uterus. Colostomy and posterior excision is not recommended but may be considered a second choice.

When the pregnancy is at or near term, cesarean section and hysterectomy are recommended to avoid compression of the tumor mass and possible dissemination of the cancer cells during parturition. Two to four weeks later radical extirpation should be performed. However, when the circumstances are ideal and the patient's condition excellent, radical resection performed at the time of section may be justifiable.

Study of the 70 cases in the literature revealed 23 in which operation was performed during pregnancy, the outcome being known in 21. Three fetal and two maternal deaths occurred, a fetal mortality of 15 per cent and a maternal death rate of 10 per cent.

Many of the tumors were undiagnosed until labor began. Frequently symptoms of the cancerous growth were masked by those of pregnancy. Constipation and, occasionally, obstipation were fairly constant symptoms. Actual obstruction occurred in 8 of the 70 cases. Pain at

stool was present in several cases. Weight loss occurred frequently. Bleeding was not so common as usual in cancer of the rectum. Vomiting in three cases was mistakenly thought to be of the pernicious type. Ages ranged from 18 to 43.

Overshadowing of symptoms by those of pregnancy places an added responsibility on the obstetrician. A careful history, digital examination, proctosigmoidoscopy and opaque enema study are not contraindicated during pregnancy if other conditions warrant them.

Acute Poliomyelitis during Pregnancy. Reidar Grelland[2a] reports 10 cases of acute anterior poliomyelitis observed in the Ulleval Municipal Hospital at Oslo. Six of the patients had respiratory paralysis, and all except one had severe paralysis of the muscles of the extremities. One abortion occurred. In one patient delivery was by cesarean section four months after a severe attack with involvement of the respiratory muscles. Four patients gave birth to healthy infants. One pregnancy had not ended at the time of the report.

In addition, Grelland analyzes 48 cases previously reported from the Scandinavian countries. Among the 58 cases, there were 11 deaths before delivery, and 7 abortions. In five cases the result of pregnancy had not been reported.

The disease had little influence on labor and parturition. Out of 35 cases delivery was spontaneous in 32 (91 per cent) and in 3 cases cesarean section was performed. Thirty patients (86 per cent) gave birth to healthy infants. Stillbirths occurred in three cases, in two of which stillbirths had occurred previously.

Grelland believes that if there is no complicating disease such as severe infection of the urinary tract, there is no reason to interrupt the pregnancy, except in cases with respiratory involvement in the last months of pregnancy.

There were 15 deaths (26 per cent of the cases), all

(2a) Norsk mag. f. Laegevidensk. 108:620-625, Mar. 7, 1947.

due to respiratory paralysis (spinal and bulbar type). Of 29 cases in the first six months of pregnancy, only one died (3.4 per cent), but of 29 in the last three months 14 died (48 per cent). The disease occurred twice as frequently in the last three months of pregnancy as in the first six months. The prognosis for the mothers is worse in the last months of pregnancy. In all cases of respiratory involvement in the last two to three months of pregnancy cesarean section ought to be performed to save the viable fetus.

[There is some question whether poliomyelitis occurs more often in pregnant than in nonpregnant women. M. J. Fox and H. G. Waisman (Am. J. M. Sc. 214:148-152, August, 1947) state that of 24 married women admitted to the South View Isolation Hospital, Milwaukee, 14 were pregnant. They believe the incidence of poliomyelitis appears to be greater in pregnant than in nonpregnant women. M. E. Baker and I. G. Baker (Minnesota Med. 30:729-735, July, 1947), who report 30 cases of acute poliomyelitis in pregnancy, maintain that the disease occurs in pregnant women more often than can be attributed to mere chance. On the other hand, E. G. Riley, epidemiologist of the Florida State Board of Health, analyzed 572 cases of poliomyelitis which occurred in Florida in 1946 and found only 8 cases in pregnant women. He concludes that there is no difference in susceptibility of pregnant and nonpregnant females in the childbearing age.—Ed.]

The Toxemias

Pregnancy in Patient with Hypertensive Disease. Leon C. Chesley and John E. Annitto[3] (Margaret Hague Maternity Hosp., Jersey City, N.J.) review 301 pregnancies in 218 women with hypertensive disease. Only patients in whom hypertension was known to have existed before pregnancy or was found before the twenty-fourth week of gestation, no previous normal readings having been recorded, were chosen. The standard for hypertension was 140/90 or greater.

The gross fetal loss in prior pregnancies was 35 per cent; in first hypertensive pregnancy, 38 per cent; in subsequent pregnancies, 40 per cent. The fetal loss increased with higher initial pressure, second trimester rises in blood pressure, higher pressures near delivery,

(3) Am. J. Obst. & Gynec. 53:372-381, March, 1947.

decreased renal function, proteinuria and superimposed toxemia. There were six immediate maternal deaths (2 per cent) and seven late puerperal deaths. The mortality was 20 times that of the other patients as a whole. Eight deaths were probably associated with hypertensive disease, and five were attributed to intercurrent causes.

Proteinuria occurred in half the pregnancies; renal function was normal in 93 per cent, and premature separation of the placenta occurred in 5.6 per cent. Although pregnancy is definitely dangerous for the hypertensive woman, the hazards are not great in two out of three cases. Two thirds of the patients escaped superimposed toxemia; in the group without toxemia there were no immediate maternal deaths, and one of the two late puerperal deaths was due to intercurrent disease. The fetal loss was 18.5 per cent. Among the one third of patients whose pregnancies were complicated by toxemia, there were six immediate maternal deaths (6.67 per cent) and five late puerperal deaths, giving a total maternal mortality of 12.2 per cent—10 times that in the group without complications. The fetal loss was exactly 50 per cent—almost three times that of the patients escaping superimposed toxemia.

In nearly 40 per cent of the hypertensive patients, a drop in blood pressure occurred in midpregnancy. Of 106 pregnancies with sufficient data for repeated prepregnancy or first trimester pressures to be compared with those observed in the second trimester, a decrease of more than 20 mm. was found in 39.6 per cent. The drop exceeded 40 mm. in 11.3 per cent. No change was found in 50 per cent, and an increase of 20 mm. or more was seen in 10.4 per cent. The midpregnancy drop in blood pressure has practical importance for diagnosis. A large number of hypertensive patients had normal blood pressures during several weeks of the second and third trimesters. If their earlier hypertensive pressures had been unknown, the conditions would have been classified as pre-eclampsia, since acute rises in pressure occurred after the twenty-fourth week of gestation.

If it could be determined which patients would escape pre-eclampsia or eclampsia, a good prognosis for pregnancy could be offered to two out of three hypertensive women. If the toxemia causes the damage done, prompt termination of a hypertensive pregnancy at the first sign of developing toxemia would protect the patient. Thus any hypertensive woman could be given a chance at pregnancy, with greater risks than normal but with a good chance that close supervision would give her a living infant.

Chronic Hypertension and Pregnancy is discussed by F. J. Browne[5] (Univ. of London) whose standard for normal blood pressure in the pregnant woman is 120/80. If the blood pressure is raised above this standard for the first time after 20 weeks, the case is classed as "pre-eclamptic toxemia," if before this, as "chronic hypertension." In patients with chronic hypertension blood pressure tends to fall to a normal level in the second trimester. Whether or not this fall occurs, the tendency is for a rise to take place in the later weeks. If the blood pressure reaches 160 mm. Hg systolic, albuminuria is likely to appear, indicating that pre-eclamptic toxemia is superimposed on the chronic hypertension. When this occurs the fetus is likely to die in utero from concealed accidental hemorrhage, which is believed to be due to spasm of the spiral arteries of the decidua, causing anoxia and injury to the walls of the vessels distal to the constriction.

Treatment depends on the severity of the disease. Termination of pregnancy is recommended when kidney function tests show decided deficiency, if there is well marked retinal arteriosclerosis, exudates or papilledema, or persistent albuminuria. Patients with severe hypertension in early pregnancy may be admitted to the hospital to evaluate reaction to rest. If the blood pressure falls to normal or near normal levels, the outlook for the patient under proper supervision is good. If it remains at 150/100 or more, the outlook is doubtful, and

(5) Brit. M. J. 2:283-287, Aug. 23, 1947.

if pregnancy is allowed to continue very strict supervision is necessary.

In patients in whom the results of tests are satisfactory the pregnancy may be allowed to continue, but careful supervision is necessary after the twenty-fifth week. All efforts are directed at keeping the blood pressure below the critical level of 150 mm. Hg systolic.

If pre-eclamptic toxemia does not supervene a natural delivery may be allowed at term. If albuminuria develops, however, it may be advisable to terminate the pregnancy as soon as the fetus is viable.

[The articles by Chesley and Annitto and by Browne are most important ones on the subject of hypertension associated with pregnancy. Physicians should read the entire articles because they contain a large amount of valuable information. Chesley and Annito had at their disposal the huge number of patients seen at the Margaret Hague Maternity Hospital, one of the largest and best maternity hospitals in the world. F. J. Browne who has recently retired as Professor of Obstetrics and Gynaecology at the University of London has made intensive studies of hypertension and toxemias of pregnancy over a period of many years, and is one of the leading authorities on this subject. There are many points of agreement in both papers and several of disagreement. Perhaps the most striking statement in Browne's paper is his statement that he considers a blood pressure of 120/80 as the upper limit of normal. In the United States nearly all of us use 140/90 as the dividing line between normal and abnormal, and this is the accepted criterion of Chesley and Annitto. In choosing 120/80, Browne was influenced by Robinson and Brucer (Arch. Int. Med. 64:409, 1939; 66:393, 1940) who showed that (1) the normal range of blood pressure is 90 to 120 systolic and 60 to 80 diastolic; (2) blood pressure does not rise with age in normal persons but it does in hypertensive and pre-hypertensive persons; (3) a history of blood pressure above 120 systolic and 80 diastolic over a ten year period is pathologic, and an almost infallible sign of incipient hypertension; (4) transient rises of blood pressure should not be ignored and should lead one to suspect a further permanent rise; (5) slightly over 40 per cent of the population (in the U. S. A.) is either actually or potentially hypertensive.

A second unusual statement in Browne's paper is his recommendation not to ignore the first reading of blood pressure if it is found to be high. Concerning this he says, "The patient usually is allowed to rest, and then a second reading is taken, and if it is lower, as it generally is, this is recorded as the true level. I believe that this is wrong and that the first reading is significant and should be recorded, though there is of course no harm in taking it again after rest and recording that also. Indeed, if the second reading is lower it may have a prognostic significance. . . . The blood pressure of the normal pregnant woman does not rise significantly with nervousness. If it does she is hypertensive or

potentially so. I described this condition in 1933 as the early warning rise of blood pressure and showed that in 65 per cent of such women the blood pressure later in pregnancy became permanently elevated."

Browne and Chesley and Annitto emphasize that in a certain proportion of cases of chronic hypertension in pregnancy, the blood pressure falls in the second three months, as first observed by D. E. Reid and A. M. Teel (Am. J. Obst. & Gynec. *37*:886-896, May, 1939).

Browne stresses the fact that when the blood pressure reaches 160 mm. Hg systolic, albumin usually appears in the urine. At the same time, the fetus is apt to die in utero from concealed abruptio placentae.

In normal pregnancy, pre-eclamptic toxemia with hypertension and albuminuria develop in about 1 per cent of cases. In Browne's last series of cases of chronic hypertension it developed in 14.9 per cent. If before the twentieth week there is persistent albuminuria, it is not worthwhile continuing the gestation, because intrauterine death will almost certainly occur. Since the critical blood pressure level is 160 mm. systolic, efforts must be made to keep the blood pressure below this level. For this purpose, Browne recommends rest in bed with a mild sedative at night. There is no need for diet restrictions, but if pre-eclampsia develops with albuminuria and edema, restriction of salt and fluid is advisable.

The great majority of women with chronic hypertension go to term without any trouble and deliver healthy babies spontaneously. Where operative delivery is necessary, Browne stresses the value of episiotomy for premature babies and the use of local anesthesia for cesarean section, recommendations which I have made many times.

In every case in which the fetus died in utero the blood pressure had not fallen in the second three months. On the other hand, all patients in whom the blood pressure fell in the second three months gave birth to living children. This point may therefore have some prognostic value. Chesley and Annitto state that if a rise of blood pressure occurs in the second three months it is ominous for the baby.

Browne raises the question, "Is the woman who has chronic hypertension made any worse by pregnancy? Is her expectation of life shortened?" In 1939 Browne and Dodds (J. Obst. & Gynaec. Brit. Emp. 46:443-461 June, 1939) said: ". . . we believe that the large majority of women with simple hypertension may pass through several pregnancies, go to term, and give birth to live infants without suffering any demonstrable deterioration in their condition." Browne presents figures to show that pre-eclamptic toxemia and eclampsia do not of themselves *cause* chronic hypertension, or later cause a latent hypertension to appear at an earlier age than it otherwise would have done.

My prize case of chronic hypertension is briefly as follows: In 1925 I saw Mrs. B. S., aged 33, married six years but never pregnant because of a blood pressure ranging between 190/90 and 200/106. Several internists had advised against a pregnancy. I also warned the patient, but she came almost once a year pleading to be permitted to become pregnant. Finally in 1934, at the

age of 42, she came into my office saying she was two months' pregnant, and did not care what I or her internist said. She intended to have a baby. The blood pressure at this visit was 228/118. There was no albuminuria or edema. In the sixth month of pregnancy, the patient had a sudden attack of violent abdominal pain, and she was admitted to the Chicago Lying-In Hospital where a diagnosis of gallbladder colic was made. The blood pressure could not be recorded because the systolic pressure went above the highest recording of the manometer. It was over 300 mm. Hg systolic. After a few days in bed the patient was discharged. Late in pregnancy, albuminuria and edema appeared, so I performed a low cervical cesarean section under local anesthesia. The blood pressure at the time of operation was 292/170, but it fell during the operation to 112/76. After intravenous saline solution, it rose to 206/110. A healthy baby, weighing 4 lb. 9 oz., was born even though a partial abruptio placentae was found at operation. This patient's blood pressure has continued high. Recently, 13 years later, it was 220/160, and the patient is apparently well.—Ed.]

Value of Cold Pressor Test in Prediction of Hypertension and Toxemia in Pregnancy is evaluated by Vera I. Krieger and Sara Weiden[6] (Women's Hosp., Melbourne). Upper limits of normal obtained in response to cold pressor tests were established as 145/100. Dieckmann's modification of the Hines and Brown test was used in a series of 522 tests performed during 200 pregnancies: 84 patients reacted normally to all tests, and only 13 of these later had hypertension; 31 patients showed hyper-reaction in one test only, and either hypertensive toxemia or pre-eclampsia developed in over half of these; 85 showed hyper-reaction in more than one test, and hypertensive toxemia developed in 49 of these and pre-eclampsia in 10.

In many patients hyper-reaction to the cold stimulus was observed for several months before basal blood pressure was raised. Other patients had only a slight rise in basal blood pressure, and hyper-reaction to the cold stimulus was confirmatory evidence of a sensitive vasomotor system.

Basal blood pressure readings and cold pressor tests were made 2 months and 12 months after delivery in 506 patients not tested during pregnancy. An abnormal response followed normal pregnancy in 12 per cent, followed mild toxemia in 36 per cent, followed pre-eclamp-

(6) M. J. Australia 1:417-423, Apr. 5, 1947.

sia and eclampsia in 50 per cent and followed hypertensive toxemia in 68 per cent. About one third of the total number who had a hyper-reaction at 2 months were apparently normal reactors at 12 months.

The authors conclude that in patients who give a hyper-reactive response to the test early in pregnancy hypertension and in some instances pre-eclampsia and eclampsia develop. Those who will have hypertension only cannot be separated by means of this test from those who will have pre-eclampsia or eclampsia.

Patients who still give hyper-reactions 12 months after delivery should be classified as hypertensive. When a hyper-reaction is replaced by a normal response some time after delivery, it can be assumed that the abnormal response during the pregnancy under consideration was caused by some specific agent which may not be active in a subsequent pregnancy.

Results of serial cold pressor tests during pregnancy are valuable to the obstetrician, since 50 per cent of the patients showing only one hyper-reactive response will have hypertensive or pre-eclamptic toxemia. Nearly 70 per cent of patients exhibiting two or more abnormal results will have such toxemia. On the other hand, toxemia occurs in only a few patients whose response to the test is always normal.

Effect of Essential Hypertension on Pregnancy was studied by John A. Sharkey and Catherine B. Hess[7] (Univ. of Pennsylvania) in 115 women with essential hypertension among 3,000 consecutive patients delivered in the university hospital. The criteria for the diagnosis were blood pressures of 140/90 or higher on two or more prenatal visits in the absence of signs or symptoms of renal disease. The patients were followed regularly throughout pregnancies and 90 were examined six weeks post partum.

Of 55 patients who had increased blood pressure on the first prenatal visit, 37 had further increase as pregnancy progressed, and 18 remained unchanged. The re-

(7) Am. J. Obst. & Gynec. 52:672-676, October, 1946.

maining 60 patients entered pregnancy with normal pressure but later showed an increase. This increase was not permanent in all, nor was it detrimental to the mother's health. In 45 patients hypertension became permanent. Two patients were known to have impaired kidney function, several showed some early retinal changes, and the remainder showed no renal, cardiac or eyeground abnormalities.

The study indicated that pregnancy aggravates the hypertensive state in parous and nulliparous persons but usually does so without demonstrable injury to the mother's health. The existence of hypertension itself is not sufficient reason for terminating pregnancy.

Although others have reported that the hypertensive state increases infant mortality and incidence of abortions, premature deliveries and stillbirths, in the authors' patients these events were no more frequent than in normal patients.

Changes in Retinal Arterioles Associated with Hypertension of Pregnancy were seen in 2,500 women during a 14 year study made by Alton V. Hallum[8] (Atlanta, Ga.). Frequency and degree of these changes more closely follow the severity of the hypertension and, consequently, the toxemia than any other single laboratory or clinical sign. The one outstanding and consistently reliable change observed was the degree of general and localized spastic contraction of the retinal arterioles. The degree of spasm of the retinal arterioles indicates the degree of angiospasm in other parts of the body.

Interpretation of the changes in the eyegrounds often aids in differentiating the type of toxemia present. In pre-eclampsia and eclampsia, the outstanding change is spastic localized and generalized constriction of the arterioles, and the degree of constriction usually is in proportion to the severity of the toxemia. When the angiospasm is severe, retinopathy appears.

Such spastic changes are found most often in the last trimester of pregnancy and are much more common in

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(8) Arch. Ophth. 37:472-490, April, 1947.

primiparas, especially young primiparas. This is because true toxemia occurs much more frequently in young women, especially during the first pregnancy. If the angiospasm does not exist long enough to cause organic changes in the walls of the arterioles throughout the body, blood pressure returns to normal within a few days after delivery and remains so permanently, and the retinal arterioles soon resume their normal caliber. Increase in the uric acid content of the blood above 3.5 mg. per 100 cc. indicates that the hypertension is of toxic origin, and peripheral resistance is actually produced by spasm of the arterioles. When the uric acid content of the blood is normal in a toxic patient with constriction of the retinal arterioles, vascular disease is probably the basis of the toxemia.

If the eyegrounds show only the signs characteristic of retinal arteriolar sclerosis, such as arteriovenous compression, unsymmetrical arteriolar constrictions and increased light reflex, the hypertension is explained by vascular disease which antedated the pregnancy. Vascular disease accounts for most cases of hypertension during the first two trimesters of pregnancy, and unless the hypertension is severe there are usually no toxic symptoms or laboratory abnormalities. However, the hypertension of chronic vascular disease usually is accentuated during pregnancy.

The eyegrounds should be examined routinely during the early months of pregnancy to determine the status of the arterioles. This is useful in the prognosis of the existing pregnancy and is valuable in interpreting changes that occur if toxemia appears later. When hypertension and other symptoms during late pregnancy indicate toxemia, the eyegrounds should be examined every few days, with special attention to the degree of angiospasm. When the degree of angiospasm increases despite conservative medical treatment, pregnancy should be terminated to prevent permanent damage to the mother's vascular system. In some cases, induction of labor is lifesaving for both mother and infant, and study of the eyegrounds is

probably the most consistently reliable single guide in determining when pregnancy should be terminated. On the other hand, the absence or scarcity of changes in the eyegrounds is often of great help in determining when it is safe to allow pregnancy to continue.

Hypertension of Pregnancy is discussed by Paul Milliez[9] (Paris). Only in exceptional cases does hypertension of pregnancy constitute an isolated finding. Usually there is also albuminuria and, at times, edema. The triad, hypertension, albuminuria and edema, Milliez calls the alarm syndrome. Hypertension associated with cerebral symptoms, visual disturbances, excessive azotemia, albuminuria and signs of cardiac weakness denote pre-eclampsia, and convulsions usher in eclampsia. These three stages do not necessarily occur in sequence. The disease may remain at the stage of the alarm syndrome throughout pregnancy, pre-eclampsia may set in rapidly and persist till delivery or culminate in eclampsia, and eclampsia may arise directly from the alarm syndrome. The manifestations of hypertension of pregnancy are not pathognomonic for gestation. Eclamptic convulsions are comparable to those of essential epilepsy, and symptoms of pre-eclampsia are identical with those of hypertensive encephalopathy in lead intoxication, acute nephritis and paraganglioma and with paroxysmal attacks in essential hypertension.

Eclampsia is of two varieties. So-called solitary eclampsia sets in suddenly at term or post partum in very young, apparently healthy women (usually after an insufficiently supervised pregnancy). Actually, there is always a preceding period of incomplete alarm syndrome. The ocular fundi of these women show no abnormalities except for increase in arterial retinal pressure. The child is almost always normal, and the placenta shows no infarcts. The patients usually recover and exhibit no hypertension during succeeding pregnancies. The second type of eclampsia is preceded by a long period of pre-eclampsia and occurs in women over 30 who have had

(9) J. med. franc. 30:105-128, May, 1947.

hypertension before pregnancy. These patients have hypertensive retinitis, the child is often stillborn or dies soon after birth and the placenta shows old and recent infarcts. Pre-eclampsia and eclampsia usually reappear during subsequent pregnancies. Between these two distinct forms there may be a transitional type; e.g., a young woman with apparently solitary eclampsia may exhibit hypertensive states during later pregnancies and ultimately show fixed hypertension.

The pathogenesis of the disease is obscure. The fetus does not seem to play a direct role, but pregnancy may elicit temporary hypertension or aggravate an existing hypertension which is the essential factor in the clinical syndrome. The hypertensive state in young, apparently healthy women may perhaps be explained by excessive water retention or by sudden mobilization of the physiologic water reserves.

In most young, previously healthy patients with an alarm syndrome, complete bed rest, salt-free diet and restriction of fluids will prevent occurrence of convulsions. The outlook for already hypertensive women with alarm syndrome is less favorable. In pre-eclampsia, in addition to the aforementioned regimen, the treatment is similar to that in any hypertensive encephalopathy. However, injections of hypertonic solutions, magnesium sulfate or novocain do not bring uniformly good results. Lumbar puncture gives only temporary relief and large venesections may give rise to circulatory collapse. Treatment of eclampsia is chiefly prevention of convulsions by placing the patient in a quiet, darkened room and administering barbiturates and morphine. Venesection, lumbar puncture and lumbar novocain infiltration have brought encouraging palliative results.

The attitude in regard to termination of labor in young, previously healthy women with eclampsia has been mostly determined by the temperament of the obstetrician. Some intervene and others wait. However, in patients with permanent hypertension, pregnancy consti-

tutes a factor aggravating the vascular disorder, either owing to the presence of the fetus itself or the particular physiologic state elicited by its existence. Therefore, the appearance of cerebral symptoms and visual disturbances calls for immediate termination of pregnancy to save the mother and, possibly, the child.

The most important factor in treatment of hypertension of pregnancy is prophylaxis. The appearance of the alarm syndrome can be anticipated in every pregnant woman by regular determinations of blood pressure and weight and by urinalyses. Women with a history of eclampsia should be carefully watched during succeeding pregnancies. Hypertensive women should be advised against pregnancy, especially if there is a history of cerebral symptoms during preceding pregnancies.

[Milliez is an outstanding internist in Paris. He has access to all cases of toxemia in several Paris hospitals and has followed up a large number of cases of toxemia both clinically and at autopsy. I believe the term "alarm syndrome" to include hypertension, albuminuria and edema is excellent because any physician who has a patient with this syndrome should be alarmed. If such alarms are heeded and prompt treatment is instituted, there will be a drastic reduction in incidence of eclampsia which is still a serious complication causing many maternal deaths.

Milliez is much more pessimistic about pregnancy in women with hypertension than are Chesley and Annito and Sharkey and Hess. All agree, however, that if toxemia, i.e., albuminuria and edema, appear with hypertension, the patient's condition is serious. If conservative therapy with sedatives, glucose, bed rest and other measures do not reduce the blood pressure, albuminuria and edema, pregnancy must be terminated.—Ed.]

Late Pregnancy Toxemia: Review of Experimental Findings by George Van S. Smith and O. Watkins Smith[1] (Free Hosp. for Women, Brookline, Mass.) supports the concept that late toxemia is caused by the escape from the uterus into the general circulation of an injurious protein, a product of intrauterine tissue damage.

During pregnancy, the placenta takes over the ovarian function of sex steroid secretion at about the twelfth week. Histochemical studies provide strong evidence that the placental syncytium fulfils this role. The rate of secretory activity of the placental syncytium is believed

(1) West. J. Surg. 55:288-294, May, 1947.

to be inversely proportional to the rate of oxidative inactivation of the estrogens. Normally, urinary estrogens and pregnandiol increase rapidly up to about the thirty-eighth week, with slight decreases at the sixteenth, twenty-eighth and thirty-sixth weeks and a marked decrease preceding onset of spontaneous labor. High and balanced levels of estrogen and progesterone at the thirty-eighth week result in minimal destruction of estrogens, so that syncytial degeneration results from lack of stimulation by oxidation products. This process advances to such a degree that these cells are no longer able to respond. Consequent continued withdrawal of hormonal support from a uterus stretched to capacity produces inadequate vascularity and consequent tissue changes which initiate labor.

A premature deficiency of estrogen and progesterone exactly like that normally occurring at term characteristically precedes pre-eclampsia, eclampsia, premature delivery and stillbirth. Syncytial degeneration of the placenta conforms with this finding.

Correlation of the authors' hormonal studies with other histochemical studies suggests that the chorionic gonadotrophin secreted by the placental cytotrophoblast is actually utilized in the production of estrogen and progesterone by the syncytium. The mechanism by which estrogen oxidation products stimulate syncytial secretion appears to act through enhancing this utilization. The high level of chorionic gonadotrophin in the serum of most toxemic patients is not due to increased production of this hormone by the cytotrophoblast, but appears, rather, to reflect failure in its utilization by the placental syncytium.

There is convincing evidence that withdrawal of hormonal support from the uterine contents results in tissue catabolism, with formation of an injurious protein exactly like menstrual toxin, and that this toxin is absorbed into the general circulation unless, as at term, the products of conception and the source of the toxin are delivered. The pathologic effects of this toxin are such as

to warrant the hypothesis that it is finally responsible for the generalized signs and symptoms of pre-eclamptic toxemia.

Late Pregnancy Toxemia: Clinical Trials Based on Experimental Findings are reported by O. Watkins Smith and George Van S. Smith[2] (Free Hosp. for Women, Brookline, Mass.). Six patients with pre-eclampsia were treated with a pseudoglobulin fraction of human exudates which protects rats against menstrual toxin. Definite clinical improvement occurred in all. This result indicated that a toxin similar to that of menstrual discharge was being at least partially neutralized, and that this toxin, a product of tissue catabolism, was responsible for the clinical manifestations of the disease. Neutralization of toxin cannot be expected to remedy the basic abnormality in the placenta which results in the formation and release of this injurious catabolite of tissue damage, but it should reduce the amount of maternal injury.

The protective factor per se had no effect on the hormonal abnormality characteristic of pre-eclampsia. In two patients receiving only this factor, the abnormally high serum chorionic gonadotrophin was uninfluenced, and the values for urinary pregnandiol reflected a progressive deficiency in secretory activity of the placental syncytium. In two of the four patients to whom the protective fraction and stilbestrol were both administered there was evidence that partial neutralization of the toxin made possible response to stilbestrol, i.e., increased secretion of progesterone because of better utilization of chorionic gonadotrophin, as reflected in a rise in urinary pregnandiol and a drop in serum chorionic gonadotrophin. It appears, therefore, that once toxemia is clinically apparent some element is introduced which prevents the normal response of the placenta to stilbestrol. At least partial neutralization of the toxin is a necessary precursor of any placental response to stilbestrol. Further purification and concentration of the protective pseudoglobulin, permitting larger amounts to be administered, will

(2) West. J. Surg. 55:313-321, June, 1947.

make the substance a valuable adjunct in treatment of severe toxemia.

Diethylstilbestrol should be used as an adjunct to treatment with protective pseudoglobulin, since there is always the possibility that there is still sufficient secretory potential in the syncytium for it to be stimulated, provided the toxin can be neutralized.

[The Smiths believe that late toxemia of pregnancy is caused by escape from the uterus into the general circulation of an injurious protein, a product of intrauterine tissue damage. Hazel A. C. Lin (Am. J. Obst. & Gynec. 54:97-101, July, 1947) believes that toxemia of pregnancy might be an allergic reaction to placental proteins. She produced a condition closely simulating toxemia of pregnancy with albuminuria, hypertension and edema in rats by sensitizing them against placental protein before pregnancy. The pathologic changes corresponded closely to the early lesions in the human toxemia of pregnancy.

More study is needed before we can recommend the use of stilbestrol or other hormones to the general practitioner for treatment of the toxemias of pregnancy. The Smiths have reported intensive, brilliant studies on toxemia and menstruation. They are continuing these studies, and it is hoped that they will soon report a large series of pre-eclamptic women treated with protective pseudoglobulin.—Ed.]

Sensitization of Vascular System in Pre-Eclamptic Toxemia and Eclampsia. F. J. Browne[3] (Univ. College Hosp., London) cites evidence that the cause of hypertension in pre-eclamptic toxemia is abnormally increased sensitivity of the vascular system to pressor hormones rather than an excess of the pressor hormone itself.

By testing the reactions to a pressor substance (tonephin) of 27 women at their first attendance at the prenatal clinic and comparing results with those obtained for 2 of these patients who later had pre-eclamptic toxemia, it was found that the acquired abnormal sensitivity of the vascular system to pressor substances develops between the early weeks of pregnancy and appearance of the pre-eclamptic toxemia.

Chorionic gonadotrophin might be responsible for the sensitization, since abnormally high levels of this substance have been found in the urine five or six weeks before other signs and symptoms of toxemia appear. Synapoidin (a synergistic preparation containing anterior

pituitary extract in combination with urinary chorionic gonadotrophin) was given to patients being treated expectantly in the hospital because of mild antepartum hemorrhage, with tonephin tests being made before and after the course of injections to test for any change in sensitivity. Only those patients were treated who, apart from mild hemorrhage, were normal in every respect.

Results were not always consistent, but they suggested that the sensitizing substance is chorionic gonadotrophin rather than estrogenic hormone or hormone of the adrenal cortex.

[In the 1946 YEAR BOOK (p. 118) in a comment on Hofbauer's paper dealing with the etiology of late toxemia I mentioned that Woodbury and his associates found that toxemic patients can inactivate pitocin and pitressin as rapidly as can normal patients. Hofbauer recently wrote me, "As quoted in your 1946 YEAR BOOK, Woodbury tried to invalidate the well-founded tenet that the serum obtained from pre-eclamptics lacks the factor which normally antagonizes the post-pituitary principle known as vasopression. His experiments were carried out with strips of uterine muscle and he could find no inhibition of contraction of these muscle strips. These experiments are *meaningless* since the oxytocic properties of sera obtained from pre-eclamptics are not impaired. In my paper read during October, 1932, in Chicago, I stressed the point that both the liver and the endothelium of the capillaries destroy the pitressin principle, but fail to have any influence (experimentally) on the oxytocic principle."

Considerable effort is being expended in an attempt to find the cause of eclampsia. E. Moller-Christensen and J. E. Thygesen of Copenhagen (J. Obst. & Gynaec. Brit. Emp. 53:327-343, August, 1946) noted that the amount of serum globulin circulating in the blood of eclamptic women seems to be reduced. They believe that the adrenal cortex plays a greater part in the etiology of pre-eclampsia and eclampsia than is generally supposed. E. W. Page (Am. J. M. Sc. 243:715-718, June, 1947) concluded that it is unlikely that a deficiency of the "protective" enzyme (plasma angiotonase) or group of enzymes is the basis of eclamptic hypertension. D. F. McDonald and L. D. Odell (J. Clin. Endocrinol. 7:535-542, August, 1947) found that serum glucuronidase is increased during pre-eclampsia and eclampsia but is not significantly increased in hypertensive toxemia.—Ed.]

Frequency of Toxemia during War Years. Sakari Parviainen[4] (Univ. of Helsinki) reports results of a study of toxemia based on 31,125 obstetric cases observed at hospitals of Helsinki and Turku between 1935 and 1944. During the war, the incidence of toxemia dimin-

(4) Acta obst. et gynec. Scandinav. 26:174-192, 1946.

ished considerably. The decrease was greatest in Helsinki, (from 24.2 per cent in 1936 to 5.6 per cent in 1943) where the food situation was at its worst, and least in Turku, where it was comparatively good. The decrease concerned equally primiparas, multiparas, young or older mothers, unmarried mothers and those with twin pregnancies. The decrease was more marked in milder degrees of toxemia, e.g., in cases of albuminuria the incidence was one sixth to one seventh that of the maximum peacetime figures. On the other hand, frequency of pre-eclampsia or eclampsia remained almost unchanged. This was corroborated by the mortality rates of mothers and infants. Two explanations can be given for this phenomenon. (1) Toxemia can be divided into two groups —that of constitutional origin and physiologic albuminuria due exclusively to extrinsic causes, such as nutrition. (2) Toxemia is decreased during war years because of impaired nutrition. However, the nervous strain of wartime tends to produce elevation of blood pressure and increase the predisposition to convulsions, which, in turn, result in increase in cases of severe toxemia. The latter interpretation seems to fit the observations made in the present survey.

Principles of Treatment in Pre-eclampsia and Eclampsia are outlined by J. Robert Willson[5] (Univ. of Chicago).

Recognition of the earliest signs of pre-eclampsia and prompt institution of adequate treatment usually prevents progression to severe pre-eclampsia and eclampsia. Treatment is directed toward maintenance of normal renal function and reversal of abnormal fluid exchange between blood and tissues.

Edema can be controlled by strict adherence to a diet containing less than 2 Gm. sodium chloride daily. Ammonium chloride, 8 Gm. daily, may hasten fluid release. Mild sedation with phenobarbital, mental relaxation and rest in bed for at least 10 hours daily aid in controlling blood pressure.

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(5) J. Kansas M. Soc. 553-557, December, 1946.

Effects of treatment in mild pre-eclampsia are gauged by control of weight (edema), control of blood pressure, maintenance of urine output, stabilization of 24 hour protein excretion and prevention of symptoms.

Important factors in control of eclampsia are intravenous use of hypertonic glucose solutions to re-establish normal renal function and relieve cerebral edema, and control of convulsions by sedatives. Depression of blood pressure is not a factor, since this may reduce urine output.

Termination of pregnancy at a time least dangerous for the mother should be preceded by a period of medical treatment to control convulsions and re-establish renal function.

Study of Eclampsia: Consideration of 200 Cases. Frank E. Whitacre, Walter M. Loeb, Jr., and Henry Chin[6] (Univ. of Tennessee) believe eclampsia to be related to nutritional deficiencies and characterized by a syndrome and distinct pathologic lesions which are associated with angiospasm.

Two groups of patients were reviewed: group 1 was composed of 100 consecutive eclamptic patients from Peiping Union Medical College Hospital, and group 2 included 100 consecutive eclamptic patients from the University of Tennessee Hospital. Race did not seem to be significant. There was no appreciable difference in the two groups in regard to age or parity, and the stage of gestation was almost identical. Chemical tests of the blood gave very similar results. In both groups, the disease occurred among the underprivileged who could be expected to have nutritional deficiencies.

The cause of eclampsia is not known, but it is probable that constriction of arterioles first observed in the retina is general throughout the body. Decreased volume of urine can also be explained on the basis of angiospasm. Constriction of small blood vessels may alter the vessel wall sufficiently to aid in producing edema, although lack of excretion of certain metabolites and steroids is

(6) J. A. M. A. 133:445-449, Feb. 15, 1947.

also concerned. Serum proteins must be sufficiently concentrated to prevent fluid from becoming extravascular.

Alarming elevation in blood pressure during the cold pressor test occurring in patients with a moderate degree of pre-eclampsia is excited not by constriction of arterioles in the arm but by spread of this constriction by means of the sympathetic nervous system until angiospasm becomes generalized.

Electroencephalographic tracings made on six patients during convulsions showed anoxemia of the brain, which the authors consider to be due to angiospasm. It seems reasonable to conclude that angiospasm is probably both the immediate basis for the syndrome of eclampsia, accounting for the gradual or sudden rises in blood pressure and the suppression of urinary excretion, and the exciting cause of the convulsive seizures in some patients. The placenta is probably the stimulating factor in the production of pressor substances. Methods of medical management rely for their success on the relaxation of angiospasm directly or indirectly.

The word toxin applied to eclampsia probably will be supplanted by the word hormone. It is probable that the placenta does not produce a toxin but rather stimulates production of pressor substances which are not sufficiently destroyed by the liver. Hence, the factor of nutrition enters into the problem.

Further Observations on Use of Neutral Diet and Hydration in Treatment of Toxemias of Late Pregnancy. Russell R. de Alvarez[7] (Univ. of Michigan) evaluated the conservative treatment of 224 patients with pregnancy toxemia. According to the classification prepared by the American Committee on Maternal Welfare, 170 cases (75.9 per cent) in the series represented "true" pregnancy toxemia, in which manifestations of toxemia were apparent only during the last 3½ months of pregnancy.

The object of treatment is to return involved tissues and organs to, and to maintain them in, as nearly normal

(7) Am. J. Obst. & Gynec. 54:445-458, September, 1947.

physiologic condition as possible. The general plan is based on utilization of the neutral diet, ammonium chloride, abundant fluids, bed rest, sedation and hospitalization. More than 80 per cent of the patients with so-called true toxemia of pregnancy responded to this type of management.

No rule can be proposed regarding the use of cesarean section in the treatment of toxemias except that section should not be done in uncontrolled eclampsia.

The neutral diet consists of foods which yield an equal amount of acid and alkaline ash or foods which yield an ash with no chemical reaction. Sodium ion and salt are avoided. The diet supplies about 2,100 calories and 85-100 Gm. protein. Fluids are supplied to insure a minimum daily urinary output of 2,000 cc. Ammonium chloride releases the sodium ion from the tissues and hence the intercellular fluid held by the sodium ion. It is given in 0.5 Gm. gelatin capsules, 3 Gm. being given three times a day with meals for four days. Little sedation is required in most cases. Phenobarbital or pentothal may be used. Mild toxemia may be cared for in the home but it is recommended that in other types the patient be hospitalized.

Toxemia with convulsions occurred in 16 patients (7.1 per cent). The over-all maternal mortality rate was 2.67 per cent and gross fetal mortality 14.2 per cent.

Treatment of Toxemia of Pregnancy is discussed by Foster S. Kellogg[8] (Harvard Univ.) who believes it essential that patients be placed in a "suspect toxemia" group on the basis of the following conditions: established vascular disease or familial history of vascular disease, chronic glomerular nephritis, history of acute nephritis, diabetes, scarlet fever or pyelitis-pyelonephritis, previous pregnancy toxemia, history of sterility, habitual abortion, stillbirth or premature delivery of a living child with or without toxemic manifestations, obesity, low basal metabolic rate with or without high blood cholesterol level, diastolic pressure or 70 or more

(8) M. Clin. North America 31:1192-1204, September, 1947.

on two or three observations and a toxemic appearance.

Routine for the care of these patients is the same as for a pregnant patient with rheumatic heart disease.

In treatment of established hypertensive albuminuric toxemia, use of veratrone is most valuable in selected cases, and use of lumbodorsal splanchnicectomy has its place. Treatment must always be individualized.

Kellogg gives synthetic vitamin E in 300 mg. doses daily to all "suspect toxemia" patients, but the vitamin is not a sure prophylactic against toxic separation, placental degeneration or pre-eclampsia. With the appearance of toxemic signs and symptoms all patients are given vitamins K and C and, if available, choline dihydrogen citrate to combat the potential blood condition if placental separation occurs.

Progress might be made if the three following trends of thought could be reconciled.

1. According to the Smiths' postulate, stilbestrol alone is sufficient to prevent miscarriage, premature labor, placental degeneration, eclampsia and toxic separation.

2 Kellogg's theory, on the other hand, is that vitamin E protects placentation and is prophylactic against eclampsia and toxic separation of the placenta on the basis of clinical experience and evidence that it fosters the integrity of the capillary walls. He believes that use of massive doses of stilbestrol is dangerous because of the drug's water-retaining potentialities (denied by the Smiths) added to the water-retaining factor in toxemia. Kellogg uses it in doses up to 15-20 mg. daily, withdrawing it slowly.

3. Shute's completely worked-out program is based on plus or minus results of estrogen assay, giving a clear-cut reason for using vitamin E in certain cases and estrogens in others. This is a far simpler classification, if the estrogen plus or minus test is valid.

[If! This is for all three trends of thought.—Ed.]

Eclampsia. Julio Bazan and Francisco A. Uranga Imaz[9] (Buenos Aires) found that among 308 patients

(9) Semana med. 53:883-885, Nov. 14, 1946.

admitted in nearly 25 years to the maternity ward of the Rivadavia hospital and to the present Maternity Institute, maternal mortality was 5.52 per cent and fetal mortality, 12.33 per cent. In a series of 75 patients treated exclusively by the modified method of Stroganoff, maternal mortality fell to 2.66 per cent. This important improvement in results is attributed to the advantages offered by the perfected method and its strict application and to the benefits of constant educational propaganda given in the courses of medicine, outpatient clinics and wards for pregnant women. However, treatment was often started late, since many patients entered the hospital after having had one or several attacks at home, with or without attention and always under poor conditions. Some patients were in hopeless coma. In these 75 cases, fetal mortality was 21.33 per cent.

The rule followed in the Maternity Institute is to deliver the patient by the natural route whenever obstetric conditions are favorable. Cesarean section as a means of treating eclampsia is now used only in exceptional cases; it was performed only twice in the last 75 cases.

[Whenever there is a discussion of the treatment of eclampsia, the name of Stroganoff arises. Few books mention the Tweedy, Rotunda or Dublin method of treating eclampsia. (Dieckmann, however, devotes an equal amount of space to the Tweedy and Stroganoff treatments.) O'Donel Browne, recently appointed Master of Rotunda Hospital, pointed out to me that Tweedy antedated Stroganoff in his plea for conservatism in treatment of eclampsia. Tweedy wrote his original paper on this subject in 1896 (Tr. Roy. Acad. Med. Ireland, vol. 14), whereas Stroganoff did not begin his treatment until a year later. In 1896 Tweedy recommended (1) control of convulsions by morphine, (2) complete starvation with efficient purgation and (3) copious administration of fluids. He also approved the use of stimulants and removal of blood by venesection when indicated. A full account of Tweedy's and Stroganoff's therapy, contrasting their main differences, appears in the fifth edition of Tweedy's *Practical Obstetrics* (1925). Despite the fact that Tweedy was Master of the Rotunda as far back as 1903-10, his death rate for eclampsia (8.6 per cent) has not since been equaled at the Rotunda. During the last few years, the so-called Rotunda or Tweedy treatment has been abandoned at the Rotunda.

O'Donel Browne has recently completed a history of the Rotunda Hospital. The book is a real treat for anyone interested in the history of obstetrics and for those who have ever visited or were trained there.—Ed.]

Analytic Survey of Eclampsia in the hospital of the Jefferson Medical College is reported by J. Bernard Bernstine and Leon N. Price[1] (Philadelphia). Among 14,374 deliveries from January, 1927, to December, 1945, incidence of eclampsia was 0.43 per cent. Incidence of eclampsia in the first five years was 0.62 per cent; in the last five years, 0.40. Practically half the cases of eclampsia occurred in patients aged 15-20, and it was twice as common in primiparas as in multiparas. Frequency of eclampsia in the various seasons was: summer, 33.8 per cent; winter, 25.8 per cent; autumn, 22.5 per cent, and spring, 17.7 per cent. All patients had hypertension, edema and albuminuria. Eclampsia occurred ante partum in 72.5 per cent, intra partum in 17.7 per cent and post partum in 9.6 per cent. Fetal mortality was 37.7 per cent; maternal mortality, 16.1 per cent. Mortality was more than two and one-fourth times as great in patients with no prenatal care as it was in those with inadequate prenatal care.

Toxic Complications of Pregnancy in Gorgas Hospital, Panama Canal Zone, 1931-45: Analysis of 10,000 Pregnancies. Nevin S. Scrimshaw, George A. Culver and R. A. Stevenson[2] (Gorgas Memorial Hosp.) report on the incidence of pre-eclampsia and eclampsia. The population in the Canal Zone consists of white North Americans, West Indian Negroes and Panamanians. The term "silver" refers to West Indian Negroes and Panamanians, while "gold" refers to North Americans. The division of the employees of the Panama Canal Zone into "silver" and "gold" is found throughout the administration of the zone. It dates back to early construction days when laborers were paid in silver coin and clerical and administrative workers were paid in gold. The "silver" group live on a low economic standard, whereas the "gold" patients have a high standard of living.

The significantly higher incidence of hypertension in the silver patients as compared with the gold is beyond

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(1) Am. J. Obst. & Gynec. 53:972-979, June, 1947.
(2) Ibid. 54:428-444, September, 1947.

doubt. It is higher in Negroes than in Panamanians, but no significant difference can be detected between income groups of Panamanians. There was a small group of patients with eclampsia (15 per cent) who had convulsions and other symptoms but normal blood pressure at all times when determined in the hospital or clinic.

Albuminuria was noted before delivery in 93 per cent of patients with eclampsia and severe pre-eclampsia, but only 60 per cent of patients with mild pre-eclampsia showed this symptom.

Of patients with eclampsia or severe pre-eclampsia, 76 per cent showed either dependent or generalized edema. Of patients with mild pre-eclampsia, 57 per cent showed edema.

Nearly half of the ante- and intrapartum eclampsias began in the thirty-fifth to thirty-seventh week; 18 per cent began before the thirtieth week. Times of onset of mild pre-eclampsia showed a symmetrical distribution about a sharp peak at 38 weeks. When pre-eclampsia developed in patients who had had hypertension before pregnancy it tended to appear earlier in pregnancy than in the pre-eclampsia group as a whole.

Eighty per cent of the patients with eclampsia and 52 per cent of those with pre-eclampsia were primiparous. The age incidence curve for mild pre-eclampsia followed the age distribution curve for normal pregnancies, but the severe cases showed one peak at this age and another in the 33-35 year range. The age incidence for eclampsia showed the same two peaks, with a slightly higher percentage in the younger group and a slightly later second peak.

Multiple toxemias occurred more frequently in the silver group. Fetal and neonatal death increased with the severity of the antepartum eclampsia. The over-all incidence of stillbirth was 3.4 per cent. Eclampsia accounted for more than three fourths of the maternal deaths in this series. The over-all incidence of maternal deaths for the conditions investigated was 1.9 per cent or 0.16 per cent of the total deliveries.

Seasonal variation in the incidence of these conditions could not be found. The higher incidence in Negroes cannot be accounted for on the basis of racial, dietary, therapeutic or climatic factors. Adverse social and psychologic factors affecting Negroes more than other groups may be an important influence.

Late Postpartum Eclampsia. H. J. Stander, R. W. Bonsnes and W. B. Stromme[3] (Cornell Univ.) report three cases occurring on the fourth, sixth and eighth post-partum days. One case is given here.

Woman, 31, primigravida, with a history of hypertension ranging as high as 168/96 and associated with emotional stress had an uneventful pregnancy except for one episode two weeks before delivery, when the blood pressure rose to 150/100 with 1 plus edema. Both responded to bed rest. She was admitted in labor with a blood pressure of 145/80 and all other findings normal. Spontaneous delivery occurred after uneventful labor of 12 3/5 hours.

During the first six postpartum days the blood pressure was normal to borderline with varying minimal proteinuria. On the morning of the sixth day she had severe headache with blurring of vision. Blood pressure was 155/90 and increased one hour later to 180/90, at which time generalized convulsions occurred. Blood chemistry studies at this time revealed non-protein nitrogen 28.5 mg. per 100 cc., uric acid 4.1 mg. per 100 cc. and carbon dioxide-combining power 25 volumes per cent. With modified Stroganoff treatment, symptoms disappeared within a few hours and blood pressure returned to normal.

In the following eight days the elevated systolic pressure fluctuated widely, although the diastolic pressure remained at about 90. During the remainder of the hospital stay, blood pressure was within normal limits, and blood chemistry values gradually returned to normal.

The patient was followed for 2 2/3 years. Her only complaint was occasional precordial pain. There was no proteinuria or edema. Systolic blood pressure rose steadily to 180, but diastolic pressure remained at 90. The diagnosis was post-partum eclampsia in a patient with essential hypertension.

The other two patients also showed most of the typical clinical and laboratory manifestations of eclampsia. On the basis of these observations, the authors have extended the time limit during which they believe post-

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(3) Am. J. Obst. & Gynec. 52:765-772, November, 1946.

partum eclampsia may occur to include the first week of the puerperium.

Hemorrhages Due to Toxemia of Pregnancy. Luis Tisné Brouse[4] (Santiago, Chile) states that as a result of the edematous, toxic, cellular process of eclampsia, the uterine muscle fibers may be disrupted by the excessive amount of interstitial fluid, the disruption producing inertia and hemorrhage during or after labor. When hemorrhage occurs during the third stage of labor, it may sometimes be overcome by administration of oxytocics, transfusion and stimulants and by uterine massage. However, in intractable cases, unless hysterectomy is performed immediately, acute anemia and death may supervene. Among 18 cases of toxemia and uterine inertia with hemorrhage observed at the El Salvador Maternity Hospital there were two deaths, an incidence of 11.1 per cent. In advanced cases, hemorrhagic foci are formed in the subperitoneal zone of the uterus, which assumes a purplish red and later a bluish aspect. In some cases the process may spread to the broad ligaments and adnexa, producing Couvelaire's syndrome of uteroplacental apoplexy. If uterine distention due to hemorrhage occurs suddenly, tears are produced in the visceral serosa, with resulting hemoperitoneum. In the present series there were four cases of uterine apoplexy with hemoperitoneum and one of apoplexy with venous thromboses.

Circulatory disturbances in toxemia are due to alterations in the vascular walls which give way to increased blood pressure. The apoplectic lesions produce hemorrhage in the decidua basalis, with resulting partial or total separation of the placenta and internal or external hemorrhage. Among 120 patients with abruptio placentae observed at the El Salvador Maternity Hospital, 58 had toxemia. Multiparas over 30 predominated in this group. External hemorrhage was a presenting symptom in 45 (81.8 per cent). In several cases, total detachment of the placenta produced neither death of the fetus nor marked clinical symptoms. At the beginning of the series, surgery

(4) Obst. y ginec. latino-am. 4:749-762, October, 1946.

was the method of choice. At present, preference is given to medical induction of labor of Kreis (artificial rupture of the membranes and administration of antispasmodics) and expectant passive treatment.

In 26 autopsies on patients with toxemia there were 9 cases of cerebral hemorrhage. Hepatic hemorrhage is the most common observation in patients who die of toxemia; it was present in 22 (84.6 per cent) of the 26 cases. In eclampsia symptoms of hepatic hemorrhage are masked because of mental confusion and convulsions. In pre-eclampsia, in which the patient's mind is clear, the symptoms consist of sudden pain in the upper right quadrant, radiating to the shoulder and back and caused by the sudden distention of Glisson's capsule. This is accompanied by vomiting, muscular reaction and shock.

Possible Etiologic Significance of Thrombosis of a Placental Vein on Mechanism of Placental Infarction and Associated Toxemia of Pregnancy. R. A. Bartholomew[5] (Atlanta, Ga.) reports a case.

In patient, 28, pregnancy progressed normally until the ninth month. She then showed a gain of 5½ lb., increase in blood pressure from 110/78 to 120/90, slight edema and a light cloud of albumin in the urine. Induction of labor with quinine and castor oil was done at term. Normal delivery occurred after eight hours; the infant was in good condition, and the site of the opening in the membrane near the margin of the placenta indicated low implantation. At this time, the urine showed heavy albumin and numerous coarse and fine granular casts. Retinal examination on the second day after delivery showed many sharp and spindle-shaped arterial spasms. Two weeks later, blood pressure was 135/85.

The placenta (Fig. 9) shows a thrombosed vein on the fetal surface, and a broad area of infarction was present. The area of infarction on the maternal surface showed a deep circular indentation about 3 × 4 cm., filled with firm black clot. Examination after fixation in 10 per cent formalin for several weeks showed massive acute infarction of the "E" type, seen as dark areas throughout the strip (Fig. 10), and also a "C" type of infarction lining the indented area.

(5) Am. J. Obst. & Gynec. 53:650-657, April, 1947.

This case suggests a sequence of events leading to toxemia of pregnancy. Overstimulation of the muscular sphincters of the collecting placental veins by an unknown mechanism causes obstruction of venous return

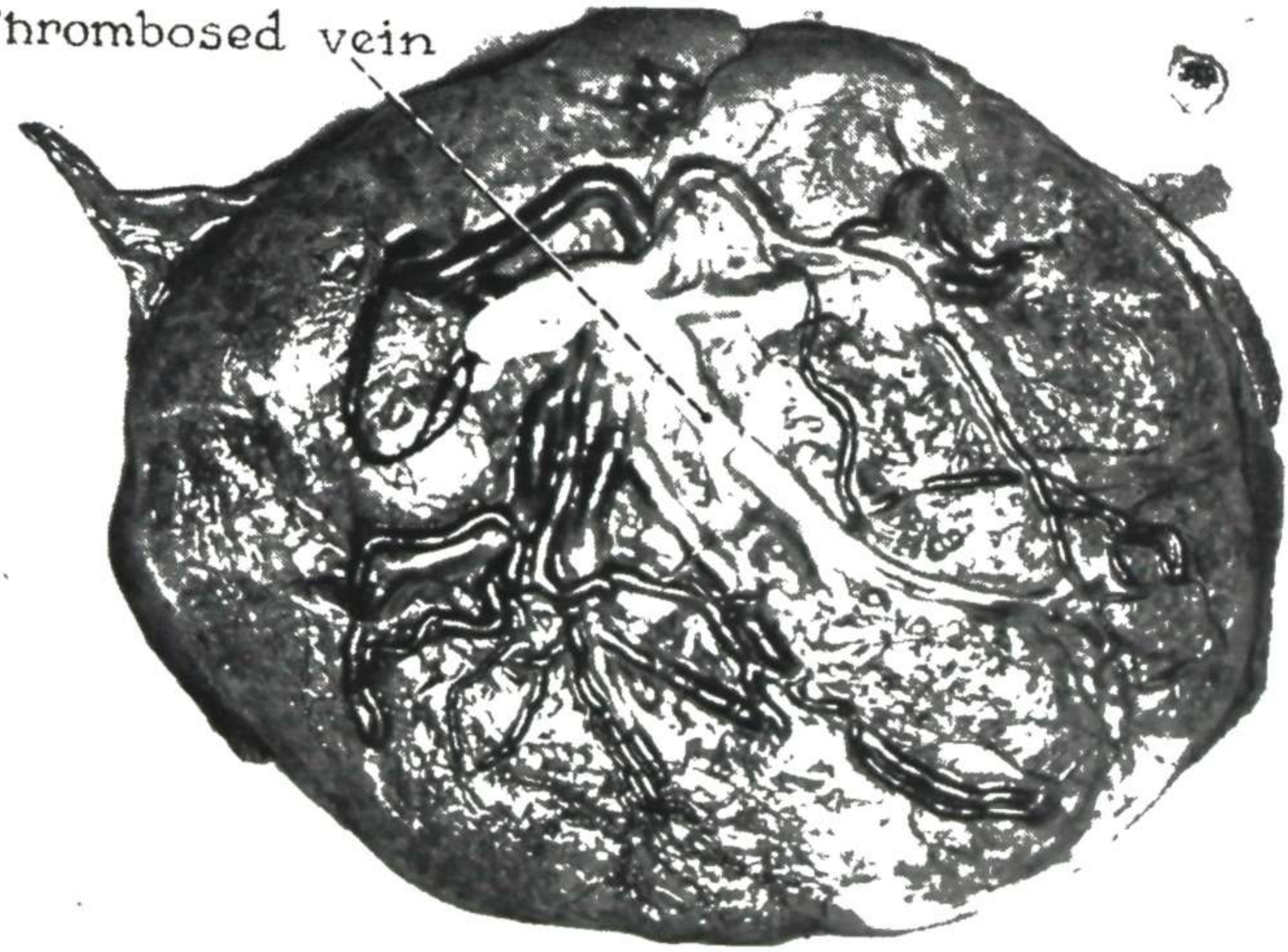

Fig. 9.—Placenta showing yellow thrombosed vein, arising from area of acute infarction, on fetal surface of placenta. (Courtesy of Bartholomew, R. A.: Am. J. Obst. & Gynec. 53:650-657, April, 1947.)

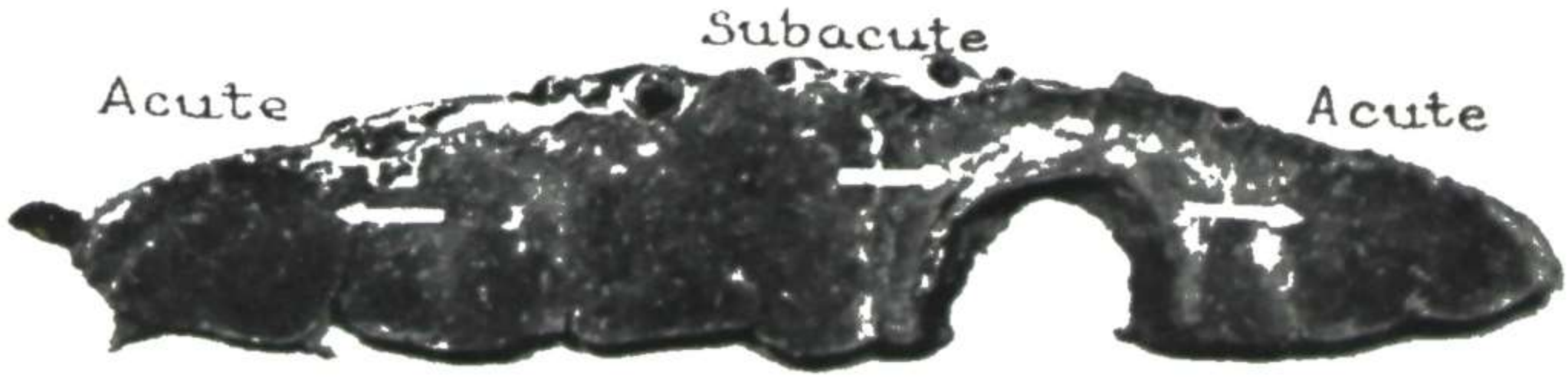

Fig. 10.—Placental strip cut through areas of infarction, showing subacute infarct of "C" type, lining indentation (central arrow) and dark areas of acute infarction of "E" type on either side. (Courtesy of Bartholomew, R. A.: Am. J. Obst. & Gynec. 53:650-657, April, 1947.)

from the dependent placental villi. This causes distention, engorgement and rupture of villous capillaries and consequent stagnation of villous circulation. Thrombosis, necrosis and disintegration of the affected villi occur. This is followed by autolysis of the necrotic villi, with

dissemination of poisonous products of protein-splitting, probably peptone histamine and guanidine, into the maternal circulation. There is widespread damage to maternal tissues, particularly to the liver and kidneys, resulting in toxemia of pregnancy. Eclamptic convulsions are probably due to hyperguanidinemia or hemorrhagic manifestations such as abruptio or ablatio placentae, according to the degree of liver damage and the effect on the mechanism of blood coagulation.

Pregnancy Following Lumbodorsal Splanchnicectomy for Essential and Malignant Hypertension and Hypertension Associated with Chronic Pyelonephritis is well tolerated if the response to operation was favorable. John L. Newell and Reginald H. Smithwick[6] (Harvard Univ.) report that 14 patients with moderate to severe hypertension before splanchnicectomy tolerated pregnancy without material cardiovascular damage or increase in the severity of hypertension. The interval between operation and pregnancy ranged from 3 to 96 months, the average being 30 months. In one patient the operation was performed during the first trimester.

Malignant hypertension was present in three of the patients before operation. In two pregnancy was uneventful, and in one a transient rise in blood pressure associated with the occurrence of a positive test for albumin necessitated delivery a few days before full term. All mothers lived, although the puerperium of one was complicated by a psychosis. They have exceeded the average life expectancy for patients with malignant hypertension.

The remaining 11 patients had severe essential hypertension, with or without chronic pyelonephritis. All were well at the time of writing, and the hypertension was much less than it was before operation. There is as yet no definite evidence that pregnancy materially affected the postoperative course of the hypertensive process in these patients. In five, increasing hypertension associated with increasing albuminuria occurred during the third trimes-

(6) New England J. Med. 236:851-858, June 5, 1947.

ter, necessitating delivery before full term. Hypertension did not increase before the seventh month of pregnancy.

It is emphasized that signs of toxemia should be closely watched for, and the accepted criteria for termination of pregnancy be closely observed.

Average age at delivery was 31 and average parity was 2.3. The blood pressure of nine patients remained within normal limits during pregnancy, and they had no albuminuria. The other five patients showed no significant elevation of blood pressure until the third trimester, when two showed pronounced elevation (above 180 mm. Hg systolic).

Eleven patients had normal deliveries and three, cesarean sections, the indication being a previous hysterotomy in two and fulminating pre-eclampsia in the third. Thirteen babies lived, two of these having been delivered prematurely. One infant was stillborn owing to premature separation of the placenta. This mother later successfully completed her second pregnancy.

The puerperium of all patients was uncomplicated except for the previously mentioned patient with a postpartum psychosis. Average blood pressure was 134/89 two weeks post partum, and 133/87 six or more weeks post partum. None of the patients had albuminuria at that time.

[Splanchnicectomy may prove to be a blessing to some young women with malignant hypertension and enable them not only to bear children but to live and enjoy their offspring.—Ed.]

LABOR

General

Second Stage of Labor: Internal Rotation. L. A. Calkins[7] (Kansas Univ. Hosp.) determined from careful records for 2,900 primiparas and 2,500 multiparas that internal rotation is complete at the time the head reaches the pelvic floor in approximately two thirds of all pa-

(7) Am. J. Obst. & Gynec. 53:488-493, March, 1947.

tients. In less than 30 per cent, internal rotation is completed shortly after the head reaches the pelvic floor. The belief that only small, round heads sometimes fail to undergo internal rotation was not confirmed by the study, nor was the size of the infant found to be a factor. Failure of rotation occurs with occiput anterior as well as with occiput posterior. Early rotation was definitely more frequent in multiparas than in primiparas. Furthermore early rotation was considerably more common with good than with poor labor pains. These facts indicate that parity and the character of labor pains are definite factors in this process.

In patients in whom internal rotation was wholly or partially incomplete, failure to rotate was much more significant in primiparas than in multiparas. Operative delivery is rarely if ever necessary for multiparas except in the group with large infant, late rotation and poor pains. For primiparas, forceps are not necessary when labor pains are good. Even in the group in which pains are poor and the infant large, forceps should not be used as soon as the head reaches the pelvic floor; a delay of 30-60 minutes will produce sufficient distention of the perineal tissues so that forceps delivery will be much easier. Moreover, rotation often does occur at the end of 30-40 minutes, even when at first it seemed most unlikely. The old rule of "not over one hour on the pelvic floor" is still reliable.

[I fully agree with Calkins that in the vast majority of cases if one waits long enough, and usually the wait is not excessive, anterior rotation takes place and spontaneous delivery follows. If application of forceps is necessary because of danger to mother or baby or instrumental delivery is deemed advisable for other reasons, it is surely much easier to deliver a head when the occiput is anterior than when it is transverse or posterior.—Ed.]

Adolescent Primigravida. Herbert E. Schmitz and Janet E. Towne[8] (Loyola Univ., Chicago) studied 200 consecutive primigravidas aged 17 or under, the youngest (3 patients) being 12, to evaluate the obstetric risk involved in such patients.

Mesiolateral episiotomies were done on all patients.

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(8) Surg., Gynec. & Obst. 84:962-966, May, 1947.

Pudendal block or caudal anesthesia was used. The second stage of labor was terminated by elective outlet forceps operation. The third stage was managed by administration of ergotrate intravenously with delivery of the anterior shoulder.

In all three stages, labor was found to be somewhat shorter than in unselected primigravidas and terminated spontaneously in 98 per cent. Complications of labor and the puerperium were not unusual. Morbidity was 6 per cent, and there was no maternal mortality. Infant mortality included 1 per cent neonatal deaths and 3.5 per cent stillbirths. Cesarean section because of cephalopelvic disproportion was necessary in only one case.

Rupture of Membranes before Onset of Labor is regarded by E. Tonkes[9] (Middleburg, Netherlands) as responsible for the death of many infants who could be saved by timely intervention. In 66 such cases there were 2 maternal deaths, 17 stillbirths and 3 cases of cerebral hemorrhage (1 associated with imbecility) in the infants.

For the mother there is danger of severe puerperal infection, uterine atony and even death. Operative intervention after long, inefficient labor is frequently required, and, partly because of this, incidence of endometrial infection is high.

Early treatment is essential. When true labor does not begin after rupture of the membranes, immediate stimulation of labor by means of drugs is indicated. If this fails, operative delivery is warranted. Vaginal cesarean section is preferred.

[The loss of 2 mothers and 17 babies (25 per cent) is frightfully high. Dry labor is generally not as serious as is represented in this report. I do not at all agree with the last paragraph. Great harm can be done by trying to stimulate labor pains with drugs and mechanical measures and by early operative intervention. Labor usually starts spontaneously after the bag of waters ruptures. There is no harm in waiting even several days for pains to begin, but the patient should be in a hospital where she and the baby can be watched. Strenuous efforts to start labor pains with drugs, bags, bougies and other means do greater harm to mother and baby than waiting for nature to start the labor.—Ed.]

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(9) Gynaecologia 123:58-72, January, 1947.

Is Artificial Rupture of Amniotic Sac Usable As Means to Promote Birth? H. Scherer[1] agrees with Wolf that, although the bag of waters does not have any actual dilating action, preservation of the sac may constitute a direct hindrance to dilatation of the cervix, and excessively increased internal pressure in the uterus may cause exaggerated tension of its walls. He has performed rupture of the sac in the beginning of labor (mostly in multiparas) or in the beginning of the stage of dilatation in 151 cases and recommends the procedure (1) in prolonged pregnancy, especially of multiparas, (2) in overstretching of the uterus by twins, hydramnios and large fetus, and (3) in atony of the uterus in labor.

In the first group of 83 patients there were 4 failures. Of the 79 remaining patients, 77 were delivered within 6 hours, most of them within 3 hours, while 2 required 30 hours and 6 days, respectively. In the second group of 30 patients, delivery occurred within two to three hours and often considerably more rapidly. In the third group of 38 patients, 50 per cent of whom were primiparas, spontaneous delivery occurred within 1 and, more rarely, within 2 hours in the primiparas and within 20-30 minutes in the multiparas.

Elective Induction of Labor. R. M. Grier[2] reports that during 1935-45 labor was induced in 12.9 per cent (1,353 patients) of the women delivered at Evanston Hospital, Evanston, Ill. These figures exclude bag inductions. During the last five years, the incidence increased.

Criteria for induction are: no cephalopelvic disproportion, mature infant, preferably a vertex presentation, fetal head engaged and not floating or ballotable and cervix soft, partially effaced and dilated at least 1 cm.

METHOD.—The patient enters the hospital without breakfast, is given perineal preparation, a hot soapsuds enema and 10 cc. of 10 per cent calcium gluconate intravenously. Two hours later, the physician ruptures the membranes. If labor ensues within two hours, it is allowed to progress. If it does not, 1 minim doses of pitocin are given into the muscle at

(1) Gynaecologia 122:233-243, October, 1946.
(2) Am. J. Obst. & Gynec. 54:511-516, September, 1947.

30-60 minute intervals. Two doses usually suffice. In this series, 36 women went into labor without need for pitocin.

In 1945-46, 10 per cent of the patients had induced labor. Of 34 primiparas, there were 13 whose labor was longer than average. Of the 95 multiparas, 32 had labor longer than average. The more completely the previously mentioned criteria are fulfilled, the more smoothly induction and labor proceed.

Grier prefers to rupture the membranes without putting part of the hand into the vagina but by guiding the instrument through the cervical canal from the rectum. Calcium is used because it is an effective stimulant to uterine contractility.

In this series maternal morbidity was less than the general average for the past 10 years. Gross fetal mortality was less than 2 per cent, which is less than the general fetal mortality for these years.

Induction of Labor at Chicago Lying-In Hospital. Wm. J. Dieckmann and Robert B. McCready[3] (Univ. of Chicago) feel that termination of pregnancy by induction of labor after 32 weeks has less justification now than it had in the past. It is inevitably followed by increased maternal and fetal mortality and morbidity regardless of how carefully the cases are selected.

The primary indication must always be whether the patient is better off with the uterus empty, whether the infant is alive and in good condition and whether its chance of survival is increased by early delivery. Specific indications are placenta praevia, abruptio placentae, eclampsia, nonconvulsive toxemia, certain systemic diseases, habitual intrauterine fetal death, polyhydramnios and twin pregnancy with overdistention. Induction is usually not indicated for convenience, ruptured membranes, cephalopelvic disproportion or postmaturity.

If labor is to be induced with the most favorable outcome the cervix must be "ripe"—complete effacement and the cervical margins 0.5-1 cm. thick and soft with dilatation from 0-3 cm. In the multipara the canal may or

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(3) Am. J. Obst. & Gynec. 54:496-510, September, 1947.

may not be effaced, but in either type patient there must be dilatation of 2 cm. or more and a soft cervix. Rupture of the membranes is the simplest and most effective method. When a bag is indicated it is used.

METHOD.—If labor is induced, there must be no sedation except nitrous oxide or ethylene until the uterine contractions occur every 2-4 minutes, lasting 40 or more seconds, and cervical dilatation (noted on vaginal examination) is increasing; then morphine, hyoscine or other sedation may be started.

Vaginal examination is made to make certain that the cervix is ripe, that the presenting part is normal and that there is no occult prolapse of the cord. The membranes are stripped.

Medical Procedure.—Subcutaneous injection of obstetric solution of posterior pituitary extract or 0.03 ml. pitocin (for toxemic patients) is made. At 20 minutes 0.06 ml. is given if no or weak contractions are noted; at 40 minutes, 0.13 ml., if there are no or weak contractions, and at 60 minutes, 0.2 ml., if there are no or weak contractions, and this dose is repeated if necessary until a total of 1 ml. has been injected.

Mechanical Procedure.—If there is no palpable cord, the membranes are stripped and then ruptured, as much fluid as possible being permitted to escape. If contractions do not develop in 8-12 hours, the medical procedure is followed or a weight of 200-500 Gm. is attached to a bag or forceps. If a bag is used, it should be vaginal, intra- or extraovular. If traction is applied to the fetal head, Vulsellum or Willets forceps with a weight is advised. If leg traction is used, skin traction with adhesive tape is best for a viable infant. A fillet and weight can be used if the fetus is dead.

Rupture of the uterus, shock, anuria and death have been attributed to use of solution of posterior pituitary extract. Judicious use of the drug is not harmful if the physician is thoroughly acquainted with its properties and possibilities.

The incidence of attempted induction of labor at Chicago Lying-In Hospital is 3.2 per cent and of failure, 9 per cent.

Morbidity Associated with Induction of Labor. Melvin A. Roblee[4] (St. Louis) reviews 500 cases of induced labor and found 25 per cent combined maternal and fetal morbidity as against 10.5 per cent in 500 cases of spontaneous labor. The increase in morbidity is caused by forcing labor before the cervix, lower uterine segment and uterus

(4) Am. J. Obst. & Gynec. 53:382-404, March, 1947.

have been prepared. The character and results of induced labor approach that of natural spontaneous labor only when induced labor precedes by 48 hours or less the time when spontaneous labor would have occurred. Hence induction of labor in obstetric practice is mainly for the patient with toxemia or diabetes. Inducing labor in cases of contracted pelvis, pelvic disproportion or post-maturity has little or no value and may be dangerous after spontaneous rupture of the membranes. Elective induction of labor which would have occurred 24-48 hours later causes little or no morbidity. However, this procedure has little or no obstetric advantage. Convenience and order are its justification.

[Labor was induced in 12.9 per cent of all the obstetric cases at Evanston Hospital and in only 3.2 per cent at Chicago Lying-In Hospital. This fourfold difference is linked with the crux of the entire debate about the dangers of induction of labor. In the Evanston series, most of the inductions were elective, usually for convenience of the patient. (In the last five years labor was induced at Evanston Hospital in 14.4 per cent of all cases.) In the Chicago Lying-In series, labor was nearly always induced, not for the convenience of the patient or the physician, but for some complication such as toxemia, uterine hemorrhage or polyhydramnios. Naturally, trouble may arise from the complication which made the induction advisable or imperative. But in these cases, additional complications can and do follow as the direct result of the induction regardless of how the induction was carried out. The chief reason for these obstetric complications is that the uterus was not ready for the onset of labor. If labor must be started in a patient whose cervix is not effaced or dilated, trouble must be anticipated. The uterus is not prepared for labor, and no matter how we try, we cannot bring about softening, dilatation and effacement of the cervix and lower uterine segment in the natural physiologic way.

Now what is the other side of the picture of induction of labor? Why do nearly all the reports dealing with elective inductions of labor claim enthusiastically that maternal and fetal mortality and morbidity are certainly no higher than when labor starts spontaneously, and that patients suffer less because labor is usually shorter than otherwise? Elective induction of labor, when performed at the *proper* time by one who knows how, carries no risks.

What is the *proper* time to induce labor? It surely does not depend on the history of the duration of pregnancy. We should not rely on the date of the last menstrual period, because at times a patient's memory is fallacious and because babies ripen at different rates and uteri are prepared for labor at different tempos. Life for us obstetricians would be much simpler if every woman went into labor 266 days after conception, just as dogs go into

labor 63 days after mating. But since this utopia is not for us, we must try to determine when a baby is mature and a uterus is ripe for delivery. This is possible only by feeling the cervix. If the cervix is long and closed, the uterus is not ready for labor regardless of how long the pregnancy has lasted. An attempt to induce labor in such a case is a deliberate invitation for trouble. Of course, if the patient has toxemia or there is other reason for inducing labor, there is no choice but to perform cesarean section, but we are now discussing only elective, not indicated, inductions of labor. Of all the methods of induction, I prefer rupture of the bag of waters. I rarely prescribe castor oil and quinine, even though they are occasionally effective, and I have not used a metreurynter for many years. Before the bag of waters is ruptured, three conditions *must* be present or trouble will arise: (1) the cervix must not be thicker than 1 cm. and it must readily admit at least one finger through the internal as well as the external os, (2) the head must be the presenting part and (3) the head must be engaged. In nearly all cases of elective induction, I separate the membranes from the uterine wall all around as high as I can reach, and I permit a considerable amount of fluid to escape, but I keep my finger in the cervical canal to be sure the fluid escapes slowly. Usually a hot enema is given one hour after the bag is ruptured. In most cases, labor starts within eight hours. In the few remaining cases, 1 unit doses of pituitary extract are given at 30 minute intervals.

In the discussion of Roblee's paper read before the American Association of Obstetricians, Gynecologists and Abdominal Surgeons M. P. Rucker (Tr. Am. A. Obst., Gynec. & Abd. Surg. 57:178-179, 1947) stated that he had induced labor by rupture of the membranes 4,045 times and by other means 2,138 times. Neonatal deaths were 1.1 per cent for the amniotomy cases and 4.2 per cent for the others. Stillbirths were 1.1 per cent for the amniotomy cases and 5 per cent for the others. Morbidity was not increased by rupturing the membranes. There were only 8 cases of prolapse of the cord in the 4,045 amniotomy cases as compared with 21 in the 2,138 other cases.—Ed.]

Application of Ergometrine for Induction of Labor. In 1935-36, soon after ergometrine was isolated and purified, E. Møller-Christensen[5] conducted a study to determine whether or not ergometrine was a suitable means of inducing labor. Because results were unsatisfactory, they were not published. However, because ergometrine and related compounds have recently been tried again for induction of labor, results of the early study are reported. In 84 of 100 women, labor was successfully induced, in 76 of these on the first attempt. Total dose of ergometrine ranged from 0.05 to 1.04 mg., but few patients who failed to go into labor before a total dose of

(5) Acta obst. et gynec. Scandinav. 27:70-79, 1947.

0.5 mg. was administered went into labor after more than 0.5 mg. was given. This suggests that the efficient total dose of ergometrine is less than 0.5 mg. Ergometrine induction seemed to prolong labor in primiparas and caused uterine spasms in four patients, causing fetal death in three of them. Ergometrine cannot be recommended as a labor-inducing drug, unless the fetus is already dead.

[A. Odier (Gynaecologia 124:24-41, July, 1947) used another ergot preparation, partergin, in 100 cases. This drug induced labor in 53 and failed in 47 cases. D. Trolle (Acta obst. et gynec. Scandinav. 27:94-114, 1947) also used partergin and concluded that it is dangerous for the fetus because it produces tetanic contractions which killed 3 of the 48 babies in his series. In contrast is the experience of W. D. A. Callam (Edinburgh M. J. 54:245-305, June, 1947), who maintains that partergin is as successful in the induction of labor as any other method, has no deleterious effect on mother or child and is safer than ergometrine or ergonovine.

Anyone who knows the history and literature of oxytocic drugs will never use an ergot preparation to induce labor or to shorten labor. Long before the introduction of pituitary extract in 1909 by Blair-Bell and by Hofbauer, the physicians of the last century used ergot before and during labor. They quickly learned that its effects were disastrous. That is why I urge that ergot and ergot-like preparations never be used before the baby is delivered. The only exception is the use of ergonovine just as the anterior shoulder of the baby is being delivered. But physicians of limited experience in obstetrics will play safe if they do not use any ergot preparation until the entire baby and placenta are out of the uterus. Even then, ergot and its derivatives should be used only to stop uterine bleeding during and after the third stage of labor.

Many methods of inducing labor have been advocated. Here is a new one. L. Hoff (Wien. klin. Wchnschr. 58:725-730, Dec. 6, 1946) advocates a 48 hour fast, which he employed in 111 cases for inducing labor. Before term the results were poor, in the last week of pregnancy there was a fifty-fifty chance that labor would begin, but after term the prospects of success were good.—Ed.]

Use of Radiology in Predicting Difficult Labor: Technical Considerations in Pelvimetry and Cephalometry. J. Chassar Moir[6] (Univ. of Oxford) describes his method of taking three films.

METHOD.—1. Lateral projection is obtained with the patient standing erect. Two movable pegs are attached to the upright screening, and the patient presses the anterior superior spines of the ilium against these. A metal rod mounted on a firm stand is placed between the patient's legs so that a centimeter measure

(6) J. Obst. & Gynaec. Brit. Emp. 53:487-497, December, 1946.

rests alongside the cleft of the buttocks. A scale magnified equally with the pelvis in the sagittal plane is impressed on the film.

2. For the superoinferior projection the patient is placed on the x-ray table in a reclining position. To assure superimposition of the superior and inferior pubic rami, the following technic is observed. When the previous lateral film was made, a small metal marker was fixed to the skin over the sacrum at the approximate level of the posterior superior spines of the ilium. In the film the angle formed by the lines joining the upper margin of the symphysis pubis to the marker on the one side and to the posterior extremity of the brim on the other was measured. A series of half-circle wire hoops is now used. Each hoop is shaped to touch the skin marker behind and the upper border of the symphysis pubis in front. From the front of the hoop an arm extends upward, making an angle with the vertical which varies from 10 to 35 degrees. The hoop with an angle corresponding to the angle previously measured on the lateral film is applied. The patient is then moved until the arm of the wire hoop points vertically upward. With the pelvis in this position, the brim is necessarily parallel to the table.

3. For the pubic arch projection the patient sits on a specially constructed box in which there is an oblique slot to hold a film cassette. When she assumes a comfortable sitting posture the ischial tuberosities slide into a groove, thus placing the pelvis in a correct position and, at the same time, insuring that the pubic arch lies approximately parallel to the plane of the film.

Cephalometry is important, since obstetric disproportion means an unfavorable relation of the fetal head to the maternal pelvis. Precision in measurement cannot always be attained, but the shortest diameter of the skull usually can be obtained from the lateral film, allowance being made for any difference of level of the required diameter of the head from the level of the centimeter scale. If radiographic examination is made before term, an allowance of 2 mm. per week is made as the rate of growth.

Molding of the head can be relied on to some extent when the pelvis is contracted in only one dimension, but it is not effective in overcoming resistance offered by the generally contracted pelvis. It is unwise to rely on a reduction of more than 2 or 3 mm. in any dimension.

Use of Radiology in Predicting Difficult Labor: Forecasting Course of Labor is made possible by the use of a graph method devised by J. Chassar Moir[7] (Univ. of Oxford). Three charts were prepared, one for the brim, one for the cavity and one for the outlet. In each, the anteroposterior dimensions were marked vertically and the transverse dimensions horizontally. Separate sets of charts were made for each size of fetal head from 9-9.9 cm. biparietal diameter. Results of deliveries in cases for which complete radiologic and clinical data were available were entered on the charts, easy deliveries being signified by a cross and difficult deliveries by a naught. A dividing line to separate easy from difficult deliveries at that particular level could then be drawn on each chart.

The charts were then combined and a single set of three charts was drawn up, showing the dividing lines for easy and difficult deliveries. Any pelvis can be pinpointed on these charts and its obstetric value defined in relation to the estimated size of the fetal head.

It must be emphasized that dividing lines were drawn on the basis of clinical experience rather than any mathematical formula.

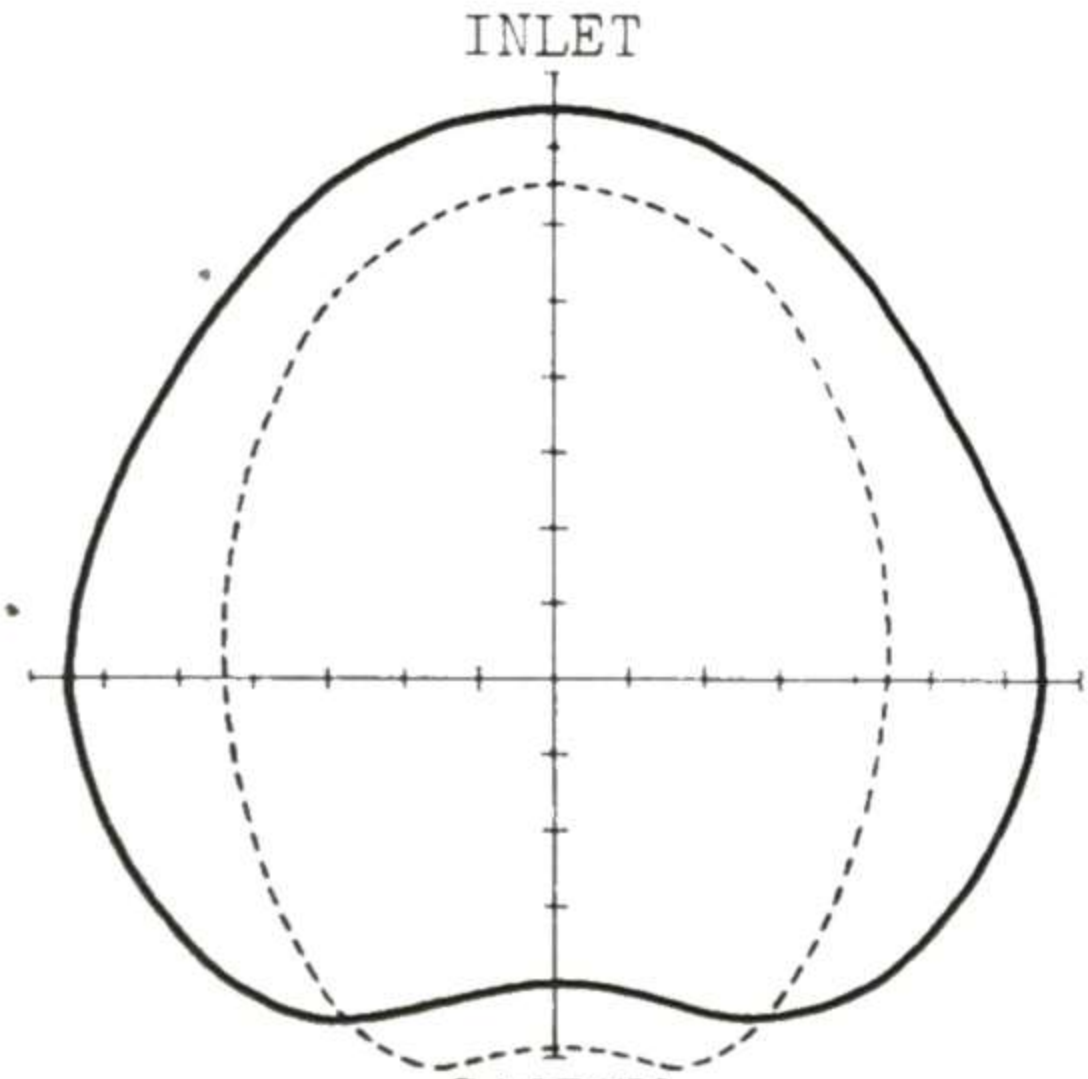
Cases on which this investigation was based were far from unselected; there were a great number of patients showing clinical evidence of disproportion at term and of patients who had unexpectedly difficult deliveries and who were, therefore, examined in retrospect. Results were as follows: a favorable outcome was indicated in 89 and easy delivery occurred in 64; difficulty was anticipated in 104 cases and delivery was difficult in 86, while 6 of the remaining cases were borderline in that had the head been only 1 mm. less in biparietal diameter, a favorable forecast would have been made.

Prediction of dystocia is most certain when a fault is revealed in the brim graph. However, obviously all pelvic abnormalities are not allowed for in the graph. Among those omitted are: (1) high inclination of the pelvic

(7) J. Obst. & Gynaec. Brit. Emp. 54:20-33, February, 1947.

brim, (2) lack of normal full curve of the sacrum from above downward and (3) malposition of the head.

Graphic Portrayal of Relative Pelvic Size. William F. Mengert and William C. Eller[8] (Southwestern Med. College) report a method involving comparison of three cross-sections (inlet, midplane and outlet) with a diagram of the normal pelvis of a corresponding type (Figs. 11



SACRUM

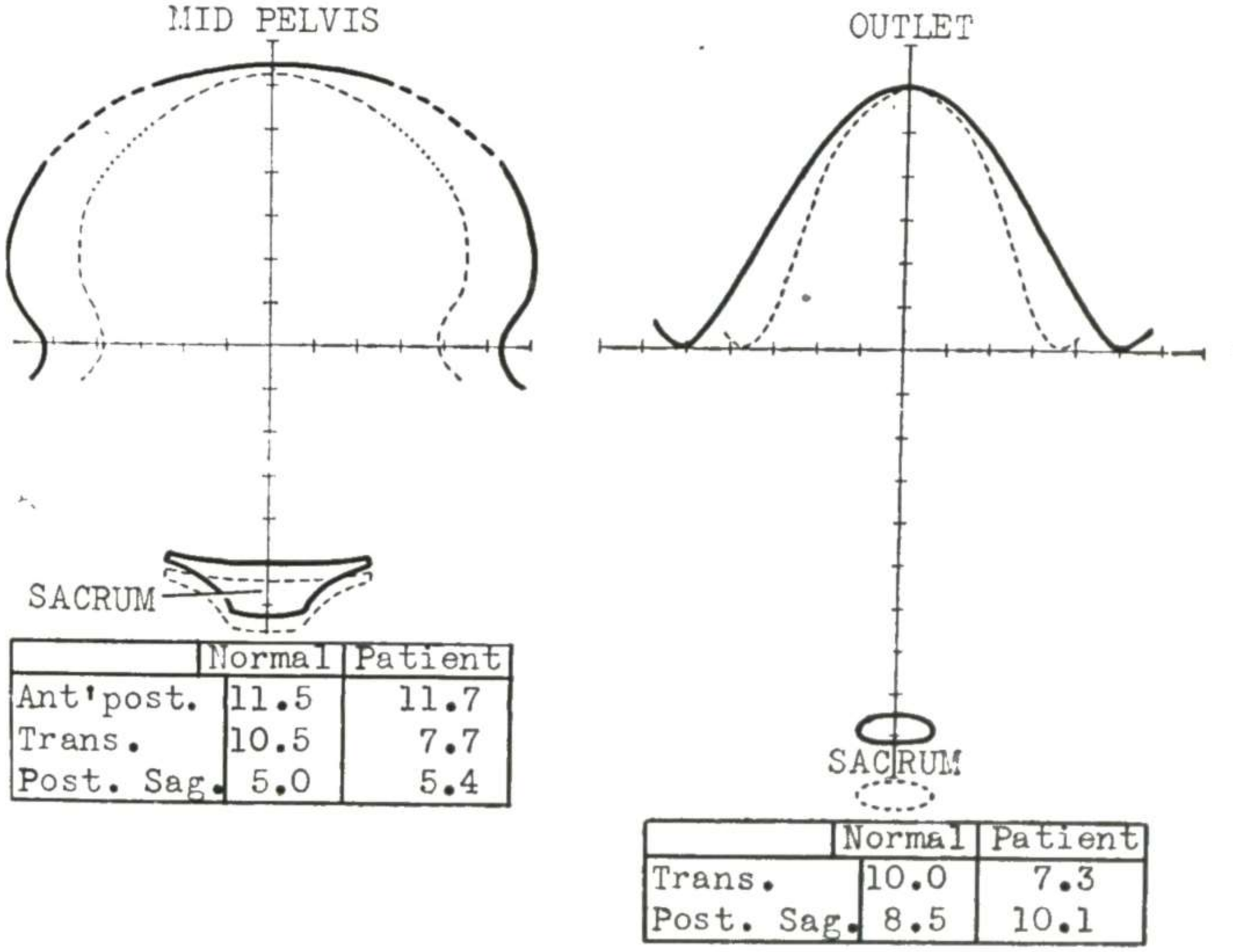
	Normal	Patient
Ant'post.	11.5	11.4
Trans.	13.0	8.8
Post. Sag.	4.0	4.9

Fig. 11.—Dotted lines represent anthropoid type of pelvis. (Courtesy of Mengert, William F., and Eller, William C.: Am. J. Obst. & Gynec. 52:1032-1040, December, 1946.)

and 12). The following six pelvic diameters are necessary: anteroposterior and transverse diameters of the inlet and midplane and posterior sagittal and transverse diameters of the outlet. The anteroposterior diameter of the inlet, transverse and posterior sagittal diameters of the outlet and transverse diameter of the midplane may be estimated manually. Two are measured roentgenographically—transverse diameter of the inlet and anteroposterior diameter of the midplane. The authors recommend use of Snow's technic, which requires only anteroposterior and lateral films and simple calculation.

(8) Am. J. Obst. & Gynec. 52:1032-1040, December, 1946.

The outline of each plane is sketched on the basic diagram of its normal counterpart. The transverse diameter is exactly bisected by the anteroposterior unless there is unilateral pelvic distortion. The point at which the trans-



	Normal	Patient
Ant'post.	11.5	11.7
Trans.	10.5	7.7
Post. Sag.	5.0	5.4

	Normal	Patient
Trans.	10.0	7.3
Post. Sag.	8.5	10.1

Fig. 12.—Dotted lines represent anthropoid type of pelvis. (Courtesy of Mengert, William F., and Eller, William C.: Am. J. Obst. & Gynec. 52:1032-1040, December, 1946.)

verse diameter crosses the anteroposterior of each of the three planes is variable and must be determined by measurement of the posterior sagittal diameter. This can be accomplished for the inlet and midplane only by roentgenography. Technic of manual measurement of the posterior sagittal diameter of the outlet is familiar.

Decision concerning management is facilitated by applying a diagrammatic transparent plastic cutout of small, average and large fetal heads to the graphic pelvic diagrams (Fig. 13). Cephalic outlines corresponding to infants weighing 2,500-3,000 Gm., 3,000-3,500 Gm., and 3,500-4,000 Gm. were constructed of 2 mm. thick plastic shaped to the contour of the largest size, the other two

outlines being etched in the plastic. Allowances were made for the normally flexed position of the fetal head during birth. The authors found that when a given sized cephalic outline can be fitted exactly into the pelvic diagram, a child of equivalent size plus 500 Gm. can pass through the pelvis. The 500 Gm. excess is probably accounted for by the process of molding.

Standards of inlet and outlet contraction sufficient to modify the course of labor are well recognized, but standards of midplane contraction are only now being formulated.

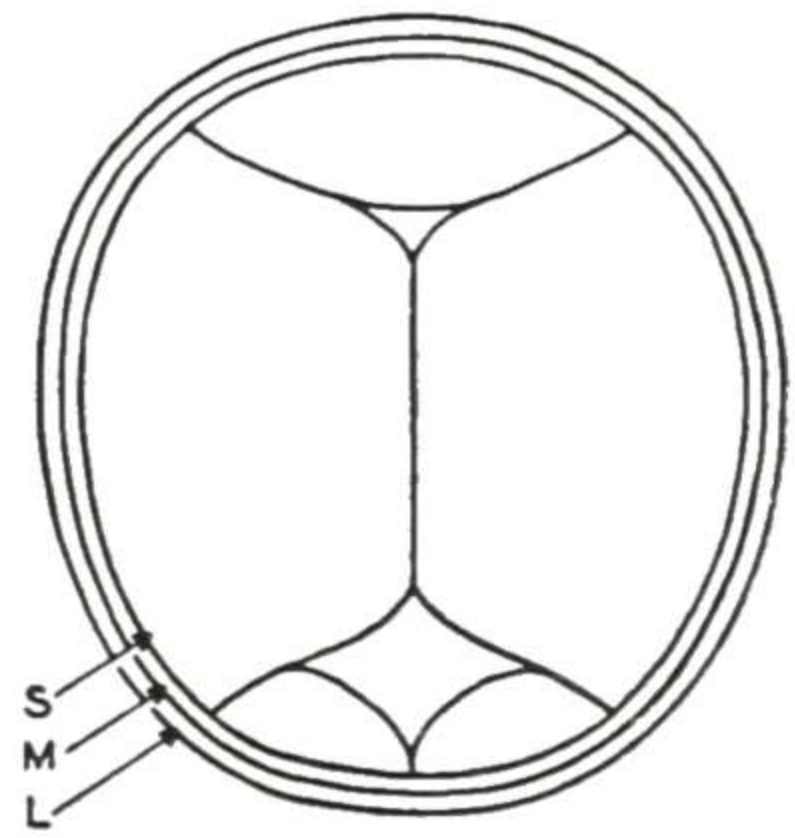


Fig. 13.—Fetal head diagram showing fetal weight in relation to head size: *S*, 2,500-3,000 Gm.; *M*, 3,000-3,500 Gm.; *L*, 3,500-4,000 Gm. (Courtesy of Mengert, William F., and Eller, William C.: Am. J. Obst. & Gynec. 52:1032-1040, December, 1946.)

[We have obtained a great deal of valuable information from radiologic studies of the female pelvis. X-ray studies have revealed what a normal female pelvis really looks like and also all the major and minor changes in morphology. They also disclose the size of the baby's head in comparison with that of the mother's pelvic cavity, especially the pelvic inlet. Furthermore, roentgen studies have enabled us to study the mechanism of labor in normal and abnormal cases. There is, therefore, no doubt about the importance of roentgenography in obstetrics. The question is, Shall this procedure be used routinely in all primiparas, as has long been advocated by Thoms and others? For any test or procedure to become a routine one, it must not be too complicated, time-consuming or costly. X-ray studies of the pelvis are fairly easy to carry out, they do not take much time, and they are not expensive. Therefore, x-rays could be taken routinely along with the other routine tests.

Is the information obtained by routine x-ray studies worth while? I think so, provided the roentgenologist will familiarize himself with the available data concerning x-ray studies of the pelvis. This is necessary for proper interpretation of the x-rays. Second, and more important, routine x-ray investigations will have a proper place in obstetrics if physicians will not depend *solely* on the roentgenologist or the x-ray pictures when deciding whether or not to perform a cesarean section. Whereas x-ray pictures 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.

Now what about pelvic measurements? For years all authors (including myself) of obstetric textbooks have written about and

illustrated how we take the interspinous, intercristal and external conjugate or Baudeloque diameters and other external measurements of the pelvis. Every obstetric record in at least every teaching hospital in this country and in many countries abroad contains such measurements. Recently less emphasis has been placed on the external measurements of the inlet, and repeated statements have been made that we are neglecting to measure the pelvic outlet and that these are important. True, it is much more difficult to measure the pelvic outlet properly with instruments or the hand, but such measurements should be taken routinely or outlet contractions will be overlooked until it is too late to have an uninjured mother and baby after delivery.

My attitude about external pelvimetry is that external measurements of the pelvic inlet have no value. Deformities are obvious without pelvic measurements. I have given up taking external measurements of the inlet, and in the next edition of the DeLee-Greenhill *Principles and Practice of Obstetrics* I shall omit all data and illustrations regarding these measurements.

The problem of measurements of the outlet is different. We must know the shape of the pubic arch, but this is easily determined with the fingers. We must also know the distance between the ischial tuberosities, and this too does not require a pelvimeter because the fist or fingers can give nearly all the necessary information. If, however, the space between the ischial tuberosities does not easily accommodate an average-sized (about 8 cm.) fist, this distance should be determined with any type of pelvimeter, or with small pieces of wood or metal. In such cases the posterior sagittal diameter should be measured, because if this diameter is less than 9 cm., delivery may be difficult or impossible. A contraction between the ischial tuberosities can usually be determined not by measuring the distance between the tuberosities but simply by outlining the pubic arch with the fingers. In this I agree with E. P. Allen (New Zealand M. J. 43:116-129, June, 1944) that contraction of the pubic arch always means a reduction in the intertuberous diameter. Measurement of the pelvic outlet is not easy, and because of this, obstetricians' measurements of the same patient often vary considerably. For this reason it is important to supplement this measurement with the bi-ischial diameter taken through the vagina. This measurement is still more difficult to gauge accurately. Unfortunately, roentgen measurements of the outlet are not very satisfactory. Even such an enthusiast as Thoms (Surg., Gynec. & Obst. 83:399-402, September, 1946) says: "Roentgenographic methods for depicting the pubic arch have not proved very satisfactory because of distortion difficulties." E. P. Allen (Brit. J. Radiol. 20:45-54, February, 1947), who has had an extensive experience in radiologic pelvimetry, points out defects in roentgen studies of the outlet. There is no generally accepted technic of measuring the subpubic angle. Allen makes suggestions for measuring this angle because it is of obstetric significance. Regarding the bituberous diameter, Allen (Brit. J. Radiol. 16:279-282, September, 1943) said that in many cases the end-point of the diameter could not be identified with certainty. Measurement of the posterior sagittal diameter of Klien is, according to Caldwell and Moloy, useless and sometimes misleading. According to Allen, the features

of the pelvis which can be measured accurately by x-ray are the obstetric conjugate, the transverse and posterior transverse of the brim, the anteroposterior, transverse, posterior sagittal and the bispinous of the midplane and the pubosacral and subpubic angles.

Knowledge of these measurements is so important that unless one has had considerable experience in carefully examining obstetric patients over many years, one should routinely have an x-ray picture of every primigravida. But I emphasize that the physician should see every x-ray picture himself and not rely on the roentgenologist's report, that entire dependence should not be placed on the x-ray picture, that regardless of what the roentgenogram shows the baby's head is an important factor in labor, that a head may mold and adapt itself in astonishing ways, and that experience is still important in estimating a woman's ability to have a baby through the natural passages. Because the relationship of the baby's head to the mother's pelvis is so important in labor, stereoscopic x-ray pictures should be used, as first emphasized by Caldwell and Moloy. It does not matter much whether one uses the ordinary or the precision stereoscope.—Ed.]

Recognition of Midpelvic Contraction according to William C. Eller and William F. Mengert[9] (Southwestern Med. College) would render infrequent unforeseen midpelvic arrest, unexpectedly difficult midforceps operation and unexplained stillbirth and neonatal death due to midpelvic contraction.

Average midpelvic measurements may be accepted as follows: transverse (interspinous), 10.5 cm.; anteroposterior (from the lower border of the symphysis to the fourth to fifth sacral interspace), 11.5 cm., and posterior sagittal (from the midpoint of the interspinous line to the same point on the sacrum), 5 cm. There is no satisfactory method of manual mensuration of midplane diameters. The anteroposterior diameter can be measured by vaginal examination, but the posterior sagittal dimension of the midplane can be measured only by roentgenography.

The method of pelvimetry described by Snow and Lewis is recommended by the authors. Exposure of the films, a flat anteroposterior and a lateral view, is simple and requires no special equipment. Measurements corrected for distortion can be obtained in a few minutes with a specially devised slide rule. This method combines simplicity, speed and accuracy, is available for use

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(9) Am. J. Obst. & Gynec. 53:252-258, February, 1947.

by any practitioner willing to spend the few hours necessary to master the technic and places interpretation of the films in the hands of the obstetrician, where it belongs.

Manual evaluation of the obviously adequate pelvis does not need to be supplanted by routine roentgen pelvimetry. On the other hand, manual evaluation of the borderline pelvis should be supplemented by roentgen study.

Roentgen pelvimetry is indicated in the presence of any one of the following: (1) history of difficult labor (especially midforceps delivery) and unexplained stillbirth; (2) palpation of prominent ischial spines, and sacral deformity (especially forward angulation); (3) on manual mensuration, ability to touch sacral promontory on vaginal examination of inlet, or external measurements below average, or bisischial outlet of 8.5 cm. or less, or sum of bisischial and posterior sagittal outlets of 15 cm. or less, and (4) nonengagement of fetal head at term in a primigravida.

[Much attention has been focused on midplane contractions because most of these contractions have been detected on roentgenograms. Considerable dystocia and loss of many babies have been due to midplane contraction. X-ray pictures show the distance between the ischial spines, hence whenever the spines appear to be prominent or too near together on vaginal examination x-ray studies should surely be made. McKelvey (1942 YEAR BOOK, p. 210) advocated cesarean section for cases of midplane contraction. In a comment on his article I stated that with few exceptions the decision to do an *elective* cesarean section in *head* presentations should not be made from an x-ray picture alone.

I was impressed by the plastic transparent models and the pelvic diagrams shown by Eller and Mengert at the American Congress of Obstetrics and Gynecology in St. Louis. Such models and diagrams should be most helpful.—Ed.]

Outlet Contraction of Pelvis may be recognized by observation of various diagnostic criteria defined by W. I. C. Morris.[1] Bony contraction of the outlet may result from (1) absolute narrowing at the plane of least pelvic dimensions, (2) narrowing below the level of this plane or narrowing of the pubic arch, or (3) combinations of the two. Three radiologic views are desirable.

(1) Edinburgh M. J. 54:90-110, February, 1947.

1. The posteroanterior view shows the shape of the arch. The interval in centimeters between the apex of the pubic arch and the circumference of the circle, and the relation of the coronal diameter of the circle to the ischial tuberosities are noted. The former measurement is used in assessing the effect of pubic arch narrowing in relation to the other bony boundaries of the outlet, the latter in assessing the effect of such narrowing on the soft tissues.

2. The lateral view provides measurement for calculating the corrected anteroposterior diameter of the outlet as follows: a point is taken in the general line of the conjoint rami seen in profile, at a distance from the lower border of the symphysis equivalent to that of the waste space recognized in the pubic arch view, and the distance between this point and the tip of the sacrum is taken as the corrected anteroposterior diameter of the outlet.

3. The anteroposterior view shows the diameter between the ischial spines and, in some cases, between the medial surfaces of the ischial tuberosities.

Of actual clinical measurements, the only one which approaches accuracy is the anteroposterior diameter of the least pelvic plane.

Morris believes that in all cases in which the anteroposterior diameter from the lower border of the symphysis to the tip of the sacrum is 11.5 cm. or over, outlet contraction is unlikely unless the ischial spines appear to be particularly prominent and inverted; when this measurement is less than 11.5 cm., the patient should be referred for radiologic examination; when the diameter is less than 10 cm., the outlet is definitely contracted.

It is emphasized that, as in brim contraction, at the outlet disproportion is more important than actual contraction and that the breech is a particularly dangerous presentation.

Soft tissues are deliberately neglected in making these calculations to exclude the possibility of mistaking faults in the soft tissues for bony faults.

Management depends on the choice among three alternatives: (1) to allow labor at term, (2) to induce labor prematurely and (3) to perform elective cesarean section. Each patient must be judged individually, taking into consideration not only pelvic measurements but also parity, age, relative fertility, psychosomatic background, relative size of brim and outlet with presence or absence of disproportion at the brim, and other factors.

Determination of Labor has been studied by F. Hanon and M. Brunaud.[2] The end of gestation is difficult to determine in human beings, although the gestation time of animals is remarkably fixed. This study is based on a hypothesis, namely, that if there is a substance which controls the uterine contractions in labor, it exists primarily in the uterus itself and at the instant of contraction. Previous studies have established the logical basis for this hypothesis; it has been shown, for example, that denervation of the animal uterus does not hinder parturition; transfusions of blood from pregnant women have shown that the circulating blood does not contain a substance capable of causing labor in a pregnant woman nor of modifying the course of a labor already begun. Posterior pituitary extract, histamine and acetylcholine have been shown to be without effect on labor.

Experimental Technic.—Pieces of human uterus removed when hysterectomy was necessary during labor and rabbit uteri from animals killed during labor were extracted with acetone, dried and defatted. The material was then powdered, and aqueous extracts were prepared from the powder. Basic, neutral and acid extracts were used. The extracts were tested in vitro on guinea pig uterus muscle and on rat duodenum. In vivo study of the extracts was made on rats, dogs and some women in labor.

Under the experimental conditions, it was concluded that the extracts of powdered uterus have excitomotor properties for the guinea pig uterus. After it had been proved that these properties were not due to histamine, to substances of acetylcholine type, to posterior pituitary extract, to certain amino acids or to urea, the hypothesis was formulated that there is a previously unknown sub-

(2) Gynec. et obst. 46:201-215, 1947.

stance involved, to which the name eutocine was given. Other experiments were conducted to test this hypothesis.

In studies on guinea pig uteri, it was found that similar doses of the same extract had varying effects on different uteri, but the effect of varying doses of the same extract on the same specimen varied according to the size of the dose. It was found, moreover, that a single dose of extract produced a series of contractions; the first contraction was always the longest, and then followed contractions just as powerful as the first but of gradually diminishing duration. Between contractions the muscle was almost completely relaxed. Eutocine does not appear to be species specific, but it possesses organ specificity; it did not produce contractions in rat duodenum in vitro. The extracts did not lose their effect on standing for 30 days at room temperature, and boiling extracts of varying hydrogen ion concentrations for 15-30 minutes had no effect on the activity of the eutocine. Simple irrigation with tyrode solution restored the specimens of uterus to the pre-experimental state. Injection of the extracts into anesthetized dogs caused an elevation of blood pressure entirely different from that caused by histamine and by acetylcholine.

The effect of human amniotic fluid was also studied, and it was found that it produced contractions similar to those produced by uterus extracts. Study of the effect of increasing doses of amniotic fluid indicates that the excitomotor action is proportional to the dose.

In further studies it was found that extracts of different uteri differed in effectiveness and that amniotic fluid from the same subject varied in effectiveness as did the uterus extract. This raises three interesting questions. (1) Is there a means of measuring the effectiveness of a uterus in labor and, consequently, of the outcome of the labor? (2) Can the acceleration of labor which follows rupture of the membranes be explained on the basis of resorption through the genital tract of eutocine from the amniotic fluid? (3) Will it be possible to institute artificial but physiologic labor at term? It was further

determined that the amniotic fluid of a multipara is richer in eutocine than that of a primipara. Does this fact explain the easier deliveries and more frequent postpartum pains of multiparas?

[These authors properly state that "The end of gestation is difficult to determine in human beings. . . ." This leads us to the matter of postmaturity. How do we know a baby is actually post mature? So far we have no reliable criterion. Weight surely is not an index because large babies which surely did not remain in the uterus 40 weeks have been delivered, and we have seen babies under 4 lb. at birth which just as surely had been in the uterine cavity at least 38 weeks. Nor is the supposed duration of pregnancy conclusive evidence of maturity. A. J. Wrigley (Proc. Roy. Soc. Med. 39:569-574, July, 1946) criticizes present ideas about postmaturity and maintains that whereas we should continue to give patients the same estimated date for confinement and should continue to note the rate of increase in size of the uterus throughout pregnancy and the time of the first fetal movement, we should cease to teach that every woman will *inevitably* mature her baby of 7 lb. weight in the calculated 40 weeks. We should abolish instructions to terminate pregnancy as a routine at the calculated 40, 41 or 42 weeks or what you will. If, however, repeated examinations reveal what may really be interpreted as postmaturity, induction of labor is indicated. I fully agree with Wrigley, but I emphasize that true postmaturity is very rare and that, unless this is appreciated, great harm will result from meddlesome interference. Again I say if a cervix is long and not dilated, the baby is not ready to be delivered, no matter how long the pregnancy is supposed to have lasted. The exceptions to this rule number almost zero.

In this connection I cite a case which shows how much more our judges know about the duration of pregnancy than we obstetricians. In a case (J. A. M. A. 133:347, Feb. 1, 1947) in which a man sued his wife for divorce on the grounds that it is impossible for a period of 355 days to elapse between coitus and parturition the judge said: "It thus appears that while the duration of pregnancy was 355 days, the head of the fetus was engaged for at least 68 days which presents a question as to whether the last 40 days were a part of the period of gestation proper or were due to difficulty in delivering the child." The baby weighed 9 lb. The husband was not granted the divorce.—Ed.]

Management of Delivery Following Stillbirth from Previous Dystocia. Arthur B. Hunt and Robert W. DeVoe[3] (Mayo Clinic) review the deliveries of 32 patients. As term approaches, those patients must be selected for whom a test of labor may be tried. The fact that a woman has lost an infant from dystocia does not indicate, per se, that elective cesarean section must be

(3) Am. J. Obst. & Gynec. 53:812-816, May, 1947.

done thereafter. No single criterion should decide the method of delivery. With an adequate pelvis and normal vertex presentation, prospects for successful delivery through the pelvis are excellent. There is also the tremendous advantage that the cervix has been dilated previously.

Elective cesarean section was done in 13 cases; in 9, definite pelvic contraction was present, and in 4, other complications. In 23 of 36 deliveries, all but 1 were successful in fetal outcome. The one infant was dead in the uterus because of severe toxemia of the mother on admission to the hospital. There was no maternal mortality. In a series reported by the authors previously (1926-35), half the patients required cesarean section. The reduced number in the second group may indicate better selection of patients with contracted pelves for cesarean section. The conduct of the first delivery after the stillbirth from dystocia seemed to determine the type of management in later deliveries. In the care of these patients individual prenatal care, examination and study of the safest method of delivery are most valuable.

Analgesia and Anesthesia

Amnesia during Parturition achieved by intravenous injection of pentobarbital sodium and scopolamine hydrobromide is reported by Perry P. Volpitto[4] (Augusta, Ga.).

Technic.—The contents of a pentobarbital sodium ampule (3¾ gr.) and a scopolamine hydrobromide ampule (1/100 gr.) are mixed and diluted to 10 cc. with sterile distilled water. With a 10 cc. syringe and a 27-22 gauge needle an initial 3-4 cc. of the mixture is given at the rate of 1 cc. every 30 seconds until the patient begins to fall asleep or talks incoherently. The procedure is begun when pains are 4-5 minutes apart and last at least 30 seconds. With the needle in place, the patient is carefully watched during a contraction, and if she is extremely restless and talks coherently an additional 1-3 cc. is administered.

The average patient requires an initial dose of 10 cc. Three-

(4) J. A. M. A. 132:1059-1062, Dec. 28, 1946.

fourths to one hour after the initial injection the average patient requires an additional 2 cc. or less. The average multipara may need two 2 cc. injections and the average primipara about three. The interval grows longer with each injection. It is important to remember that it is amnesia, not analgesia, that is sought.

This method was used in over 1,000 patients in four years; 170 were followed closely. Seventy-five were primiparas and 95 multiparas. Delivery was spontaneous in 164 (96.4 per cent) and by low forceps in 6. Complete amnesia was reported by 152 (89.4 per cent) and partial amnesia by 18 (10.6 per cent).

Slowing of either or both first and second stages of labor occurred in 18 patients (10.6 per cent) and pains ceased completely in 5 (2.9 per cent). Three patients (1.7 per cent) became extremely excited but were controlled by intravenous administration of 1/8 gr. morphine sulfate.

Severe drop in blood pressure in two was associated with rapid injection of the drugs by inexperienced personnel. Both patients recovered on administration of 2 mg. neosynephrine hydrochloride and high concentrations of oxygen by anesthetic bag and mask. Severe respiratory depression occurred in one patient to whom the drugs were given too rapidly. Recovery followed administration of oxygen with an anesthetic apparatus. Nausea and vomiting in three patients was controlled with small additional doses of the amnesic drugs. One patient with undetected early double lobar pneumonia died.

Of the 171 babies delivered, 157 (92.4 per cent) breathed spontaneously and immediately. Of 13 (7.6 per cent) born apneic 12 were resuscitated by use of the Torpin insufflator. Five of these apneic babies were born to mothers who were given 1/6-1/4 gr. morphine sulfate subcutaneously one to four hours before delivery. The one stillborn infant was born to the patient who died of lobar pneumonia complicated by administration of the amnesic drugs.

High incidence of spontaneous breathing in the infants adds evidence that nonanesthetizing doses of pentobarbital sodium do not depress fetal respiratory centers. If

the drugs are not given too early in labor and only in amnesic doses, labor is usually not delayed and spontaneous delivery occurs. Barbiturates are contraindicated in (1) patients with pulmonary disease, (2) debilitated persons, (3) patients with toxemia, (4) asthmatic patients and (5) patients with hepatic damage, suspected or real. The safety and success of the method depends on the experience and ability of the person using it.

Scopolamine and Apomorphine in Labor. In the past 15 years at the Boston Lying-in Hospital, scopolamine was found to be the most useful drug in producing amnesia. Apomorphine is used to counteract excitement resulting from scopolamine. Bert B. Hershenson and Elwood R. Brubaker[5] (Harvard Univ.) reviewed the records of 500 patients in whom this drug combination had been used.

The optimum routine of medication as finally established is as follows. Patients in labor are given 3 gr. seconal by mouth or rectum, after an enema on admission. When labor is progressing and the patient complains of pain, scopolamine and apomorphine are administered in doses of 1/100 gr. each. In three quarters of an hour 1/150 gr. scopolamine and 1/50 gr. apomorphine are given again and then repeated at two hour intervals. Apomorphine is kept in sterile 20 cc. vials containing 0.4 gr.

In 90 per cent of 300 patients in whom this regimen was used, effective amnesia resulted; the other 10 per cent received the drugs in insufficient quantity. Ninety-six per cent of patients receiving three or more doses had satisfactory amnesia. Vomiting occurred in 24.5 per cent of patients, but vomiting is common in labor when other premedication or no premedication is used. Excitement occurred in 21.5 per cent of patients as contrasted to 40 per cent when scopolamine alone was used. The average primiparous labor in this series was 11.3 hours as contrasted to 16 hours in primiparas who did not receive medication. Average multiparous labor was

(5) Am. J. Obst. & Gynec. 53:980-995, June, 1947.

6.5 hours in this series, contrasted to 12 hours in multiparas not receiving medication. No increase of blood loss was noticed. These drugs exerted no demonstrable depressant effect on full term or late premature infants, even when administered shortly before delivery.

Childbirth Pain Alleviated by New Oxytocic-Analgesic Drug Combination. E. Lévy-Solal, F. Mercier and A. Remlinger[6] prefer the term childbirth with alleviated pain to painless childbirth, since the latter phrase is deceiving both to obstetrician and to patient and since the chief objective is to relieve labor pains as completely as possible without endangering mother or child. The new drug combination has the following formula for one ampule:

Dihydroxycodeinone camphosulfonate	0.0075 mg.
Dihydroxycodeinone phenylpropionate	0.005 mg.
Scopolamine camphosulfonate	0.0002 mg.
Ephedrine camphosulfonate	0.02 mg.
Sparteine sulfate	0.08 mg.
Physiologic salt solution	q.s.ad 2 cc.

Dihydroxycodeinone has marked analgesic properties, the phenantrene series being the least toxic of the opium alkaloids. To reduce its toxicity for the fetus, it is given in the form of camphosulfonate. Dihydroxycodeinone phenylpropionate hastens analgesia. Scopolamine reinforces and prolongs analgesia, and ephedrine has a vasoconstricting and hypertensive effect, stimulates respiration and counteracts the depressive action of hydroxycodeinone and scopolamine. Given as a camphosulfonate compound, it also has a beneficial shock-combating and antitoxic effect. Sparteine sulfate reinforces and regulates uterine contractions without the dangers attendant on administration of posterior pituitary extracts.

The authors have used this new oxytocic-analgesic compound for healthy primiparas and multiparas, for patients having coexistent disease of the lungs, heart or kidneys, for patients who had had previous gynecologic operations and in cephalic and breech presentations. They found it to be innocuous for mother and child. The in-

(6) Bull. med., Paris 61:301-305, July 21, 1947.

jection is made intramuscularly over 30 seconds. The initial dose is 4 cc. (2 ampules). The analgesic effect is noted on the average 8-12 minutes after injection. Analgesia lasts 3½-4½ hours and in exceptional cases, less than 1 hour or more than 6-8 hours. During uterine contractions, pain is greatly diminished and often abolished. For primiparas, the injection is given when the head is distinctly engaged and the dilatation has progressed well; for multiparas, it is given when the head is fixed in the lower segment, the cervix effaced and labor definitely in progress. In some instances when labor is unduly prolonged and pains reappear, a second injection may be necessary. Only one ampule is then given; in addition, an ampule of coramine is given to stimulate the fetal respiratory centers. If an obstetric operation under general anesthesia is required, such anesthesia should be maintained at the loss-of-consciousness level, as the new compound is a powerful preanesthetic agent and additional deep general anesthesia may cause fetal apnea.

In the authors' experience, use of the new oxytocic-analgesic compound brought about a course of labor without severe pain in 82 per cent of cases.

Analgesia and Anesthesia in Obstetrics: Control of Pain during Labor. According to Hubert Ph. De Kanter[7] (Mexico City), the anesthetic agents used in obstetrics can be divided into those used chiefly during the first and part of the second stage of labor, those used during expulsion of the fetus and those used during the entire period of labor. In his experience, the procedure that produced best results during the first stage of labor is as follows. If the patient has been well prepared psychologically and co-operates fully, no analgesic is needed until labor has actually begun. Otherwise, administration of 0.01 Gm. morphine facilitates dilatation up to 2-3 cm. Thereafter the patient is given 0.20 Gm. sodium seconal with 1/150 Gm. scopolamine. This dose may be repeated within two hours if necessary. At 4 cm. dilatation an ampule of demerol or dolantin is given. If better sedation

(7) Rev. ginec. y obst. de Mexico 2:181-190, May-June, 1947.

is required before complete dilatation takes place, 0.1 Gm. seconal is given in addition.

De Kanter believes ether to be the ideal general anesthetic agent when used during the terminal stage of labor because of its easy administration, complete abolition of pain, the possibility of rapid transition from superficial to deep anesthesia and vice versa and the wide margin of security. Nitrous oxide is readily absorbed and rapidly eliminated, does not affect uterine contractility and does not cause postoperative morbidity. However, to obtain anesthesia, the oxygen percentage must be low and this may result in anoxia of both mother and infant. Nitrous oxide anesthesia is contraindicated for feeble patients and at altitudes higher than 5,000 ft. above sea level. Cyclopropane often produces extrasystoles and auricular fibrillations. Pentothal sodium should be given only during the terminal stage of labor because of danger for the infant.

In selected cases and in expert hands, caudal anesthesia is an ideal means of abolition of labor pain. Blood loss is less than with other types of anesthesia, and there is no effect on the infant. Therefore, it is especially recommended in premature labor, and, being a local type of anesthesia, for mothers who cannot tolerate general anesthesia, e.g., those with conditions such as tuberculosis or anemia. However, complete relaxation of the pelvic floor results in a greater number of occiput posterior presentations. Spinal anesthesia with hyperbaric solutions does not eliminate labor pain and because of its hazards should not be used in spontaneous deliveries. Pudendal block is perhaps the method of choice for the terminal stage of labor in eclamptic patients to eliminate pain arising in the pelvic floor and thus prevent shock. Local infiltration anesthesia is practically nontoxic and should be used for patients with eclampsia and renal and hepatic disease.

Pethidine in Labor: Results in 500 Cases are reported by Josephine Barnes.[8] Among 479 primigravidas and 21 multiparas given 100 mg. demerol (pethidine) by injec-

(8) Brit. M. J. 1:437-442. Apr. 5, 1947.

tion repeatedly before delivery, toxic symptoms occurred in 11. There were no maternal deaths. Even when the drug was given shortly before delivery, asphyxia, which occurred in 55 infants, all of whom recovered spontaneously, could be attributed to the drug in only a few cases.

Good analgesia was experienced by 55 per cent of mothers and would have been present in others if the drug had been given early enough. Amnesia was obtained in only 10 per cent. The addition of chloral hydrate orally may be desirable for production of amnesia when lack of co-operation of the patient is not feared. Some analgesia was experienced by 87 per cent of patients.

No effect on uterine contractions was noted in 67 per cent, and in 23.3 per cent contractions increased. The first stage of labor was prolonged an average of seven hours by demerol, but no significant change in duration of the second and third stages was noted. No significant increase was noted in the proportion of patients requiring forceps delivery, and there was no tendency to postpartum hemorrhage. No maternal or fetal mortality occurred in the 32 cases in which demerol was used as premedication for cesarean section. In Barnes' opinion, demerol is the best obstetric analgesic known.

Combined Evipal and Scopolamine Analgesia and Cyclopropane Anesthesia in Obstetrics. Harley E. Anderson[9] (Univ. of Nebraska) evaluated clinical data of 700 private obstetric patients and found this method safe and effective. Evipal soluble crystals (1.5 Gm.) were dissolved in 60 cc. tap water and given rectally when the patient was in true labor, and 1/150 gr. scopolamine hydrobromide was given hypodermically at about the same time. An additional scopolamine injection was given one hour after the first injection if necessary. Cyclopropane was not given until delivery was imminent.

Analgesia and amnesia were complete in 93 per cent of patients; 7 per cent experienced slight or no relief from pain. About 5 per cent of patients became difficult

(9) Am. J. Obst. & Gynec. 53:758-765, May, 1947.

to manage while under sedation. This is an improvement over results obtained with most barbiturate-scopolamine combinations. The cause of each of four stillbirths was ascertained, and in no instance was the fetal death caused by the drugs. Less than 7 per cent of newborn infants required artificial resuscitation, and all of these survived. Cervical laceration occurred in 4 per cent of cases. This shows the relaxing effect of evipal and scopolamine on the cervical muscle fibers. When analgesia and surgical anesthesia are used there is an increase in the proportion of perineal application of forceps in vertex presentation, especially in the primigravida.

Oxygen Therapy and Analgesia with Nitrous Oxide Anesthesia in Closed Circuit. Jules Scêmla[1] (Tunis) uses the closed system apparatus which permits rebreathing of nitrous oxide and oxygen in varying proportions and believes that it is superior to the Walton Minnit apparatus used heretofore. Scêmla's procedure is as follows.

PROCEDURE.—In cases in which uterine contractions begin abruptly and are immediately associated with intense pain, a mixture of 70 per cent nitrous oxide and 30 per cent oxygen is given at the onset of contractions. Once analgesia has been obtained, the proportion is changed to 50 per cent of each agent. If uterine contractions begin insidiously a 50 per cent mixture is given at first and increased progressively to 70 per cent nitrous oxide at the peak of pains. At intervals between contractions, the mixture contains 80 per cent oxygen and 20 per cent nitrous oxide. This is sufficient to suppress lumbar pain and to maintain sufficient oxygenation. During the period of expulsion, 75 per cent nitrous oxide is given for two inspirations, whereafter the patient is asked to hold her breath and strain. These two inspirations usually suffice to produce the analgesia necessary to make straining painless. For the third inspiration, the mixture is modified to 20 per cent nitrous oxide and maintained in this proportion during the intervals between contractions. The proportion of nitrous oxide should never exceed 75 per cent lest the infant be born asphyctic. This imminent danger in cases of prolonged expulsion period in primiparas with a taut perineum has prompted Scemla to infiltrate the internal pubic nerves and the perineal surface with novocain. This infiltration provides sufficient perineal relaxation and regional anesthesia to allow for reduction of the nitrous oxide percentage to 50.

(1) Bull. med., Paris 61:311-312, July 21, 1947.

Scêmla used the closed system of nitrous oxide-oxygen anesthesia for 25 patients (12 primiparas and 13 multiparas). The mean duration of anesthesia was one hour. With exception of three cases in which anesthesia was too deep and the infants had to be resuscitated, there was no untoward effects. Analgesia was complete in 23 patients and incomplete in 2 who were nervous, anxious and not sufficiently prepared from the psychologic viewpoint.

Obstetric Autoanalgesia with Nitrous Oxide is discussed by P. Lantuéjoul, J. Boureau and R. Chambraud[2] (Tarnier Clinic, Paris). A new apparatus, G. S. 45 (Liquid Air Society) makes possible the production of autoanalgesia of satisfactory quality and with comparatively few disadvantages. The gas is supplied by a tube of liquefied nitrous oxide, and before it is delivered to the mask it passes through two detention chambers which reduce the pressure to that of the atmosphere. Use of the apparatus is begun at the time of severe pain; the air vent of variable diameter is closed, and the patient places her index finger over the fixed vent. She then inhales through the nose and exhales through the mask. As soon as analgesia is obtained, the finger falls away from the air vent; if the mask is left in place, very light anesthesia is continued by the mixture of air and nitrous oxide. If further analgesia seems unnecessary, the mask is removed.

This method of inducing autoanalgesia has been used by the authors in 36 deliveries; 26 of the patients were primiparas and 10 were multiparas. Analgesia was perfect in 25 cases, partly successful in 7 and unsuccessful in the other 4. The state of the infant was noted at birth and for 12-14 days thereafter; the analgesia seemed to have no significant effect on the offspring.

Analgesia was accompanied in some cases by cyanosis, vomiting and agitation. It also seemed to have a retarding effect on expulsion, but, on the whole, the results were considered good.

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(2) Gynec. et obst. 43:293-297, 1947.

Pentothal in Gynecology and Obstetrics. E. Dlhoš[3] (Košice) states that pentothal anesthesia has proved useful in all types of short gynecologic operations. Its use is contraindicated in anemia. When curettement is done in the third or fourth month of pregnancy uterine stimulants must be on hand in case atony of the uterus occurs. Pentothal anesthesia is suitable for almost any gynecologic operation except laparotomy, in which relaxation of the abdominal wall cannot be obtained with pentothal alone.

In obstetrics, Dlhoš' experience with pentothal anesthesia was limited to a few cases; therefore, definite conclusions cannot be drawn. It proved satisfactory in three forceps deliveries and in two breech extractions in primiparas; the infants were not asphyctic, the third stage of labor was not protracted and complications did not occur. Transverse presentation of the fetus is a contraindication to use of pentothal anesthesia, as the perfect relaxation of the uterine muscle required for version cannot be obtained with pentothal alone.

Minimal Spinal Anesthesia in Vaginal Delivery: Analysis of 1,000 Consecutive Cases. John A. Haugen (Minneapolis) and Ralph C. Benson[4] (San Francisco) used 1.5 per cent metycaine in Ringer's solution, injecting 1.5 cc. (22.5 mg.) into the spinal canal when the cervix was completely dilated in primiparas. Many multiparas were given injections before complete dilatation. After the injection the patient is promptly turned on her back, and the head of the delivery table raised 1 ft. After 10 minutes, the table is returned to the horizontal position. Anesthesia lasts 60-90 minutes, and there is no obliteration of uterine muscle activity.

Episiotomy followed by elective outlet forceps delivery was practiced, but spontaneous delivery was encouraged when easy prompt outcome was anticipated. There was no instance of the usually feared side-effects of spinal anesthesia in the obstetric patient. The occurrence of

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(3) Ceskoslovenska gynaek. 12:125-136, 1947.
(4) Am. J. Obst. & Gynec. 53:805-811, May, 1947.

postspinal headache in 6.3 per cent was the only undesirable factor. The favorable effect on the infant plus the minimal trauma to the birth canal which can be achieved only with a high degree of perineal relaxation suggests that this method of anesthesia for operative deliveries has many advantages over inhalation agents and compares favorably with other regional anesthetic methods.

Dilute Solution, Catheter, Continuous Spinal Analgesia for Labor and Delivery: Preliminary Report. Sylvan M. Shane, D. Frank Kaltreider and Harry M. Cohen[5] (Baltimore) have overcome the complications of continuous caudal analgesia and the undesirable features of spinal analgesia by injecting into the subarachnoid space through a ureteral catheter an anesthetic solution which is so dilute that no somatic sensory effect could be detected and little or no motor paralysis involving the musculature of the thorax, abdomen or extremities was produced; yet the pain of labor contractions was abolished.

TECHNIC.—A 16 gauge spinal needle is inserted into the subarachnoid space, and when it is determined to be in the proper position a ureteral catheter is passed through the lumen of the needle and brought to rest in the subarachnoid space. The needle is then withdrawn. The catheter is taped over a ½ in. roll of sterile gauze to the back. A syringe is attached for the administration of dilute pontocaine in glucose (0.05 per cent or 0.5 mg. per cc.). The patient may rest in any position.

Dilute pontocaine is administered at the rate of 1 cc. per hour until the cervix approaches full dilatation, when 2-3 cc. may be needed to control the pain. Just before actual delivery, 4 mg. pontocaine in 2 cc. glucose is injected, with the patient in reverse Trendelenburg position. Two minutes should be required for the injection, and after one minute more the table is leveled. All pain is relieved by this injection, and episiotomy, forceps application or any type of operative procedure may be performed. Anesthesia is produced for about two hours. When delivery is completed the patient is turned and the catheter gently withdrawn.

In general, analgesia is begun in nulliparas when the cervix is dilated 6-7 cm. and in multiparas when it is dilated 3-5 cm. The presenting part must be engaged and at least on the level of the ischial spines. Contraindications for continuous caudal anesthesia apply to this method.

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(5) Am. J. Obst. & Gynec. 54:488-495, September, 1947.

In a series of 50 cases there was no increase in operative or midforceps intervention as a result of the analgesia. If the patient did not make progress, injections were withheld. None of the stages was prolonged. The patient could at all times "bear down," and infants did not require resuscitation. There were no complications, and fetal and maternal mortality was zero.

Problem of Anesthesia in Cesarean Section. B. Neme and Jutahy Esteves[6] (Univ. of São Paulo) review 559 cases in which cesarean section was performed at the obstetric clinic. Anesthetics were spinal in 74.9 per cent, inhalation in 16.8 per cent, peridural in 2.9 per cent, cases. For subarachnoid block, hypertonic scurocaine sacral in 0.5 per cent and intravenous in 0.3 per cent of solution was used in 95.7 per cent of cases. Ether and balsoform were used in 90.3 per cent of cases of inhalation anesthesia. At present, if inhalation anesthesia is to be used, cyclopropane gas-ether anesthesia given by the closed method is preferred.

The importance of hemorrhage as a cause of death in cesarean section is stressed; its incidence is higher with inhalation anesthesia. Peridural, local and spinal anesthesia were associated with a lower incidence of hemorrhage. The authors point out the depressive effect of analgesic drugs and anesthetic gases on the fetus. It was possible to resuscitate more infants after inhalation anesthesia (15.6 per cent) than after spinal anesthesia (6 per cent), despite the larger number of cases of severe anoxia in the spinal group. To reduce the number of immediate accidents and complications of spinal anesthesia, which include death (0.71 per cent in the present series) and severe hypotension (2.3 per cent), its physiopathology should be well known. Only well trained anesthetists should administer spinal anesthesia. Complementary anesthesia was required in 6.9 per cent of cases of spinal, 15.3 per cent of epidural, 31.2 per cent of local and 100 per cent of intravenous anesthesia.

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(6) An. brasil. de ginec. 22:174-185, September, 1946.

The authors believe the dangers of spinal block to be highly overrated. It was used in 65.4 per cent of patients with hypertension, in 66.6 per cent with placenta praevia, in 47.6 per cent with abruptio placentae and in 42.8 per cent with cardiac disorders. However, spinal block is no longer used in hypertensive states or abruptio placentae with toxemia. For cardiac patients it is used only exceptionally, and in placenta praevia its use depends on the severity of posthemorrhagic hypotension. Spinal block is the anesthesia of choice, provided there are no contraindications, because it assures good uterine retraction, excellent abdominal relaxation, almost complete absence of toxicity and low risk for mother and child.

Saddle Block Anesthesia with Nupercaine in Obstetrics. Ray T. Parmley and John Adriani[7] (New Orleans) report their technic and results in 136 patients.

TECHNIC.—Nupercaine, 0.5 cc. of 0.02 per cent solution, (2.5 mg.) is thoroughly mixed with 0.5 cc. glucose solution in a 2 cc. syringe. With 1 per cent procaine used for infiltration, lumbar puncture is performed, preferably at the fourth interspace, with the patient sitting. Free flow of spinal fluid must be obtained to assure correct placement of the bevel of the needle, but not more than 0.1 cc. spinal fluid should be aspirated or dilution interferes with the desired distribution of anesthesia. The solution is injected as rapidly as gentle pressure on the plunger permits (approximately two seconds). The needle is withdrawn, and the patient is asked to remain sitting for 30 seconds, after which she is placed in a recumbent position. The patient must not move or shift about for 5-10 minutes after completion of the injection, since this causes spreading of the drug in the spinal canal. The solution should not be introduced during a contraction because increased spinal fluid pressure forces the drug into the thoracic region, increasing the distribution of anesthesia and halting labor.

This technic produces localization of drug concentration in the conus. Anesthesia of the vulva and other perineal structures is complete. Hypalgesia and disseminated areas of analgesia are present in the legs and thighs, but little or no paresis of the leg and thigh muscle is obtained. Sensory fibers to the uterus and cervix are blocked, but the number or force of contractions is not

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(7) Am. J. Obst. & Gynec. 52:636-640, October, 1946.

diminished. The recti are not affected, and the patient can bear down if requested.

To exclude complicating factors, use of the technic was limited to normal patients. Block was performed after the beginning of the first stage of labor. The anesthetist remained in constant attendance. Equipment for administration of oxygen, artificial respiration or analgesia was held in readiness, as were vasopressor drugs for overcoming hypotension. In 81 per cent of the patients relief from pain during labor and delivery was complete. Slight pain on application of forceps in 14 per cent was relieved by inhalation of analgesic mixtures of nitrous oxide-oxygen until the head was delivered. In 5 per cent block was not satisfactory; this was attributed to error in technic. Block was repeated after 15 minutes and was satisfactory in every case. Repeating the block is not dangerous because doses are small. A single block was sufficient in 68 per cent of cases; in 32 per cent repeated blocks were necessary. Average duration of analgesia was three hours. Neither postpartum hemorrhage nor excessive bleeding occurred. Babies cried spontaneously, and none required resuscitation.

Nausea and vomiting occurred in 13 per cent of the patients, but this was eliminated if fluids and food were restricted during labor. Systolic blood pressure was lowered an average of 10 mm. in 50 per cent of the patients. This result was attributed to psychic effects of pain relief on blood pressure. Momentary fall in systolic pressure to as low as 80 mm. Hg was immediately relieved by deep breathing, except in three patients to whom it was necessary to administer 15-30 mg. ephedrine intravenously.

Respiratory depression, rectal or urinary incontinence during labor, backache, urinary retention, distention, ileus, meningismus, palsies or headache after the anesthesia was not encountered.

The group treated was not large enough to prove the advantages or disadvantages of the method. Furthermore, the patients were normal and free from complications. But the simplicity of induction, safety allowed by

low dosage and exact localization of distribution of anesthesia make the method worthy of further clinical trial.

Anesthesia in Obstetrics. Though not all women can be delivered under local infiltration anesthesia, J. P. Greenhill[8] (Chicago) believes that maternal and fetal mortality and morbidity will be reduced by widespread use of this form of anesthesia. Local anesthesia has many advantages over other forms of anesthesia in obstetrics. Practically no deaths have resulted. None of the pulmonary complications occurring from irritation of the respiratory tract or aspiration of secretions in inhalation anesthesia or from diminished respiratory excursion in spinal anesthesia occur in patients treated with local anesthesia. Local and general complications are rare. Only three difficulties are possible. (1) A needle may break off. Since breakage almost always occurs near the hub, needles should never be inserted to their whole length. (2) Injection of the solution directly into a vein may occur. To avoid this the barrel of the syringe should be withdrawn before injection. (3) In rare instances drug shock may occur. The technic is simple and may be used at home or in a hospital. No ill effects on liver, lungs, heart, circulatory apparatus or nervous system occur. No special knowledge is required, and, since the physician carries out the procedure, he is not dependent on other persons. None of the after-care required by other types of anesthesia is necessary. Bleeding is negligible. There is no interference with the uterus, abdominal wall or respiration. Postoperative symptoms are rare. Food and liquid may be taken by mouth during and after operation. Suturing may be more careful because it is unhurried. Tissues must be handled gently, but this is an advantage to the patient. There is less wound infection since local trauma is diminished and the patient's general resistance is not lowered. It is the least expensive anesthetic and does not cause asphyxia of the child, which may result from inhalation anesthetics or use of pentothal too early in delivery.

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(8) Am. J. Obst. & Gynec. 54:74-81, July, 1947.

Local anesthesia should be used only for patients who will co-operate if awake during delivery. The patient's feelings must be considered by the operating team and the patient assured that an inhalation anesthetic will be given if she desires it.

Local anesthesia can be used for normal deliveries with and without episiotomy and for most obstetric operations both vaginal and abdominal.

Ethyl and divinyl ether and chloroform inhibit uterine contractions when the quantity is sufficient to produce adequate analgesia. Nitrous oxide and ethylene have a very small margin of safety. All inhalation anesthetics cause respiratory complications. Pentothal cannot be used intravenously before actual delivery because it may depress fetal respiration. Caudal anesthesia requires concentrated attention of trained personnel. Spinal anesthesia has a higher mortality than any other form of anesthesia, and its mortality in obstetrics is higher than in nonpregnant patients.

Local Infiltration Anesthesia in Obstetrics and Gynecology. J. P. Greenhill[9] (Chicago) cites the disadvantages of inhalation, spinal and caudal anesthesia and direct infiltration anesthesia in an attempt to prove that the latter, which is admittedly the safest of all, can be used with great satisfaction in many obstetric and gynecologic patients. No special skill is required because the technic is simple. The patient is given hypodermically 10 mg. morphine and 0.3 mg. scopolamine 15 minutes before infiltration is started with 0.5 per cent procaine hydrochloride (novocain) to which are added 3 drops of adrenalin for each ounce of solution; 0.25 per cent procaine is almost as effective.

Local anesthesia can be used for the following obstetric operations: dilation and curettage for incomplete abortion, therapeutic abortion, hydatidiform mole, missed abortion, etc.; spontaneous delivery; episiotomy and repair; repair of childbirth lacerations, recent and old; low forceps delivery; cesarean section, classic or cervical

(9) Gynaecologia 122:309-326, December, 1946.

type; Porro hysterectomy; anterior vaginal hysterectomy (vaginal cesarean section), and sterilization, abdominal and vaginal.

The following gynecologic operations can be done under direct infiltration anesthesia: dilation and curettage; plastic operations on the vagina and perineum; Manchester operation; Le Fort colpocleisis; vaginal hysterectomy; the Watkins-Wertheim interposition operation; abdominal operations, including salpingectomy, oophorectomy and hysterectomy.

Increased use of local infiltration anesthesia will help reduce maternal and gynecologic mortality and morbidity.

Local Anesthesia in Obstetrics and Gynecology. Because local anesthesia does not depress fetal respiration, Ross Mitchell[1] (Winnipeg), advocates use of procaine. It is indicated (1) in the presence of toxemia, especially if the baby is premature, (2) when a general anesthetic is contraindicated or a competent anesthetist is not available, (3) to aid in spontaneous expulsion of the breech, and (4) in any cesarean section if the patient is suitable, but particularly in the presence of placenta praevia, severe cardiac disease or chronic nephritis.

When giving local anesthesia the operator can usually obtain the patient's co-operation if he tells her what he proposes to do and what he expects of her. Local anesthesia makes possible needed surgical procedures in elderly women. Infiltration makes identification and separation of tissue layers easier, and the epinephrine lessens hemorrhage and oozing. Its use in cesarean section has the following advantages: (1) absence of operative shock, (2) rarity of pulmonary complications, (3) absence of injurious effects on liver or kidneys, (4) lack of effect on heart muscles, (5) unimpaired gastric and intestinal motility, (6) unimpaired uterine retraction, and (7) absence of asphyxia in the infants.

It is neither possible nor advisable to dispense wholly with general anesthetics, but the greater safety of local

(1) Canad. M. A. J. 55:560-562, December, 1946.

anesthesia suggests that it should be used more often.

Local Anesthesia in Cesarean Section. Leon S. McGoogan[2] (Univ. of Nebraska) reports results in 104 operations. The drug used was 1 per cent novocain with three drops of 1:1,000 solution of adrenalin hydrochloride added to each ounce of novocain. Average amount used was approximately 90 cc. Supplemental anesthesia was given in eight cases, in six of which a 2.5 per cent solution of sodium pentothal was given intravenously at delivery as an experimental procedure, with good results.

Postoperative discomfort was decreased. In 35 patients, there was slight to moderate postoperative distention, 3 had slight nausea and vomiting and 3 required use of a Wangensteen suction apparatus because of vomiting. Only six patients required six injections of morphine sulfate; the remainder required five injections or fewer, and three patients required none.

There were no maternal deaths. Five patients had postoperative wound infections and three had postpartum pyelitis.

Low cervical section was performed in 71 cases, classic section, in 31 and combined low cervical and Porro, in 2. In 19 cases, the patients were in labor before operation, and in eight premature rupture of the membranes occurred without onset of labor.

Uncorrected fetal mortality rate was 7.61 per cent, but no death could be ascribed to the anesthesia. There were 14 cases of placenta praevia and premature separation of the placenta; four of the infants, all premature, died, making fetal mortality for this group 28.53 per cent. Placenta praevia or premature separation developing under 36 weeks' gestation presents a definite hazard for the infant, but use of local anesthesia decreases the risk.

Local Anesthesia for Cesarean Section. Frank P. Light[3] (Long Island College Hosp.) reports that since

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(2) Nebraska M. J. 32:104-106, March, 1947.
(3) New York State J. Med. 47:48-52, Jan. 1, 1947.

1941 the technic described by Beck has been used for 255 cesarean sections by 21 surgeons at his hospital. Results were satisfactory in 90.6 per cent of cases, and failure occurred in 9.4 per cent. In 45 instances, additional operative procedures were done; in these, local anesthesia was usually supplemented by nitrous oxide analgesia after the infant was delivered.

No maternal or fetal deaths were attributable to the anesthetic agent. The patients' immediate postoperative condition was uniformly excellent and their convalescence smooth. Dehydration and vomiting were seen only rarely. Abdominal distention and gas pains were infrequent. Embolism occurred in only one case. Bleeding occurred from the placental site in one case because a piece of placenta was left behind. Delay in resuscitation of the fetus rarely occurred.

In patients properly selected with regard to emotional factors, the only disadvantage is that the operation is time-consuming and tries the operator's patience. The fact that local anesthesia requires gentle handling of the tissues is considered an advantage.

The foregoing articles represent but a small proportion of the papers written this year (Oct. 1, 1946-Oct. 1, 1947) on analgesia and anesthesia in obstetrics. This indicates that no one has yet found the perfect way to relieve all or most of the pains of labor. I subscribe wholeheartedly to Lévy-Solal's preference for the term "childbirth with relief of pain" rather than "painless childbirth." I have often emphasized that we should not promise to relieve *all* the pains of labor because there is no procedure, drug or combination of drugs which will relieve all the pains without some danger to the mother or baby or both.

I shall discuss the articles in the order in which they appear. Pentothal is distinctly beneficial chiefly for actual delivery of the baby by forceps or by cesarean section. It may also be used in the first stage of labor, but considerable care and experience are required. L. M. Hellman, L. B. Shettles, and H. Stran (J. Biol. Chem. 148:293-297, May, 1943) found that little pentothal reaches the fetus during the first 5 minutes, but within 10-12 minutes there is equal concentration of the drug in the maternal and fetal blood. Therefore, if pentothal is to be used for delivery, the drug should not be injected until the patient is draped, catheterized and prepared for actual delivery. V. P. Mazzola (Am. J. Obst. & Gynec. 53:207-213, February, 1947) employed pentothal in 300 cases and found it to be safe and satisfactory. L. Laverde Mercado analyzed 985 forceps deliveries, 286 breech extractions, 112 external versions and 69 cesareans and found pentothal most satisfactory.

The drug combination being used by Lévy-Solal and his associates is new. I saw a few patients under its effects in Paris, and they were distinctly comfortable.

Demerol is being used by more and more obstetricians, including me. Amadio Narcia Ruiz in a personal communication reported on 120 deliveries in which he combined demerol with pitocin. He had previously used thymophysin instead of pitocin, but gave this up because, although delivery was more rapid, the patients became "remarkably pale." I wish he would give up using pitocin, too, even though it shortens labor. It is well and good for such an expert obstetrician to use oxytocics routinely, because if trouble arises, he knows how to overcome it, but if general practitioners used oxytocics routinely, many difficulties would result.

Now we come to caudal and spinal anesthesia. There is not a single article dealing with caudal analgesia, and this was not done deliberately. In contrast to previous years, when a huge number of papers appeared on caudal analgesia, there are now few. Two articles arrived after the closing date for this YEAR BOOK. One by N. W. Vaux, C. B. Lull, R. A. Hingson and S. D. Collins (Tr. Am. A. Obst., Gynec. & Abd. Surg. 57:220-235, 1947) evaluates continuous caudal analgesia by the men who gave it impetus. The authors state not only the advantages of caudal analgesia but also the hazards and disadvantages. They say: "The profession should understand that our present evaluation is based on the results obtained from rigidly adhering to the warnings, the contraindications, and the 'don'ts' of the technique, as originally stressed by us in our early communications. When used in this manner, we believe that the effective control of pain, the protection of mother and baby, and the salvage of blood with continuous caudal analgesia should remain as a part of good obstetrics." In the same issue is a report of the Committee on Study of Continuous Caudal Anesthesia. The Committee said that until enthusiasm is tempered by sound thinking, they must conclude: (1) It is an obstetric procedure; it is an anatomic problem; the drugs used cause definite physiologic reactions and, to date, too many pathologic conditions have resulted. (2) It is not a procedure to be advocated or managed by the anesthetist. (3) Training, organization, selection of patients and the time factor are all important in determining the value of caudal anesthesia in obstetrics. In their judgment, "much damage has been done to obstetrics. Until such a time as its safety can be determined, we must say that caudal anesthesia has a limited place in obstetrics, and should be limited to the obstetrician trained to administer the drugs, and who has time for its supervision."

In a 100 page monograph, F. Cerruti and M. Laudisio (Rev. paulista de med. 29:1-100, July, 1946) review the literature and report their results with continuous caudal analgesia. At the end, they say: "It should be published in the medical press that it is a dangerous method when used by the inexperienced physician, and its real value should be given. One should also react against the layman's press that makes the method appear free from accident, within the reach of any physician or nurse, and destined to abolish labor pains easily."

To readers of the YEAR BOOKS, the foregoing quotations and

the recommendations of the American Association Committee should sound familiar, for from the time Hingson and Edward's first paper appeared, I urged great caution and pointed out the limitations and dangers of caudal analgesia. Readers of the YEAR BOOKS know that I believe spinal anesthesia has no place in obstetrics. There are numerous reports of excellent results for both mother and baby, but deaths and complications still occur too often. These accidents occur even in the hands of experts. For example, C. O. McCormick (J. A. M. A. 133:801, Mar. 15, 1947) says: "During the past three years, I have known of five additional maternal deaths (from caudal analgesia), one of which occurred within the past year at one of the larger Chicago teaching centers. In this instance the administrators of the analgesia had had an experience of over 800 cases, and therefore properly could have been considered as expert. Following this death, the institution has discontinued the method."

Since even experts can cause the death of a patient by giving a caudal or spinal anesthesia, what would you think of a man who makes the following statement: "The technic of continuous spinal anesthesia was carried out easily by any person competent to perform lumbar puncture. In my experience, *nurse anesthetists were able to administer this type of anesthesia efficiently with minimal instruction.*" (My italics.) (R. E. Gillett, Northwest Med. 45:743, October, 1946.)

Words fail me. I repeat, however, that I have a wholesome respect for my spinal canal, and I would have only an expert physician stick a needle into it for any purpose. We should all apply the Golden Rule.—Ed.]

COMPLICATIONS

Pituitary Extract in Uterine Inertia: Is It Justifiable? Nicholson J. Eastman[4] (Baltimore) points out the danger in the use of this drug when it is given before the birth of the infant. During the past five years he has observed its use in 463 patients. When the total cases were divided into ward and private patient groups, the incidence of pituitrin stimulation in the latter was three times greater. This means that the drug is being used not infrequently for minor degrees of uterine inertia which probably would have had a satisfactory outcome without oxytocic stimulation. In the series of 233 ward patients who had true uterine inertia, Eastman believes that use of the drug may have been justifiable. In this series it was used in an effort to avoid either Dührssen's incisions and a difficult midforceps delivery or extraperitoneal section.

(4) Am. J. Obst. & Gynec. 53:432-441, March, 1947.

The most notable benefit was the dramatic reduction in the number of midforceps deliveries, from 1 in 30 deliveries during the nonpituitrin period to 1 in 1,000 during the pituitrin period. There was also a 50 per cent reduction in the frequency of Dührssen's incisions and a reduction in the number of cesarean sections. Before pituitary extract is used, the condition must be one of genuine primary uterine inertia, with labor practically at a standstill and no progress. The patient must be in true labor, with effacement and dilatation of the cervix. Progress may have come to a standstill, but dilatation must have progressed to 3 or 4 cm. Use of pituitrin to "push" labor in patients who are not in labor will lead only to difficulties. There must be no mechanical obstruction to easy delivery, as attested by every type of evidence. Patients of high parity (paras IV and over) must not be given the drug because their uteri rupture more readily. The condition of the fetus must be good, as evidenced by a regular heart beat and absence of meconium-stained liquor amnii. A dead fetus is no contraindication to administration of pituitary extract. The first contraction after the drug is given should be timed and ether given if it lasts longer than three minutes.

The initial dose must not exceed ½ minim. This dose should not be exceeded unless it is clear that no improvement in pains ensues. In this event, the dose may be increased to 1 minim, but under no circumstances should more than 1 minim be given at a time. Thirty minutes must intervene between injections. When there is doubt as to whether a case meets the foregoing criteria, pituitary extract should not be given.

Treatment of Prolonged Labor with Posterior Pituitary Extract. Duncan E. Reid[3] (Harvard Univ.) reports results in 1,000 patients given posterior pituitary extract during the first and second stages of labor because of evidence of inertia. There were 707 private and 842 clinic patients.

Labor over 30 hours was considered prolonged. In the

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3. Am. J. Obst. & Gynec. 52:718-734, November, 1946.

private patients 717 deliveries were uncomplicated and 50 prolonged; in the clinic patients 636 were uncomplicated and 206 prolonged. Two thirds of all patients were primiparas, and two thirds were under 30.

In both groups without complications five sixths of the patients had a first stage of less than 12 hours, and in half the patients delivery was completed in less than 8 hours. In the groups with complications 88 per cent of the private patients and 61.6 per cent of the clinic patients completed the first stage in less than 30 hours.

Length of the second stage was shorter among the private patients because they received more individual attention and increased amounts of pituitary extract. Furthermore, a longer second stage was permitted in clinic patients in the hope that low forceps delivery could be easily accomplished. A prolonged second stage need not be feared so long as the patient is making progress. When progress ceases, delivery should be carried out at once. Results suggested that the dose at any one time and the total amount should be increased until the patient has effective uterine contractions.

Corrected stillbirth and neonatal mortality was as follows: private patients without complications, 0.69 per cent; those with complications, 4 per cent; clinic patients without complications, 0.63 per cent; those with complications, 11.65 per cent. Intrauterine asphyxia occurred four times as often as intracranial hemorrhage and was more often the cause of death when labor was prolonged, particularly when it continued for many hours after progress ceased. Lack of progress was attributed to uterine inertia. Pituitary extract was perhaps not used in sufficiently large doses. However, the uterus may become refractory to the drug. Dangers of its use were not impressive, since no case of ruptured uterus or extensive birth canal trauma occurred. Incidence of prolonged labor decreased to 2 per cent during the five years in which the drug was used routinely, and midforceps operations decreased to 0.5 per cent.

Reid suggests the following policy for effective use of

the drug. In the absence of cephalopelvic disproportion, patients who have prolonged labor should be given sterile pelvic examination to determine accurately the degree of progress. When progress ceases posterior pituitary extract may be used (1) to stimulate contractions or (2) to ascertain whether the uterus is refractory to the drug. The latter may save much time and permit use of other methods of terminating the pregnancy.

The drug should be given as close to the time progress ceases as possible. Dosage starts with 1 minim and is increased as necessary by 1 minim every 30-45 minutes up to a 4 minim dose. If no effective contractions are produced after one to four doses, administration of the drug should be discontinued and other means used to complete labor.

[It is not easy to discuss the two papers by Eastman and Reid. I well remember when pituitary extract was used extensively many years ago. I read of many disasters, heard of others not reported and witnessed a few. I lived through the thymophysin era. In fact, Temesvary of Budapest, who originated thymophysin, was and is a friend of mine. I arranged for him to read a paper on thymophysin before the American Association of Obstetricians, Gynecologists, and Abdominal Surgeons in Memphis and went with him because his knowledge of English was limited. As is well known, DeLee was adamant against the use of pituitary extract or any combination of drugs which included pituitary extract during the first and second stages of labor. I asked the Wilson Laboratories in Chicago to prepare ampules containing only 25 per cent U.S.P. pituitary extract, and I compared this preparation with thymophysin. The results were published (J. A. M. A. 98:1260-1263, Apr. 9, 1932), and the conclusions were as follows: "(1) No preparation containing pituitary substance should ever be given as a routine or indiscriminately to shorten labor, (2) No pituitary preparation should be administered in the second stage of labor except on rare occasions, (3) Weak pituitary solution and thymophysin are seldom effective for the induction of labor, (4) Both 25 per cent U.S.P. pituitary extract and thymophysin shorten labor in some cases when administered during the first stage of labor, (5) If these substances are used during the first stage of labor they should be given only for a definite indication; namely, uterine atony or some urgent reason for shortening labor, and only small doses should be given: namely, 3 minims or less, (6) The 25 per cent U.S.P. pituitary extract and thymophysin seem to give almost the same clinical results. The claims of Temesvary for the clinical value of thymus extract in combination with pituitary have not been borne out. My clinical studies are therefore in accordance with the laboratory observations of Nelson on this point, (7) The addition of thymus to pituitary extract does not add any factor of

safety to the use of pituitary. The clinical use of pituitary extract depends not on the preparation used but on sound clinical judgment, time of administration, dosage and close observance of the behavior of the patient, (8) Occasionally, weak pituitary extract and thymophysin even in small doses may do harm. Both have a tendency to increase the blood pressure; both may result in incomplete relaxation of the uterus between pains, and both may produce irregularities in the fetal heart rate which even if temporary may nevertheless result in injury to a baby."

Eastman reports 463 cases of uterine inertia seen in 5 years, and Reid reports 1,609 obstetric cases given pituitary extract because of inertia, also during the last five years. These numbers of inertia cases are large in my opinion, and the reason is almost certainly a difference in our definitions of inertia. Eastman admits that the incidence of pituitary stimulation was three times as high among the private patients as among the ward patients. In speaking of the ward patients, Eastman also used the words "true uterine inertia" to differentiate these cases from some of the private patients. Reid also divides his cases into clinic and private patients. Why make any distinction? Do not the uteri of private patients act the same way as those of ward patients? They certainly do, but there are several reasons why ward and private patients are treated differently. Private patients engage a physician who is solely responsible for all the prepartum care, the conduct of labor and delivery and the postpartum care. He must see that the pregnant woman is properly prepared for labor, that in most cases she receives analgesia in the first stage of labor, and usually some type of anesthesia for actual delivery; he is responsible for the baby, at least during the first few days of life, and he must see the patient daily for a few days after delivery. Often he is urged by the patient's family to shorten labor, and sometimes he yields when he should not, especially when he is overtired and yet must deliver this patient himself. At times the physician delivers a private patient one or two hours before he would otherwise, if he did not have to go to his office or deliver a patient in another hospital or operate elsewhere. Not infrequently a doctor will induce labor in a private patient before term for the convenience of the patient or himself.

Ward or service patients, on the other hand, rarely have the same physician for prepartum care, conduct during labor, delivery and postpartum care. There is therefore divided responsibility. In many hospitals, ward patients receive little or no analgesia, but of course for operative deliveries, they are anesthetized by one method or another. During labor, at least one and often five or six physicians see or examine the patient. In nearly all teaching institutions, new drugs and procedures are tried chiefly on the ward patients. Also for teaching purposes, the incidence of low forceps deliveries is increased. Generally the staff pays little or no attention to the importunities of the family to shorten labor even if the presence of relatives is permitted during labor. Members of a hospital staff caring for clinic patients can always be as conservative as they wish and can wait for spontaneous labor. They certainly need not induce labor for their own convenience if they want to leave for a vacation, for example, because some other member of the house staff

will take care of the ward patient without an outcry from the patient or her family. For these and other reasons, there is a statistical difference between ward and private patients.

Results of the use of pituitary extract at Johns Hopkins and Harvard are excellent, but we must remember that these institutions are among the best in the world. It is therefore expected that the men on the staffs use pituitary extract judiciously, and when trouble arises, they know how to overcome the difficulty with safety to mother and child.

Schub (J. A. M. A. 133:122, Jan. 11, 1947) of Leningrad used thiamin chloride both as an anesthetic in labor and for accelerating labor. The most effective route was the intramuscular one. Labor generally lasted half as long as usual. These observations were confirmed by D. Ginodman, M. Tyurin and M. Ziroulnikov of Moscow (J. A. M. A. 134:119, July 26, 1947). They noted a parallelism between vitamin B_1 in the organism, the duration of labor and labor pains. However, the anesthetic action of vitamin B_1 is small. Considerable study with sufficient controls is necessary before this work can be accepted.—Ed.]

Pregnancy and Labor in Cases of Oversized Fetus were studied by João Amorim, O. Lacreta and L. Endrizzi.[7] Of 3,173 women delivered at the Casa Maternal e da Infancia, 120 (3.7 per cent) gave birth to infants weighing more than 4,000 Gm. The largest infant weighed 5,375 Gm. Approximately half of these mothers were aged 25-35. In 41 per cent of cases, oversized infants were born to nulliparas or primiparas. Of the patients, 12 per cent had had malaria, 5 per cent syphilis, 0.83 per cent heart disease and 0.83 per cent hyperthyroidism. In 61 per cent of cases, pregnancy was uneventful; only one patient had eclampsia. Hypertension was present in 20 per cent of cases. In 19 per cent of cases pregnancy lasted 300 days; this was considered true prolonged pregnancy. Spontaneous rupture of membranes occurred in 76 per cent; two patients had premature and 21.66 per cent artificial rupture of the membranes. Cervical dilation required more than 12 hours in 41 per cent of cases. Since multiparas predominated in this group, this may be considered prolonged labor. In 75 per cent of cases, expulsion of the fetus took less than two hours. Face presentation occurred in 2.5 per cent. The most frequent type of dystocia was arrest of the shoulders in the pelvic outlet, but in 90 per cent of cases

(7) Matern. e infanc. 3:261-270, Jan.-Feb., 1947.

there was no dystocia. Spontaneous delivery occurred in 82.5 per cent of cases; forceps was used in 8.5 per cent; cesarean section was performed in 0.8 per cent, Zarate operation in 0.8 per cent, external version in 0.8 per cent and embryotomy in 1.6 per cent.

Maternal accidents included one case of near shock, laceration of the perineum in 15 per cent of cases, tear of the vagina in 7.5 per cent and laceration of the cervix in 3.3 per cent. Hemorrhage during the third stage occurred in 12 per cent. Manual removal of the placenta was necessary in one case. Fetal asphyxia occurred in 10.8 per cent, and the fetal mortality rate was 4.1 per cent.

The course of the puerperium was normal in 75 per cent, febrile in 12 per cent and subfebrile in 8.3 per cent of cases.

The most significant data obtained in this survey are the high incidences of fetal accidents, of prolonged labor and of operative obstetric procedures.

Hydramnios is defined by Louis Carnac Rivett[8] (London) as a condition in which the amount of liquor amnii exceeds 3,000 cc. Severe maternal distress consisting of physical discomfort, cardiac and respiratory embarrassment, edema and, rarely, albuminuria may occur.

Rivett describes a method of abdominal puncture which he prefers to puncture of the amniotic membrane through the cervical canal, because it is more often successful and less likely to induce labor.

TECHNIC.—One hour before the procedure, ⅓ gr. omnopon and 1/150 gr. scopolamine are administered to the patient, who is kept quietly in bed. Site of the puncture is usually well above the umbilicus when fluctuation of the uterus is great and fetal parts cannot be palpated. The skin is punctured with a small tenotomy knife, and a spinal trocar and cannula are inserted through the abdominal wall and the uterus into the amniotic sac. The trocar is withdrawn, and since the fluid is rarely under pressure, the cannula is attached to a suction pump via a collecting bottle. As much fluid as possible is withdrawn. If palpation still reveals excessive fluid the procedure is repeated at a different site. A dressing is applied, and the patient is returned to her room. Morphine (¼ gr.) is administered and

(8) Am. J. Obst. & Gynec. 52:890-893, December, 1946.

repeated that evening and the following morning to discourage uterine contractions.

In most cases excess liquor reaccumulates in three or four weeks. The procedure can be repeated again and again. As much as 7,500 cc. fluid has been removed at one operation and as much as 23 L. at repeated operations. Rivett encountered no complications such as uterine infection, perforation of maternal viscera other than the uterus, peritonitis, hemorrhage or injury of the fetus which could be attributed to the procedure.

Over 25 per cent of the author's patients who required treatment before viability of the fetus gave birth to live infants. In all these cases, puncture of the membrane via the cervix would inevitably have brought on labor with death of the fetus.

[Since in many cases of polyhydramnios there is a fetal monstrosity, x-ray study is advisable. In over half the cases there is a deformity of the skull or spine that can be recognized on a roentgenogram. If the excessive amount of fluid interferes with delineation of the fetus, one may remove the excess fluid through the abdomen and then have an x-ray picture taken. If a monster is present it is surely inadvisable to repeat drainage through the abdomen. Proper treatment is to rupture the bag of waters through the vagina with the intention of terminating the pregnancy. H. Devel (Schweiz. med. Wchnschr. 77:1003-1005, June 13, 1947) describes a new sign of fetal death. The fat-containing area of the skin over the skull is what one sees in an x-ray picture of a baby in utero. After a baby dies, the skin separates from the skull and appears as a halo around the baby's skull. The author presents four roentgenograms showing such halos in dead babies.—Ed.]

Midpelvic Dystocia: Preliminary Report. William C. Eller, William F. Mengert, William H. Andrew, Jr., and Raymond J. Jennett[9] (Southwestern Med. College) evaluated the pelves of 140 patients by a combination of roentgen mensuration and graphic portrayal. In the latter method, a plastic transparent model representing a small, medium or large fetal head is superimposed on a diagram of the pelvis. Prediction was made in each of the 140 women in terms of "easy" or "difficult" vaginal delivery or of necessity for cesarean section. A prediction of difficult delivery was made for 25 patients. Cesarean section was performed on 5 and with 17 of the remaining 20,

(9) Am. J. Obst. & Gynec. 53:823-828, May, 1947.

difficulty was experienced. In a group of 22 patients for whom the prediction was incorrect, there were three breech deliveries, two elective and unindicated forceps operations and six cases of prolonged labor (more than 30 hours) thought to be due to uterine inertia rather than to bony dystocia.

Fetal size and moldability of the head, fetal position and force of uterine contractions also must be considered in addition to pelvic measurements. Evaluation of mid-pelvic capacity showed that dystocia and fetal death were more common when the sum of the interspinous and posterior sagittal diameters was less than 14 cm. There were three fetal deaths in 29 such patients (10.3 per cent) as opposed to 6 among 111 patients (5.5 per cent) with a sum of 14 cm. or more. On the other hand, term-sized infants were born alive through the two smallest mid-planes (12 cm.) in the series.

Concerning 215 Cases of Prolapse of Umbilical Cord. Ricardo Dubrovsky and Normando O. Di Fonzo[1] (Buenos Aires) studied a total of 215 cases and found that prolapse occurred in 57.21 per cent of multiparas and in 42.79 per cent of primiparas. Breech presentation was observed in 43 cases (20 per cent). Contracted pelvis was present in 28 (13.02 per cent). Twin pregnancy occurred in 20 of the first series of 107 cases (18.6 per cent) and in 5 of the second series of 108 cases, giving a total percentage of 11.62. High cephalic presentation with timely or premature rupture of the membranes was found in 27 cases and hydramnios in 12. Low, cervical cesarean section was performed 22 times (10.23 per cent).

In the calculation of fetal mortality 29 cases had to be discarded; they were 25 admissions with dead fetus, 3 with nonviable fetus and 1 with congenital cardiopathy. In the remaining 186 cases, 47 (25.26 per cent) fetuses were born dead.

[S. B. Gusberg (Am. J. Obst. & Gynec. 52:826-839, November, 1946) analyzed 71 cases of prolapse of the cord seen at Sloane Hospital during the past 10 years. Incidence was 0.42 per cent. The gross fetal death rate was 39 per cent and for viable babies, 32

(1) VI Jornadas rioplatenses de obst. y ginec., pp. 165-170, 1946.

per cent. Among the 71 cases there were 30 vertex, 20 breech, 1 compound and 7 transverse presentations and 13 pairs of twins.—Ed.]

Constriction Ring Dystocia. Louis Rudolph and Charles Fields[2] (Chicago) review 56 cases of parturients with this complication. The operative incidence was 93 per cent, with 2 maternal deaths and 18 fetal deaths. Vaginal operations failed in 40 per cent, with a fetal mortality of 41 per cent. The authors conclude that management should be either ultraconservative procedures or cesarean section.

Speculative diagnosis of constriction ring dystocia is based on a prolonged first stage, irregular uterine contractions, prolonged and intermittent periods of cervical dilatation and arrest of the presenting part in the second stage of labor. Absolute diagnosis is based on the intrauterine palpation of a constriction ring, the state of the cervix and lower pole of the uterus, and a transverse extrauterine constriction ring. In management of an internal constriction ring and a potentially prolonged first stage of labor, cesarean section may be elected if unduly prolonged labor is anticipated. A further test of labor for not more than 10 hours may be made. In an external constriction ring with a prolonged first stage, management is determined after 18 hours of labor. Cesarean section should be performed early, when conditions are favorable, rather than late when they are unfavorable. When an internal constriction ring complicates the second stage of labor, intrauterine examination is usually made to account for the failure of a forceps or version operation. Ultraconservative management is instituted until the ring relaxes.

Review of the series demonstrates that the high operative incidence, failed vaginal operations, fetal mortality and the potential maternal mortality require careful consideration of constriction ring dystocia. Some of the procedures used in the series are condemned on the basis of further experience. These are Dührssen's incisions and forceps delivery, manual dilation of the cervix and ver-

(2) Am. J. Obst. & Gynec. 53:796-804, May, 1947.

sion and extraction. Ultraconservative management and cesarean section when conditions have been properly evaluated are advocated.

Constriction Ring Dystocia is defined by M. Pierce Rucker[3] (Richmond, Va.) as one or more bands of uterine muscle forming opposite depressions of the fetal ovoid. They may occur at any level and effectively anchor the fetus to the uterus so that progress in birth ceases despite painful contractions. A constriction ring may be reversible or irreversible but does not rise, and spontaneous rupture of the uterus does not occur.

Incidence depends on whether the condition is sought. In 202 cases observed, the first 20 were found in 2,737 deliveries, an incidence of 0.73 per cent; the next 182 cases were found in 10,838 deliveries, an incidence of 1.67 per cent.

The condition should be suspected when there is no obvious cause of failure of labor to progress despite hard pains, especially when the cervix hangs loosely about the presenting part.

Position of the fetus was unfavorable in 70 per cent; pelvic abnormality and increased age were also present. However, no common factor, not even long labor, could be considered a possible cause. Rucker suggests that the ring is a fatigue phenomenon, comparable to spasms occurring in striated muscles in athletes. Clinically, such a hypothesis is useful as a guide in management.

Constriction rings may occur at any time in the three stages of labor. If a constriction ring occurs early in the first stage, the patient should be given morphine, demerol or magnesium sulfate intravenously and be encouraged to sleep. If the patient is not allowed to become dehydrated, there is no reason to worry about length of labor. After a good rest labor is likely to progress more normally.

When the ring appears late in the first stage or after the cervix is fully dilated, one mode of treatment is to rest the patient and keep up fluid intake and electrolyte

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(3) Am. J. Obst. & Gynec. 52:984-992, December, 1946.

balance. Another is to effect relaxation of the ring. Rucker has found epinephrine (1:1,000), administered subcutaneously in 5-8 minim doses, the most reliable relaxing agent.

Results are evaluated in two groups. Before the advent of epinephrine, anesthesia and manual dilatation were the only means of relaxing the ring. In this group of 20 patients 1 mother and 9 babies died. In the second group there was no maternal death, and the fetal death rate was 17.5 per cent. Eleven of the 32 infant deaths occurred in the first 23 cases. As experience with the drug grew, results improved.

[A few skeptics like Rudolph Holmes believe that constriction ring dystocia, if it exists at all, is extremely rare. However, the publications of the three outstanding contributors on this subject, Louis Rudolph, M. Pierce Rucker and Herman Johnson (Am. J. Obst. & Gynec. 52:74-82, July, 1946) have verified beyond doubt the existence of constriction ring dystocia, its symptomatology and treatment. I fully agree with these authors that the condition is more common than is generally believed. It is overlooked because it is not borne in mind and because physicians seldom try to prove its existence by the only absolute means, i.e., by inserting the hand into the uterus to feel the ring. When no attempt is made to palpate a ring, the delay in labor is usually attributed to uterine inertia or cervical dystocia, which is uncommon. This difference of interpretation accounts for the wide variation in the reported frequency of constriction ring dystocia.

Unfortunately there is no unity of opinion as regards the treatment of constriction ring dystocia. Even Rudolph, Rucker and Johnson disagree. My preference depends on the condition of the cervix. If there is complete dilatation, I prefer adrenalin followed by immediate delivery if the adrenalin relaxes the uterus. If the head is low forceps are applied, otherwise the baby is delivered by version and extraction. If the ring does not relax after adrenalin, the patient is deeply anesthetized with ether or chloroform and the ring is relaxed by pressure of the hand. When this is done the head is displaced; hence the usual type of delivery following pressure relaxation is version and extraction.

If the cervix is not completely dilated, I prefer cesarean section in most cases, but occasionally Rudolph's recommendation to leave the patient alone except for sedation, fluids, etc., should be followed. In most cases, the ring eventually relaxes and spontaneous delivery follows. Unfortunately in these cases there is a high fetal mortality.

I dislike resorting to Duhrssen incision and manual dilatation of the cervix, but occasionally these procedures must be carried out. Johnson has had excellent results with prompt delivery from below in the presence of an incompletely dilated cervix by manually dilating the cervix and applying forceps. I do not advise this treatment for anyone with limited obstetric experience.

Rucker was the first to advocate the use of adrenalin to overcome constriction rings. I have found it sometimes effective and sometimes not. The uterus, pregnant and nonpregnant, is apparently a peculiar structure physiologically. There is wide disagreement in the way uteri of different animals react to the same drug. Also, different portions of the uterus of the same animal give different responses to the same drug, and the pregnant state elicits reactions different from the nonpregnant. Even in the nonpregnant uterus there is a difference at the time of menstruation. Hence it is not advisable to draw conclusions for humans from experiments on the animal uterus. Even in humans we must know the time of the menstrual cycle, or if the uterus is or was pregnant, whether the study was made during pregnancy, labor or the puerperium and which part of the uterus was studied. Furthermore, strips of uterus do not behave as does the whole organ. Nevertheless, animal experiments are still being conducted along physiologic lines. A. Granjon and S. Vassy (Gynéc. et obst. 46:115-119, 1947) found that caffeine and adrenalin inhibit uterine contractions in the living nongravid rat regardless of the time in the estrus cycle. They did not study the effects of these drugs in pregnant rats. Other French obstetricians have been interested in the clinical aspects of abnormal uterine contractions. O. Gosselin (Gynéc. et obst. 45:288, 1946) treats prolonged labor due to "spasm" of the cervix by rupture of the membranes and antispasmodic drugs. The antispasmodic used extensively in France and elsewhere in Europe is spasmalgine (pantopon 0.01 Gm., papaverine 0.02 Gm., and atropine 1 mg.). Some Frenchmen use it routinely, others rupture the bag of waters in every labor case even if the cervix is dilated only 2 cm., and still others resort to both procedures. I condemn these procedures when done *routinely* and hope none of the readers of this book will use them in this way.

E. Lévy-Solal (Rev. franc. de gynéc. et obst. 41:225, 1946) studied the anomalies of uterine contraction in women during labor by means of an external hysterograph, and S. R. M. Reynolds, O. O. Heard and P. Bruns (Science 106:427-428, Oct. 31, 1947) devised a Tokodynamometer for recording uterine contraction patterns in pregnant women. This instrument may prove to have prognostic value by indicating within the limits of statistical probability the relation of the contraction pattern observed in a uterus a short time before term to the subsequent clinical course of labor.—Ed.]

Unusual Cases of Agglutination of Cervix. P. Burger[4] (Strasbourg) reports three cases which showed absence of any trace of external os and remarkable thickness of the cervical cap which persisted despite the prolonged action of strong pains. The cervical cap was absolutely smooth and could best be compared to a section of a thick rubber balloon.

In the first case the cause may have been previous

(4) Gynec. et obst. 45:475-479, 1946.

internal uterine endometriosis which, partaking of the nature of a neoplasm and an inflammation with strong infiltrative and adhesive tendencies, may have reached the cervical tissue during the pregnancy and succeeded in agglutinating thoroughly the lips of the external os. The infiltration of the cervical wall would explain its increase in volume and its resistance to the usual thinning by decrease of its elasticity.

In the second case there were pronounced traces of an atrophying inflammation with cervicovaginal adhesions. The origin of this inflammation was unknown, but the presence of abundant scar tissue at the level of the cervix explained its resistance to thinning.

For the third case, which was similar to the first, the report was lost.

The usual procedures could not be applied in these cases, and cesarean section was the only method that could be considered. But subtotal hysterectomy was necessary as well, because the cervical tissue was extremely resistant, it did not allow easy perforation and it presented no trace of an os.

Uterine Ruptures in Pregnancy. Roberto Gandolfo Herrera[5] reports a case.

Woman, 26, between the fifth and sixth months of pregnancy had spontaneous rupture during sleep, at the site of an anterior hysterotomy performed 15 months earlier for suspected myoma complicated by missed abortion. At age 20 she had had a normal pregnancy, and the child had been delivered by forceps. Subsequent persistent metrorrhagia had necessitated curettage which resulted in amenorrhea for one year. Rupture involved the anterior aspect, the fundus and part of the posterior aspect of the uterus and had allowed the fetus in the amnion to escape into the abdominal cavity, together with part of the placenta, the remainder of which was still attached to the uterus. Subtotal hysterectomy was performed and recovery was uneventful.

The production of so-called spontaneous ruptures of the uterus requires one or more factors which modify the uterine musculature; to this may be added the exaggerated distention of the organ and surgical or inflammatory ventrofixations. According to Trask, most cases

(5) VI Jornadas rioplatenses de obst. y ginec., pp. 265-291, 1946.

occur in multiparas of about 30, and the most common ruptures are longitudinal. The clinical picture is similar to that of rupture of ectopic pregnancy. Uterine rupture outside of labor may be rapidly fatal from shock, intoxication or hemorrhage, but the patient may recover after a more or less serious episode and later suffer grave consequences if a second accident occurs. Fetal death is practically the rule; maternal death occurs in 37 per cent of cases. The best treatment is prophylactic and consists of pertinent advice to avoid new pregnancies. Once the accident has occurred, there is no other recourse than early laparotomy after treatment of shock.

The accident reported here was conditioned by the sequence of probably excessive uterine curettage which caused prolonged amenorrhea, a missed abortion, a penetrating placenta and an exploratory hysterotomy with too thorough curettage, followed almost immediately by pregnancy.

Rupture of Uterus is discussed by James S. Taylor[6] (Altoona, Pa.) on the basis of 33 maternal deaths from this cause reported to the Pennsylvania Maternal Welfare Survey. There were eight primigravidas. Slightly more than 45 per cent of the deaths occurred in patients aged 37-45, a fact emphasizing the importance of age and parity in obstetric management. Rupture is uncommon in the primigravida, but increasing parity increases the risk.

Failure to recognize impending rupture, faulty obstetric technic, poor obstetric judgment, delay in seeking help, neglect in obtaining a full obstetric history and attempts at obstetric operations in the home were all responsible factors in these 33 cases.

Previous cesarean section necessitates careful evaluation of the patient. Too much dependence must not be placed on a cesarean scar's holding secure for a second or third vaginal delivery merely because the patient was delivered vaginally once after section. Such patients should be hospitalized at least two or three weeks before the

(6) Pennsylvania M. J. 50:801-807, May, 1947.

date of confinement, and if repeat section is elected it should be performed at least two weeks before term.

Transverse presentation, with or without a prolapsed extremity, is a major obstetric problem, and attempts at or performance of version are responsible for many ruptured uteri.

Use of pituitrin is responsible for many uterine ruptures. It should not be given early in labor or at any time merely because no progress is being made.

[Try to reconcile this statement based on 33 deaths from rupture of the uterus with the papers by Eastman and Reid. I am afraid that, even though the results at Johns Hopkins and Harvard are excellent and will continue to be so, if general practitioners again begin to use pituitary extract extensively there will be more ruptured uteri and more deaths. Eastman warns against the use of more than 1 minim doses, but Reid says it is safe to give up to 4 minims. I definitely agree with Eastman for many reasons, but particularly because I have seen two ruptures of the uterus follow 1 minim doses. Despite these warnings, will all practitioners limit the amount of pituitary extract to 1 minim or even 4 minims, especially if labor does not progress as rapidly as they wish?—Ed.]

Operative Obstetrics

Prophylactic Lateral Episiotomy in Forceps Applications in Primiparas. H. Pigeaud[8] (Lyon) has used this operation routinely in 200 cases. The episiotomy must be prophylactic. Before introduction of the first blade of the forceps, section of the vulvar ring must be performed. If sufficiently deep, this section eliminates the hazard of occult or apparent tears of the perineum. The incision must be large enough to allow passage of the presenting part without too much distention of the maternal tissues and will vary in depth from 2 to 3 cm., the depth depending on the quality of the tissues; in some particularly difficult cases the episiotomy may be made bilaterally. It must be lateral so as to leave in the median line an intact perineal block which can play its role and, by pressing on the bregma and frontal regions, delay the descent of the head and keep it maximally flexed. Furthermore, the episiotomy wound must be repaired perfectly.

(8) Gynec. et obst. 45:471-474, 1946.

This procedure has resulted in perfect cicatrization with symmetrical and supple vulva, no interstitial muscular lesions, integrity of the perineum, prevention of cystorectocele, and a practically painless postoperative period.

Episiotomy Blood Loss in 71 patients with left mediolateral episiotomies was studied by Lester D. Odell and Arthur Seski[9] (Univ. of Chicago).

METHOD.—Collection of blood was made with the patient in a lithotomy position with a double thickness of waxed paper beneath the hips and with the end of this paper directed toward a floor basin containing about 1,000 ml. N/10 hydrochloric acid. Blood and linen washings were converted to acid hematin with N/10 hydrochloric acid, and blood loss was calculated by the following formula:

$$\text{milligrams blood loss} = \frac{\text{total grams hemoglobin recovered}}{\text{grams hemoglobin per 100 ml. patient's blood} \times 100.}$$

Results showed that after left medial lateral episiotomy, the amount of blood lost is directly related to the time consumed between the incision and tamponade of the wound by the infant's head. Use of a stuffed sponge in episiotomy wounds does not significantly reduce blood loss during this period. Ligation of bleeding vessels reduces blood loss per minute but increases total blood loss because of time consumed. Total blood loss can be reduced by shortening the time between incision and tamponade of the wound by the head. In addition, average blood loss for outlet forceps delivery is comparatively low, and application of thrombin to the wound reduces bleeding significantly.

Blood loss during actual delivery of the infant is without significance. Bleeding after delivery until completion of episiotomy repair is much less than that between incision and wound tamponade by the head. Blood loss after delivery is less after slow delivery than after more rapid delivery. Reduced blood loss after delivery may be due to obliteration of ends of cut vessels by pressure of the head during delivery or to the relief of venous congestion by re-establishment of circulation between

(9) Am. J. Obst. & Gynec. 54:51-56, July, 1947.

perineal venous plexuses and pelvic veins after delivery.

Rectal Complications of Episiotomy. William B. Marbury and Milton L. Goldman[1] (Washington, D. C.) report three cases. Two of the patients had typical fistula in ano, which was successfully treated by surgery. The third had rectal pain but no definite fistula; excision of the scar tissue which had formed did not seem indicated.

The authors explain such complications as being due to infection that starts when, in suturing an episiotomy wound, a suture is inadvertently passed too deeply. It pierces the rectal wall and then passes through the episiotomy wound, carrying the rectal flora with it. This complication can be avoided by keeping a gloved finger in the rectum when placing the deep sutures or by doing a rectal palpation afterward. If a suture is palpated in the rectum, the suture should be cut in the episiotomy wound and withdrawn through the rectum. If drawn out through the wound itself, it will contaminate the area.

When the episiotomy scar has become infected and tenderness and edema are present, hot applications relieve pain and localize the abscess. After the edema has subsided and the pus has been evacuated, the internal opening of the fistula can be felt in the rectum just above the sphincter as a tiny hardened pea-sized area. The internal and external openings should be connected by passing a soft probe gently through the external opening into the rectum and incising boldly down to the probe. This lays the tract wide open and allows it to heal by granulation. To prevent incontinence due to complete division of the sphincter, a seton can be threaded around the sphincter and through the internal opening, then tied and left intact. Later the sphincter should be divided and the seton removed. This can be done in the office with the patient under local anesthesia. Postoperatively, frequent rectal dilations should be done to prevent too rapid bridging of the defect, which might result in formation of closed-off areas, with subsequent abscess.

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(1) J. A. M. A. 134:1174-1175, Aug. 2, 1947.

[W. R. Nicholson of Philadelphia, one of the grand old men (I hope he will not object to the word "old") in obstetrics, says (J. A. M. A. 135:245, Sept. 27, 1947) a mediolateral episiotomy or perineotomy will avoid the dangers and complications portrayed in the last article. I, too, prefer a mediolateral to a median episiotomy and it does not matter whether the incision is made on the right or left side.

In the 1946 YEAR BOOK (p. 182) there appeared an article on the use of cotton sutures for episiotomy repairs. A letter from R. D. Sweet of Vicksburg, Miss., told me that his experience with cotton for repair of the perineum has been very unsatisfactory. He still must "dig out" some cotton in women delivered six and more months ago. J. C. Brougher (Am. J. Obst. & Gynec. 54:127-128, July, 1947) reports a case of endometrial cyst in an episiotomy scar. M. M. Rozan (Am. J. Obst. & Gynec. 53:898-899, May, 1947) advocates a solution of equal parts of tincture of merthiolate and 2 per cent novocain sprayed on the episiotomy wound to relieve discomfort.

Episiotomy is being used more and more all over the world and I endorse its use not only for full-term babies but also and especially for premature babies to avoid injury to the brain.—Ed.]

Use and Abuse of Forceps. John W. Harris[3] (Univ. of Wisconsin) believes that it is difficult to justify the enormous increase in forceps deliveries in recent years.

Important uses of forceps include application to aid delivery of the after-coming head in breech presentation, prevention of prolonged arrest of the head in the second stage, and termination of labor as soon as the head reaches the pelvic floor in such conditions as myocardial damage, severe diabetes or a uterus weakened by previous cesarean section.

In modern obstetrics, so-called maternal exhaustion has practically disappeared as an indication for use of forceps. Administration of pure oxygen to the mother between uterine contractions will often permit spontaneous completion of delivery in cases of fetal anoxia unless compression of the cord is present. Fetal anoxia is usually indicated by a fetal heart rate of 100 or less. In accidents such as prolapse of the cord with the head high, delivery can usually be terminated more safely by version and extraction than by use of forceps.

Two of the most disastrous sequelae of forceps delivery result from application of the forceps through a partly dilated cervix and incorrect application in relation

(3) Postgrad. Med. 2:81-83, August, 1947.

to the position of the fetal head. Whether other obstetric uses of forceps are deemed abuses depends chiefly on the physician's obstetric philosophy. Harris believes that prophylactic "simple" outlet forceps delivery constitutes meddlesome midwifery. He also doubts the wisdom of using amounts of analgesic and anesthetic drugs sufficient to cause serious interference with contractility of uterine and abdominal musculature and loss of the co-operation of the patient. Modern methods of pain relief, he believes, have greatly increased the incidence of forceps deliveries.

Systematic Application of Forceps in Normal Deliveries: Its Prophylactic, Elective or Routine Use Because of Complacency or Pity. Josué A. Beruti[4] shows that application of forceps, no matter how simple and low it may be, is always more unfavorable for mother and child than a well conducted spontaneous delivery. The wide experience accumulated by contemporary obstetricians teaches that forceps should not be used in more than 4-5 per cent of all deliveries, except in very special eventualities, and that its more frequent use is unnecessary and harmful. These irrefutable facts suggest that the tendency of certain groups of obstetricians to use forceps in 50-100 per cent of physiologic deliveries is to be condemned.

Use of forceps to spare the patient can be justified only under certain exceptional circumstances. Its use prophylactically is no kindness unless all the classic indications are present, and routine and elective use of forceps is contrary to common sense.

It is possible and even probable that use of low forceps is more frequent with increasing age of the patient, especially to avoid excessive prolongation of spontaneous delivery. But this frequency should never reach the fantastically high levels indicated in some North American statistics intended to show the favorable results of continuous caudal analgesia during physiologic delivery.

Good management of spontaneous delivery will often

(4) Obst. y ginec. latino-am. 4:771-790, October, 1946.

avoid the need for application of forceps by utilizing the many available corrective procedures in labor which are much less injurious than low forceps delivery.

[Both Harris and Beruti condemn what DeLee termed "prophylactic forceps." DeLee and I have pointed out certain advantages in delivering babies with forceps when the head is on the perineum instead of waiting for spontaneous delivery. In recent years, obstetricians in various parts of the world have written concurring reports. L. A. Calkins (Nebraska State M. J. 32:23-25, January, 1947) ends a very practical article on the second stage of labor with the following sentence: "With the head on the perineum, however, in the presence of poor pains and lack of voluntary effort, our more recent experience has taught us not to wait two or three hours in the expectation of a spontaneous delivery which so frequently does not take place." This by no means favors prophylactic forceps but is a step forward from Calkins' previous ultraconservatism. Ph. De Kanter (Ginéc. y obst. de México 5:21-26, Jan.-Feb., 1947) discusses the advantages of "elective" forceps deliveries and mentions that in Mexico City there has been an increased incidence of elective forceps deliveries.

I have often condemned the use of pituitary extract during the first and second stages of labor because I fear the harm which many general practitioners will do if they resort to pituitary extract injudiciously. Similarly I can easily be criticized for advocating the use of prophylactic forceps, because no matter how much emphasis is placed on the fact that a forceps delivery requires knowledge and skill, some doctors will do harm if they resort to the too frequent use of forceps. Logically, if Eastman and Reid are to be censured for acclaiming the good results they obtain with pituitary extract, I should be taken to task for doing the same thing with forceps delivery. This brings up what we should teach both undergraduate and graduate students about operative obstetrics. Few general practitioners attempt to do delicate neurosurgery, orthopedic surgery or any type of serious major surgery; yet most physicians will try to perform any type of obstetric delivery from below or above, because (1) these operations seem easy to carry out, (2) a large part of any general practitioner's practice is obstetrics and (3) in small communities there are no specialists in obstetrics to call in consultation. I suppose all that teachers can hope to do is keep repeating that ultraconservative obstetrics in the hands of men who are not specialists yields by far the best results for both mother and baby.—Ed.]

Management of Persistent Occiput Posterior: Note on Technic of Forceps Rotation by the Stillman Procedure. D. N. Danforth[6] (Northwestern Univ.) believes the occiput posterior position is a serious obstetric complication and should be approached with due respect. The physician should acquaint himself with each of the pelvic fea-

(6) Illinois M. J. 90:212-216, October, 1946.

tures, visualizing them both with respect to the other pelvic variables and to the fetal head.

Thirty per cent of posterior positions persist. Many which require aid first become manifest by uterine inertia and failure of cervical dilatation to proceed at its expected rate. This inertia is usually of mild degree, and treatment should be symptomatic so long as labor progresses, however slowly, and so long as the condition of mother and baby remains good.

Operation during the first stage of labor is directed toward achieving full dilatation and should be undertaken only if the condition of patient or baby indicates it. Bunim's pudendal block method followed immediately by subcutaneous administration of 2 minims pitocin is preferred for obtaining dilatation, which may occur within 20-30 minutes. This procedure should be done with the patient prepared for vaginal delivery.

Most authorities believe that the second stage of labor should be terminated after two hours because of the danger of either uterine rupture or formation of a pathologic contraction ring. However, if contractions of even less than normal intensity continue, if gradual descent is occurring and if the condition of baby and mother remains good, it is permissible in carefully selected cases to allow the second stage to continue under close observation as long as five hours.

In some cases in which the head is on the pelvic floor, the sacrum is far posterior and the subpubic arch and transverse of the outlet are wide, delivery in position is preferred. An additional indication is the presence of prominent spines which require elevation high into the inlet before rotation can be accomplished safely. If there is doubt as to the pelvic capacity at the outlet cephalic application of the forceps may be made and gentle traction applied to determine whether descent can be readily effected.

For rotation of the occiput to the anterior either manually or by the use of forceps, anything less than deep ether anesthesia is unsatisfactory. If accomplished easily,

manual rotation followed by low midforceps extraction may be done.

TECHNIC.—The Stillman technic, using the Tucker-McLane instrument, is preferred for forceps rotation. Classic forceps are applied to the head, the concavity of the pelvic curve looking upward. By gentle upward pressure in the axis of the birth canal the head is lifted away from the point of obstruction to the lowest satisfactory diameter for rotation. The handles of the blades are lifted slightly to the anterior, and rotation is gently accomplished through a 5-10 degree arc. The head is again elevated and the procedure continued intermittently until the occiput reaches the anterior. An assistant rotates the anterior shoulder across the abdomen. The handles of the blades are made to describe a wide arc so the flat surfaces of the blade remain parallel to their original axis. The direction for rotation is usually to the side from which the head has begun its descent, but the opposite side may be tried if obstruction or difficulty is encountered. Any serious difficulty, however, indicates that the procedure is not being carried out properly or that the diagnosis is in error.

When rotation is complete, with the handles of the blades almost perpendicular to the floor, gentle downward traction fixes the head in its new position and the left blade is removed from the right side of the baby's head. The right blade of the forceps to be used for delivery is immediately substituted, and the right blade of the rotating forceps is replaced by the left blade of the second instrument. Delivery is then completed as in a low midforceps operation. The utmost gentleness is necessary throughout this procedure.

[The Stillman technic is useful just as the DeLee "key-in-lock" maneuver has proved helpful. In cases of occiput posterior when there is considerable molding of the head, I deliver the baby as an occiput sacral after making a liberal episiotomy. The alternative is to rotate the head manually or by forceps to an occiput anterior, but because of the huge caput succedaneum the head must be permitted to assume a new type of molding before the baby is delivered.—Ed.]

Selection of Forceps for Midpelvic Arrest of Vertex. Louis Langman and Howard C. Taylor, Jr.[5] (New York Univ.), after experience with 701 midforceps deliveries, have devised the following plan of handling midpelvic arrest.

In the absence of progress a second stage of one hour in the multigravida and two hours in the primigravida is allowed in otherwise normal patients before interven-

(5) Am. J. Obst. & Gynec. 52:773-782, November, 1946.

tion. The forceps technic is based on the principle that a given type of pelvis and given position of the vertex indicate selection of a special type of instrument.

With the occiput in the anterior position, classic forceps, usually the Haig-Ferguson type, are used. If the occiput has successfully reached this position it can usually be assumed that descent in the transverse position is no longer necessary.

With the occiput transverse, manual rotation to an oblique position may be attempted if the pelvis is gynecoid. If this is easily accomplished, the classic forceps are used. Otherwise descent is accomplished with Barton forceps. If the pelvis is android or flat, manual rotation may be impossible, and continued descent in the transverse position with the aid of Barton forceps is particularly desirable. If Barton forceps is used, rotation is carried out when crowning first occurs, and delivery can be completed with this instrument if desired.

In the posterior position the procedure of choice is an attempt at rotation in the midpelvis if the type of pelvis is favorable. Otherwise the Kielland forceps is used, and traction is made with the occiput still in posterior position. Delivery is carried out with the vertex in that position or after rotation on the pelvic floor. In some cases upward displacement of the head with rotation above the pelvic brim may be necessary.

In this series, the Barton forceps was used 371 times, the Kielland 134 and some type of classic forceps 196. Infant mortality was 9.4 per cent, being higher for the Kielland-delivered babies than for the others. Injuries to the birth canal occurred in 20 per cent of the mothers. The total maternal morbidity was 41.3 per cent. There were four maternal deaths. The annual percentage of patients delivered by cesarean section at the authors' hospital ranged from 1.8 to 4.3 per cent during the 12 years covered.

Contribution to Technic of Kielland Forceps. Richard Tauber[6] (Philadelphia) states that, because of their bay-

(6) Clinics 4:961-970, December, 1946.

onet shape, these forceps are particularly applicable to high transverse arrest. For correct biparietal application, the left blade or lock blade is applied to the left side of the infant's head and the right blade to the right side of the head, with the lock of the instrument pointing to the occiput. Rotation is performed in the correct position if the left blade (lock blade) of the forceps corresponds to the left hand and the right blade to the right hand. The concavity of the cephalic curve of the blade corresponds to the palm of the respective hand. The hand with the palm upward can be rotated in only one direction, and this is the direction to which the corresponding blade has to be turned.

Kielland forceps were used as outlet forceps and were found satisfactory at this stage of labor, since the slender blades reduce injury to a minimum. Furthermore, biparietal application can be made to the head in the transverse position on the pelvic floor or in persistent occipitoposterior position, and rotation and extraction can be performed without removal and reapplication of the instrument. The technic of application to the head on the pelvic floor is different from that in high transverse arrest. The instrument can be used in four different positions, according to the direction and degree of rotation of the infant's head.

[There are hundreds of different types of obstetric forceps and most obstetricians have a favorite one. I prefer the DeLee modification of the Simpson forceps and occasionally use the Kielland forceps for transverse arrest or asynclitism, and the Piper forceps for the aftercoming head. E. H. Deneen (Virginia M. Monthly 74:150-157, April, 1947) discusses the selection of an obstetric forceps to suit the case. He believes that instrumental axis traction diminishes the amount of effort and injury and is desirable in any station of the head. I agree that axis traction usually reduces the amount of effort needed but it certainly does not diminish the amount of injury to the vagina.—Ed.]

Failed Forceps. From a study of 30 recent annual reports giving details of 70,000 deliveries in three Dublin hospitals, J. K. Feeney[7] obtained information on 121 cases in which forceps delivery failed. In 77, failure occurred outside the hospital and the patients were subse-

(7) Irish J. M. Sc., pp. 1-21, May, 1947.

quently admitted; in 44, failure occurred in the hospital. Cases collected from the British and American literature brought the total number of failures to 346. The combined mortality rate was 11 per cent, or one death in nine cases.

In 17 cases of abnormal cephalic presentation conditions for safe forceps delivery in domiciliary practice (cervix fully dilated and taken up, vertex presentation, greatest engaging diameter through the pelvic inlet with the head well down on the pelvic floor) were not fulfilled. In six cases hydrocephalus as a cause of dystocia was overlooked. In 28 cases proper conditions for safe low forceps delivery in home practice were absent. In 24 cases failure was due to unrecognized disproportion between the presenting head and the maternal pelvis; 15 of the patients were multiparas. The other 2 of the 77 failures were due to constriction ring dystocia.

Among the 44 failures in the hospital, contracted pelvis was the probable cause in 26 of 28 primiparas and in 7 of 17 multiparas. Of the three maternal deaths in this group, one, which occurred in the period before sulfanilamides were used, was due to infection; one was due to shock and acute sepsis after delay in performing craniotomy on a dead fetus with head lodged in the mother's vagina, and one was due to inhalation of stomach contents during anesthesia.

[After failure with forceps, 12 women were delivered by low cesarean section with one death from inhalation pneumonia; 12 women had a pubiotomy or symphysiotomy with no maternal and 2 fetal deaths and 3 women had cesarean hysterectomies and all recovered. As the author himself admits in a footnote, the outcome in cases of failed forceps is not as black as his statistics indicate because he did not take into account the cases of failed forceps where spontaneous delivery took place, or where delivery was accomplished by low forceps operation without complications. Regardless of this we must remember that in nearly all cases where forceps are applied and the baby cannot be delivered, the conditions necessary for a forceps delivery are not present: the cervix is not completely out of the way, there is a cephalopelvic disproportion, usually involving the midplane or the outlet, there is an unrecognized occiput transverse or posterior, the head is too high, or there is ignorance on the part of the physician as to how to deliver the baby. Not infrequently an error is made in applying forceps too early. In such cases, if sufficient trial traction

fails to bring the head down, the physician should not persist in his efforts but should have the courage to remove the forceps, give the patient a sedative and wait. It is surprising how many times a spontaneous delivery will follow in such cases.—Ed.]

Results of Management of Breech Presentations at Institute for Midwives at Helsinki, 1934-44, are reported by Heikki Pitkänen[8] (Helsinki). The material, comprising 833 deliveries of breech presentation, included all children weighing 600 Gm. or more, in single and multiple births. The frequency of breech presentation was 5.03 per cent but only 4.01 per cent in single births.

Among the 652 single births, the total mortality was 20.8 per cent. Of the 88 children who weighed less than 2,000 Gm., 74 (84.1 per cent) died. Of 564 weighing 2,000 Gm. or more, 62 (11 per cent) died. Cesarean section was resorted to in 1.56 per cent of the young primiparas, in 15.38 per cent of the older primiparas and in 5.4 per cent of the multiparas. Two mothers died in single deliveries, cesarean section having been performed on both. No children died after cesarean section.

The total infant mortality in twin deliveries, when one or both fetuses were breech presentations, was 14.04 per cent. Of the 36 children who weighed less than 2,000 Gm., 14 (38.9 per cent) died; of the 142 who weighed 2,000 Gm. or more, 11 (7.75 per cent) died. There was no maternal mortality in the twin deliveries.

To improve the unfavorable results of breech delivery Pitkänen recommends intensified care of the mother to prevent premature birth. In full term or nearly full term deliveries he believes that extraction should be resorted to only in an emergency and that other vaginal operations are of little avail. Cesarean section should be performed when an obvious disproportion exists between the pelvis and the fetal head, when the child is large, even though a contracted pelvis is not probable, when labor pains are weak or when, for some other reason, it appears that labor may be prolonged.

[Pitkanen opposes interference in breech deliveries but F. Hoff (Wien. klin. Wchnschr. 51:301-305, June 13, 1947) advocates extraction of the baby after the breech appears over the perineum.

(8) Acta obst. et gynec. Scandinav. (supp. 1) 27:1-57, 1946.

He gives his patients 3 units of a pituitary preparation intravenously to bring about spontaneous birth of the breech. There is considerably more danger from the use of pituitary extract in breech cases than in occiput presentations, especially when the drug is given intravenously.—Ed.]

Version by Purge and Enema (New Series). Three years ago, J. I. Torres[9] reported 50 cases in which he had used this method with 74 per cent absolute successes, 14 per cent relative successes and 12 per cent failures [see 1944 YEAR BOOK OF OBSTETRICS AND GYNECOLOGY, p. 189.—Ed.]. Since then various authors have described their experiences with the method, which consists of the administration of 30 Gm. castor oil and, on arising the following morning, an enema of 1 L. soap water, followed by a visit to the clinic on the same morning. Torres reports a new series of 80 cases with 75 per cent absolute and 3.75 per cent relative successes and 21.25 per cent failures. All patients except seven were in the seventh or eighth month of pregnancy, and all but two required only one treatment.

Pooling all reported cases in which the method was used, he found that among 236 cases there were 194 absolute successes. This figure represents 81 per cent of versions handled successfully without any of the inconveniences of external version.

Voorhees Bag: Analysis of Its Use in 164 Cases at the Cook County Hospital is reported by Augusta Webster[1] (Northwestern Univ.). In 28,000 deliveries over seven years, the Voorhees bag was used in 164 instances. Indication for use of the bag in 64 was toxemia, in 62 placenta praevia, in 20 abruptio placentae, in 16 abnormal presentation, in 1 ruptured membranes for four days and in 1 dyspnea from diaphragmatic hernia.

The 164 patients were delivered of 168 babies. Gross infant mortality was 85. Since fetal heart tones were absent in 51 patients on admission to the hospital and 16 fetuses were aged 26 weeks or less, corrected infant mortality is 18.

Of the 64 patients with toxemia, 22 had had no pre-

(9) Rev. obst. y ginec., Caracas 6:142-146, 1946.
(1) Am. J. Obst. & Gynec. 53:957-971, June, 1947.

partum care and 13 had attended clinic only once. Fifty per cent of the patients with abruptio placentae and 17.7 per cent of patients with placenta praevia were in shock when admitted to the hospital. Seven patients with placenta praevia and eight with abruptio placentae had hypertension. Three patients with abruptio placentae had trauma to the abdominal wall.

In some cases, choice of the hydrostatic bag was not wise and in others, too small a bag was used. Obstetric difficulties were present in all cases. Most patients were not able to withstand abdominal surgery. Use of the hydrostatic bag should not be condemned because its use in some patients is ill advised. The results of its use cannot be compared with those of cesarean section. Webster believes that the hydrostatic bag still has a limited use in obstetrics.

[T. M. Boulware and C. D. Howe (J. M. A. Alabama, 16:201–205, December, 1946) used a Voorhees bag to induce labor and to facilitate delivery in 100 cases. There were no maternal deaths and six stillbirths, of which at least four had no relation to the bag. Ten per cent of the cases required suture of the cervix. I have not used a Voorhees bag for any purpose for many years.—Ed.]

Cesarean Section. A. W. Andison[2] (Univ. of Manitoba) discusses indications for operation in 158 sections performed from 1940 to 1945.

Disproportion was the major indication. Of 60 operations, 34 were performed after trial labor. The general policy was to give the patient an opportunity to deliver vaginally. This necessitates close supervision, but great degrees of disproportion may be overcome.

In 21 cases the indication was previous cesarean section. However, under favorable circumstances, it is reasonably safe to allow a patient with a previous lower segment operation a trial of labor if the postoperative course was completely afebrile. Soft tissue radiography should be used to determine the position of the placenta.

Heart disease was the indication in four patients, although increasing experience has convinced Andison that in such cases section should not be routine.

(2) Canad. M. A. J. 56:170-177, February, 1947.

Extreme rigidity of the cervix prolonging labor occurred in three cases. General supportive treatment is nearly always effective, but section was indicated because of fetal or maternal distress. Presence of pelvic tumors in seven cases required operation. On only three occasions was cesarean section performed for toxemia of pregnancy. This condition is best managed conservatively, usually by induction of labor.

Accidental hemorrhage was the indication in only two cases, in one to save a still living fetus and in the other because of continuous profuse bleeding. In 26 cases, placenta praevia was the indication. Even in marginal cases, section is the preferred method of delivery. Uterine inertia complicated by other factors indicated operation in 10 patients. Most of them were older (39-44) and of low fertility. Another five patients were operated on because of repeated stillbirths. Malpresentation accompanied by unfavorable obstetric history, previous section or low fertility was the indication in 19 cases.

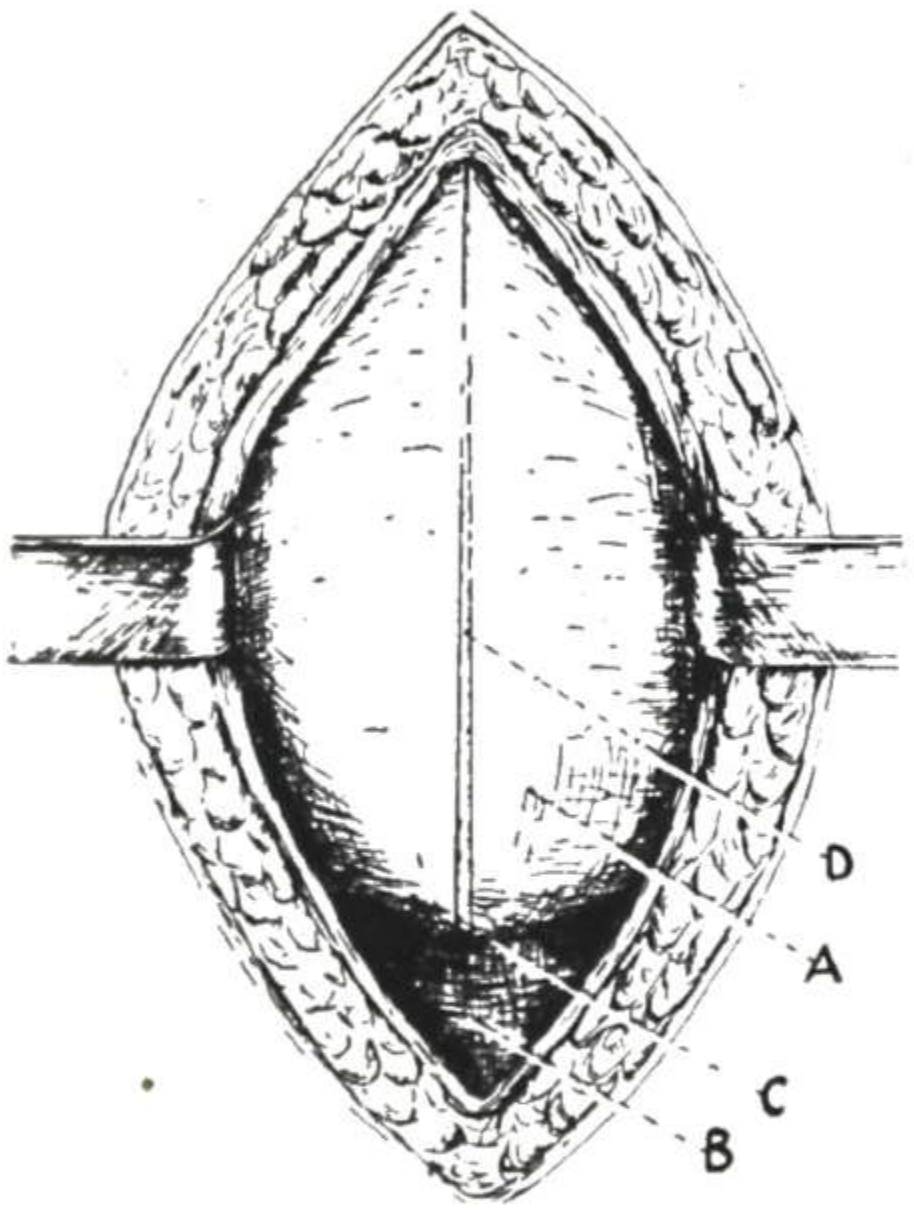
Miscellaneous conditions included diabetes, tonic uterine contraction, previous rupture of the symphysis pubis, dystocia dystrophia, moribund patient, cord presentation and cord prolapse.

The lower segment operation is definitely preferred, 88 per cent being of this type. Ether anesthesia was most commonly used, but in 40 per cent of cases infiltration anesthesia was used. In many respects, this was the ideal mode of anesthesia.

Extraperitoneal Cesarean Section: Intraperitoneal Approach; Presentation of Author's Technic. Robert A. Cacciarelli[4] (Newark, N.J.) describes his technic.

TECHNIC.—After incision into the abdominal wall in the midline from 1 in. below the umbilicus to the pubis, the rectus muscles are dissected from their sheaths and retracted laterally (Fig. 14) exposing the following: (*A*) transversalis fascia, (*B*) bladder, (*C*) parietovesicoperitoneal reflection and (*D*) median umbilical ligament. The transversalis fascia and peritoneum are incised vertically from a point ½ in. above the parietovesicoperitoneal reflection upward for 1-1½ in. The peritoneal edges are grasped by forceps (Fig. 15) and the

(4) Am. J. Obst. & Gynec. 53:100-108, January, 1947.



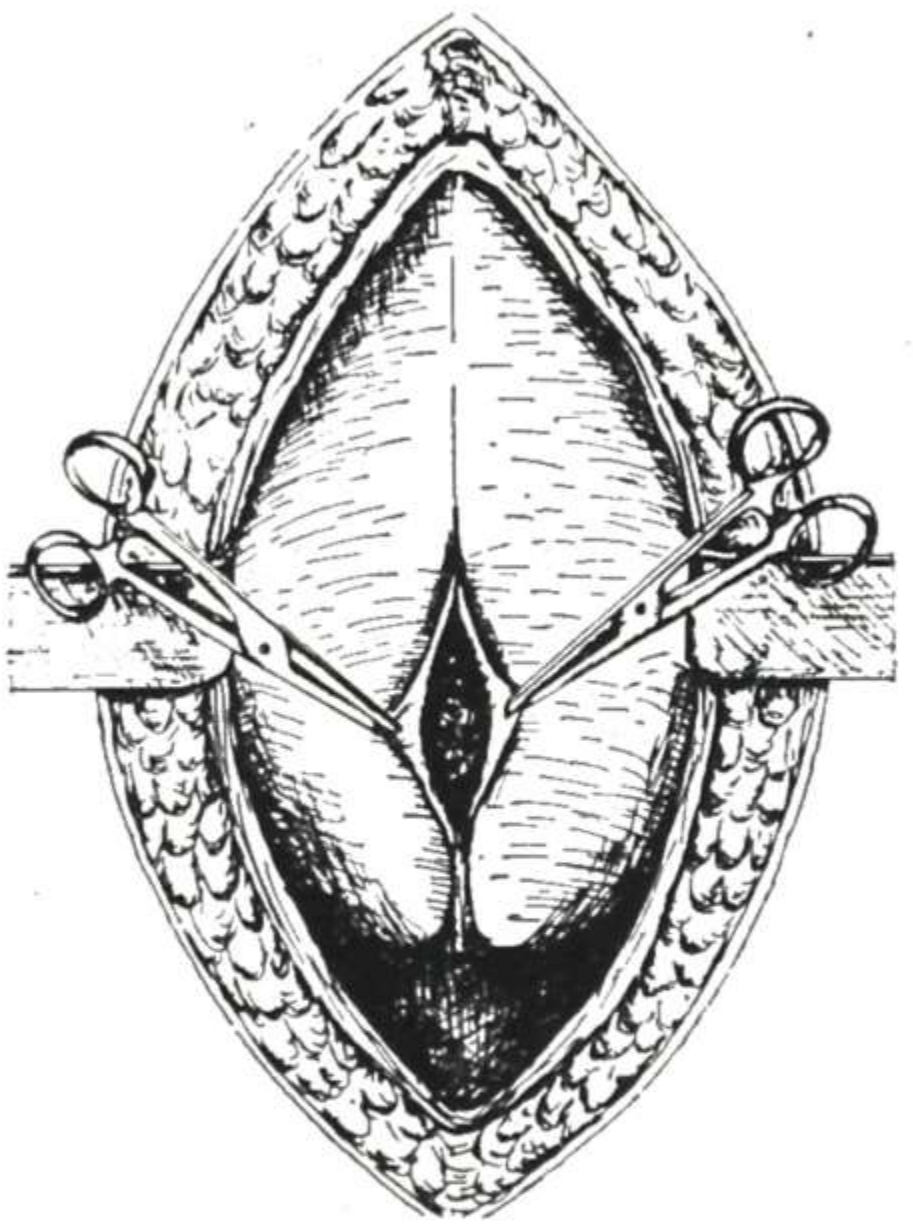
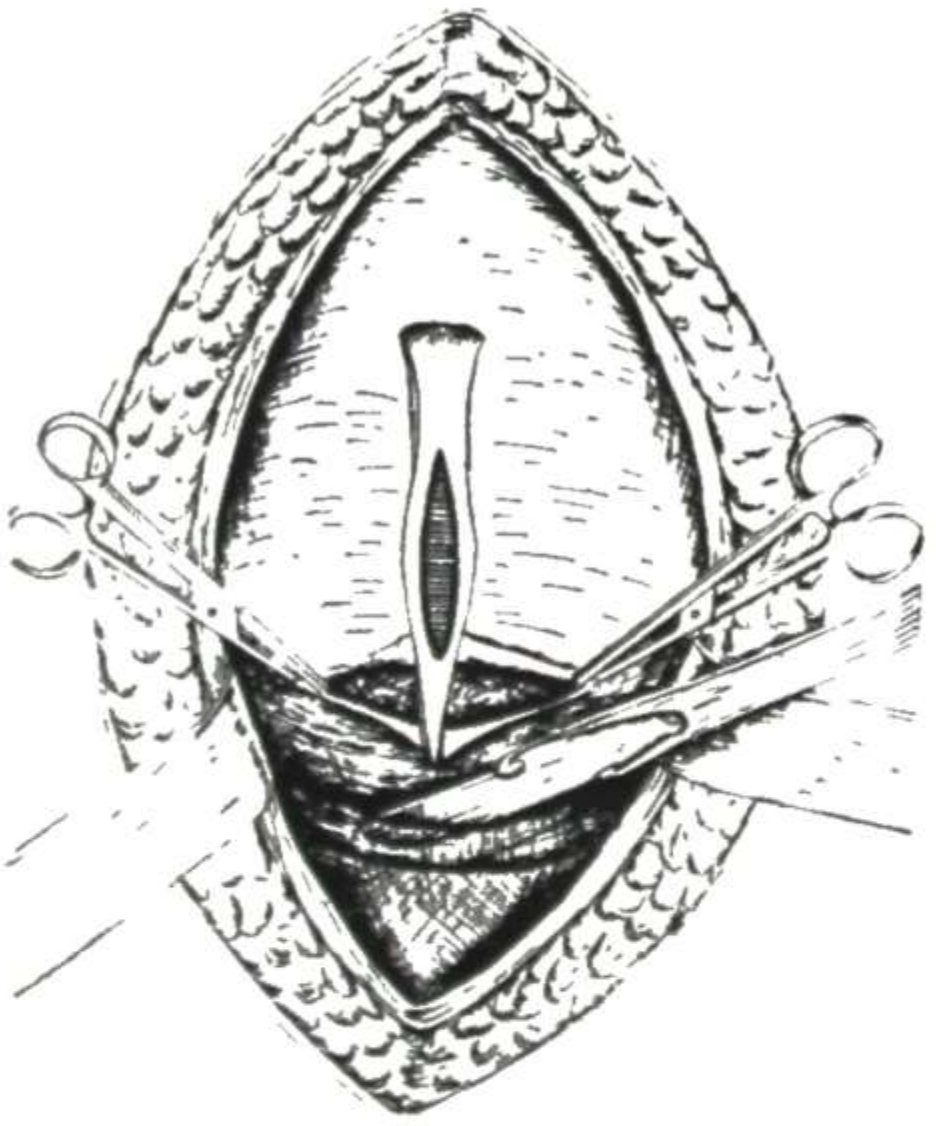


Fig. 14 (left).—*A,* Transversalis fascia; *B,* bladder; *C,* parietovesico-peritoneal reflection; *D,* median umbilical ligament.
Recti muscles are retracted laterally, bringing to view parietal peritoneum, transversalis fascia and bladder. Urachus, shining in midline, is seen to end at apex of bladder.

Fig. 15 (right).—Incision of transversalis fascia and peritoneum. Edges are grasped with forceps.
(Courtesy of Cacciarelli, Robert A.: Am. J. Obst. & Gynec. 53:100-108, January, 1947.)



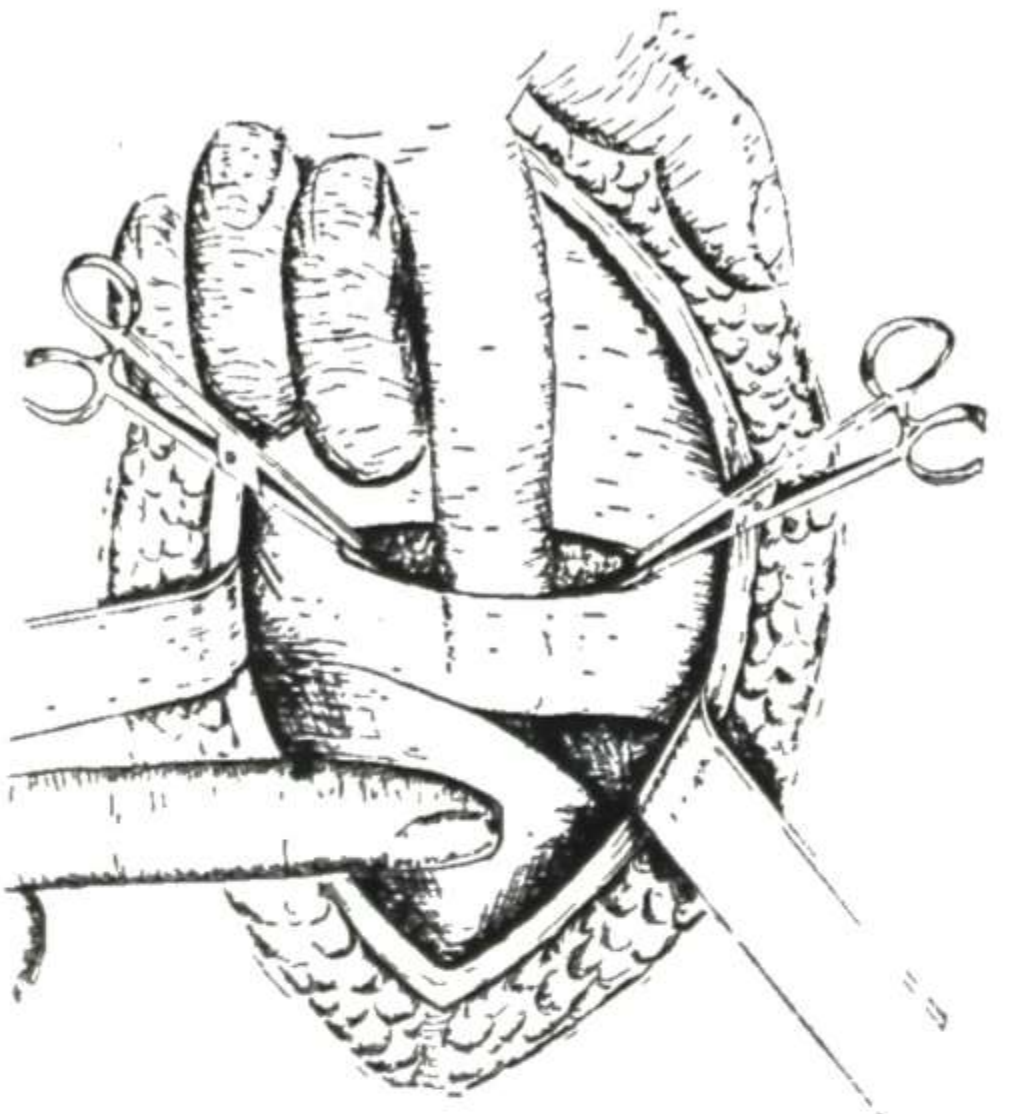
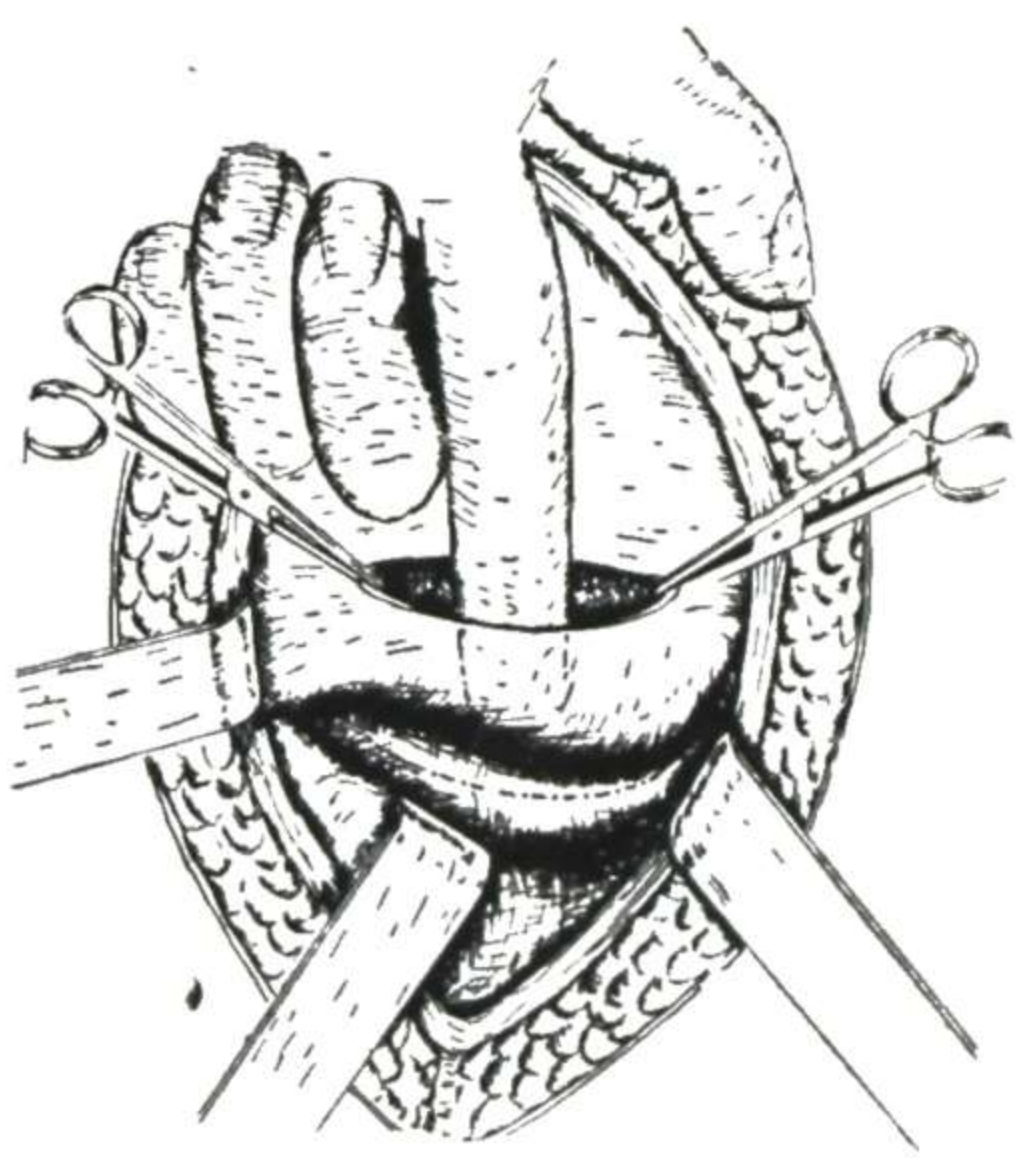


Fig. 16 (left).—Wound is spread out in transverse fashion. Thumb forceps can be used to elevate lower edge of wound. By sharp dissection with scalpel, bladder is separated from its overlying peritoneum, starting in midline, then proceeding to left bladder angle and then to right bladder angle.

Fig. 17 (right).—Bladder is pushed downward by index finger of right hand. As strands of areolar tissue which join vesical fascia to peritoneum are brought to view by counter pressure with index finger of left hand within peritoneal cavity, they are cut with scalpel or scissors. Top and right angle of bladder is also denuded of its peritoneum.
(Courtesy of Cacciarelli, Robert A.: Am. J. Obst. & Gynec. 53:100-108, January, 1947.)

wound spread out transversely. By sharp dissection with scalpel (Fig. 16), the bladder is separated from its overlying peritoneum, starting in the midline and proceeding to the left and finally to the right angle of the bladder. This is done under direct vision and is made easier by stretching the peritoneum with one or two fingers in the abdomen (Fig. 17). With the fundus of the bladder freed from peritoneum, the rest of the bladder can easily be stripped of peritoneum by



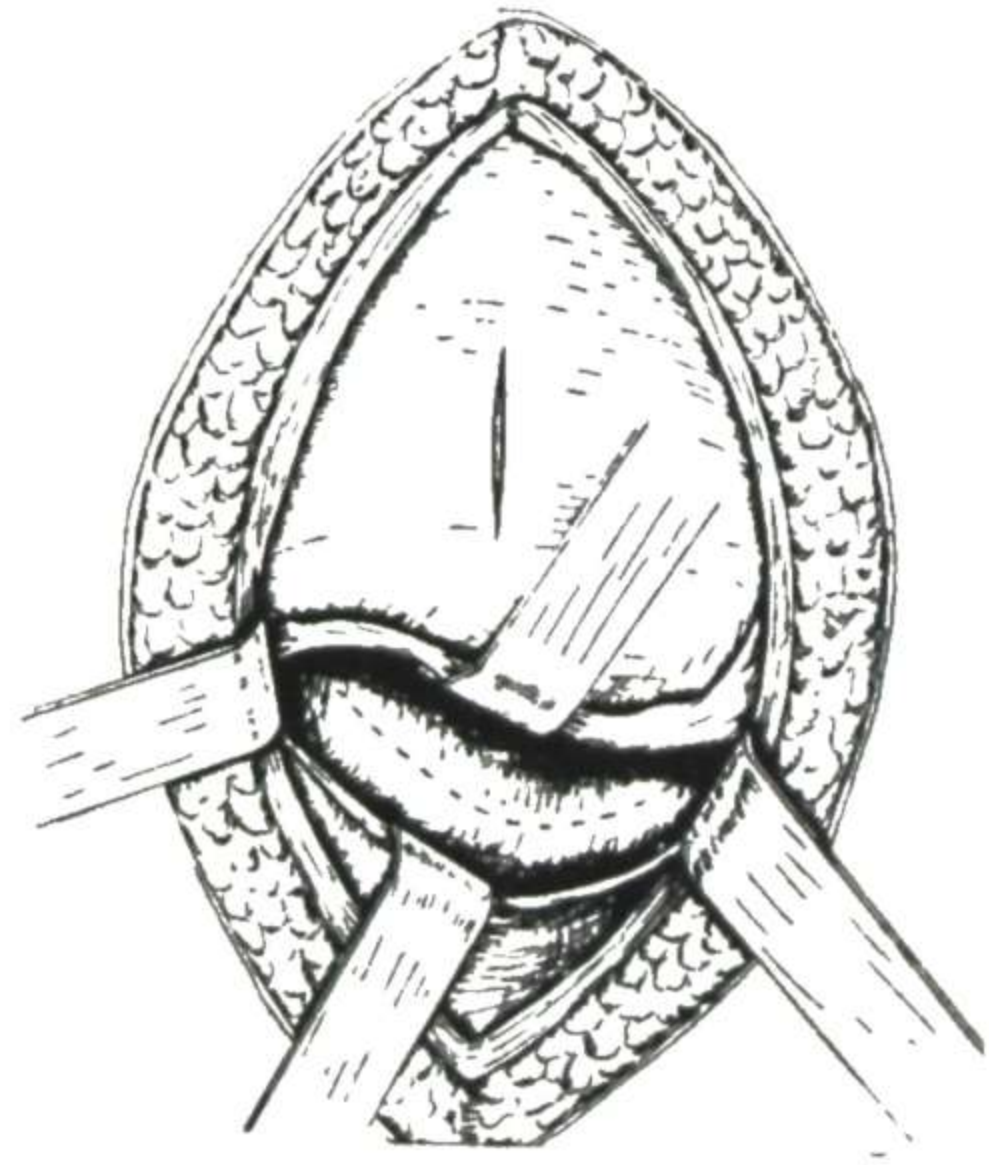


Fig. 18 (left).—Bladder has been completely denuded of its peritoneum. Tonguelike hernial sac can be seen plainly through its course by inserting index finger within peritoneal cavity. By pushing upward on this fold and pushing downward and to right on bladder, lower uterine segment covered with its fascia is seen. Type and position of incision through fascia is shown.

Fig. 19 (right).—After incising fascia of lower uterine segment, finger is inserted under upper flap of fascia, and, by pressure, this part of fascia with peritoneal tongue is raised off lower uterine segment. Finger is inserted under lower fascial flap pushing with it bladder downward and to right, exposing a fairly large space through which crescentic incision is made. (Courtesy of Cacciarelli, Robert A.: Am. J. Obst. & Gynec. 53:100-108, January, 1947.)

using a gauze sponge down to the vesicouterine peritoneal reflection. This fold of peritoneum must not be injured. If vesical fascia comes off during dissection, it is allowed to remain attached to the peritoneum. By insertion of a finger in the peritoneal fold and pushing upward on this and downward and to the right on the bladder, the fascia of the lower uterine segment is exposed. This is incised about ¾ in. inferior to the zone of peritoneal reflection (Fig. 18). Incision should extend equally on both sides of the midline and should be larger than the proposed lower uterine incision. By blunt dissection with the finger, the upper fascial flap is dissected upward for a short distance, carrying with it the peritoneal

fold and the lower flap reflected downward with the bladder, thus exposing a large area of lower uterine segment. This is opened with a crescentic incision the ends of which curve upward as far as 1½ in. above its apex, which is 1 in. above the detached bladder (Fig. 19). All retractors are removed, and the infant is extracted. Ergotrate is given intravenously and the placenta extracted manually at once. The lower uterine segment is closed by three layers of continuous no. 2 chromic catgut sutures. The bladder is anchored to its former position. The peritoneal opening is raised in tent fashion, and a plain catgut ligature is tied around the base of the tented peritoneum. The peritoneum distal to the ligature is transfixed from above downward and from side to side to prevent slipping. It may be closed before the lower uterine segment is incised if the patient has been in labor. The abdominal wall is closed.

Analysis of 305 Lower Segment Cesarean Sections with Transverse Incision is presented by O. León Ponte and O. Agüero[5] (Caracas). With few exceptions, Kerr's technic was used. The material comprised 157 primigravidas, 15 multigravida nulliparas and 133 multiparas. Forty-one patients had had previous cesarean operations. The indications for cesarean section in the total series were: (1) contracted pelvis in 95 cases (31.4 per cent); (2) cervical dystocia in 67 (21.9 per cent), and (3) placenta praevia in 33 (10.8 per cent). In the other patients operation was performed because of fetal-pelvic disproportion, unengaged head, lesion of soft tissues, Bandl's syndrome and miscellaneous other conditions. Incidence of cervical dystocia was higher than in other reported series.

In 62 per cent of cases, operation was performed after more than 30 hours of labor; in 80 per cent of cases of prolonged labor, cervical dilatation did not exceed 5 cm. The number of vaginal examinations averaged one to two in only 11 cases; in the remainder, it averaged three to seven. In only five cases was the operation performed with the membranes intact.

Of the total series, 85 per cent of the patients had actual or potential infection. Cervical dystocia was an important factor in cases of contamination in this series.

(5) Rev. obst. y ginec., Caracas 6:201-225, 1946.

In 81 patients with infection peritoneal exclusion technics were used, but the results were poor and the authors believe that this method is illogical. Intraperitoneal use of sulfonamides proved efficacious; no case of peritonitis occurred in the series. Drainage was used in three cases.

Operative complications included three cases of respiratory collapse due to ether anesthesia, one case of hypotension due to spinal block, four cases of accidental prolongation of the uterine incision and one case of accidental injury to the uterine corpus followed by profuse hemorrhage. Mild bleeding associated with the operation occurred in 22 cases and hemorrhage in 28. Combined use of ergonovine given intravenously and pituitary extract given intramurally contributed considerably to spontaneous separation and expulsion of the placenta, which occurred in all but seven cases. Maternal mortality rate was 2.6 per cent, which the authors believe is low in view of the high percentage of patients with infection. The infant mortality rate was 9.4 per cent.

Postoperative course was febrile in 165 cases (54 per cent). Fever could be attributed to extragenital causes in 9 (2.9 per cent) and to genital infection and abdominal wall abscess in 156 (51 per cent).

The authors consider the transverse incision to be superior to longitudinal incision in the lower segment operation, for surgical, anatomic and obstetric reasons.

Abdominal Drainage in Cesarean Operation in Contaminated Cases. Alberto Peralta Ramos[6] (Buenos Aires) states that the problem of cesarean section in contaminated cases has not yet been solved; maternal mortality is still high. Accessory technics such as drainage in lower segment operations and peritoneal exclusion are neither useless nor harmful, as claimed by some. Miculicz drainage is not applicable in classic cesarean operations because of the movability of the uterine corpus. However, in extraperitoneal sections, drainage is not only effective but also a means of obtaining isolation and hemostasis. This is particularly true if it is combined

(6) Obst. y ginec. latino-am. 4:715-728, October, 1946.

with peritoneal exclusion technics, regardless of the method of fixation of the visceral to the parietal peritoneum. Results of drainage in general, whether gauze or tubes are used, depend less on the drainage itself than on the type and virulence of the organism and its relation to the resistance of the body. This is shown by the statistics of the Instituto de Maternidad. Among 100,000 patients delivered up to 1944, drainage was used in 119 lower segment cesarean sections (both the usual type and the type using exclusion technics). After exclusion of 14 cases in which sulfonamides were used, 105 cases remained. Among 36 cases of grade II contamination, there was no maternal mortality; among 40 cases of grade III, one death and among 29 cases of grade IV, four deaths.

On the basis of his personal experience, Peralta Ramos concludes that drainage and extraperitoneal cesarean sections combined with exclusion technics are of definite value in contaminated cases. Today all hopes are based on use of antibiotics. However, this medication should not exclude use of drainage and the aforementioned technics, or even hysterectomy for removal of a septic focus. Sterling Müller's advice regarding appendicitis, "When in doubt, drain," is still as valid as it was before the sulfonamide era.

Sulfonamides As Prophylactic Agent in Conjunction with Cesarean Section were tested by H. Close Hesseltine and Christine Thelen[7] (Univ. of Chicago). At first sulfonamide crystals and sulfonamide powder in a thin cloth sack were placed in the uterine cavity with the routine small pack, but blood clots formed a complete barrier to absorption. Thereafter sulfonamides were directly applied to the incised uterine wall.

In 10 patients sulfonamides were placed within the uterine cavity; 7 were afebrile and 3 febrile. In a second group of 15 patients who had Porro sections during the same period with no sulfonamide therapy 12 were afebrile and 3 febrile.

In a control group of 125 unselected patients, 90 were

(7) Am. J. Obst. & Gynec. 52:813-816, November, 1946.

afebrile and 35 (28 per cent) febrile. Febrile courses occurred regardless of the indication for cesarean section and the type of anesthesia.

In the treated group of 43 patients the incision in the uterus was closed in the routine manner. When the area covered by the detached vesicouterine peritoneum was free from blood and dry, 5 Gm. sulfonamide powder was deposited over the uterine fascia. The peritoneum was reattached to the uterine wall, covering the sulfonamide powder, special effort being made to keep the drug out of the free peritoneal cavity. In this group, 16 patients (37 per cent) were febrile. There was no evidence that the febrile reaction resulted from drug sensitization.

Blood sulfonamide levels averaged as follows: fourth hour 3.3, eighth hour 4, twelfth hour 3.8 and twenty-fourth hour 3. However, absorption was so erratic that this channel appeared unsatisfactory for establishing effective and dependable levels.

Local use of sulfonamides in the uterine cavity or over the uterine incision did not lower morbidity rate or shorten convalescence. Furthermore, the bladder peritoneum seemed more adherent in a few patients who subsequently had laparotomy.

Use of Penicillin in Cesarean Sections in Case of Amniotic Infection. L. Portes and Maurice Mayer[8] (Paris) report 12 cases in which observance of the classic rules without use of penicillin would have resulted in mutilating operations. All operations were conservative low cesarean sections: in the first four, penicillin and sulfonamides were used in the peritoneal cavity, but in the last eight, penicillin alone was used. In the first three, abdominal drainage was instituted, but it was not used in the last nine, regardless of the gravity of the condition.

Immediately after admission systemic penicillin treatment was started with large doses intramuscularly or by slow infusion; it was continued for at least four days postoperatively and, when necessary, for two or three

(8) Gynec. et obst. 45:508-510, 1946.

days after the temperature had returned to normal. The doses administered varied from 600,000 to 2,200,000 units. Locally, 20,000 units (2,000 per cc.) was injected into the uterine muscle immediately after extraction of the placenta, and 20,000 units into the parametrium on each side of the uterus; finally, 50,000 units (1,000 per cc.) was injected into the peritoneal cavity before it was closed. Postoperatively, an intraperitoneal injection containing 1,000 units per cc. was given when meteorism or a painful reaction of the abdomen suggested that the patient was in danger of having peritoneal infection.

Intrauterine Use of Sulfanilamide during and after intrauterine operative and obstetric procedures has been studied in 77 cases by A. Sadovsky, Y. M. Bromberg and Z. Polishuk[9] (Rothschild-Hadassah Univ. Hosp., Jerusalem).

When administered in this manner sulfanilamide acts through local bacteriostasis due to high local concentration and through general bacteriostatic effect after absorption into the circulation. Local effect was shown in 11 of 14 cases in uterine cultures taken before and after introduction of sulfanilamide.

The maximal blood level of sulfanilamide is reached three to six hours after intrauterine application. Absorption is better from a pregnant than from a nonpregnant uterus and is especially high in the uterus at term. Absorption from the uterus compares favorably with absorption after oral administration.

The procedure has been used as a prophylactic and therapeutic measure for various conditions in 50 cases. It has special prophylactic value in manual removal of the placenta, cesarean section and hysterotomy for submucous myomas. Therapeutically, it is useful for septic abortion and chronic endometritis.

Intraperitoneal Use of Sulfonamides As Prophylaxis in Obstetric Surgery in Contaminated Cases. Manuel Luiz Pérez[1] (Buenos Aires) believes that abdominal

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(9) Exper. Med. & Surg. 4:310-318, November, 1946.
(1) Gynec. et obst. 46:5-19, 1947.

drainage does not play an important part in prevention of peritoneal infection. It merely impedes complete utilization of the sulfonamide by the body, as the gauze absorbs the powder and even facilitates its expulsion. On the basis of his experience, he recommends the following management of cesarean sections in all cases including the "clean" ones. Opitz' lower segment transperitoneal section should be performed, with a minimum of traumatization of tissues and peritoneal dissection and with mechanical aspiration of fluids oozing from the uterus. Four Gm. of powdered sulfonamide is placed on the sutures of the uterus, the serosa and the abdominal wall. A sulfonamide is given parenterally for 72 hours after operation. The concentration of the drug in the blood is estimated twice a day so that it may be maintained at 6 mg. per cent. Penicillin therapy is initiated immediately after operation, or even before operation if signs of infection are evident; 200,000 units being given over 48 hours.

Prophylactic Use of Vaginal Sulfanilamidothiazole Treatment against Puerperal Infections. Rolf Fåhraeus[2] (Stockholm) investigated the effect on puerperal infection of the intravaginal administration of two suppositories, each containing 0.5 Gm. sulfanilamidothiazole, every 12 hours from admission until the fifth puerperal day in 212 primiparas delivered of full term or premature children. A comparable group of 217 patients served as controls.

In about 90 per cent of the patients use of the drug was started the day before or on the day of delivery. In a few, blood tests were made, but in only one was a trace of the drug found.

Of the nontreated patients, 32.3 per cent had fever of genital origin exceeding 100.2 F., whereas only 16.5 per cent of the treated patients had such fever. The difference is regarded as statistically significant. If fever of unknown origin is combined with that due to genital infection, the treated group contained 72 patients with

(2) Gynaecologia 124:1-10, July, 1947.

fever and the untreated group 103. The difference, 13.5 per cent, is 2.87 times the mean error and thus not quite statistically reliable. However, this study suggests that a statistically significant effect could be shown if the material were larger.

Problem of Repeat Cesarean Section—Preliminary Study. Mortality in repeat classic cesarean sections in this country at the present time is about 1.5 per cent. With the low type of operation, mortality is slightly over 1 per cent. These figures are based on series composed almost entirely of second and third cesarean sections. Series including fourth and fifth cesarean sections would reveal higher mortality. Rupture of the uterine scar and intestinal adhesions occur less often after low section than after classic cesarean section.

In 316 repeat sections reviewed by Cornelius T. O'Connor[4] (Boston), there were three deaths. Among the cases in which the type of section was known, 75 were classic and 131 low. Approximately half of the patients had only one repeat operation; one-fifth had two repeat operations; one-twelfth had three repeat operations and several had four or five. Adhesions complicated operation in 57 patients. Incisional hernias in 6 patients, thin uterine scars in 6, atony of the uterus with hemorrhage in 11 necessitating hysterectomy in 1 and causing death in another, severe sepsis in 1 and phlebitis in 3 complicated these operations.

Tubal resection is usually proposed as the method of choice for avoiding complications of future cesarean sections. This procedure preserves the dubious advantage of menstruation and the possibility of subsequent carcinomatous and inflammatory disease of the uterus. O'Connor prefers elective cesarean hysterectomy. This procedure not only avoids the dangers and inconveniences of a useless uterus but, by eliminating the danger of uterine hemorrhage associated with operation, should reduce operative mortality by about one-half. Postoperative recovery is much easier because of the absence

(4) Am. J. Obst. & Gynec. 53:914-926, June, 1947.

of a necrosing uterus. This procedure is suggested for: patients over 40 who have had one cesarean section, those with adhesions, weak scars or atonic uteri, those who have had three or more classic sections and those with severe heart or kidney disease or tuberculosis.

[I do not agree with O'Connor that elective cesarean hysterectomy is usually preferable to tubal ligation for sterilization. With the Pomeroy and Madlener methods there is practically no bleeding and the added time for these operations should be less than three minutes, even for a slow operator. The only real danger is possibility of intestinal adhesions to the wounds in the tubes, but this is rare and may occur after hysterectomy. Mortality from tubal ligation is no higher than from hysterectomy. The uterus is not entirely useless in young women, even if they are not to bear more children. Of course in women past 40, particularly if they have profuse menses, fibromyomas or other pathology, the uterus should be removed. DeLee, Nadelhofer and I reported 91 repeat low cervical operations performed at Chicago Lying-In Hospital (Am. J. Obst. & Gynec. 16:184-196, December, 1928) in which 31 patients were sterilized, usually by the Madlener method.—Ed.]

Cesarean Hysterectomy. Ralph A. Reis and Edwin J. DeCosta[4a] (Michael Reese Hosp., Chicago) undertook a study to determine the present status of cesarean hysterectomy.

A review of 731,690 deliveries as reported in the American literature for 1931 to 1945 showed that the incidence of cesarean section was 3.42 per cent and the average maternal mortality 2.14 per cent. In 25,027 cesarean sections reported, hysterectomy was performed 636 times, an incidence of 2.54 per cent. The average maternal mortality was 5.2 per cent.

In the authors' series hysterectomy was performed in 54 of 1,202 cesarean sections, an incidence of 4.5 per cent. Among 23,214 deliveries during this period the incidence of cesarean section was 5.18 per cent. Three patients died after cesarean section, a mortality of 0.25 per cent. There were no deaths following cesarean hysterectomy.

The most frequent indication for cesarean hysterectomy was uterine fibroids (in 25 patients). Next in frequency was uterine bleeding (in 15). Six patients had uncontrollable bleeding at the time of cesarean section,

(4a) J. A. M. A. 134:775-779, June 28, 1947.

five had abruptio placentae, three had placenta praevia and one had placenta accreta. Hysterectomy was performed four times for pre-eclamptic toxemia and four times for intrapartum infection. In the other six patients the operation was performed for miscellaneous reasons, being done only once for sterilization.

The morbidity rate was found to be less than following cesarean section. Removal of the uterus removes the potentially infected area of placentation and eliminates sloughing of the decidua and involution of the uterus. A short incision with opportunity for spontaneous drainage is substituted for the longer buried uterine incision. Less difficulty should be encountered in cesarean than in abdominal hysterectomy because of the greater mobility of the uterus.

[This excellent paper by Reis and DeCosta contains several important items. (1) They show that the present cesarean hysterectomy differs considerably from the Porro operation. The latter included: (*a*) complete removal of the uterus and its appendages by an occluding ligature, often metallic; (*b*) external placement of the uterine pedicle, and (*c*) culdesac and/or abdominal drainage. Since the original Porro is so different, the name should not be used for the present type of cesarean hysterectomy. Another valid reason for not using the name of Porro is that the first cesarean hysterectomy was reported by George H. Bixby in 1869 and concerned a patient operated on by H. R. Storer. The first operation was not done by Porro until 1876. (2) Reis and DeCosta analyzed 731,690 cesarean sections done in 14 hospitals in the United States during 1931-45. Incidence varied from 1.19 to 8.28 per cent, but that of all the operations was 3.42 per cent. Frequency of cesarean hysterectomy was 2.54 per cent. (3) Analysis of the 54 cesarean hysterectomies done at Michael Reese Hospital showed that the most frequent indications were fibromyomas, uncontrollable uterine hemorrhage before and during cesarean section and intrapartum infection. In women under 40 the uterus should not be removed without good cause. As was said before, I do not consider the desire for sterilization to be a proper indication for hysterectomy. Nor are small fibromyomas an indication. On the other hand, with definite intrapartum infection, if vaginal delivery cannot be carried out and a cesarean section must be done, the uterus should be extirpated. This is far safer than any type of extraperitoneal operation.—Ed.]

Fetal Mortality in Cesarean Section at Methodist Hospital, Brooklyn, is reported by Henry S. Acken, Jr.[5] In 1,066 sections performed between 1920 and 1938, ma-

(5) Am. J. Obst. & Gynec. 53:927-935, June, 1947.

ternal mortality was 3.18 per cent and fetal mortality 5.2 per cent. Maternal mortality in 768 sections done from 1936 to 1946 was 0.65 per cent and fetal mortality 4.9 per cent.

Fetal mortality in cesarean section is higher than that for vaginal delivery. For accurate diagnosis of the cause of fetal death, however, a higher percentage of autopsies would be necessary. Fetal mortality might be decreased by earlier operation in cases of abnormal presentation and by regional anesthesia to avoid fetal anoxia. Prematurity remains the greatest single cause of fetal mortality in cesarean section. Other causes of fetal death were congenital anomalies, maceration, congenital atelectasis, bronchopneumonia, erythroblastosis foetalis, hemorrhage of the newborn and gastroenteritis.

Most of the cesarean sections were done because of previous sections or contracted pelves; under such circumstances fetal mortality was low. Fetal mortality was highest when cesarean section was done because of fetal distress, abruptio placentae and placenta praevia; it was also high in sections performed for toxemia.

Fetal mortality might be diminished by earlier operation in patients with placenta praevia, but this practice would increase maternal mortality. Early transfusion and administration of oxygen to combat fetal anoxia in patients with placenta praevia will decrease fetal mortality.

Biotherapeutic or Biologic Method in Obstetric and Abdominal Surgery: Preliminary Communication. According to M. C. Amadeo Narcia Ruiz[6] (Mexico City), biotherapy aims at early restoration of normal bodily functions so as to reduce the incidence of postoperative morbidity, i.e., shock, toxemia and circulatory disorders (mainly thrombophlebitis and pulmonary and cerebral embolism). The basic principles of the biologic method of treatment are early ambulation, nontoxic anesthetics, prevention of shock, normal diet and improvement of the patient's state of mind.

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(6) **Medicina, Mexico 27:221-233, May 25, 1947.**

Local, regional or spinal anesthesia are preferred because of their minimal toxicity. If general anesthesia is unavoidable, the method of choice is anesthesia with a mixture of pentothal and cyclopropane because of its easy induction and elimination and minimal toxic effect on the liver. Shock is prevented by (1) allaying fear of operation, causing the least pain possible and securing postoperative comfort and favorable state of mind, (2) avoidance of excessive operative trauma by following sound surgical principles and a gentle technic and (3) reducing postoperative toxemia induced by the anesthetic and products of disintegration of tissues traumatized during operation. Narcia Ruiz's procedure is as follows.

METHOD.—*General Schedule in Abdominal Surgery.*—On the eve of operation, a full meal, an enema if necessary and one capsule of nembutal are given. On the morning of operation, sweetened fruit juice (or if local anesthesia is to be used, a full breakfast), nembutal and, one hour before operation, demerol are given. During operation, 1,000 cc. physiologic saline, followed by 500 cc. glucose, is given intravenously, and blood transfusion is administered if hemorrhage is profuse. After operation, 1,000 cc. biclisil (Abbott) with vitamin C is given intravenously, leg exercises are initiated, any position desired by the patient is assumed, sweetened liquids are offered and penicillin is injected every three hours until 300,000 units has been given. For patients who have had local anesthesia, ambulation and normal diet are started on the first day; for those who have had general or spinal anesthesia, after 24 hours. Patients are encouraged to walk by explaining to them the advantages of early ambulation, and, if necessary, by giving an analgesic.

Procedure for Cesarean Section.—The general routine is the same as outlined in the preceding paragraph. For local anesthesia, 0.5 per cent procaine with 100,000 units of penicillin per 300 cc. solution is used; 100,000 units of penicillin in physiologic saline is injected beneath the anterior visceral peritoneum of the uterus. After extraction of the fetus, ergotrate is given intravenously and 10 units of pituitary extract is injected into the uterine muscle. The skin clips are removed on the fourth day, and the patient is allowed normal activity including climbing steps.

Although Narcia Ruiz has used this procedure not only for cesarean sections but also in a series of 200 de-

liveries, including 10 forceps deliveries, 5 versions and several perineorrhaphies, he has not seen an untoward incident.

[Each year numerous papers appear on cesarean section. More and more sections are being done, not only in our country, but also abroad. E. M. C. Passos (*Cesarea Abdominal* [São Paulo: Quando Pratica-la, 1946]) in an extensive monograph on cesarean section reports 1,078 of these operations with a maternal mortality of 7 per cent and compares this with 4,274 forceps deliveries with a death rate of 0.74 per cent. The death rate for cesarean section was 16.3 per cent in 1937 but it decreased to 2.5 per cent during 1940-44. The frequency of the operation rose from 2.06 per cent in 1937 to 3.01 per cent for 1940-44. In the Philippine General Hospital according to A. Baens (Philippine J. Surg. 1:5-12, July-Aug., 1946) the incidence of cesarean section rose in ten years from 0.32 per cent to 0.77 per cent, still a very low incidence. The uncorrected mortality rate for classic cesarean sections was 5 per cent, but among the 201 low cervical sections the rate was only 0.99 per cent. Local anesthesia was used for 135 of 228 cases.

Each year I repeat that I prefer the cervical cesarean section under local infiltration anesthesia as the safest procedure for mother and baby. I have never used a drain after a cesarean section, and I do not use either sulfonamides or penicillin locally for either obstetric or gynecologic surgery. I am therefore happy to obtain support from Hesseltine who failed to observe a lower morbidity rate or shorter convalescence after local use of sulfonamides in the uterine cavity or over the uterine incision. Narcia Ruiz of Mexico City is to be congratulated on his systematic attempt to prevent shock, intoxication and circulatory failure in obstetric and surgical cases.

At the last meeting of the International College of Surgeons in Chicago in October, Alex W. Spain, master of the National Maternity Hospital in Dublin reported a series of 7 pubiotomies and 21 symphysiotomies. Spain prefers symphysiotomy, and his technic is fairly simple. I was very much impressed by his report, and I await with interest the published paper for discussion in the next YEAR BOOK.—Ed.]

UTERINE HEMORRHAGE

Postpartum Blood: Its Clotting Mechanism and Relationship to Peripheral Blood Picture was investigated by Allan C. Barnes[7] (Ohio State Univ.), who reports the following conclusions.

1. Coagulation. Uterine blood post partum does not clot in vitro spontaneously or on the addition of any on of the following substances singly: calcium, thrombo-

(7) Am. J. M. Sc. 213:463-469, April, 1947.

plastin, trypsin, fibrinogen or thrombin. Accordingly, it does not resemble oxalated, citrated or heparinized blood or recalcified plasma. It displays a clot-promoting action and a definite but weak proteolytic activity. It clots on the addition in excess of a mixture of thromboplastin and fibrinogen or on "seeding" with small amounts of freshly drawn venous blood. In these respects, it behaves in a manner similar to defibrinated blood or a suspension of cells in serum.

2. Hematologic and chemical characteristics. The cell count varies daily during the puerperium, the variation following a characteristic pattern, with the hemoglobin and red cell count dropping steadily while the white cell elements rise rapidly. Chemical analyses gave results which would be anticipated for a suspension of cells in serum.

3. Effect of variations in the clotting mechanism of the peripheral blood on the amount of postpartum blood lost. Prolongation of the prothrombin and clotting times (by dicoumarol and heparin) did not increase the amount of blood lost post partum. Administration of vitamin K did not raise the already elevated prothrombin level of the patient immediately post partum nor did it diminish the vaginal blood loss. A patient with monocytic leukemia and a platelet count of 68,000 at delivery had a smaller postpartum blood loss than the control patients in this series. Literature reporting thrombopenic dyscrasias in pregnancy shows no correlation with hemorrhage.

Although it has been assumed to exist, no definite relation can be established between the coagulability of the peripheral blood and the amount of postpartum bleeding.

Third Stage of Labor: Measurement of Blood Loss; Intravenous Ergotrate. James Knight Quigley[8] (Rochester, N.Y.) devised a simple method for measuring blood loss during the third stage of labor. He slips a sterile metal plate under the patient's buttocks after the birth

(8) Am. J. Obst. & Gynec. 53:271-274, February, 1947.

of the baby. This plate drains into a glass jar, of over 1 L. capacity, supported by a ring bracket attached to the delivery table. The amount of blood is visible at all times to the obstetrician. He should control bleeding and replace the loss when the amount exceeds 300 cc. Signs of hemorrhage do not appear immediately, and it is better to start administration of plasma, to be followed by transfusion if necessary, when the amount of blood lost is known rather than to wait for clinical evidences.

The following technic described by Davis and Boynton was used in conjunction with accurate measurement of blood loss in 430 cases. Immediately after delivery of the infant's head, the mother is given an intravenous injection of 1/320 gr. ergotrate (ergonovine). Before delivery of the shoulders there is a one minute pause during which mucus may be cleared from the infant's pharynx. The drug shortens the third stage of labor and lessens blood loss. The pause of a minute gives time for separation of the placenta while the cervix is held open by the infant's body. If delivery is completed too rapidly, the cervix closes down and placental retention results.

Average measured blood loss of 75 patients to whom ergotrate was not given until after the birth of the infant was 327 cc. Of the 430 patients for whom the Davis method was used, 46 who had blood loss averaging 554 cc. chiefly from laceration of the vagina or perineum were excluded. In the remaining 384 deliveries, blood loss resulting from placental separation and expulsion averaged 136 cc., almost entirely from the uterus.

Fourth Stage of Labor. Account of Physiology and Clinical Aspects of Postpartum Uterus during First Postplacental Hour. Emanuel M. Greenberg[9] (New York City) proposes that the first postplacental hour be considered a distinct phase of labor, so that its physiologic nature and clinical importance may be recognized and properly handled. Such recognition would reduce mortality from postpartum hemorrhage, which is assuming first place among causes of maternal mortality.

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(9) Am. J. Obst. & Gynec. 52:746-755, November, 1946.

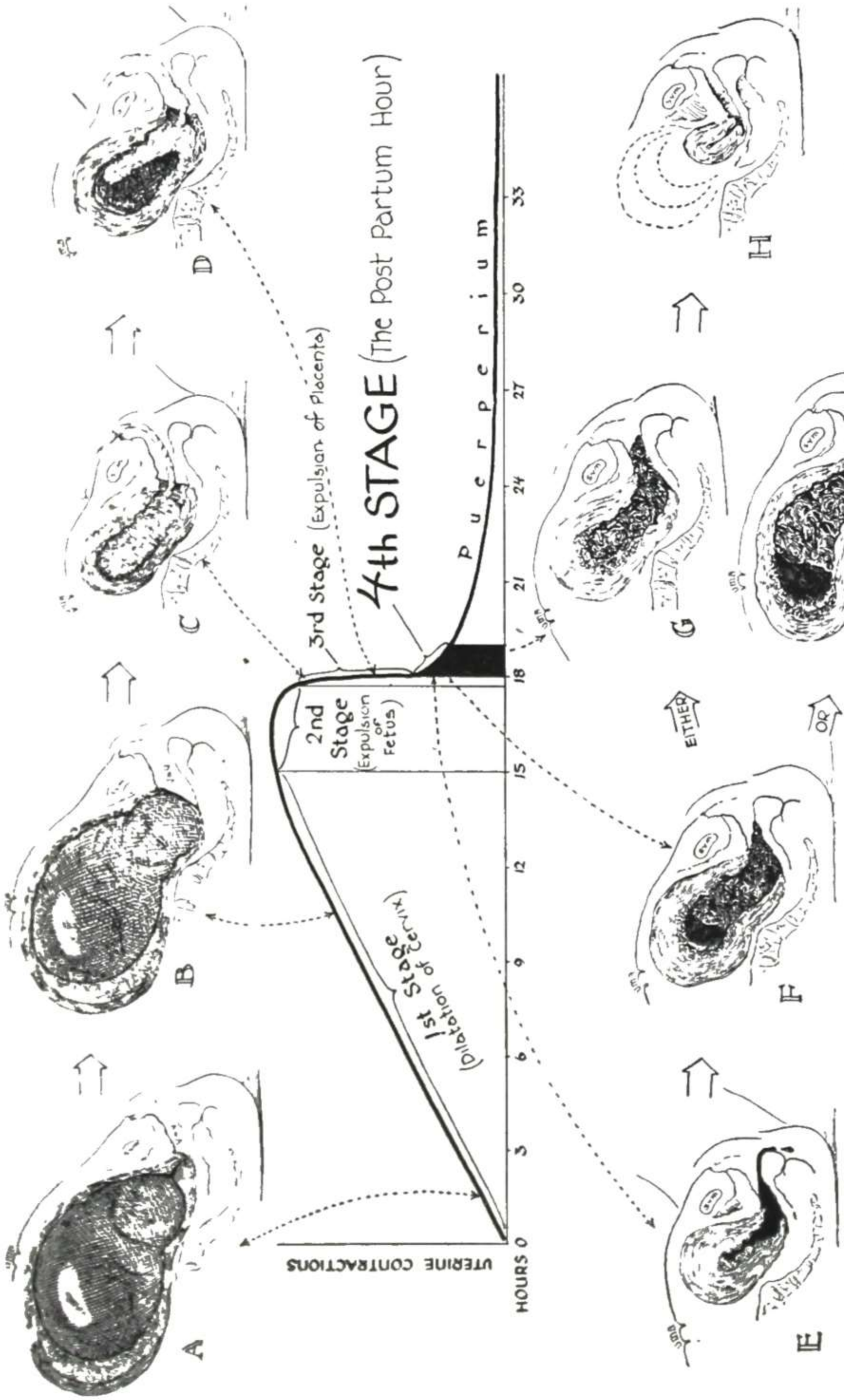

Fig. 20.—Stages of labor with special reference to postpartum hour as fourth stage of labor. (Courtesy of Greenberg, Emanuel M.: Am. J. Obst. & Gynec. 52:746-755, November, 1946.)

The fourth stage represents the tapering off of the actual process of labor (Fig. 20) and consists of two main parts, the contractile phase and the hemorrhagic phase. These phases are interrelated and inseparable. The contractile phase has four stages.

1. Uterine myotamponade. After the fetus is expelled the uterus contracts. As the placenta separates the uterus rises slightly and then contracts usually to a point halfway between the pubis and the umbilicus. Tamponade is achieved by compression, kinking and twisting of the uterine vessels enmeshed in the multiplaned arrangement of the myometrial whorls. This process is the first line of defense against postpartum hemorrhage.

2. Thrombotamponade. This stage results from the presence of thrombi in the large uteroplacental blood vessels and the intrauterine hematoma or hematomas with which the placental site may or may not be continuous. The tamponading hematoma is as important to the fourth stage of labor as the placenta is to the third and is the second line of defense against hemorrhage in the early postplacental period when the sinuses of the placental site are but freshly thrombosed and the stage of fixed contraction has not yet been reached. Myometrial contractibility and stimulation by pressure of the clot finally attain equilibrium, which may be called "myothrombal equilibrium."

In cases of strong and prolonged muscle contraction there may be little or no caval clot. But in cases of mild contraction due to atony the caval clot is highly important, and its integrity must not be impaired by uterine squeezing which results in its partial or complete expression.

3. Myouterine indifference. For at least one hour the uterus remains in a state of isotonicity, hypotonicity or hypertonicity and may transiently vacillate among the three. Alternating cycles of contractions and relaxations in this period are a tapering off of the cyclically expulsive process of labor. Frequent brisk massage with expression of clots results in temporary contraction, but often in secondary relaxation, and prolongs the stage of uterine indifference. Also, relaxation after stimulation occurs without benefit of the myothrombal check because the clots have been expelled.

The obstetrician has no way of determining the final

course which the vacillating postpartum uterus will take. He has but to gently palpate and stimulate the uterus with a force just less than that required for expression of clots and to watch, wait and observe.

4. Fixed myouterine contraction. The safe attitude is to assume that this does not occur for 10 days. However, in the normal fourth stage the uterus should be firmly and irreversibly contracted by the end of the first postplacental hour. Failure to achieve fixed contraction results in immediate possibility of hemorrhage.

In the normal postpartum hemorrhagic phase two main types of physiologic hemorrhage, traumatic and atonic, are manifested.

A, traumatic hemorrhage may be considered component 1 and is physiologic bleeding of clotting blood from the uterovaginal tract.

B, atonic hemorrhage, is component 2 and consists of hemorrhage associated with placental separation. Hemorrhage continues after the atonic rise of the uterus which follows placental delivery but before uteroplacental sinuses have begun to thrombose. Component 3 is the nonclotting component which is collectable up to 24 hours after delivery.

Greenberg presents the physiology of the fourth stage of labor as a basis for further physiologic and pathologic research, which will undoubtedly result in modifications of the present concept of the fourth stage of labor.

Placental Stage and Postpartum Hemorrhage. Wm. J. Dieckmann, Lester D. Odell, Victor M. Williger, Arthur G. Seski and Russell Pottinger[1] (Chicago Lying-In Hosp.) state that hemorrhage caused 30 per cent of maternal deaths in the United States in 1944 and 1945. Prevention of postpartum hemorrhage is easier than treatment. The authors' studies indicate that, patients with placenta praevia or abruptio placentae being excluded, proper conduct of the late second and early third stages of labor caused marked reduction in the incidence of postpartum hemorrhage due to uterine atony.

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(1) Am. J. Obst. & Gynec. 54:415-427, September, 1947.

The placenta normally begins to separate as the infant is born, and it can usually be expressed within one to three minutes after delivery. After a controlled study, the authors concluded that in most cases oxytocic drugs have no effect on separation or delivery of placenta. Slow delivery of the fetus seemed to be the factor which favored separation of the placenta. Separation and delivery of the placenta in over 95 per cent of anesthetized patients can be completed within six minutes after delivery with or without an oxytocic drug if the infant is delivered slowly. If no oxytocic is used during the second or third stage of labor in such patients, the amount of blood lost with the placenta is slightly increased and the blood loss after expulsion of the placenta is definitely increased. Therefore, anesthetized patients must be given an oxytocic.

All placentas should be manually removed at the end of 1 hour at the maximum and usually within 15 minutes. If there is hemorrhage, the placenta should be removed manually or expressed at once. In 90 per cent of 900 patients, the third stage lasted three minutes or less, and in 98 per cent of 2,000 patients, it was less than nine minutes.

Slow delivery of the infant is described as including a 30-60 second pause after the delivery of each shoulder, requiring a total of at least three minutes. The uterus is thus given time to contract and tear itself away from the placenta. Use of 1 unit of a solution of posterior pituitary extract or 0.2-0.4 mg. ergotrate is advised after delivery of the posterior shoulder if the physician is experienced in the use of this drug or after delivery of the placenta if he is not. Oxytocics are used to prevent bleeding rather than to promote separation of the placenta.

During the last six months of 1946, 1,159 patients were delivered by the house staff, with 1 unit of pituitary extract being given with delivery of the posterior shoulder. Incidence of postpartum hemorrhage (over 500 ml. blood) was 0.35 per cent as compared with 1.36 per cent

in 664 patients who were delivered by staff obstetricians.

If the placenta has been delivered intact and bleeding still continues from the uterus, the following treatment is recommended: (1) intravenous injection of ergotrate or pituitary solution is repeated; (2) the uterus is explored manually for an accessory placental lobe or tumors and to exclude rupture; (3) brisk massage of the uterus is done through the abdominal wall; (4) if bleeding continues despite these measures, the uterus is packed (this systematic treatment controls uterine bleeding from atony in almost all cases), and (5) after hemorrhage, the patient must be given 1,000-2,000 ml. saline solution by hypodermoclysis and blood in amounts more than sufficient to replace what was lost (minimum 1,000 ml.), which is always underestimated. Agents other than whole blood are stop-gap measures, and although the blood pressure increases and the patient improves, injection must not be repeated unless blood is also given.

Studies of postpartum hemorrhage occurring after the tenth day suggest that it may be due to faulty involution of the placental site resulting from ergotrate.

Over 2,000 patients have received pituitary extract in the present study and reactions attributable to the drug have not been recorded.

Late Postpartum Bleeding: Method of Prevention. Lochia rubra which persists more than seven days post partum is generally the result of retained secundines with subinvolution of the uterus or subinvolution of the uterus without retention of placental tissue. To decide whether placental tissue is retained, H. W. Erving and H. A. Power[2] (Pittsburgh) make a pelvic examination on the eighth or ninth postpartum day unless temperature shows a septic condition. The labia are widely separated and two fingers are introduced into the vagina, as close as possible to the symphysis to prevent breaking down the episiotomy. The anteflexed uterus is straightened with the outside hand; the second finger is introduced through the patulous cervix and the fundus is

(2) Am. J. Obst. & Gynec. 53:1019-1023, June, 1947.

pushed down so that the examining finger can explore the entire cavity. In practically all cases, a piece of tissue or a marked elevation on the uterine wall can be felt. With this confirmation, the patient is moved from her bed to the operating room the next day unless there is marked reaction to the pelvic examination. Under anesthesia, a placental forceps is introduced into the uterus; the tissue is grasped and removed with a twisting motion, and the uterine cavity is packed. Penicillin is given for 48 hours.

Intravenous Injection of Posterior Pituitary Extract in Treatment of Postpartum Hemorrhage Due to Uterine Atony is discussed by A. Ginglinger.[3] Intramuscular injection of posterior pituitary extract has proved useful in combating uterine inertia, but its action is too slow and not much superior to that of ergot. On the other hand, intravenous injection of pituitary extract is remarkably effective within 30 seconds. The injection must be made under general anesthesia lest it elicit pronounced vasoconstriction and shock. The objective of the anesthesia is to produce a superficial state of unconsciousness and diminish the patient's sensibility. A few drops of chloroform or a few whiffs of ether will accomplish this. Intravenous injection of pituitary extract produces marked pallor of the skin, which should not cause alarm since the rate and quality of the pulse remain normal.

In most instances, one injection of 5 I. U. pituitary extract is sufficient to initiate uterine contractions but, if necessary, the injection should be repeated immediately. In exceptional cases, atony may recur, with hemorrhage two hours after the injection. The treatment is then repeated without anesthesia, 10 units of pituitary extract diluted in 20 cc. physiologic saline being injected intravenously at the rate of 1 cc. per minute. Intravenous injection of pituitary extract may elicit complications in hypertensive patients. Hence such patients are given a preparation from which the pressor factor has been removed and in which only oxytocin is left.

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(3) Bull. med., Paris 61:307-309, July 21, 1947.

Ginglinger has used this method for the past 15 years and finds that the general aspect of the delivery room and obstetric wards has changed since then. The syndrome of acute anemia due to hemorrhage from uterine inertia has disappeared, puerperal morbidity has been reduced and secondary anemia and infections are rare. Intravenous injections of pituitary extract should be given only after the uterus has been evacuated. Intravenous injections of pituitary extract given before expulsion of the placenta will cause its retention. It is expedient always to examine the uterine cavity before giving the injection, even in the absence of retained placental remnants. Blood coagula adherent at the placental site affect the uterine contractility as unfavorably as retained cotyledons.

Late Postpartum Hemorrhage results most frequently from retention of placental fragments, according to Samuel A. Wolfe and Paul Pedowitz[4] (Jewish Hosp. of Brooklyn). Retained fragments may be spontaneously expelled, but recurrent episodes of bleeding usually require surgical intervention. Formation of placental polyps is infrequent. In the authors' series there were four cases of spontaneous expulsion; 31 patients required operative removal, and 2 had enmeshment or polyp formation.

The universal symptom of retained placental fragments is abnormal vaginal bleeding. The best gauge of the severity of blood loss is the patient's clinical state. Palpation of a fragment on digital exploration of the uterus is the only sure method of diagnosis; other physical signs are insufficient.

Treatment for retained placental fragment is surgical, and separation by the exploring finger is the method of choice. If this is unsuccessful, the curet or ovum forceps may be safely used. In febrile patients such measures are followed by moderate morbidity. Use of sulfonamides and penicillin before and after operation is indicated for both febrile and afebrile patients.

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(4) Am. J. Obst. & Gynec. 53:84-99, January, 1947.

Uterine factors as causes of late postpartum hemorrhage have not been sufficiently emphasized heretofore. Incomplete involution of the placental site is shown by poorly thrombosed veins which reopen and produce late secondary bleeding. In two patients such conditions were observed and were successfully treated by curettage.

Retention of abnormal amounts of decidua vera during separation of placenta and membranes causes a milder type of late postpartum hemorrhage. The authors observed three cases in which large masses of decidua were spontaneously expelled after an episode of bleeding. In two others, sizable decidual masses were found in the cervix before curettage.

Digital exploration of the uterine cavity is the first step in treatment. Only by this method can a retained placental fragment be discovered and removed. If no fragment is present, noninvolution of the placental site or separation of excessive amounts of decidual slough are the causes of the bleeding.

Method of Treating Massive Obstetric Hemorrhage. John Totterdale Cole[5] (Cornell Univ.) states that hemorrhage outranks all other single causes of maternal death in the United States. When loss of blood is not checked, hemorrhagic hypotension, if not treated, may progress rapidly to impending shock and the latter to irreversible shock from which recovery is impossible.

At New York Hospital the blood group and Rh type of all patients is determined on admission. If difficult delivery is anticipated, blood is cross-matched. Cesarean section is performed, with M/6 sodium lactate solution being given intravenously with a recipient transfusion set and 1 pt. compatible blood being held in the room for immediate use if necessary.

Although the volume of blood lost serves as a guide to treatment, it is not a good measure of the patient's condition and frequently does not affect the final outcome. It is important that the control of hemorrhage should be rapid, effective and atraumatic. The longer a

(5) J. A. M. A. 135:142-144, Sept. 20, 1947.

patient is in a state of shock, the more difficult is treatment. Alkalis delay the onset of irreversible shock and also combat transfusion reactions which might occur when multiple transfusions are given. A small bank of 2 pt. type O, Rh-negative, citrated whole blood which has been treated with Witebsky blood-group-specific substance to eliminate anti-A and B factors should be kept on hand at all times for immediate emergency use.

When a patient is in shock, the ordinary drip method of transfusion is unsatisfactory. If recovery is to occur, at least 40 per cent of the total blood lost should be replaced during the first hour after the initial hemorrhage. Rapid treatment should not be stopped until there has been a definite blood pressure response. Thereafter blood may be given by the usual methods until there has been 100 per cent. or more replacement. With a simple pressure mechanism and maintenance of 120 mm. Hg pressure, 500 cc. blood may be given in 2-5 minutes with a 15 gauge needle.

Since the method was adopted, no deaths from hemorrhage have occurred during 3,600 major and 3,900 minor gynecologic operations. On the obstetric service one death due to hemorrhage occurred in 14,000 deliveries. While the method has been in use there have been 250 postpartum hemorrhages, with loss of 600 cc. or more blood.

Postpartum Hemorrhage and Shock is responsible for the largest proportion of maternal deaths. According to Robert D. Mussey[6] (Mayo Clinic), ideal conditions for prevention of postpartum hemorrhage include adequate prenatal care, conservative management of labor and its third stage in an adequately equipped hospital, hemostasis and replacement of loss of blood volume.

Adequate prenatal care must include examination of the blood, treatment of anemia if present, correction of nutritional deficiencies, early recognition and treatment of toxemia, pelvic mensuration and estimation of the adequacy of the birth canal.

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(6) J. M. A. Georgia 36:251-258, July, 1947.

Careful management of labor requires that exhaustion of the patient be prevented or relieved by use of sedatives to give periods of rest and by intravenous administration of glucose, with or without saline solution depending on whether or not toxemia is present. Excessive analgesia and anesthesia should be avoided. Ill advised operative procedures in the second stage are responsible for many instances of severe postpartum hemorrhage. During the third stage, caution demands close observation of the amount of bleeding and of the state of the uterine fundus from the time of delivery to the primary contraction and retraction of the uterus accompanying separation of the placenta. The placenta should be inspected carefully and oxytocic drugs given the patient to accelerate and accentuate uterine contraction.

In the management of postpartum hemorrhage the first consideration is to control the bleeding, the second to replace lost fluid and the third to treat shock and anemia. The patient should be given as much fluid intravenously as the amount of blood she has lost. Administration of normal saline solution (except in the presence of toxemia) or 5 per cent solution of glucose should be followed quickly by administration of properly selected whole blood. Sufficient blood should be given to maintain the concentration of hemoglobin at about 10 Gm. per 100 cc. blood.

Prevention and Treatment of Postpartum Hemorrhage are outlined by Wm. J. Dieckmann, V. Williger, L. D. Odell and A. Seski[7] (Univ. of Chicago). Since slow delivery of the fetus is the factor which favors normal separation of the placenta, the recommended procedure is as follows: the anterior shoulder is delivered; a wait of 30 seconds is made; the posterior shoulder is delivered; 0.1 ml. solution of posterior pituitary extract (1 ml. pituitary extract or pitocin plus 9 ml. saline solution) is given; a wait of 30 seconds is made, and the infant is slowly delivered. In the authors' series average delivery time for multiparas given gas with pains was 4½ minutes

(7) Mississippi Doctor 25:31-36, June, 1947.

and that for primiparas under anesthesia, 3½ minutes.

Persistence of a globular uterus is the signal for expression of the placenta by the Pastore technic, with slight traction on the cord once the placenta is in the vagina. All placentas are removed manually if necessary at the end of one hour (maximum) and usually within 15 minutes. If there is hemorrhage, the placenta is expressed or removed manually at once.

Use of this technic in over 600 cases was accompanied by a third stage of three minutes or less in 90-92 per cent and less than nine minutes in 98 per cent. Incidence of hemorrhage of 300 ml. or more was decreased and hemorrhage of 500 ml. or more was practically eliminated.

If the placenta has been delivered intact and bleeding continues, the following treatment is given: (1) Intravenous injection of ergotrate or pituitary extract is repeated. (2) The uterus is explored manually for an accessory lobe and to exclude rupture. (3) The uterus is briskly massaged through the abdominal wall. (4) Packing of the uterus is done if bleeding continues despite treatment. This treatment controls uterine bleeding from atony in almost all cases.

During and after hemorrhage the patient must be given 1,000-2,000 ml. saline solution by hypodermoclysis and blood in amounts more than sufficient to replace what was lost (minimum 1,000 ml.), which is always underestimated.

Periodic hemoglobin or hematocrit determinations should be made.

Prolonged Labor, with Special Reference to Postpartum Hemorrhage. L. D. Odell, J. H. Randall and G. W. Scott[8] (State Univ. of Iowa) studied 422 cases of prolonged labor and found that uterine inertia was the principal cause, whereas cephalopelvic disproportion and abnormal fetal presentation accounted for only 13.5 per cent of cases.

In uterine inertia, both myometrial contraction and

(8) J. A. M. A. 133:735-739, Mar. 15, 1947.

retraction are at fault. Prolongation of labor is probably due to lack of proper retraction of the lower segment. Contraction and retraction evidently combine to produce placental separation and expulsion from the uterus. Retraction of the subendometrial muscle layers is particularly important in the control of bleeding.

Postpartum hemorrhage was more frequent after prolonged labor than after labors of normal length in this series. In many cases hemorrhage was due largely to prolonged anesthesia and the trauma of operative delivery. After nonoperative deliveries bleeding was on the basis of postpartum uterine atony.

Prophylaxis against a tendency to bleed requires careful conduct of the third stage and early use of oxytocic drugs. In the presence of atonic bleeding, massage and oxytocics usually produce adequate retraction. Liberal and early use of fluids and whole blood is demanded when abnormal loss of blood occurs.

Analysis of Deaths from Postpartum Hemorrhage was made by Clayton T. Beecham[9] (Philadelphia). He believes that of the 168 deaths, 105 (62.5 per cent) were preventable by the physician, 16 (9.5 per cent) preventable by the patient and 47 (28 per cent) nonpreventable. One of the glaring omissions was good antepartum care, especially in diet instruction as a means of physically conditioning the patient for labor. An integral part of nutrition is the blood picture, and most of the charts carried no notation as to the blood count during the antepartum period. When a blood count was done, no follow-up studies were made. There was almost total disregard of the necessity of combating anemia in pregnancy to prevent postpartum hemorrhage. Another factor in the prophylaxis of hemorrhage is routine typing of all antepartum patients; this too had often been omitted.

There was little evidence that measures were used during labor to combat fatigue and exhaustion as prophylaxis against hemorrhage. Poor choice and use of anes-

(9) Am. J. Obst. & Gynec. 53:442-452, March, 1947.

thesia was another contributing factor. Errors in the management of the third stage included leaving this stage to an inexperienced person, continuing inhalation anesthesia through this stage even though the patient was bleeding excessively, and not constantly palpating the uterus or holding the fundus. Other errors were allowing the placenta to remain in the uterus while the patient bled to death, not treating inversion of the uterus, failing to carry out the minimum one hour period of close observation after delivery of the placenta and failing to treat energetically patients bleeding abnormally after the placenta was delivered.

There were 75 instances of bleeding from an atonic uterus. The uterus was atonic in most cases because of multiple factors, ranging from inadequate antepartum care to poor choice of anesthetic. In placenta praevia, the physician usually forgot that he was dealing with an area in the uterus that lacks contractile power. In all such cases packing should be done whether the patients are delivered vaginally or by cesarean section.

In most cases, treatment was far from ideal. Failure to use oxygen, lack of uterovaginal packing and inadequate use of blood transfusions were noted.

Manual Removal of Placenta: Report of 410 Cases with One Death; 150 Done As Routine or Prophylactic Measure. Harry W. Mayes[1] (Methodist Hosp., Brooklyn) believes that the low death rate (1 death, a morbidity of 7.6 per cent) may be explained by the routine use of vaginal antiseptics during labor and at delivery and by the fact that manual removal of the placenta was carried out within 20-30 minutes after delivery in the majority of cases.

Manual removal of the placenta is not recommended as a routine procedure. However, if it were done more often and patients were not allowed to bleed or were not subjected to repeated attempts at the Credé maneuver, mortality and morbidity from the procedure would be greatly reduced.

(1) West. J. Surg. 55:483-490, September, 1947.

Manual Removal of Placenta: Benign Procedure. C. Wesley Sewall and Donald Coulton[2] (Boston Univ.) review 45 consecutive cases. They attribute the considerable improvement in results over those reported by others to the fact that the procedure was done early, while the patient was still in good condition.

Blood loss was the indication for removal in 82.2 per cent of cases. Falling blood pressure or steady (even if not profuse) loss of blood was sufficient indication for removal provided the placenta could not be delivered by the usual methods. Profuse blood loss at any time, even immediately after delivery, was an indication for immediate manual removal as a prophylactic measure. Average blood loss was estimated to be 350 cc.

Retention of the placenta was the indication in 17.8 per cent. In cases without blood loss, 45 minutes was the average time the authors found it wise to wait for separation to occur. If gentle suprafundic pressure 25 minutes after the end of the second stage did not result in delivery of the placenta, an extremely gentle application of the Credé method was used. This was not repeated more than twice in the next 20 minutes. Manual removal was done if these measures were unsuccessful.

Most deliveries were aided by episiotomy, and repair was completed except for tying final knots or burying suture ends. If manual removal became necessary, it was accomplished without damage to the repair. A sterile Western strip was always at hand for uterine packing if necessary. Ergotrate was withheld until delivery of the placenta was accomplished, when 1/320 gr. was given intramuscularly. In the presence of atonicity or continued oozing of blood, a tight uterine pack was inserted. Transfusions and fluids were given intravenously as indicated, but the authors found that early manual removal before the patient entered a state of borderline shock obviated their routine use.

None of the authors' patients died. Elevation of temperature, attributable to pre-existing infection, occurred

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(2) Am. J. Obst. & Gynec. 52:564-573, October, 1946.

in one case. Manual removal did not increase the length of hospitalization. Uterovaginal packing was done in five cases (11.1 per cent). The packing was removed 24 hours later, and in no case was second packing necessary. Chemotherapy was started at once and continued until the temperature remained normal for three days. Although slight fever often occurred toward the end of the 24 hours, temperature returned to normal immediately after the pack was removed. No case of true shock occurred. Three cases of subclinical shock characterized by rapidly falling blood pressure were encountered.

The authors believe that morbidity and mortality due to manual removal of the placenta arise not from the procedure but from associated blood loss, shock and delay, which permit infection to supervene. Whenever steady blood flow occurs, manual removal should be considered.

[Nearly everyone now agrees that excessive loss of blood is the most frequent cause of maternal deaths. This is regrettable and at the same time hopeful, because in a large proportion of cases the fault lies with the attending physician. In other words, in most instances serious hemorrhage, especially postpartum hemorrhage, is preventable. Considerable loss of blood is due to many factors, including excessive inhalation anesthesia during delivery which causes undue relaxation of the uterus, the injudicious use of oxytocics resulting in tears, clumsy operative procedures leading to lacerations, interference before complete dilatation of the cervix with resultant extensive tears, unnoticed steady bleeding from perineal lacerations or an episiotomy wound, manhandling of the uterus in an effort to separate and express the placenta and delay in removing the placenta when the patient is bleeding excessively.

As has been said time and again, prevention is the best way to treat postpartum hemorrhage. Serious postpartum bleeding is not common when conservatism is practiced. Bleeding must not be permitted to continue from any source without an effort to check it. This is especially true of perineal lacerations and episiotomy wounds. Few physicians realize how much blood is really lost from these wounds. In 1922 I witnessed the death of a woman from bleeding from an episiotomy wound. The physician made the perineal incision without examining the patient vaginally. When he attempted to deliver the baby he found the cervix incompletely dilated. He sat down and waited for complete dilatation, and in spite of suggestions from the internes about the steady trickle of blood from the episiotomy, he disregarded these hints until the patient died from loss of blood. In my own practice, in delivery by forceps, I do not make the episiotomy incision until *after* I have applied the forceps to the head.

In treatment of postpartum hemorrhage, pituitary extract and ergot preparations are essential. The quickest results are from intravenous injections, although I do not like to inject pituitary extract into a vein. If the placenta is still in the uterine cavity when a patient bleeds profusely, there should be no delay in removing it, but it must be taken out in one piece. Most physicians wait entirely too long before they remove a placenta from a bleeding uterus. I consider Credé manipulations highly dangerous and I also gave up using intrauterine packs long ago. I resort to transabdominal injection of pituitary extract when bleeding is serious. In rare cases, hysterectomy is indicated, and it requires fine judgment and courage to decide on this course, especially if the patient is young. But sometimes hysterectomy is the only way to save a life. Of course, before this is done, the uterine arteries should be clamped or tied off through the vagina, but this does not always stop bleeding and care must be exercised to avoid the ureters. A uterus which does not respond to intramuscular oxytocics, removal of the placenta, massage, intravenous oxytocics and clamping of the uterine arteries (and hence must be removed) nearly always shows pathologic changes histologically. Reist (Gynaecologia 122:299, November, 1946) removed such a uterus and found multiple areas of degeneration and necrosis in the muscle tissue and also striking dilatation of the uterine veins and capillaries. In 1910 Labhardt showed that these changes in the myometrium and in the vascular system were the basis for atonic postpartum hemorrhage.—Ed.]

Management of Placenta Praevia at Chicago Lying-In Hospital. M. Edward Davis and Alice Campbell[3] base their report on experience in 325 cases during 1931-45. The condition occurred in 0.79 per cent of 40,961 deliveries and accounted for 15-20 per cent of all maternal deaths.

All patients who have vaginal bleeding late in pregnancy are hospitalized for examination, diagnosis and treatment. With compatible blood available and preparations for delivery complete, the patient is examined vaginally. The state of the cervix is determined and the presence of placenta over the os and the extent of coverage noted. If the os is free of placenta, the adjacent walls of the lower uterine segment are carefully explored for a low lying placenta. Fetal position is now determined and the state of the soft parts and size of the pelvis are noted.

When the diagnosis has been established, termination of pregnancy is indicated. The initial management of

(3) Surg., Gynec. & Obst. 83:777-788, December, 1946.

placenta praevia is directed toward control of further bleeding and delivery by the most conservative procedure consistent with safety. Although many babies have not reached the stage of viability when bleeding occurs, delivery is indicated because continuation of pregnancy is hazardous for the mother. Primary risk of hemorrhage can be combated by keeping the patient in a hospital where blood is readily available. However, the increased hazard of infection in the presence of vaginal bleeding is still difficult to overcome. Prophylactic use of the new antibiotics may some day alter the present routine.

Rupture of the membranes alone or combined with some other procedure was the initial treatment to control bleeding and institute labor in 197 patients (60.6 per cent). Cesarean section was the initial treatment in the remainder.

Complete placenta praevia is treated by cesarean section because the procedure offers the best prognosis for baby and mother. Section is indicated in incomplete placenta praevia when serious blood loss has occurred, when the cervix is long and uneffaced, in primiparas nearing the end of the reproductive period and in patients with pelves of even doubtful adequacy. Laparotrachelotomy is the operation of choice because bleeding can be controlled and the placental site thoroughly inspected.

In most instances incomplete placenta praevia can be so managed that vaginal delivery can be completed. With a partially effaced cervix and patulous os, the membranes are ruptured. Besides inducing labor, this procedure controls bleeding in most patients because the placenta is allowed to remain attached to the lower segment as retraction progresses and the presenting part creates pressure on the placenta. Scalp traction by Willett's method is effective for control of bleeding when it persists after membrane rupture.

Cesarean hysterectomy is reserved for patients with potential or obvious infection in whom termination of reproduction is no great loss. Extraperitoneal operations,

such as the Water's procedure, are of questionable value because the abnormal location of the placenta leads to increased vascularity of the lower uterine segment and bladder.

Some accepted methods of treatment for placenta praevia have no place in the modern hospital. Use of tamponade, colpeurynter and Hick's version should be abandoned.

In the third stage of labor after vaginal delivery, the abnormal location of the placenta may lead to incomplete separation and continued bleeding from sinuses in the lower uterine segment or from trauma. Intravenous administration of ergonovine at least 30 seconds before the baby is delivered expedites placental separation. If separation is delayed in the presence of bleeding, manual removal of the placenta should be carried out. Continued bleeding after delivery of the placenta calls for careful exploration of the uterine cavity, lower uterine segment and vagina for retained fragments or trauma. It may be necessary to control bleeding from the placental site by uterine pack. If severe bleeding continues despite these measures, hysterectomy is indicated. In the authors' patients manual removal of the placenta was indicated in 36, uterine tamponade to control continued bleeding in 15 and hysterectomy in 5.

Treatment of Placenta Praevia is evaluated by John Chesterman[4] (Sydney) on the basis of results in 225 cases, in which maternal mortality was 0.9 per cent and fetal mortality 53 per cent.

When watchful expectancy is possible, the infant has a chance of attaining reasonable maturity. However, the patient must be in a hospital, where treatment can be given at a moment's notice. Vaginal examination should be made only when hemorrhage makes it imperative and then only with preparations in readiness to treat whatever condition is found. In 49 patients so treated there were 22 fetal deaths, results being best in the lateral type of placentation (9 deaths in 30 cases).

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(4) M. J. Australia 1:293-297, Mar. 8, 1947.

When the fetus is dead or is alive and reasonably mature, the uterus should be emptied as soon as the patient's condition permits. The following methods were used.

1. Artificial rupture of the membranes when the patient was in labor and the placenta was not lying centrally was used in 19 cases, with 9 fetal deaths.

2. Willett's forceps can be applied to the scalp through a cervix dilated to admit one finger. Fetal mortality was high (21 deaths in 32 cases) when this procedure was used.

3. Plugging with the half-breech to control hemorrhage was accompanied by an extremely high fetal mortality (43 deaths in 47 cases). This method should not be used unless the fetus is nonviable or dead or in an emergency to control severe hemorrhage.

4. Cesarean section gives the best results for the infant and in this series was safe for the mother. The classic operation was used in almost every case, 70 patients being operated on, with 18 fetal deaths.

Management is summarized as follows.

1. If the baby is alive and hemorrhage does not require active treatment, an expectant attitude may be followed, the patient being kept in bed.

2. If hemorrhage indicates active treatment, vaginal examination should be made in the operating room with preparations made for immediate treatment.

3. If the infant is alive and reasonably mature, cesarean section is justified under the following conditions: (*a*) if the placenta praevia is central, (*b*) if severe hemorrhage is present, the cervix closed and labor pains absent, (*c*) if the patient is a primigravida in the last childbearing years, (*d*) if the patient is a primigravida with lowered fertility and (*e*) in some cases, if the placenta praevia is marginal and is situated on the posterior wall. In this last instance, the thickness of placenta over the promontory of the sacrum is likely to interfere with the descent of the head which does not so easily compress the bleeding point.

4. If the placenta is not over the internal os and the patient is in labor, the membranes should be ruptured.

5. Marginal placenta praevia associated with the dilation of a multiparous cervix may be treated by application of Willett's forceps or by version and the bringing down of a leg. However, both methods are associated with a high fetal mortality rate.

Statistical Study of Cases of Placenta Praevia Occurring in Jewish Hospital from 1935 to 1946. Isidore Daichman and William Pomerance[5] (Brooklyn) report a fetal mortality of 25.8 per cent and a maternal mortality of 0.6 per cent in 165 cases of placenta praevia. Cesarean section was performed on 98 patients and transfusions were given to 43. In a report of 283 cases of placenta praevia made 10 years ago, fetal mortality in this hospital was 46.3 per cent and maternal mortality 5.3 per cent. The authors attribute the improvement to more frequent use of blood transfusions and delivery by cesarean section or by simple rupture of membranes, in preference to use of the hydrostatic bag and vaginal manipulations. They favor use of gentle vaginal examination done aseptically, with the operating room ready for possible cesarean section. In addition, they believe that it is safe to temporize when the fetus is nonviable or near-viable if the institution is well equipped, the patient under careful supervision and blood loss replaced.

[There are only two satisfactory ways to treat placenta praevia: rupture of the membranes and cesarean section. In cases where bleeding is not profuse, simple rupture of the bag of waters will suffice, although in some cases this must be combined with traction on the scalp by means of a Willett or other grasping forceps. Where bleeding is profuse with placenta praevia, cesarean section should be done even if the baby is nonviable, dead or a monster. In such cases the operation is done solely for the sake of the mother. Blood transfusion is, of course, necessary in all cases of serious bleeding and at least as much blood should be given as was lost. It is foolish to give only 500 cc. blood if a patient has lost 1,000 cc. or more. Whenever blood is given, one must automatically think not only of the patient's blood group, but also of her Rh status.

I hope that every physician knows that whenever placenta praevia is suspected, a rectal examination should never be made and vaginal examination should be made only in a delivery or

(5) Am. J. Obst. & Gynec. 53:1024-1028, June, 1947.

operating room with sterile preparations for temporary control of bleeding at hand.—Ed.]

Two Cases of Inversion of Uterus, Treated by Anterior Abdominal Vaginocervical Hysterotomy (Author's Technic). On reviewing the various methods of treatment of inversion of the uterus, Julián Ocejo[6] finds that they can be grouped under two headings: (1) taxis, or forceful manual single stage replacement method, whereby the uterus is pulled through the constricting ring and the cervix, with an incomplete incision or no incision and (2) vaginocervical hysterotomy, consisting of an incision extending from the vagina to the body of the uterus and completely dividing the constricting ring and the cervix. Reduction is carried out in two stages: (1) reposition of the uterus from the vagina into the abdomen and (2) reinversion of the inverted uterus. Ocejo lists the various technics used in the repair of acute, subacute and chronic inversion and reports two cases of chronic inversion in which he used his own technic through the abdominal approach. One of the patients subsequently had five deliveries. The advantages of his technic are good results whenever the condition of the uterus permits conservative surgery, easy and rapid execution, absence of hemorrhage, the ease with which a firm ligamentopexy can be performed to prevent retroversion and recurrence, and reduced risk.

TECHNIC.—The constricting ring is raised with two Allis clamps; with a knife, the vesicouterine peritoneum is cut from one round ligament to the other. The peritoneum and the bladder are thereby freed from the anterior wall of the vagina, as in Wertheim's panhysterectomy. Scissors are introduced into the infundibulum and the cervix and adjacent portions of the vagina and the body are divided longitudinally in the midline, the finger is introduced into the infundibulum and the body of the uterus is pulled into the pelvis. After the corpus has been replaced in the pelvis, reinversion of the uterus is done with the fingers. The cervix is sutured first, then the body, and last the vagina. A small drain is inserted into the vagina. The entire denuded surface is covered with the vesicouterine peritoneum. Doleris-Gilliam ligamentopexy is now performed.

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(6) Rev. med. cubana 58:427-445, June, 1947.

Ocejo concludes that taxis continues to be the method of choice in acute inversion, hemorrhage being the chief indication. It is contraindicated in shock or infection. If taxis is unsuccessful and hemorrhage continues, anterior abdominal vaginocervical hysterotomy should be tried. When there is no hemorrhage, expectant treatment is justified. Immediate reduction with instruments or continued pressure with instruments or bags does more harm than good, whereas gauze packs are advisable for their protecting effect rather than for their reducing action. Chronic inversion of the uterus always requires surgical intervention, the safest, easiest, most harmless and rational operation being the anterior abdominal vaginocervical hysterotomy. Crossen-Gilliam ligamentopexy insures protection against retroversion recurrence, infection and complications during subsequent pregnancies and deliveries. Infection constitutes a contraindication to manipulation or operation. Hysterectomy is at times unavoidable in cases of gangrene or grave infection of the uterus. Ocejo's technic eliminates incidental hysterectomies. Blood transfusion is the most efficient therapeutic measure in inversion of the uterus. Plasma, solutions given intravenously, stimulants, heat, morphine and antishock remedies should be given when required, without waiting for the report on blood compatibility. Use of sulfonamides and penicillin decreases the danger of infection and widens the indication for use of the abdominal route.

[H. Rocamora, R. Renach and A. W. Esparza (Rev. cubana de obst. y ginec. 8:3-10, Jan.-June, 1947) reported a case operated upon successfully by Ocejo's method. Recently Ocejo wrote me of two more cases treated by his operation at the University of Cuba Hospital. D. F. Kaltreider and G. B. West (Bull. School Med. Univ. Maryland 31:144-149, April, 1947) report ten cases of acute inversion of the uterus, two of which were observed at cesarean section. These authors recommend immediate replacement, but if the patient is in shock when the diagnosis is made, the shock should be treated first.—Ed.]

General

Hormones and Lactation: Dried Thyroid Gland. Margaret Robinson[8] (London) studied 332 mothers who failed to establish lactation in the puerperium. Of these, 78 were used as controls, 194 were treated with dried thyroid gland and 60 were treated with thyroxine. Daily injections of crude ox anterior pituitary extract caused no greater increase in daily output of breast milk than injections of normal saline. When dried thyroid gland was given, output of milk increased. As the dose of thyroid increased the number of resistant cases decreased.. When thyroid medication was stopped, output of milk fell off. Under thyroxine therapy, the same course of events was noted. Lugol's solution produced an increase in the output of breast milk. However, no information is available as to the production of milk after cessation of iodine therapy. In this series none of the mothers showed signs of thyroid deficiency. The extra load produced by lactation apparently reveals the deficiency. The daily dose of dried thyroid gland necessary for optimum production of milk varies, but few patients require more than 12 gr. per day.

[The same author (Brit. M. J. 2:126-128, July 28, 1947) believes that failure to establish a satisfactory milk output is apparently due to two deficiencies, estrogens and iodine. If both deficiencies are present at the same time, the estrogens must be given first. The sign of estrogen deficiency is lumpy breasts with a thick yellow secretion that is difficult to express. The sign of an iodine deficiency is soft empty breasts with a scanty secretion of milk. In 20 cases of failure of lactation, Lugol's solution increased the daily output 300 per cent.—Ed.]

Early Puerperal Rising is discussed by Arthur G. King[9] (Cincinnati). The success of early ambulation for general surgical patients suggested a study of its effect in 221 patients with uncomplicated parturition. Contraindications to a regimen of early exercise and activity included general medical or surgical conditions, toxemia, severe anemia, loss of over 500 cc. blood at

(8) Lancet 2:385-387, Sept. 13, 1947.
(9) Am. J. Obst. & Gynec. 52:657-660, October, 1946.

the time of delivery and any unusual circumstance of labor favoring infection. Use of forceps or episiotomy was not a contraindication.

The patient stood for one minute the first day post partum, sat in a chair for five minutes the second day and did abdominal exercises in bed and sat up twice for five minutes the third day. On the fourth day she did knee-chest exercises and sat up twice for 30 minutes. She walked about and had toilet privileges on the fifth or sixth day, took a shower on the seventh day and was discharged from the hospital on the eighth day when desired or necessary.

The incidence of complications, subinvolution, prolonged lochia rubra, episiotomy breakdown, infections and uterine retroversion was not greater than that in women treated puerperally with bed rest for six to seven days and hospitalization to the tenth day.

King believes that early puerperal rising in uncomplicated childbirth is desirable and without danger or unfavorable sequelae. The women have a sense of well-being and are benefited psychologically during the puerperium. Furthermore, their attitude toward the entire episode of pregnancy is improved. They are prepared by the regimen of increasing activity to leave the hospital by the eighth day post partum, and their convalescence at home is shortened considerably.

Early Ambulation in Practice of Obstetrics was used by E. Cullen Bryant[1] (Toronto) in 125 patients selected at random, and the results were compared with those in a control group of 125 patients. The postpartum care for the two groups did not differ essentially.

The most striking result was in the occurrence of bowel movements. Among early risers, 102 had a bowel movement before the fourth postpartum day and only 23 required enemas or oil, whereas only 43 late riser had a voluntary bowel movement before the fourth day and 79 required oil.

Involution was definitely better among early risers

(1) Canad. M. A. J. 57:257-259, September, 1947.

Early rising resulted in more rapid and comfortable convalescence with less asthenia and postpartum depression. However, if early rising is to be undertaken, it is important that the patient walk, not sit. The optimum time is 24-36 hours post partum. After three or four days, few benefits are obtained, and it is better to keep the patient in bed.

Further Studies in Early Puerperal Rising are reported by Gordon Rosenblum and Eugene Melinkoff[2] (Los Angeles). Of 601 women, the 490 who were made ambulatory on the first or second postpartum day showed obvious benefit. Bowel function was definitely improved. No wound breakdown occurred. The belief that early puerperal rising may increase the incidence of retroversion of the uterus was not confirmed in these patients. The authors believe that the present series further substantiates their earlier conclusions that early rising is safe, improves bowel function, reduces the need for nursing care and is viewed favorably by patients. Patients getting up on the third or fourth postpartum day are no better off than those getting up on the first or second. Early puerperal rising promotes rapid and comfortable convalescence.

[All the papers I have read on early rising after delivery point out advantages of this procedure. I have seen no articles which condemn early ambulation. I have followed a large number of private patients for many years and am still enthusiastic about getting patients out of bed even on the first day following vaginal or abdominal delivery, if they cannot urinate spontaneously. Early rising definitely decreases the need for catheterization following delivery or operation.—Ed.]

Puerperal Gynecology: Report of 30 Years' Experience with Gyneplastic Repair Operations Immediately after Childbirth. Jacob L. Bubis[3] (Cleveland) cites his case records over this period as indisputable proof in refuting charges which have been made against the advisability of gyneplastic repair immediately after childbirth. Hemorrhage and infection can be avoided by careful technic and by observing the same aseptic and

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(2) Am. J. Obst. & Gynec. 54:325-328, August, 1947.
(3) Ibid. 53:787-795, May, 1947.

antiseptic precautions as in any major surgical operation. It has been claimed that it is impossible to differentiate between temporary and permanent disturbances immediately after delivery, but any gynecologist who is also an obstetrician can determine in which cases the relaxation is temporary and in which it is permanent. The lochia does not interfere with healing unless infection is present or the sutures are so tight as to obstruct circulation and cut tissues or interfere with drainage.

Repair of the cervix is the most important feature of puerperal operations. Any new lacerations, regardless of size, extent and number, should be repaired. Other types of immediate puerperal operations are those for cystocele, lacerations of the vaginal walls, rectocele and hemorrhoids. Morbidity and mortality in the series reported were lower than those reported by institutions in which gyneplastic operations were not performed during the puerperium. Since 1930, no maternal death could be attributed to a repair operation. Advantages to the mother are improved general health, saving of time and money, prophylaxis against subsequent disabilities and probable protection from cancer in later life.

[Bubis has advocated repair operations immediately after delivery for many years. Despite his large number of cases and the good results obtained, relatively few obstetricians do immediate postpartum repair of old lacerations. Why?—Ed.]

Postpartum Treatment of Old Perineal Lacerations. M. Lacomme[4] points out that the general tendency is not to repair an old perineal laceration immediately after childbirth. The arguments given for this point of view are that the relaxed soft tissues lend themselves poorly to proper repair, their greatly increased vascularization results in oozing of blood and hematomas, and the lochia infiltrate the sutures and cause their disruption. However, Lacomme's own experience with a simple method of repairing old perineal lacerations proved satisfactory. The principles of his technic are summarized briefly. Operation is performed immediately after delivery. The rectovaginal septum is divided, and the perianal tissues

(4) Bull. med., Paris 61:313, July 21, 1947.

are approached en masse and united in the midline by means of two U-shaped sutures. Approximation of the retracted levator ani muscles and suturing of the vaginal mucosa and of the skin are done. During the postoperative period, the vulva is kept as dry as possible, the vagina is amply sprayed with sulfonamide powder, and the patient is kept constipated for eight days.

In two of the three cases in which this operation was done, healing was rapid and functional results, in respect to sphincter action and relief obtained, were excellent. In the third patient, return to normal function was slow, but almost perfect sphincter action was restored within six months. Lacomme believes that if the obstetrician's attitude were less passive during the postpartum period, many a prolapse could be prevented. In many patients, especially multiparas with a gaping vulva and retracted levator ani muscles, and thus with potential prolapse, repair should be performed post partum.

Time for Postpartum Sterilization: Report of 150 Cases, Bacteriologic Studies on Postpartum Uterus. Frank E. Whitacre (Univ. of Tennessee) and Walter M. Loeb, Jr., and Laura Loeb[5] (Peiping Union Med. College) advocate sterilization from one to two hours after spontaneous delivery, when the period of probable postpartum hemorrhage is over and the period of probable infection has not yet begun. The Madlener technic (Figs. 21-23) was used in 50 cases at Peiping Union Medical College (group 1) and in 100 cases at Tennessee College of Medicine (group 2). The average hospital stay was 13 days in group 1 and 9 days in group 2. This figure compares closely with average obstetric hospitalization. There was no mortality, thrombosis or embolism in either group. The standard approved by the American Committee on Maternal Welfare determined morbidity in group 1 as 12.5 per cent and as 6 per cent in group 2. One postoperative complication, wound infection prolonging hospitalization to about three weeks, occurred in each group.

(5) Am. J. Obst. & Gynec. 52:1041-1053, December, 1946.

Advantages of early postpartum sterilization are that it is simple, safe and relatively bloodless. The operation performed even 10-15 days after delivery must be con-

Fig. 21 (top).—Index finger is inserted into abdominal cavity and over round ligament through 1½ in. subumbilical incision. Uterus is rotated to bring fallopian tube into incision.
Fig. 22 (bottom left).—Fallopian tube is elevated with Allis forceps and crushed with heavy clamp.
Fig. 23 (bottom right).—Clamp is replaced by heavy silk ligature.
(Courtesy of Whitacre, Frank E.; Loeb, Walter M., Jr., and Loeb, Laura: Am. J. Obst. & Gynec. 52:1041-1053, December, 1946.)

siderably more extensive, thereby increasing the risk. The necessity of performing cesarean section is eliminated. Future hospitalization is avoided and postpartum hospitalization prolonged but slightly, if at all. Development of infection or failure to sterilize are mostly, but

not entirely, the result of poor selection of cases and errors in technic.

To determine time of bacterial invasion of the uterus after delivery, uterine cultures were taken on 100 afebrile patients in groups of 10 at the end of 2, 4, 6, 8 and 10 hours and at the end of the first, second, third, fourth and fifth days. Only one culture was taken on each patient, and no patient had fever after the procedure.

In 100 uterine cultures, 87 were positive and 13 negative. Cultures were negative only when they were obtained during the first few hours. At the end of 2 hours only 1 in 10 was positive; at the end of 4 hours, 6 in 10, at the end of 6 and 8 hours, 7 in 10, at the end of 10 hours, 8 in 10 were positive. At the end of the first day 9 in 10 were positive. From the second to the fifth days all (40 consecutive cultures) were positive. The number of organisms identified similarly increased up to the end of the third day and then decreased. By the end of the third day local and general immunities possibly begin to become effective, but although the number of organisms decreased, cultures of the fourth and fifth days were strongly positive.

These studies support the well known clinical fact that removal of membranes or fragments of placental tissue from the uterus shortly after delivery is relatively safe, whereas the same procedure after the first postpartum day may be dangerous.

Postpartum Period and Early Puerperium and Factors Influencing Them. Hannes Sauramo[6] (Helsingfors Univ.) collected 2,000 cases of uncomplicated deliveries (1,000 in 1936 and 1,000 in 1945) and compared them in various ways to learn the factors which may influence postpartum and puerperal infections. In this study, it was observed that advanced methods of prophylaxis evidently increased the number of uncomplicated deliveries and decreased the incidence of albuminuria and nephropathy, but the incidence of puerperal infections in spontaneous deliveries did not diminish. Young parturients,

(6) Nord. med. 34:1096-1100, May 9, 1947.

especially primiparas, for whom delivery is often difficult, are particularly liable to puerperal infections. Previous infections in the genitalia, episiotomies of the second degree and perineal rupture may increase the number of puerperal infections. Properly conducted internal examination and rupture of the membranes do not cause an increase of puerperal infections. Prolongation of the postpartum period evidently does not reduce the incidence of puerperal infections or retention of parts of the placenta. The average duration of the postpartum period is longer if there has been abundant bleeding during delivery. Profuse hemorrhage during and/or after the postpartum period is accompanied by increased frequency of puerperal infections.

From this study, it is concluded that prophylaxis for both mother and child is important and should be instituted before the beginning of pregnancy. Special attention should be given to treatment of primiparas. No answer can yet be given to the question whether pituitary preparations should be given intravenously immediately after delivery in routine therapy or be given only when required. Regular intramuscular injections of constricting drugs to parturients, or at least to primiparas, may be considered a practical and physiologic measure on the basis of present experience.

Penicillin and Acute Puerperal Mastitis. C. P. Hodgkinson[7] (Henry Ford Hosp.) reports the results of treating 73 infected breasts observed since 1942. Each patient had essentially the same history: sudden onset of pain in the breast, followed shortly by chills and hyperpyrexia. The leukocyte count averaged 15,600, with a corresponding rise in the neutrophil percentage. Examination usually disclosed a mass in the breast underlying an area of erythema with occasional diffuse involvement. When first seen, 18 patients had abscess, and 16 required incision and drainage: In 48 patients given intramuscular injections of penicillin during the cellulitis phase, complete resolution occurred. Average hospital stay was

(7) Am. J. Obst. & Gynec. 53:834-838, May, 1947.

6.1 days, whereas for the surgically treated group, it was 42.2 days.

Treatment consisted of giving 25,000 units of penicillin intramuscularly every 3 hours for 72 hours and then 15,000 units every 3 hours for 48 hours. Because bacteriologic studies showed that the beneficial effects were due to the action of penicillin in the blood stream rather than in the milk, it was found advisable to inhibit lactation by giving diethylstilbestrol in a total dose of 40 mg. Hodgkinson stresses proper breast hygiene in prophylaxis. In suppurative mastitis, patients were given penicillin therapy, regardless of the duration of symptoms, unless there was an area of softening, indicating a localized abscess. The results with sulfonamide therapy were disappointing. The main objections to penicillin are the required hospitalization, the frequency of injections and the cost. Four patients were treated with the oil and wax penicillin preparation, with one injection of 300,000 units being given every second day until three doses had been given. The response was as satisfactory as it would have been expected to be with the multiple injection method, and hospitalization was not required.

Treatment of Breast Abscesses with Penicillin was carried out in 18 patients by M. E. Florey, J. S. Mac Vine and M. A. M. Bigby[8] (Central Middlesex County Hosp.), and results were compared with those in a simultaneous series of 18 patients treated by accepted methods.

PROCEDURE.—In the acutely inflamed stage, intramuscular injections of 15,000 units of penicillin were given every three hours until localization occurred. When fluctuation was detected all pus was aspirated every 24 hours and penicillin solution injected up to two-thirds the volume of the pus aspirated, providing this did not exceed 10 ml. When localization was not complete and full retention of the injection was possible, intramuscular injections were replaced by injection of the full 24 hour dose of 120,000 units into the abscess cavity. When localization was complete, systemic treatment was discontinued and a solution containing 500 units per ml. used. When abscesses contained more than 10 ml. pus, incision,

(8) Brit. M. J. 2:845-848, Dec. 7, 1946.

evacuation, suture and twice daily instillations of penicillin solutions after complete expression of pus were carried out. Choice of dose was governed by the same considerations as applied to aspiration, but the systemic dose, because it was given twice daily, was reduced to 60,000 units. Where sinuses existed or were made, twice daily expression and instillation by means of a rubber tube or wide bore blunt-ended needle was done, the mouth of the sinus being occluded by a collodion dressing in the interval. Complete emptying of the cavity before each instillation is essential.

Average healing time in penicillin-treated patients was reduced to half that in controls. Suppuration was hastened rather than retarded, but ceased more rapidly. Use of stilbestrol was unnecessary, and the mothers continued to nurse. Total number of operations was reduced from 22 to 4. Total number of days of hospital treatment was reduced from 661 to 232.

[Penicillin has proved to be a great boon in treatment of puerperal mastitis. When an infection begins in a breast, an abscess can nearly always be prevented by administration of penicillin hypodermically every three hours or by large daily doses of penicillin in oil and wax. In the presence of frank pus, this treatment should be combined with aspiration of pus and instillation of penicillin into the abscess cavity.—Ed.]

Gonococcic Cervical Metritis in Pregnancy and Puerperium: Its Detection and Treatment with Penicillin. According to Maurice Mayer, Delayre and Lanvin[9] (Paris), the presence of leukorrhea in pregnancy should not be considered unimportant, as bacteriologic examination of the discharge will often yield gonococci. The gonococcus is often associated with other organisms, especially trichomonas. Cervical gonococcic metritis may be the causative factor in complications of pregnancy and the puerperium. In two series of hospitalized pregnant women with leukorrhea the authors found gonococcic infection in 4 and 6 per cent of cases, respectively. In 15 of the 28 patients treated, the disease was detected during pregnancy, and in 13, during the puerperium. Eight of the patients in the latter group had a febrile course, which in two was associated with severe complications (acute endometritis and parametritis).

Penicillin therapy in these cases is based on the fol-

(9) Presse med. 55:554-555, Aug. 28, 1947.

lowing rationale. Systemic penicillin therapy is well tolerated by pregnant women; it does not complicate pregnancy and does not elicit abortion. Local penicillin therapy is facilitated by the soft consistency of the cervix, does not cause miscarriages or premature labor and does not alter the course of labor. The treatment must be instituted as soon as possible after infection. It must be given in the combined form, as systemic treatment alone rarely secures complete sterilization. The presence of the gonococcus in the cervical secretion makes it necessary to continue treatment until the results of several bacteriologic examinations are negative. The treatment must be the more intensive the older and deeper the lesions and the more resistant they had been to previous treatment. Combined therapy with sulfonamides and penicillin is unnecessary.

Systemic treatment consists of intramuscular injections every three hours, the daily dose of penicillin being 200,000 units. The patients must be hospitalized, as they must remain in bed on the days of local treatment. Systematic antispasmodic medication to check uterine contractions is essential. The local treatment must be gentle and cautious. It is not necessary to grasp the cervix with forceps, as infiltration of the succulent tissues is easy. It is wise to reduce the amount of fluid injected by using a concentration of 10,000 units of penicillin to 1 cc. saline solution. The amount used at each treatment is 50,000 units, of which half is injected beneath the mucosa of the cervical lips and the other half beneath the mucous membrane of the cervical canal. The injections are repeated every second day. Three to eight injections usually suffice. No matter what the results of the treatment were during pregnancy, systemic treatment is resumed during labor and local treatment is resumed on the sixth day after delivery.

Gonococcic puerperal metritis occurs in two forms. (1) Clinical examination reveals merely slow involution of the uterus; the cervix appears normal but bacteriologic examination shows gonococci. (2) The cervix appears

normal but pressure elicits a frankly purulent, greenish secretion which yields gonococci. In either case, systemic penicillin treatment is instituted in the aforementioned doses as soon as the diagnosis is made, and daily local injections of 50,000 units of penicillin are begun on the sixth puerperal day and continued until clinical and bacteriologic cure is obtained.

[Mayer and his associates say that penicillin does not cause abortion, but R. C. Rainie and M. A. Chapin (J. Maine M. A. 38:23-25, February, 1947) believe that penicillin in pregnancy can induce early termination of pregnancy. They report two cases of actual and two cases of threatened abortion in a series of five women treated for syphilis. These complications occurred from 18 hours to 3½ days after start of penicillin therapy. O. Aguero (Rev. de obst. e ginec., Caracas 7:104-121, 1947) used penicillin in 380 obstetric cases both prophylactically and therapeutically and he concludes that the two obstetric conditions for which penicillin is notably successful are hysterectomy for ruptured uterus and prenatal syphilis.

D. I. Macht (Science 105:313, Mar. 21, 1947) confirmed the studies of Moldowsky and others and concluded that next to the chemotherapeutic properties of penicillin and streptomycin and their low toxicity, the most important pharmacologic finding is their thromboplastic activity. M. D. Pelz (J. A. M. A. 134:207, May 10, 1947) agrees with Macht who observed that of the commercial penicillins, the amorphous (yellow) product is superior to the white crystalline penicillin in promoting coagulation of the blood.—Ed.]

Treatment of Acute Postpartum Thrombophlebitis of Lower Extremity by Continuous Caudal Anesthesia was used by Ralph C. Benson[1] (U. S. Naval Hosp., Long Beach, Calif.) in five patients.

TECHNIC.—The technic is that of Hingson, Edwards and Southworth. A Hingson malleable 19 gauge 2½ in. or 3 in. needle is used for injection of 30 cc. of 1.5 per cent metycaine in Ringer's solution into the sacral space through the sacral hiatus. Thereafter 20 cc. of the solution is injected per hour for four hours or more. The cycle of treatment may be repeated once or more with interspaced rest periods, the needle being left in situ.

All five patients (three with deep femoral and two with extensive superficial saphenous thrombophlebitis) responded with spectacular, prompt and complete cure. A single course of treatment was used in one case and two courses in four. Pain was dispelled in all cases im-

(1) Am. J. Obst. & Gynec. 52:830-836, November, 1946.

mediately after the analgesia "take" and did not recur during the rest period or before the second course. Temperature fell to normal and remained so after 12 hours in two cases and after 24 hours in three. Edema (2 plus) was dispelled in one patient with extensive superficial thrombophlebitis after only 6 hours of analgesia, although in a comparable patient with less edema (1 plus) 36 hours was required. Twenty-four hours after institution of caudal analgesia complete resolution of edema occurred in three cases of deep thrombophlebitis. There were no recurrences; all five patients recovered completely and were ambulatory in 48-72 hours.

Since the vicious cycle of "pain—vascular spasm—pain" contributes most to debilitation, reduction of pain is followed by relief of vascular symptoms and disappearance of edema.

Benson believes that pontocaine and metycaine are nontoxic in the doses recommended but prefers metycaine, which is easier to control. Analgesia to the level of the first lumbar vertebra is believed sufficient.

Anemia, hypotension, febrile state and sensitivity to the anesthetic agent are factors contributing to unpleasant side-effects and possible shock. In the author's patients nausea, vomiting and shock did not occur. Barbital analgesia and epinephrine added ease and safety to the procedure.

Benson believes that in acute fulminating cases of thrombophlebitis of the iliofemorosaphenous system continuous caudal anesthesia is the best method of therapy; chemotherapy should be considered an adjunct.

Thromboembolic Disease and Pregnancy. Frank J. Walsh and A. M. Barone[1a] (Chicago) urge closer cooperation between the surgeon specializing in peripheral vascular diseases and the obstetrician. They review the conservative and radical treatment of thromboembolic complications.

Thrombophlebitis is primarily an infection of the vein wall associated with elevation of temperature, swelling

(1a) Illinois M. J. 91:305-311, June, 1947.

of the leg and redness over the course of the vein. Pulmonary embolism occurs in about 10 per cent of cases. Phlebothrombosis is characterized by a loosely attached noninflammatory red thrombus, which readily detaches itself from the vein wall to form an embolism. Some cases of thromboembolic disease are apparently spontaneous, whereas others occur after febrile diseases, trauma or difficult obstetric and gynecologic procedures and, possibly, third degree lacerations. Thrombophlebitis in the deep peripheral veins is associated with a higher incidence of pulmonary embolism than in the superficial veins. Diagnosis of phlebothrombosis is made when pulse rate is increased out of proportion to the temperature and regional pain and tenderness, a palpable clot, Homans' sign of painful dorsiflexion of the involved foot, and increased sedimentation rate are present.

Prophylactic treatment of these conditions includes prevention of venous stasis and hemoconcentration, avoidance of infections, correction of cardiac conditions and anemia before surgery or delivery, avoidance of chilling, avoidance or decrease in smoking, use of anticoagulants if indicated, and care not to allow the patient to remain in stirrups or lithotomy position too long.

Conservative management of thrombophlebitis consists of absolute bed rest, 45 degree elevation of the affected limb, heat of 110 F. to the limb, restriction of fluid intake and salt in the presence of edema and use of salyrgan or ammonium chloride to reduce edema, anticoagulants, and physical therapy after the patient is fever free. Lumbar sympathetic block, repeated in a day or two, may be used to reduce vascular spasm in the affected extremity. Vein ligation in thrombophlebitis is reserved for patients who have failed to respond to conservative management and evidence extension of the process. Some physicians consider this the treatment of choice and the only sure method of preventing pulmonary embolism.

Diagnosis of phlebothrombosis demands emergency treatment consisting of either simple proximal ligation,

followed by application of an elastic bandage and insistence on early ambulation, or treatment by thrombectomy, used when the clot is found to extend upward in the femoral vein beyond Poupart's ligament.

Pulmonary embolism often occurs with activity. Treatment is an emergency one. The procedure advocated by de Takats consists of immediate administration of 100 per cent oxygen by nasal catheter or mask, ½ gr. papaverine intravenously to relieve pain and 1/60 or 1/75 gr. atropine intravenously to relax the bronchial spasm.

Treatment of Phlegmasia Alba Dolens in the Maternity Institute. Alberto Peralta Ramos and Ricardo Dubrovsky[2] (Buenos Aires) state that the present method of treatment consists of sympathetic block, immobilization during the recuperative period, early mobilization and massage. In more than 100,000 deliveries since the inauguration of the Maternity Institute, the incidence of phlegmasia alba dolens has been 0.18 per cent. Undoubtedly, management of labor and puerperium was the main factor determining this low figure, but other contributing factors were active mobilization, gymnastics and early rising. More than 20,000 patients have been treated in this manner without a case of phlegmasia alba dolens.

Immobilization must be instituted early in the disease. Its duration depends on the nature of the infectious process. Adjuvant measures to shorten the period of immobilization are not used. Mobilization is started only when normal axillary and rectal temperatures and a normal pulse rate show that the acute phase is ended. It is performed under daily control of pulse rate and temperature, and if these rise again mobilization is suspended for a few days until they return to normal. Altogether 63 patients were so treated during 1936-40, with excellent results.

In five years, 30 patients were treated with sympathetic block. The result was that active mobilization could be instituted earlier, during the second week, and rising was usually possible after about 20 days. The

(2) VI Jornadas rioplatenses de obst. y ginec., pp. 321-347, 1946.

grave sequelae which used to be observed were eliminated.

[Not infrequently a pathologist who performs an autopsy on a person who died of embolism fails to find the thrombus from which the embolus arose. Jacob Erdheim of Vienna, who was a great pathologist and teacher, gave this matter considerable thought. He believed that the source of such emboli was thrombosis in a vein of the calf of the leg. It would have been a huge task to dissect out all veins of the calf, and Erdheim ingeniously made a transverse section of all the muscles of each calf and in this way instantly visualized all the blood vessels in the cut section. By making a large number of such examinations in autopsies of all kinds, Erdheim discovered that venous thrombosis in the legs was far more common than anyone had hitherto suspected. In the majority of such cases the patients showed no local symptom during life. (Personal conversations in 1924 between Professor Erdheim and Benjamin Sacks.)

R. Rossle (Virchows Arch. f. path. Anat. 300:180-189, 1937) dissected the legs and thighs of 324 patients over 20 years of age at autopsy and found that 88 (27.1 per cent) had thrombosis in the veins of the calf. He found concomitant thrombosis in the femoral veins and veins of the calf in 38 cases (12 per cent). W. C. Hunter, V. D. Sneeden, T. D. Robertson and G. A. C. Snyder (Arch. Int. Med. 68:1, July, 1941) removed the soleus and gastrocnemius muscles in 351 autopsies. Thrombosis was found in 52.7 per cent. The total number of fatal emboli was 11 (3.13 per cent), including two which did not arise in leg veins. In this group there were also 40 cases of nonfatal emboli, of which 10 had infarcts and 30 did not have infarcts. The incidence of pulmonary emboli in the entire group was 14.55 per cent. Most of the deaths occurred on the fifth or sixth days or during the third week. *All patients had been bedridden from the day of entrance to the hospital until death.* This is significant. Hunter and his associates strongly believe that the major factor in formation of thrombi is forced recumbency of adults who have been active or at least ambulatory before illness. They say that unless there is a definite contraindication, a fundamental therapeutic procedure is the prescription of periodic, active flexion and extension of the feet, legs and thighs, frequent turning of helpless patients, prevention or relief of abdominal distention and deep breathing exercises throughout the period of rest. H. Voegt (Virchows Arch. f. path. Anat. 300:190-201, 1937) studied Rossle's data with particular attention to the effects of long confinement in bed. He suggested that degenerating muscle, as a result of pressure, circulatory disturbances and inactivity, may liberate thrombogenic substance and lead to terminal thrombosis. All of these studies give a sound basis for getting patients out of bed early, as advocated in 1899 by Emil Ries and by Howard Kelly in 1911.

During the last year, several papers have appeared advocating the surgical treatment of phlebothrombosis in obstetric and gynecologic patients. F. W. Bancroft (Am. J. Obst. & Gynec. 53:109-116, January, 1947) advocates proximal ligation or thrombectomy for such cases. He admits, however, that in thrombophlebitis when

there is not much risk of embolic formation, lumbar sympathetic block popularized by Alton Ochsner relieves pain and hastens convalescence. (Phlebothrombosis is characterized by a blood clot which fills the lumen of a vein. The onset is sudden, and it is not accompanied by as high fever nor as much swelling of the leg as in thrombophlebitis. Embolism can easily occur. Thrombophlebitis is a phlebitis and periphlebitis is sometimes present without a clot in the lumen of the vein. The onset is usually initiated by a chill and high fever, swelling of the leg, marked tenderness and often redness over the involved veins. Embolism following thrombophlebitis is uncommon.) If drugs are to be used, Bancroft prefers sodium thiosulfate to heparin or dicumarol. L. Loewe and E. Hirsch (J. A. M. A. 133:1263-1268, Apr. 26, 1947), on the other hand, obtained satisfactory results by using heparin in the Pitkin menstruum in 168 consecutive patients with venous thrombocytic disease. A. W. Allen, R. R. Linton and G. A. Donaldson (J. A. M. A. 133:1268-1274, Apr. 26, 1947) point out that a misinterpretation of the term early ambulation explains the poor results in some reports. The term should mean that the patient actually gets out of bed and walks and then lies down again. Instead of this, patients are often lifted out of bed and sat on a chair with their feet on the floor. Stasis in the leg veins, being increased by such a maneuver, may well offset other beneficial effects.—Ed.]

Course of Pulmonary Tuberculosis after Delivery is discussed by V. Manuel Aviles, Fernando Rodriguez, Jose Oneto and Humberto Ampuero[3] (Santiago). Of 32,953 women delivered at the Maternidad del Salvador since 1936, 658 had pulmonary tuberculosis, an incidence of 1.99 per cent. Of these, only 65 had a complete follow-up study. In 18 of 22 patients of this group who died, death was due to pulmonary tuberculosis. Of the remaining 43, 10 exhibited a productive, 12 an exudative and 21 a mixed form of tuberculosis. Of the productive cases, 10 per cent were aggravated by pregnancy, 60 per cent showed no changes, and 30 per cent showed frank improvement. The corresponding figures for the group with exudative tuberculosis were 58, 8 and 33 per cent respectively, and for the group with mixed tuberculosis, 19, 28 and 52 per cent respectively.

When classified according to the extent of the tuberculous process, 50 per cent of the more advanced cases, 26.6 per cent of the moderately advanced and 20 per cent of minimal cases were aggravated by pregnancy. Conversely, 46.6 per cent of the moderately advanced cases,

(3) Bol. Soc. chilena de obst. y ginec. 11:145-166, October, 1946.

40 per cent of the minimal and 37.5 per cent of the more advanced cases showed improvement. The average age of patients who showed aggravation of tuberculosis was 25-35 years. Multiparous women were more likely to show aggravation of pulmonary tuberculosis than primiparas, which is not surprising, since the latter were younger on the whole. In general, starting with the postpartum period, 28 per cent of the patients showed aggravation of pulmonary tuberculosis, 30 per cent showed no changes and 42 per cent showed improvement. Rest, sojourn in a sanatorium and modern methods of treatment, especially surgical technics, have contributed to the favorable outcomes. The authors consider the immediate mortality rate of 2.73 per cent during puerperium as low in comparison to those heretofore reported.

Pulmonary Embolism by Amniotic Fluid: Report of Three Cases with New Diagnostic Procedure is made by Paul Gross and Edward J. Benz[4] (Pittsburgh). These cases were characterized by sudden, unexpected development of irreversible shock during labor or the immediate puerperium, followed quickly by death. Although autopsy revealed no significant gross abnormality, the diagnosis was established microscopically by demonstrating occlusion of small branches of the pulmonary arteries by leukocytes and constituents of amniotic fluid.

Centrifugation of blood aspirated from the pulmonary artery and inferior vena cava of one patient revealed a pathognomonic third flocculant stratum above the layer of leukocyte cream. In smears and sections of this stratum, constituents of meconium and amniotic fluid were shown.

Routine examination of blood from the right side of the heart in all obstetric deaths whether or not autopsy is performed may aid in accurately establishing the frequency of this condition, which is probably commoner than indicated by autopsy statistics.

[I. I. Goodof (J. Maine M. A. 38:101-102, May, 1947) reports an additional case of maternal pulmonary embolism due to amniotic

(4) Surg., Gynec. & Obst. 85:315-320, September, 1947.

fluid, and G. W. Mylks, A. B. Brown and C. N. Robinson (Canad. M. A. J. 56:427-429, April, 1947) report a case of air embolism during labor in a case of abruptio placentae. G. A. Lindeboom (Nederl. tijdschr. v. geneesk. 91:2277-2282, Aug. 16, 1947) reports two cases of acute pulmonary edema after prolonged labor in women who had neither heart nor kidney disease. Both recovered after administration of morphine and strophanthin.—Ed.]

Obstetric Activities in Illinois Hospitals during 1945 are reviewed by Charles Newberger[5] (Chicago) on the basis of data tabulated from monthly reports submitted to the Division of Maternal and Child Hygiene by all hospitals giving maternity service. This is one requirement for licensure of hospitals by the State Department of Public Health.

Obstetric care was given to 125,016 patients in 232 hospitals. Operative intervention was instituted in 31.8 per cent, the rate for forceps delivery being 22.7 per cent and that for cesarean section 3.6 per cent.

Complications were reported in 10.1 per cent, with genital infection, pre-eclampsia and postpartum hemorrhage as the leading conditions. Study of the more carefully prepared records indicates that morbidity occurred in 8.4 per cent, toxemia in 6.2 per cent and hemorrhage in 4.6 per cent, a total of 19.2 per cent of the mothers. Transfusion was given to 1.7 per cent.

Abortion and ectopic gestation are related to the total births in a ratio of 1:31 and 1:393 respectively. Again, through selection of more accurate reports, these ratios were found to be 1:6 for abortions and 1:71 for extrauterine pregnancies.

Of the 126,309 infants delivered in the hospitals, 98 per cent were living, 4.8 per cent were prematurely born and 0.3 per cent were injured at birth.

The stillbirth rate was 20.06 per thousand live births; the neonatal death rate was 21.30 per thousand live births, and the maternal mortality rate was 1.79 per thousand live births. There was no maternal death among 47,582 mothers delivered in 118 hospitals.

Of 222 maternal deaths, 49 (22.1 per cent) were due to toxemia, 43 (19.4 per cent) to infection and 35 (15.8

(5) J. A. M. A. 134:518-522, June 7, 1947.

per cent) to hemorrhage. Abortion was responsible for 36 (16.2 per cent) of the deaths and ectopic gestation for 17 (7.6 per cent). Since nearly all of the ectopic deaths and a notable proportion of the deaths attributed to abortion were due to bleeding, hemorrhage took first place as a cause of maternal mortality in Illinois hospitals during 1945.

Maternal Mortality: Some Aspects of Preventability are discussed by James Francis Norton and Edith K. Mangone[6] (Margaret Hague Maternity Hosp., Jersey City), who believe that improved treatment of the following conditions offers the greatest possibility for further reduction in maternal mortality.

1. Puerperal infection. Unnecessary surgical procedures should be avoided during labor and post partum. Sulfonamide therapy and use of penicillin offer hope of reduced incidence of puerperal infections to patients long in labor with ruptured membranes. Patients for cesarean section should be carefully selected as should also the type of operation. Low cervical transperitoneal approach should be used for patients not in labor or in labor only a short time and the extraperitoneal approach for those potentially or actually infected.

2. Eclampsia. Recognition of pre-eclampsia and prevention of convulsions are essential. Patients with hypertension, inordinate weight gain and albuminuria require immediate hospitalization and bed rest with energetic treatment and termination of the pregnancy if the toxemia does not improve within a reasonable period.

3. Hemorrhage. All patients experiencing bleeding in the last trimester of pregnancy should be hospitalized immediately. The exact source and amount of bleeding, the status of the cervix and the position of the placenta should be determined. The patients' blood should be typed and cross-matched and donors made available. Rectal or vaginal examination should be made only in the operating room with complete preparation for immediate delivery by cesarean section.

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(6) J. M. Soc. New Jersey 44:101-107, March, 1947.

4. Rheumatic heart disease. Treatment consists of prevention of failure. At the appearance of early signs of decompensation, the patient should be hospitalized with complete bed rest for the duration of the pregnancy. Patients most likely to experience failure are those over 30 years, those with severe prepregnancy disease and those with a history of previous failure.

5. Rupture of the uterus. Version in multiparas with previous cervical lacerations often results in extension of the previous tear into the lower uterine segment with fatal consequences. Earlier intervention in the patient long in labor before inordinate thinning of the lower uterine segment occurs is the only hope for prevention of rupture.

Pelvic examination should be made when the postpartum patient is bleeding and in shock to detect unrecognized inversion of the uterus, laceration of the cervix, rupture of the uterus or laceration of the bulb of the vestibule. Immediate hysterectomy may be essential.

Present Trends in Obstetrics are outlined by S. A. Cosgrove[7] (Columbia Univ.). Measures are directed toward prevention and alleviation of pain, hemorrhage, toxemia and sepsis.

Means of relieving pain are analgesic and anesthetic agents. Demerol and opium derivatives such as morphine are true analgesic agents whose chief disadvantage is a tendency to narcotize the fetus and interfere with normal respiration after birth. Demerol appears to be the least dangerous.

The barbiturates combine powerful soporific action with slight analgesic and amnesic properties. They vary in promptness, power and duration of action, and selection of a particular drug depends on these properties.

Scopolamine is the only drug whose usefulness depends wholly on its amnesic powers. Although sometimes used alone, it is most often used as an adjuvant to analgesic drugs. It is potentially dangerous, and carelessness in its use may be disastrous.

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(7) New England J. Med. 235:811-815, Dec. 5, 1946.

Useful anesthetic agents likewise fall into two groups. The first includes those that are usually administered by inhalation and act by narcotizing the cerebral sensorium. Ether and nitrous oxide are the most widely used. Chloroform, a useful and flexible drug, is no longer popular because of dangerous toxic side-effects. Cyclopropane, ethylene and vinyl ether are used to some extent. All of these narcotize the fetal as well as the maternal brain.

The second group includes novocain, metycaine and pontocaine, which act by contact with the peripheral nerves at some point distal to their exit from the spinal cord. Spinal, or intrathecal, injection provides rapid and complete anesthesia for vaginal or abdominal delivery. It may be used by single injection or continuously. The danger of sudden death can be eliminated by use of small doses for vaginal delivery. Caudal, or extrathecal, anesthesia is neither so prompt nor so uniform in action as spinal anesthesia. Increasing experience has defined a number of limitations and dangers of the method. It seems that in any but the most expert hands this method is not properly applicable in more than one out of four patients or for longer than six to eight hours. In successful cases the results are most satisfactory.

Infiltration anesthesia, with or without peripheral nerve block, is the safest of all anesthetic methods. It is not universally applicable, since neurotic patients are not favorable subjects. Its use, however, is steadily increasing.

Factors in reduction of the danger of hemorrhage include exact and early recognition of causes of bleeding, less reliance on uterine packs, intelligent search for sources of bleeding in the birth canal, application of more definitive operative therapy to these sources, increasing knowledge of the significance of Rh factor incompatibility for the mother as well as the fetus and inclusion of blood group and Rh determination as a routine part of early prenatal care. A further vital factor is provision of and improvement in operation of blood

and plasma banks. A significant contribution is artificial neutralization of A and B agglutinins so that blood compatible for all recipients can be divided into pools depending on the Rh characteristic. Limitations of vitamin K therapy as prophylaxis against postpartum hemorrhage are now recognized, and its use is strictly limited.

Clearer concepts of treatment of toxemia are emerging. To conserve maternal life, fetal life and maternal health, early recognition of toxemia and prompt institution of treatment are required. No degree of toxemia is clinically negligible. Often eclampsia supervenes directly on pre-eclampsia of the supposedly mild type.

The only definitive treatment of toxemia is termination of pregnancy. Cesarean section is often indicated to reduce maternal morbidity and mortality. This procedure is not inimical to the baby's chances of survival, for the hazard of prematurity is merely substituted for the many hazards incident to continuing pregnancy in the presence of toxemia.

In eclampsia, however, termination is rarely indicated. The baby's interests must be subordinated. Medical treatment of the mother is of prime importance.

Sulfonamides and antibiotic agents have increased the resources of the obstetrician but must not be depended on to replace surgical technics necessary to prevent sepsis. Their use prophylactically appears to be justified. The value of small, repeated blood transfusions in the treatment of sepsis is increasingly recognized. Because of the rarity of puerperal death from embolism and the sometimes serious sequelae of surgery, enthusiasm for surgical treatment of thrombophlebitis and phlebothrombosis has little support from obstetricians.

Maternal Welfare and the Negro is discussed by Philip F. Williams[8] (Philadelphia). The 60 per cent decrease in maternal death rate since 1933 is an outstanding achievement. It may be attributed to interest and participation of professional and lay workers, implementation of their efforts in education and maternity care by federal and state

(8) J. A. M. A. 132:611-614, Nov. 16, 1946.

funds, advances in obstetric practice, new treatments for infection and increasing hospitalization, especially in rural communities.

However, the 1943 puerperal death rate for Negroes was almost 2½ times that for white women and showed a 10 year lag in its reduction. Hypertensive disease occurs three times as often in the Negro as in the white race and appears earlier in Negro women. The high incidence of nephrosclerosis and hypertensive cardiac disease may explain the relative frequency of toxemia of pregnancy in the Negro.

The reaction of the Negro to tuberculosis is well known. Any immunity developed in the South is quickly lost in migration northward. The economic status of the Negro influences the maternal death rate through poor hygiene and poor nutrition, which favor lowered resistance to infection and anemia, predisposing to a greater degree of puerperal morbidity. Rickets, with pelvic deformity and consequent dystocia, is still common.

Syphilis is responsible for excessively high pregnancy wastage, which always implies a high maternal death rate. The stillbirth rate among Negroes is approximately double that in the white race, with consequent increase in the risk of maternal death. Furthermore, the high incidence of pelvic inflammatory disease in Negroes tends to increase the incidence and severity of puerperal infection. The high rate of illegitimacy among Negroes predisposes to the interruption of pregnancy, with resulting infection. Frequent pregnancies and extremely large families are the rule and decidedly affect maternal mortality.

The largely rural distribution of the Negro in the South predisposes to home delivery with a lack of facilities to combat emergencies and with inability to obtain adequate prenatal care. In cities hospital facilities for Negroes are extremely inadequate, and hospitalization of many Negro obstetric patients is done only in an emergency.

The practical application of the principles of proper health education and health supervision has been effectively demonstrated by the Chicago Maternity Center. In four years the mortality rate, both obstetric and nonobstetric, was less than half the national rate for white women and about one-third the rate for the nonwhite. In Alabama care given in maternity clinics set up, supervised and financed by the state has cut the state Negro maternal mortality rate in half.

Obstetric care has undergone an evolution in this generation, but the Negro has not participated fully in the benefits of modern obstetrics. Conservation of human life in the process of reproduction should be shared equally by all Americans.

Environment in Obstetrics. John H. Moore[9] (Grand Forks, N.D.) reports on advances made in his state in provision of good obstetric care.

To provide sound knowledge of fundamentals the establishment of a medical center at the University of North Dakota has been authorized. Long range plans include integration of a number of established hospitals throughout the state into a University teaching program. The student will then be brought into close teaching contact with competent instructors throughout the state.

To sustain professional interest, postgraduate opportunities have been made available to the physician practicing in a rural community through obstetric and pediatric seminars conducted by outstanding clinicians and by short courses in residence at nearby teaching centers.

Advances are being made in the integration of all agencies having for their object improvement of obstetric practice. A cordial relation has been established between the State Health Department and the State Medical Association through the latter's Committee on Maternal and Child Welfare.

In 1935 the maternal mortality rate in North Dakota was 55 per 10,000 live births; in 1940 it was 17 per

(9) Am. J. Obst. & Gynec. 52:993-999, December, 1946.

10,000 live births, and the provisional rate for 1945 is 11 per 10,000 live births. Analysis of case summaries of maternal deaths from hemorrhage in 1943 showed two chief factors: (1) injudicious operative obstetrics and (2) inadequate blood substitutes. Intensive education is needed to eliminate the first factor. To provide adequate supplies of blood substitutes, the State Plasma Bank was established in the Public Health Laboratory at the University of North Dakota. About 18 per cent of the patients receiving North Dakota-made dried human plasma during the bank's first year of operation were obstetric patients. Total cost of the program during the first year made the cost per unit of plasma $12.56. Estimated cost per unit for the coming year is $3.00 (maximum).

[During the past year, numerous reports of hospital and community obstetric statistics appeared. L. H. Douglas (Bull. School Med. Univ. Maryland 32:37-55, July, 1947) reports that whereas the maternal mortality for 1,792 registered obstetric patients was only 0.11 per cent, it was 1.45 per cent for the 210 unregistered patients. Forceps were used in 54.3 per cent of the cases, and cesarean section in 2.6 per cent. A. W. Spain with D. O'Connor and M. Soden (Clin. Rep. Nat. Matern. Hosp., Dublin, 1946) report 5 maternal deaths among 3,668 obstetric cases, but all of these deaths were among the 943 emergency admissions. Incidence of cesarean section was 2.7 per cent, and only 252 patients (7 per cent) were delivered by forceps.—Ed.]

THE NEWBORN

Hypoxemia of Fetus. Herbert F. Traut[1] (Univ. of California) believes that lack of available oxygen in utero is important not only in difficulty of resuscitation at birth but also in central nervous system lesions.

The chief cause of intrauterine oxygen lack is the character of the human placenta, which must transmit gases, salts and proteins to the fetal circulation. Placental reduction of proteins to amino acids requires so much time that the flow of maternal blood through the placenta is sluggish, and gases can be supplied to the fetus only in reduced amounts. To compensate, red

(1) West. J. Surg. 54:379-383, October, 1946.

blood cells in the fetal blood stream are much more abundant than in that of an adult, and hemoglobin in the fetal blood is capable of carrying greater quantities of oxygen, of combining more rapidly with oxygen and of discharging carbon dioxide with greater facility. Despite this, oxygen saturation of fetal blood constantly diminishes toward term and falls during the last trimester of pregnancy from 50 to 28 per cent of saturation. A second compensatory mechanism, demonstrated by Wislocki, is the probability that anaerobic breakdown of glycogen in placental tissue releases oxygen not otherwise available to the fetus.

Among pathologic causes of fetal hypoxemia are degenerative processes in the syncytial lining of the placenta, which Traut calls hemovillous degeneration. The extent of this degeneration has been shown to be fairly constant in a family, though considerable variation occurs from family to family. This process may be hastened by toxic states and by poor nutrition of the mother, particularly vitamin deficiencies.

Thus the human fetus in utero is normally in a state of partial oxygen deficit, and any further privation additionally jeopardizes the infant.

Long range effects of hypoxemia of the fetus may include spastic paraplegias and even low grade intelligence. Windle has shown experimentally that low oxygen tension in utero results in deterioration of the functions of the higher centers. His observations suggest that this state may be associated with degeneration of vital nerve pathways, producing far reaching influences on the ultimate functions of the central nervous system. In a study of 132 children who had had various degrees of hypoxemia at or near term, Preston found 97 to be of normal intelligence but to have serious behavior difficulties. The other 35 showed subnormal intelligence, locomotor difficulties and epilepsy. In infants with erythroblastosis, hemolytic anemia either in utero or immediately post partum may produce hypoxemia approaching that in Windle's experiments.

During the last trimester of pregnancy and during delivery and labor all precautions to avoid embarrassment of the burdened oxygenation mechanism should be taken. Opiates, barbiturates, paraldehyde and nitrous oxide are contraindicated when there is evidence of fetal oxygen lack. Rapid labor with prolonged or forceful contractions, premature separation of the placenta, placenta praevia and extensive maternal hemorrhage may result in partial asphyxiation of the fetus in utero. In a less acute manner, the same mechanism operates in patients who have pneumonia or serious cardiac complications late in pregnancy. Oxygen inhalation should probably be used more often. Use of analgesics should be judicious, and careful observation of the fetus in utero as to impending or actually present oxygen need is important.

Asphyxia Neonatorum. Paul Briquet[2] (Univ. of São Paulo) reviews the literature on etiology, physiopathology, pathologic anatomy, prognosis and treatment of asphyxia of the newborn. He concludes that the disorder results from excitation of the motor neurons, especially those of the respiratory center, caused by anoxemia and not by a deficit in the carbon dioxide content of the blood. The effect of lobeline on the respiratory center, which consists of stimulation of the afferent nerve terminals of the carotid sinus, proves that the stimulating chemoreceptors are not at fault. Prenatal asphyxia does not occur under normal conditions. With the fall of blood oxygen content, respiratory movements may occur, but neither the intrathoracic pressure nor the normal hypotonia of the respiratory muscles is altered. Only when the fall in the blood oxygen content is pronounced and the motor neurons become activated, thus increasing muscle tone, do respiratory movements of dyspneic character occur. Fetal respiration during labor is elicited by the greater tension of carbon dioxide and lesser tension of oxygen within the placental circulation. Delayed tying of the cord is advantageous in that it results in considerable increase in the blood volume of the new-

(2) An. brasil. de ginec. 23:81-101, February, 1947.

born. Neonatal asphyxia of the flaccid, syncopal type is usually produced by operative injuries to the brain during difficult deliveries, especially in breech presentation.

Results of treatment of asphyxia neonatorum depend on the rapidity of action. Treatment includes removal of obstruction of the respiratory passages and administration of oxygen under pressure. The infant should be protected from chilling and placed in a slightly head-down position to facilitate tracheobronchial drainage and the flow of blood to the heart and medulla. After the obstruction has been removed, inhalation of 100 per cent oxygen under pressure is started through a rubber catheter or by means of a resuscitating apparatus. Analeptics, like lobeline or coramine, act by stimulating the chemoreceptor reflex of the carotid sinus. Their use, in general, is unnecessary in mild cases and ineffective in severe cases in which the anoxic depression of the respiratory center is too marked. The newborn child who whines but does not cry loudly and who hours later has repeated, increasing attacks of cyanosis probably has aspiration pneumonia.

Prevention of asphyxia neonatorum consists of avoidance of factors that impair placental and cord circulation, avoidance of obstetric analgesia whenever possible —especially the use of nonvolatile narcotics—restricted use of oxytocic and sedative medication, and strict observance of the indications for operation.

[It is now generally recognized that asphyxia neonatorum can be prevented by the judicious use of analgesia during the first stage, the restricted use of inhalation anesthesia, the increased application of local and caudal anesthesia, the proper use of forceps, careful breech extraction, the administration of oxygen to the mother when the baby's heart tones are irregular or too slow, prevention of excessive loss of blood, and other means. The principles of resuscitation of the newborn are now standardized. These consist of keeping the baby horizontal, maintaining warmth, clearing the air passages, and supplying oxygen or air. Drugs are usually of no value and occasionally may do harm. R. H. Gottschalk (Am. J. Obst. & Gynec. 52: 651-656, October, 1946) found that demerol and hyoscine exert no effect on the respiration of the newborn from 7 minutes to 1 hour of age. A general anesthetic, when properly administered, exerts no effect on the respiration of the newborn after 7 minutes of age.—Ed.]

Cerebral Damage in Infants and in Children: Some Observations on Its Causes and Possibilities of Its Prevention. Harold K. Faber[2a] (San Francisco) believes that intracranial hemorrhage is a far less common cause of cerebral atrophy than simple anoxia. He believes that the fetus has a small margin of safety for reduced oxygen supply. Slight reduction below the margin of safety for hours or days makes anoxic damage inevitable, and of all body tissues the cells of the brain cortex are the most sensitive. Anoxia of a certain degree will leave the cortex permanently damaged while permitting the fetus to survive. Every effort should be made to offset anoxia in the pregnant woman. This includes free use of oxygen.

Faber believes that cerebral damage in Rh incompatibility is more often due to the profound changes that occur in the placental villi, setting up interference with oxygen exchange, than to anemia or agglutination thrombi in the brain capillaries. Rh-positive blood should never be used for transfusions in girls not known to be Rh-positive. Under certain conditions when Rh antibodies, either blocking or agglutinating, do not appear in the maternal blood until relatively late, induction of labor before the fetus has been exposed to them for more than 8-10 weeks may prevent fetal damage.

Cerebral damage from maternal rubella during pregnancy might be prevented by exposure of young girls to this nearly always mild disease.

In difficult deliveries the need of increased oxygen supply to the mother or, at the least, avoidance of reduced oxygen supply must be kept constantly in mind. Serious risks to the baby are inherent in use of nitrous oxide anesthesia during labor when less than 15 per cent oxygen is given with it. Oversedation of the mother during labor is apparently also dangerous. Idiosyncrasy for or overdosage of oxytocic posterior pituitary extracts may cause prolonged uterine systole with reduction in uterine blood flow and oxygen supply.

(2a) Am. J. Dis. Child. 74:1-9, July, 1947.

Methods of resuscitation of infants with prolonged apnea or cyanosis at birth have greatly improved in recent years. Use of the laryngoscope for removing occluding plugs of mucus under direct vision is in ever wider use instead of simple aspiration. The principal danger to premature infants, Faber believes, is anoxia. Clearing of the airways, use of oxygen, transfusions and administration of ascorbic acid will often prevent damage. Although theoretically preventable by administration of vitamin K to mother or infant, neonatal hypoprothrombinemia seems more effectively treated by prompt transfusion to the infant.

Placental Hormones after Death of Fetus with Viable Placenta were assayed in two cases by Bernhard Zondek[3] (Hebrew Univ.). In both, the placenta functioned normally and remained anatomically intact for as long as four weeks, although clinical manifestations indicating death of the fetus were confirmed by stillbirths.

These observations indicated that death of the fetus may be primary (independent of the placenta) or secondary (owing to death of the placenta). In secondary fetal death the hormone levels in blood and urine fell rapidly. However, a single negative pregnancy test must not be relied on, especially in the later months of pregnancy when gonadotrophin excretion decreases and becomes less regular. In primary fetal death hormone levels do not fall immediately and may even rise temporarily because the entire output of placental hormones is taken up by the maternal circulation, none going to the fetus.

Prematurity from Viewpoint of Obstetrician. Nicholson J. Eastman[4] (Johns Hopkins Univ.) in reviewing 3,331 premature births over 20 years concludes that in about 60 per cent no specific explanation for the accident can be deduced. In searching for the cause of early onset of labor in these cases, it was found that among patients who had no or poor antepartum care, the incidence

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(3) Lancet 1:178-179, Feb. 1, 1947.
(4) Am. Pract. 1:343-352, March, 1947.

of premature birth was 24.9 per cent, whereas, in women who received good care it was only 7.8 per cent. Faulty nutrition deserves serious consideration as a possible cause of the dramatic differences in the incidence of prematurity between patients at different economic levels.

The most important factor in mortality of premature infants is the degree of prematurity as reflected fairly accurately by the infant's weight. The prognosis for smaller premature infants is strikingly improved if they survive the first day. The outlook for female infants is somewhat better than for males, possibly because at a given weight they tend to be more mature from the viewpoint of gestational age.

Eastman believes that mortality of premature infants could be lowered substantially if obstetricians would insist on an amplified diet in respect to minerals, proteins and vitamins. Vitamin K should be administered to all women as soon as labor starts. Certain patients with placenta praevia and some with mild pre-eclampsia might be carried nearer to term than has been customary. Patients whose membranes are ruptured should be let alone, preferably in the hospital, and no attempt made to bring on labor. In premature labor only continuous caudal or spinal anesthesia should be permitted. Delivery should be effected under either of these forms of anesthesia or local infiltration and should be preceded by a liberal median episiotomy. The best way to deliver a premature infant, especially a small one, is as follows: when the head is on the perineum and the vulvar ring is just beginning to distend, a median episiotomy is made, followed by gentle fundal pressure. This usually suffices; but gentle forceps extraction may be advisable for some of the larger premature infants. The cord should not be clamped until pulsations cease, since, owing to their tendency to develop anemia, these infants need all the blood they can get. The infant now becomes a pediatric problem. Obstetricians should remember that immediate factors are a clear airway, oxygen, warmth and as little handling as possible.

Use of Methyl Testosterone in Treatment of Premature Infants was given a clinical trial by E. Kost Shelton and Arthur E. Varden.[5] Testosterone is one of the most important known metabolizers of nitrogen, and nitrogen storage and utilization are the physiologic effects desired in the treatment of premature infants.

The series included 15 infants with an approximate 50 per cent prediction of mortality, all but 1 having a birth weight of less than 1,920 Gm. They were given 2.5 mg. methyl testosterone in their feedings every 12 hours for 3-7 weeks. Routine care was the same as that normally given.

All treated infants responded with prompt and steady weight gains, improvement in general reactions and appearance of well-being. A treatment period of 24-48 hours was necessary before beneficial effects were evident. No untoward effects were noted.

A few infants in poor general condition were given 2 mg. testosterone propionate intragluteally immediately after delivery and again after 12 hours. These few did not survive. The authors believe that an infant must have a sufficient backlog of inherent vitality to maintain itself for 24 hours. After this, testosterone may be the determining factor in survival for an unknown percentage of infants who are too physiologically inert to initiate vigorous metabolic function spontaneously.

[A point made by Eastman should be emphasized; i.e., in premature babies, the cord should not be clamped for at least two minutes after delivery. During this time, the baby will receive needed blood. The baby can be kept warm with sterile blankets and if necessary the air passages can be cleared and a tracheal catheter passed while waiting for the cord pulsations to cease.

It will be interesting to see whether methyl testosterone will prove as helpful in a large number of premature babies as in the 15 already studied. If it does, it will be a boon to institutions without well equipped and well staffed nurseries for premature babies. M. Fukas (Gynaecologia 124:11-27, July, 1947) used adrenocortical hormone in 30 premature babies, and was surprised at the beneficial effects not only on weight but also on temperature regulation. He resorted to this therapy because of resemblance in symptomatology of premature babies and adrenalectomized animals.

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(5) J. Clin. Endocrinol. 6:812-816, December, 1946.

C. von Numers (Nord. med. 32:2745, 1946) studied 2,624 viable premature infants. As a result of this study, M. Rauramo proposed a resolution passed by the Finland Association of Pediatrics and the Finland Association of Gynaecologists. These societies agreed on the following official groups based on birth weight of fetuses under 2,500 Gm.: 1,250-2,500 Gm., "premature labor;" 600-1,250 Gm., "immature labor," and less than 600 Gm., abortions.

In a letter to me, von Numers urged an official international classification of premature babies. This should be done, and pediatricians and obstetricians should work together for this purpose. Laws differ as to what constitutes prematurity. In Illinois a baby weighing under 5 lb. is considered premature, and in California an infant weighing 5 lb. 8 oz. or less is considered premature. In 1935 the American Academy of Pediatrics accepted the following resolution: "A premature infant is one who weighs 2,500 Gm. (5.5 pounds) or less at birth (not on admission) regardless of the period of gestation. All liveborn premature infants should be included, evidence of life being heart beating or breathing."—Ed.]

Undernourished Full Term Infant: Case Report is presented by Raymond D. McBurney[6] (Los Angeles) who believes that the California State Board of Health regulation stating that an infant weighing 5 lb. 8 oz. or less is considered premature has caused undernourished full term infants to be classified as premature. Estimates of maturity based on the date of the last menstrual period are notoriously inaccurate, but when the findings of the physician at the patient's first examination coincide with the period of amenorrhea, this appears to offer a reasonable method of estimating duration of gestation.

Approximately 1.04 per cent of a series of 6,641 babies born at term weighed 5 lb. 8 oz. or less. These babies were not premature but undernourished. Undernourishment may be due to insufficient food supply to the fetus because of a small placenta. This shortage may be further increased by infarcts or other forms of disturbance in the placental circulation. There is evidence that this condition may accompany or be increased by toxic factors present during pregnancy.

The mortality rate in this series of infants seemed to be no higher than in any series of normal newborn infants.

[Many of us have seen small babies legally called premature who were born at full term and relatively large babies four and

(6) West. J. Surg. 55:363-370, July, 1947.

five weeks before term. J. P. Bush (Lancet 1:909, June 28, 1947) reports a baby which weighed 24 oz. at birth and survived. —Ed.]

Anoxia Neonatorum. Charles L. Sullivan[7] (Massachusetts Gen'l Hosp.) recognizes three stages, depression, spasticity and flaccidity, named in the order of their frequency and severity. Respirations should be established within 30 seconds of birth and should be accompanied by a vigorous cry. Failure indicates underlying anoxia.

The depressed infant does not breathe well and has a tendency to duskiness and recurring cyanosis. Muscle tone is good, and the cord pulsates strongly. The airways should be cleared immediately and completely, body heat should be maintained and pure oxygen should be administered. If normal respirations and vigor do not ensue, stimulation with carbon dioxide by mouth-to-mouth insufflation should be tried. Depression of the lower jaw during administration of gases produces respiratory obstruction.

In spasticity, irregular gasping or shallow respirations occur at long intervals. Reflex action is still present, and muscle tone is present but diminished. The mucous membranes are cyanotic and the skin blotched or pale. Froth or fluid is present in the mouth. The cord pulsates. The mortality and morbidity in this stage are about four times those in simple depression. The measures previously outlined are indicated. Oxygen should be administered, preferably by a positive-negative pressure machine, until the skin is pink and respirations are regular. A straight flow of oxygen should then be used. If the baby remains pink but does not increase its depth of respiration or cry, stimulation with 5 per cent carbon dioxide or mouth-to-mouth resuscitation should be tried. Excessive pressure must be avoided.

Flaccidity indicates a precarious state of shock with circulatory failure. Respirations occur at long intervals, and there is pallor or gray cyanosis and lack of muscle tone. The cord does not pulsate. Owing to lack of

(7) New England J. Med. 235:894-896, Dec. 19, 1946.

tone, there is respiratory obstruction from juxtaposition of tongue, soft palate and pharynx. Treatment should include the previously described general measures with the important addition of intubation, at first with suction and then with insufflation of gases as in the stage of spasticity. Intubation by laryngoscope is preferable.

All infants requiring treatment for anoxia should be placed in an incubator with continuous oxygen administration for 6-12 hours. The value of stimulant drugs is debatable.

Revised Treatment of Pemphigus Neonatorum. Jos. Síbek and Marie Síbková-Hilgertová[8] (Přerov) report a short and simple treatment of pemphigus neonatorum. Treatment used heretofore was as unsatisfactory as it was laborious and did not prevent complications. Insufficient coherence of skin layers in the newborn is chiefly responsible for failure of the older methods. Mechanical irritation or infectious agents elicit local lymphatic congestion, resulting in formation of pustules and a tendency to intertrigo. Furthermore, lack of cleanliness in the infant's environment plays an important part in the development of the disease and the unhygienic conditions are often difficult to improve.

The authors' treatment consists of application of ultraviolet rays, so that the texture of the newborn infant's skin becomes identical with that of older infants and more resistant to infection. Aside from this local effect, ultraviolet rays have a bactericidal and a general roborant action, especially in dystrophic infants. In addition to this treatment, the infant is bathed daily, a nonirritating disinfectant being added to the bath. Neither recurrences nor the usual complications, such as pemphigus-like furunculosis, developed. This method has been used for several years, and results have been excellent. When this report was written, 114 infants with uncomplicated pemphigus had been treated, 102 (90 per cent) of whom were completely cured within 4-6 day and 10 per cent within 14 days.

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(8) Ceskoslovenska gynaek. 12:137-143, 1947.

[V. D. Allison and B. C. Hobbs (Brit. M. J. 2:1-8, July 5, 1947) treated **111 cases of pemphigus neonatorum.** They found that the main reservoir of infection was the nasal passages of the nursing staff and that the infants were infected in the nursery, not by their mothers. Members of the nursing staff who are nasal or skin carriers of Staphylococcus pyogenes should observe preventive measures such as the application of penicillin ointment to the nostrils two or three times daily. Allison and Hobbs also believe it advisable to discard the large nursery in favor of nursing the mother and infant in a cubicle or in small wards.—Ed.]

Complications and Fetal Mortality in 136 Cases of Multiple Pregnancy are discussed by Equinn W. Munnell and Howard C. Taylor, Jr.,[9] on the basis of cases seen at Bellevue Hospital during the 10 years ending May 31, 1944.

Although only one mother died, the gross fetal mortality rate was four times as great as for single pregnancies. The corrected fetal mortality rate (excluding stillbirths and neonatal deaths of babies whose birth

MOST FREQUENT COMPLICATIONS IN 136 CASES OF MULTIPLE PREGNANCY

COMPLICATION	MULTIPLE PREGNANCY %	TEN YEAR AV. IN 15,398 DELIVERIES %
Polyhydramnion	5.8	0.50
Toxemias of pregnancy	16.0	5.70
Uterine inertia	8.1	3.00
Postpartum hemorrhage (500 cc. or over)	11.7	5.50
Prolapse of umbilical cord	5.8	0.73

weight was less than 3 lb., deaths of babies born with congenital anomalies incompatible with life, macerated stillbirths and deaths from causes unrelated to the multiple pregnancy) was about twice that observed in single pregnancies.

Prematurity is the greatest danger the twin baby faces. Only 53 per cent of the patients were pregnant 36 weeks or more. The average birth weight of the 273 babies born was 4 lb., 7½ oz. Only 116 babies weighed 5 lb. or more at birth. Vertex presentation of both babies or vertex-breech presentation in that order occurred in 70 per cent of the cases. Multiple pregnancy had no appreciable effect on duration of labor.

(9) Am. J. Obst. & Gynec. 52:588-597, October, 1946.

The table shows the incidence of complications in the multiple pregnancy group in comparison with that in all deliveries at Bellevue. Of the patients having hemorrhage, 25 per cent also had uterine inertia.

In fetal mortality the method of delivery of either twin was of secondary importance to prematurity. Mortality was higher for the second twin when delivered surgically. The second twin, therefore, should be allowed about 20 minutes for spontaneous delivery unless bleeding, evidence of fetal distress or maternal complications necessitate immediate intervention. To wait longer than 20 minutes would not seem advantageous. Prematurity should not be considered an indication for forceps delivery of the second twin.

[Those especially interested in the obstetric aspects of twin pregnancies should also read the excellent articles by Alan Guttmacher, who is one of identical twins (Am. J. Obst. & Gynec. 24:76, July, 1937; Ibid. 38:277, August, 1939; M. Clin. North America 23:427, March, 1939). Another interesting paper is by J. C. Hirst (Pennsylvania M. J. 43:1553, August, 1940).—Ed.]

Obstetric Causes of Stillbirths and Neonatal Deaths in 4,000 consecutive deliveries are reported by J. D. Dawson.[1] The commonest cause of death, toxemia of pregnancy, accounted for 22.3 per cent of total infant losses. Since the cause of toxemia of pregnancy is not known, it cannot be prevented. Consequently, signs of toxemia must be detected as soon as they develop and treatment be instituted early. Undue increase of weight or blood pressure above 130/80 are danger signs which warrant immediate hospitalization. Patients with such conditions should not be allowed to continue without treatment for a week or two until graver signs occur. If pregnancy has reached the thirty-fifth week and treatment fails to reduce toxemia within a week, premature labor should be induced. The premature child has a better chance of survival than the fetus allowed to remain in a toxemic environment. If toxemia occurs earlier than the thirty-fifth week, it is necessary to temporize in the interest of the child, though this is often unsuccessful. In 125 of 216 toxemic patients, labor was in-

(1) New Zealand M. J. 45:389-398, August, 1946.

duced. Fetal mortality when labor was induced was 8 per cent; when delivery was spontaneous, it was 20.9 per cent.

Unexplained prematurity, the second most frequent cause of death, accounted for 17 per cent of total infant loss. Little is known of the cause of prematurity but dietary deficiencies, endocrine abnormalities and psychologic factors seem the most likely possibilities.

Breech delivery was the cause of death in 12.3 per cent of infants, and in these asphyxia from delay in birth of the head was the usual cause of death. The hazard of breech delivery is much higher for primiparas than for multiparas. External version in the later weeks of pregnancy may prevent breech presentation. In these patients no interference with delivery should be initiated until the cervix is completely dilated. Episiotomy should be performed when necessary. An airway to the nose and mouth should be used when delivery of the head is delayed, and use of forceps is preferable to traction through the slender fragile neck.

Infant mortality in patients with placenta praevia was 24 per cent. In incomplete placenta praevia, membrane puncture, tight abdominal binder and small doses of pituitrin are sufficient treatment. If not, bleeding may be stopped by scalp traction to compress the placental site. Cesarean section is the treatment of choice in central placenta praevia. Transfusion is also of great value in these cases.

Abnormal positions of the head, forceps delivery and disproportion accounted for only 9 per cent of total infant loss. More than half of the fetuses in occipitoposterior positions were born with the face to the pubis, and three fourths of them were born spontaneously. Forceps delivery was the cause of death in only 3 per cent. In cases of cephalopelvic disproportion, infant mortality was 9.4 per cent. For these patients, a trial of labor was made, followed when necessary by cesarean section. In 44 cases in which cesarean section was performed because of disproportion, there were three infant deaths.

Study of Causes of Fetal and Neonatal Mortality on Obstetric Service of Bellevue Hospital. John S. Labate[2] (New York City) bases his report on autopsies performed during 10 years beginning July 1, 1933, on 318 term, 319 viable premature and 231 nonviable premature infants. Prematurity accounted for 27.6 per cent of the 868 deaths. Autopsy revealed conditions attributable to immature development of vital organs.

Measures of value in lowering the death rate from prematurity include delaying the onset of labor as long as possible, avoidance of excessive use of sedation, oxytocics and artificial rupture of membranes, shortening of the second stage of labor, episiotomy to eliminate strain on the fetal head by pressure of a resistant pelvic floor and energetic measures to initiate respirations.

Pulmonary lesions accounted for 22.5 per cent of deaths and were the commonest cause of death among term infants. Aspiration of amniotic fluid, as evidenced by epidermoid cells and meconium droplets in large numbers in alveolar spaces, was the cause of the lung lesions which was most frequently demonstrable at autopsy. Aspiration of large quantities of amniotic fluid occurs during intrauterine life as a result of an anoxic or asphyxial state. A fetus showing signs of intrauterine distress should therefore be delivered as soon as conditions compatible with the safety of the mother permit. Pneumonia was the second most frequent type of lung lesion encountered and was of three types: (1) congenital pneumonia, due to aspiration of infected amniotic fluid, usually a result of premature rupture of the membranes and most frequently seen in term infants, (2) aspiration pneumonia resulting from inhalation of vomitus or food, most frequently seen among premature infants, and (3) pneumonia of bacterial origin. Massive hemorrhage was the third most frequent lung lesion. Such hemorrhage may result from initiation of respiration during passage of the head through the vagina or from too energetic attempts at resuscitation.

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(2) Am. J. Obst. & Gynec. 54:188-199, August, 1947.

The third largest cause of death was birth trauma (16.9 per cent), intracranial, spinal and intra-abdominal types being most frequent. Laceration of the dural septums and subdural or subtentorial hemorrhages were the commonest lesions in term infants and were usually related to difficult operative delivery. Subarachnoid and subventricular hemorrhages were common in premature infants and often occurred in infants born spontaneously. Spinal injuries, usually cervical, were most often sustained during delivery of the head in breech presentations.

A large group (16.5 per cent) of infants on whom autopsy was performed were extensively macerated. In over half of these cases, no maternal cause for death of the fetus could be ascertained. Toxemia and vaginal bleeding due to premature separation of the placenta were found in 32.8 per cent of mothers delivering macerated fetuses.

[The only certain way to determine the cause of fetal and neonatal deaths is by autopsy; hence, the more frequently autopsies are done the greater the accuracy of reported statistics. E. L. Potter and F. L. Adair (Am. J. Obst. & Gynec. 45:1054, June, 1943) reported infant and fetal mortality among 27,321 infants born at Chicago Lying-In Hospital. The autopsy rate was more than 90 per cent among the 1,173 deaths. A. D'Esopo and A. A. Marchetti (Am. J. Obst. & Gynec. 44:1, July, 1942) analyzed 1,000 fetal and neonatal deaths from 25,823 births at the New York Lying-in and Sloane Hospitals. Incidence of autopsies was 89.3 per cent. Potter (J. A. M. A. 124:336, Feb. 5, 1944) prepared a revealing chart to show the causes of infant and fetal death at the Chicago Lying-In and the two New York hospitals. —Ed.]

Clinical Significance of Rh Antibodies (Rh Agglutinins and Blocking Antibodies) in Serums of Rh-Negative Mothers: Study of 179 Cases. Joan Howard, S. P. Lucia, Marjorie L. Hunt and Barbara C. McIvor[3] (San Francisco) undertook this study to determine the relation between serologic data of the mothers and clinical conditions found in their infants. In 15 per cent of 61 Rh-negative women bearing normal Rh-negative fetuses, isolated antepartum appearances of Rh agglutinin were demonstrable. Most of the reactions were of very low

(3) Am. J. Obst. & Gynec. 53:569-595, April, 1947.

titer. In 78 Rh-negative women delivered of normal, Rh-positive infants, 31 per cent showed isolated positive reactions ante partum, and 29 per cent of 48 women gave positive postpartum reactions. Rh-negative women who were delivered of Rh-positive infants diagnosed as having subclinical hemolytic disease showed higher Rh-agglutinin titers late in pregnancy. The serums of all 20 Rh-negative women bearing children with frank hemolytic disease contained varying amounts of demonstrable Rh agglutinin at some time before delivery. Of the 16 patients who were tested for blocking antibodies, evidence of blocking was found in 69 per cent. In 80 per cent of 15 cases, blocking antibody was present after parturition.

If immunization occurs early in pregnancy or blocking antibodies mask the Rh agglutinins, Rh antibodies of low titer in Rh-negative women having Rh-positive husbands may be significant. False positive tests for Rh antibodies may be due to the "carry-over" phenomenon or to pregnancy itself. Although antibody formation occurs more often among multiparous than primiparous women, testing is important regardless of parity because of the ease of immunization and the fact that the patient may have forgotten an incident which occasioned immunization. In general, no patient demonstrating a high antepartum titer of either antibody, especially early in pregnancy, was delivered of a clinically normal Rh-positive infant.

No definite cause-and-effect relation between the Rh agglutinin and blocking antibody could be found. The significance of apparent reciprocity between the two titer trends is not clear. Rh agglutinin is sometimes demonstrable in the maternal serum by the twentieth week ante partum, whereas blocking antibody may not be demonstrable earlier than the tenth week ante partum. Blocking antibody may be produced not as a defense for the mother, as is Rh agglutinin, but as a protection for the erythrocytes of the fetus.

Rh Factor. Edith L. Potter[4] (Univ. of Chicago) summarizes recent developments.

When the Rh factor was first recognized, it seemed that human blood could be differentiated into two varieties—Rh-positive and Rh-negative. It was soon found, however, that Rh was not a uniform entity but was composed of several fractions which might exist individually or in various combinations. The three whose existence has been established are called Rh_o, Rh′ and Rh″ and are found in the erythrocytes of about 85 per cent, 70 per cent and 30 per cent respectively of all white races that have been studied. Each is capable of antigenic activity and can elicit the production of specific antibodies—designated anti-Rh_o, anti-Rh′ and anti-Rh″—when introduced into the circulation of susceptible persons.

The original antibodies which were produced experimentally and the human antibodies which were first recognized were of the anti-Rh_o variety. Serum containing these antibodies is the only type widely available for Rh testing. The result of its use is that not only persons lacking all fractions of the Rh antigen but also persons whose blood contains combinations of various Rh fractions are considered Rh-negative. Thus an Rh-positive person, as the term is generally used, may possess anti-Rh agglutinins. The variety of antigen he possesses and that causing his immunization must be different.

Not long after the Rh factor was discovered, another antibody was discovered which was designated anti-Hr because of its seeming relationship to anti-Rh. Subsequently two varieties of anti-Hr agglutinins, indicating the presence of corresponding Hr antigens, were identified, and a third is believed to exist. Reactions to the Hr as well as to the Rh factor have been established as causes of erythroblastosis.

All human blood cells contain one or both varieties of each of three pairs of antigens; all cells will consequently

(4) Med. Clin. North America 31:236-242, January, 1947.

possess Rh′ or Hr′ or both and Rh_o or Hr_o or both and Rh″ or Hr″ or both. Each chromosome carries only one member of each of the three pairs. Eight possible combinations exist. With two chromosomes 27 different combinations are theoretically possible.

In the few laboratories in which all three anti-Rh serums and anti-Rh′ serum are available, the genotype of most persons can be established. However, since anti-Hr″ serum has been recognized only once or twice and no anti-Hr_o has been found, a complete genetic analysis of the Rh constituents of all bloods is not yet possible.

Maternal immunization is evidenced by either agglutinating or blocking antibodies, which are antigen specific. Concentration of agglutinating antibodies usually diminishes more rapidly, but they too occasionally persist for many years.

No means of prevention has been found for immunization of susceptible women during pregnancy or for erythroblastosis in Rh-positive babies of immunized mothers. The treatment of erythroblastosis in the infant after birth is symptomatic. If anemia exists, transfusions of Rh-negative blood should be given immediately.

Serology and Obstetrics. R. T. LaVake[5] (Minneapolis) presents three cases which suggest that the blood group, especially A and B, and the Rh factor of fetus and mother have an etiologic significance in the toxemia of pregnancy. Routine determination of these factors in the husband and wife is of more frequent use and of as great value as routine determination of their Wassermann status. It permits more accurate segregation of cases that bear special watching and permits the physician to be more sure of the matings that are not likely to result in toxemia of pregnancy, premature separation of the placenta or fetal injury, death and abortion due to a toxin-antitoxin mechanism. It also permits the building up of available sources of Rh-negative blood of every group so that blood is available if needed.

The widespread dread aroused by articles in the public

(5) Am. J. Obst. & Gynec. 53:459-466, March, 1947.

press and magazines concerning the Rh factor can be quieted by making patients realize the extreme infrequence of fatal results. The blood testing procedure is reassuring, and it also eliminates the necessity of mentioning the Wassermann test.

Application of Knowledge of Rh Factor as it affects policy at the Woman's Clinic of the New York Hospital is summarized by John Totterdale Cole[6] (Cornell Univ.).

At the first visit the Rh type of all patients is determined, and that of the husbands of Rh-negative patients is ascertained, whenever possible. If later an obstetric emergency requires administration of large volumes of blood, delay is avoided.

Tests for antibodies help the physician to predict accurately the outcome for the infant and to prepare for prompt treatment of the newborn infant who shows hemolytic disease. Beginning about the thirty-seventh week, weekly anti-Rh determinations are made on all Rh-negative patients. In those who have borne infants with hemolytic disease antititers are made earlier, for in these patients the fetus may die in utero as early as the twenty-fourth week. Incidence of proved hemolytic disease during the past three years was 1 case in 230 deliveries. Fifty-five patients with antibodies were delivered; all but 2 of the 36 cases of hemolytic disease occurred in this group. In 19 infants, no evidence of the disease was seen.

Close observation is given the patient who has demonstrable antibodies. Rh-negative, group O blood is made ready for mother or infant. Cord blood samples are taken for determination of the infant's hemoglobin and Rh type as well as for smear study of cord blood. If the infant appears normal, hemoglobin determinations and blood smear examinations are made at six hour intervals to detect any change at the earliest possible moment.

Fetal mortality remains high. In the hydropic form of hemolytic disease, there is no treatment. In the anemic form of the disease, mortality can be reduced by prompt

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(6) Am. J. Obst. & Gynec. 53:181-189, February, 1947.

diagnosis and administration of Rh-negative blood in sufficient quantities. In treating the jaundice type of the disease, hemoglobin and erythrocyte levels have been used as an index of need for transfusion. Results have been discouraging. In infants with minimal jaundice at birth, exsanguinating transfusion may be given.

If further study indicates that the Rh-positive infant of the woman with demonstrable antibodies will have hemolytic disease, exsanguinating transfusion soon after delivery may reduce fetal mortality.

Therapy of Erythroblastosis Foetalis with Exchange Transfusion is reported in detail in two cases by A. S. Wiener, I. B. Wexler and T. H. Grundfast[7] (Jewish Hosp. of Brooklyn).

The method of exchange transfusion entails use of heparin (0.6 cc. in three divided doses, the last being given midway in the procedure), use of the saphenous vein for the infusion and the radial artery for bleeding. If an amount of Rh-negative blood equal to twice the volume of the infant's blood is injected and an equal amount simultaneously withdrawn, substitution of approximately 90 per cent will result. Intravascular conglutination of the residual 10 per cent of the infant's Rh-positive blood has been avoided in recent cases by removing one half of the donor plasma and replacing this with saline solution to reduce the conglutinin content. Furthermore, injection of less than 50 cc. more blood than is withdrawn avoids the danger of producing polycythemia. When the blood count is high, the viscosity of the blood is increased and the circulation slowed, producing conditions favorable to intravascular clumping.

The curve of elimination of the donor's erythrocytes from the infant's body is practically linear. The maximum survival period for the donor's erythrocytes appears to be about 12 weeks. As the infant's total red cell count drops, the question arises whether the infant should receive another transfusion. In making this decision, the physician should be guided not only by the

(7) Bull. New York Acad. Med. 23:207-220, April, 1947.

blood count, but also by the smear for reticulocytes and the differential agglutination tests. Appearance on the smear of a shower of reticulocytes is a sign of active regeneration, and transfusion may be withheld even when the hemoglobin concentration is as low as 50 per cent. If the differential agglutination tests show no Rh-positive cells and there are no reticulocytes on the smear, a small supplementary transfusion of about 60-70 cc. blood may be advisable when the hemoglobin concentration drops below 60 per cent.

Hematologic observations in the infant vary according to the type of antibody produced by the mother. Univalent antibodies pass the placental barrier more readily than bivalent antibodies. In the presence of the latter, the agglutinins enter the infant's body mainly during labor and are largely removed by exchange transfusion. On the other hand, univalent antibodies pass through the placenta continuously during the latter part of pregnancy and accumulate in the fetal body in quantities large enough not only to coat the erythrocytes but also to permeate the blood serum and tissue fluids. Therefore, only a small portion of the antibodies are removed by the exchange transfusion.

Of 17 infants treated by this technic, many of whom were critically ill, all but 1 made a prompt and lasting recovery.

Review of Cases of Rh Isoimmunization during Past Five Years in Royal Victoria Montreal Maternity Hospital. Among 12,114 deliveries N. W. Philpott, J. P. A. Latour and G. J. E. vanDorsser[8] (McGill Univ.) report 37 clinically diagnosed cases of hemolytic disease of the newborn, of which 30 were considered proved. In these 30 cases there were 19 live births, and of 13 children still living 8 are normal and 3 definitely subnormal; the status of 2 is unknown. The disease occurred most often in infants born of second and third pregnancies. There was a high incidence of fetal mishaps among the previous and subsequent pregnancies of these mothers.

(8) Am. J. Obst. & Gynec. 52:926-937, December, 1946.

Rh antibodies were demonstrated post partum in 23 of the 30 mothers. Of these, 13 were the blocking type, 3 were the agglutinating type and 7 showed a combination of both. The blocking antibody persists longer and has a tendency to be of higher titer than the agglutinating type.

No other complications of pregnancy could be related to Rh isoimmunization. Retroplacental hemorrhage was specifically searched for.

Interruption of the pregnancy at the thirty-sixth week did not yield good results. Among 7 of the 30 patients so managed, there were 3 stillbirths and 4 live births with survival of only 1 infant. Of the remaining 23 full term deliveries there were 8 stillbirths and 15 live births with survival in 12.

All obstetric patients are typed with standard Rh_o agglutinating serum. The husbands of Rh-negative women are also typed. Tests for antibodies and repeated estimations of antibody titers are done as indicated. A rise of antibody titer to 1:100 indicates fetal involvement.

During labor and delivery, care must be taken to avoid diminishing maternal blood oxygen content in order to avoid accentuation of fetal anoxia.

Babies of Rh-negative mothers are typed immediately after delivery, and daily hemoglobin determinations are done on all Rh-positive babies in this group during their hospital stay. Repeated small transfusions of Rh-negative whole blood are given to all such babies who have hemoglobin levels below 90 per cent at birth or who show more rapid daily drop than normal.

Some Clinical Aspects of Rh Factor in Obstetrics are discussed by E. L. King and J. W. Davenport, Jr.[9] (Tulane Univ.).

Erythroblastosis foetalis occurs about once in 500 deliveries, and in approximately 90 per cent of these the mother is Rh-negative and the father and the infant are Rh-positive. The remainder may be due to isoimmuniza-

(9) Am. J. Obst. & Gynec. 52:917-925, December, 1946.

tion due to Rh subtypes, to the A, O and B blood factors or to the rare Hr factor. Erythroblastosis foetalis occurs in three forms, the anemic, the icteric and the hydropic. Mortality is about 55-60 per cent, the prognosis being gravest in the hydropic type and best in the anemic type.

Tests for Rh factor should be carried out on all pregnant women. When the mother is Rh-negative, the father should also be tested. If he is negative, the fetus will also be.

In Rh-negative women with Rh-positive husbands, tests for Rh antibodies as well as for blocking antibodies should be performed. This procedure is imperative in multigravidas and in primigravidas with history of previous transfusion. If antibodies are absent, the prognosis for the fetus is good. If they are found, the titer should be determined at frequent intervals, and if it rises as the pregnancy progresses induction of labor or cesarean section at 7½ or 8 months might enhance the infant's chances.

After delivery, the erythroblastotic infant should be given a transfusion of Rh-negative blood at once, and this procedure should be repeated as often as indicated. The umbilical veins can be used for transfusion.

The chance of securing a healthy baby in subsequent pregnancies when one or more erythroblastotic children have been delivered is not good unless the husband is heterozygous, in which case the chance is about 50 per cent. If the husband is homozygous, the next pregnancy should not occur for several years after repeated negative tests for antibodies. Even then the risk is great, since the reticuloendothelial system probably retains the sensitization for life. Artificial insemination from an Rh-negative donor might be performed with due regard for moral and legal implications.

It is imperative that all Rh-negative women requiring transfusion, at whatever age, receive only compatible Rh-negative blood.

False Positive Rh Typing Obtained with Commercial Anti-Rh_0 Serum. Richard D. Pettit and Edward Evans[1] (Pasadena, Calif.) report a case in which a persistently false Rh-positive reaction in typing was obtained by using a commercial anti-Rh_0 serum and unwashed cells. The patient had been sensitized previously by a transfusion of Rh-positive blood and by a pregnancy in which the fetus was probably erythroblastotic. When typing was done with human anti-Rh serum, the patient and her child were found to be Rh-negative; the patient's father and her husband were Rh-positive, and the patient's serum contained anti-Rh agglutinins.

The authors suggest the possibility of false Rh-positive typing reactions and advise extreme caution in accepting a positive Rh reaction in typing when there is clinical evidence of erythroblastosis or a history of transfusion reactions. In such cases, human antiserum of known potency and washed cells should be used for typing. The authors speculate on whether or not these false positives occur only in persons already sensitized to one of the Rh antigens, and whether or not the coating of cells with a blocking antibody could cause them to agglutinate in the presence of an agglutinin.

Antepartum Prediction of Hemolytic Disease of Newborn. Ernest W. Page, Marjorie Hunt and S. P. Lucia[2] (San Francisco) report results of a statistical study which tend to confirm a relation between duration of exposure to maternal antibodies and fetal prognosis. Complete data were available in 49 cases.

Nineteen patients showed only traces of either agglutinating or blocking antibodies, or an isolated finding of a small amount was unconfirmed by subsequent repeated tests. Only one instance of possible erythroblastosis foetalis occurred in this group; the baby had slight increase in the number of nucleated red blood cells at birth and mild anemia.

In eight patients appreciable amounts of antibodies

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(1) Am. J. Obst. & Gynec. 53:596-598, April, 1947.
(2) Ibid. 52:794-796, November, 1946.

were found from one to nine weeks ante partum. Seven normal Rh-positive infants and one normal Rh-negative infant were born to these patients.

In 22 patients appreciable amounts of antibodies appeared more than 10 weeks before delivery. Sixteen of the infants had erythroblastosis foetalis, and 10 died. Of the six normal infants, four proved to be Rh-negative children of mothers who had been previously sensitized; presumably the current pregnancy elicited a nonspecific anamnestic recall of Rh antibodies. The remaining two exceptions could not be explained.

Further influence of appearance time of antibodies is demonstrated by the fact that in 10 of these 22 patients, antibodies were found from 10 to 14 weeks ante partum. Of the eight Rh-positive babies in this group seven had hemolytic disease, and of these three died of icterus gravis. On the other hand, all 7 cases of hydrops foetalis occurred in the 10 Rh-positive infants born to patients in whom antibodies appeared at least 15 weeks before delivery.

On the basis of these observations, the authors make the following suggestions. All pregnant women should be typed routinely, regardless of parity, and in Rh-negative patients with Rh-positive husbands the first sample of blood for antibody determination should be obtained not later than the twenty-fourth week of pregnancy. If the sample is strongly positive for either agglutinating or blocking antibodies, an Rh-positive fetus will probably be too seriously affected by hemolytic disease to warrant interference before term, whereas an Rh-negative fetus will escape the disease. As yet, there is no way to determine which of these possibilities will occur except to prove that the father is homozygous for the Rh factor. If the antibodies are present only in traces, or if a small amount is found on a single determination and is unconfirmed by subsequent tests, the fetus is probably unaffected, and it would be unwise to interfere.

If the initial sample is free from antibodies but a significant amount appears later, 8-10 weeks may be allowed

to pass before hemolytic disease becomes a probability. After this time, induction of labor might be warranted provided the expected date of confinement was within the ensuing six weeks.

Prophylaxis of Hemolytic Disease of Newborn. By routinely testing serums of all Rh-negative mothers during pregnancy for presence of one or more of the Rh antibodies and obtaining titers of the amount of antibody if present, it is now possible to predict hemolytic disease of the newborn. Rh-negative blood of the proper group can then be made available for transfusion of the infant as soon after birth as possible. Although the mortality rate of liveborn infants with hemolytic disease of the newborn has been reduced considerably by such means, this form of treatment still fails in a large percentage of liveborn infants and is useless if the child is stillborn or if the patient aborts early. Ideally, the mother should be treated prophylactically during her pregnancy. Such treatment could be directed at one of three objectives: (1) prevention by chemical means of the antigen-antibody reaction's completion, (2) absorption of antibody as soon as formed by means of Rh haptene injections or (3) inhibition of antibody by immunologic means.

Donald H. Kariher[3] (Univ. of Rochester) discusses three patients given chemotherapy in an attempt to prevent progress of the antigen-antibody reaction. All three patients had previously had one or more infants with fatal hemolytic disease of the newborn. In two patients hemolytic disease was due to Rh incompatibility; in the third it was due to O-A incompatibility, the mother being group O and the infant group A. Treatment consisted of weekly intramuscular injections of 2 cc. ethylene disulfonate (each 2 cc. containing 0.000000000002 mg. ethylene disulfonate in distilled water) during the last three, four and six months of pregnancy, respectively. Two patients, after treatment, had normal infants. The third patient had an infant with mild hemo-

(3) Am. J. Obst. & Gynec. 54:1-17, July, 1947.

lytic disease of the newborn who survived after repeated transfusions were given. Kariher does not offer this therapy as a cure but hopes that others will attempt to corroborate his results.

Close observation of the titer of Rh antibody and alpha agglutinin during pregnancy revealed that in the first two patients antibody titer fell from relatively high to relatively low levels. Antibody titer ordinarily remains static or rises gradually during pregnancy. This fall in titer must have been due either to ethylene disulfonate or to distilled water. It does not seem possible that the minute quantity of ethylene disulfonate could have had any effect. Therefore Kariher postulates that injection of distilled water may damage tissues, causing liberation of an "x" substance which, when picked up by the blood stream, neutralizes all the circulating antibody and thus brings about a fall in antibody level. Another possibility is that the "x" substance attracts all antibodies to the site of injury, likewise depleting the serum titers.

Observation of these three patients also suggested that length of time before term that antibody appears in maternal serum, absolute height of antibody titer and degree of agglutination per test tube noted when titration is done should be considered in prognosticating severity of hemolytic disease of the newborn.

Studies in Rh-Isoimmunization in Pregnancy: Observations in a Series of 96 Sensitized Women. Milton S. Sacks, William J. Kuhns and Elsa F. Jahn[4] (Univ. of Maryland) present observations made on a group of 12,275 patients. Included were 96 isoimmunized women, for whom study of quantitative prepartum antibody titer correlated with neonatal mortality.

In the group of 12,275 pregnant women, 1 in 128 deliveries (0.77 per cent) occurred in a sensitized woman. The husbands of 140 of these women were Rh-negative. Incidence of isoimmunization in the total Rh-negative group was 4.84 per cent. If Rh-negative women with Rh-

(4) Am. J. Obst. & Gynec. 54:400-414, September, 1947.

negative husbands are excluded, the incidence rises to 5.26 per cent. Among the 1,635 Rh-negative women with Rh-positive husbands, 727 were primigravidas and 908 multigravidas. There were 9 sensitized Rh-negative primigravidas and 77 sensitized multigravidas.

There is a discrepancy between theoretical potentiality for isoimmunization and its actual occurrence which can be attributed to: (1) relatively infrequent appearance of sensitization in primigravidas and (2) individual variations in placental permeability, antigenic strength and response to antigenic stimulation.

For 79 of the total of 96 women included in this study, the outcome of pregnancy is known. Fifty-three (67.1 per cent) gave birth to infants with varying manifestations of erythroblastosis foetalis. Twenty-six (32.9 per cent) gave birth to offspring with no evidence of congenital hemolytic disease. Isoimmunization is not necessarily synonymous with the occurrence of disease in the newborn infant. In 12,275 deliveries, congenital hemolytic disease occurred 57 times or once in 215 deliveries, an incidence of 0.46 per cent.

The authors feel that the present series is too small to warrant dogmatic inferences but point out that a definite correlation exists between antibody titer and outcome of pregnancy. When serum conglutination titers exceeded 10 units infant mortality was significant.

Clinically detectable isoimmunization was noted to occur in pregnancy, particularly in the last trimester. When found, antibodies are usually of low titer and are not generally associated with evidence of neonatal disease. Patients showing immune bodies throughout a major part of pregnancy, particularly if the titer is significantly increased, give birth in a high proportion of cases to infants with hemolytic disease. It seems, however, that degree of sensitization is more important than duration of sensitization. Labor was found a potent factor in the stimulation of maternal antibody formation. Of 19 patients, 11 (57.8 per cent) showed a significant rise in titer.

Rh antibodies, like other immune bodies, persist in the circulating blood and can be demonstrated for a long time after initial antigenic stimulation. With establishment of an immunized state, successive pregnancies lead to the birth of Rh-positive infants with increasingly severe manifestations of erythroblastosis foetalis. In a group of 14 who had previously given birth to such children, 13 were delivered of similarly affected children in the current pregnancy. Hence, unwitting sensitization is to be avoided. Routine cross-matching procedures are noted to be relatively inadequate in detecting isoimmunization.

Isoimmunization, like erythroblastosis, is essentially a phenomenon associated with multiparity. However, sensitization occurs in many instances at an earlier date than was formerly realized. Of the group of 96 sensitized women in this series, 86 were multigravidas and 10 were primigravidas. In 41 of 84 multigravidas the initial evidence of isoimmunization appeared in the second pregnancy. In the remaining 43, initial isoimmunization appeared in various pregnancies, ranging from the third to the eleventh.

[The literature on the Rh factor is almost overwhelming and difficult to follow. However, the studies being made by workers particularly interested in the subject—Davidsohn, Diamond, Levine, Philpott, Potter, Sacks, Wiener and others—will perhaps help us prevent or overcome erythroblastosis. I should like to summarize briefly the following facts.

The Rh factor is present (positive) in about 85 per cent of white men and women and is absent (negative) in 15 per cent. It is inherited as a mendelian dominant (the Rh factor in Rh-negative persons is the recessive property). Hence, one or both parents of an Rh-positive person must be Rh positive, whereas parents of an Rh-negative person may be either Rh positive or negative. The Rh factor is present in the fetus and remains for life. The reaction between the agglutinin in the plasma and the factor in the red cells is responsible for the serious hemolytic transfusion reactions which follow transfusion of incompatible blood. Wiener and Peters (Ann. Int. Med. 13:2306, 1940) showed that Rh-negative persons may develop anti-Rh agglutinins if transfused with Rh-positive blood. This explains the intragroup blood transfusion reactions in recipients of blood of their own group.

P. Levine, E. M. Katzin and L. Burnham (J. A. M. A. 116:825-827, Mar. 1, 1941) show that agglutinins which develop in Rh-

negative wives of Rh-positive husbands during pregnancy are responsible for fetal erythroblastosis in Rh-positive babies. The antibodies of the mother pass the placental barrier and injure the fetal blood and blood-forming and other tissues, especially the liver and brain. According to I. Davidsohn (M. Clin. North America 28:232, 1944, and J. A. M. A. 127:633-638, Mar. 17, 1945), the three different forms of erythroblastosis—hemolytic anemia of the newborn, icterus gravis and congenital hydrops—are the result of an interlocking chain of events initiated by the antigen-antibody reaction. Erythroblastosis is rare in the first pregnancy, and when it occurs may be due to a previous transfusion of Rh-positive blood to the mother, often in childhood.

Every pregnant woman should be tested for Rh status, and surely before every blood transfusion the Rh status must be determined. However, if a pregnant woman is Rh negative and her husband Rh positive, there is no need for consternation. Between 12 and 13 per cent of all marriages are of this combination, but erythroblastosis occurs only in about 1 of every 300 babies, because few pregnant women become sensitized. All Rh-negative women who have Rh-positive husbands should have their blood examined for Rh agglutinins several times throughout pregnancy. Presence of such agglutinins means that the fetus may be exposed to the action of the maternal antibodies and harm may result. Such studies will indicate in which cases the obstetrician must be ready to treat promptly any abnormality found at birth. Some obstetricians favor interrupting pregnancy either from below or by cesarean section a few weeks before term when agglutinins are found, but I do not favor this line of therapy.

The best treatment for erythroblastosis is transfusion of Rh-negative blood. Several obstetricians use Rh-positive blood, among them E. Frankowski and R. R. Darrow (J. Am. M. Women's A. 1:207-209, October, 1946). Blood replacement therapy has been used with some success. If about 60 per cent of the blood of the newborn is replaced by Rh-negative blood immediately after birth, the baby may survive.

In about 10 per cent of cases of icterus gravis, kernicterus (athetosis, drowsiness, spasticity, mental and physical retardation and other symptoms) appears. This may not show up for many months, hence prognosis must be guarded.

With an Rh-negative wife and Rh-positive husband, the parents and living children of the husband should be examined to determine whether he is homozygous or heterozygous. If homozygous, all his children will be Rh positive, but if heterozygous, one half of his offspring may be Rh negative and therefore will not have erythroblastosis.

The following comment (J. A. M. A. 135:162, Sept. 20, 1947) concerns the use of the Rh factor in a law court: "In a disputed paternity case that arose in New York recently the wife, husband and child submitted to the usual blood grouping tests, with the result that the blood of all three was found compatible. Despite this finding, the husband insisted that he was not the father of the child and Rh blood grouping tests were made which ruled out the husband as the father. Justice Panken of the Domestic Relations Court was convinced by the testimony of the expert witness

who performed the Rh tests and, although he could not find reference to any court case involving the efficacy of the procedure, he held that the husband was not the father of the child. In reaching his decision, Justice Panken referred to a *Journal* editorial of June 17, 1944, which stated that 'medicolegal application of the Rh blood types in cases of disputed parentage is justified, provided suitable potent reagents are available.' "—Ed.]

Stillbirth and Neonatal Death: Clinicopathologic Study. Mary Evans and G. Stewart Smith[5] (Manchester) analyzed reports on 373 fetuses or infants coming to autopsy between the twenty-eighth week of gestation and the end of the fourth week of life. Body weight was used as the index of prematurity, and any fetus or child weighing 5½ lb. or less was recorded as premature. The chief pathologic lesion was given as the cause of death.

Intracranial hemorrhage was responsible for 64 (16.1 per cent) of the deaths. Of these, 14 resulted from forceps delivery and 4 from internal version and breech extraction. In the remaining 39 cases spontaneous vertex delivery occurred. In 6 of these labor was prolonged and in 4 induced; in 1 delivery was rapid, and in 28 nothing abnormal was observed during labor or delivery. Incidence of intracranial hemorrhage might be reduced by wider use of episiotomy in vertex deliveries, especially when the infant is immature, as were 18 in the group studied.

Asphyxia accounted for 101 deaths (36 per cent). Of these, 74 were stillbirths and 27 neonatal deaths. Accidental antepartum hemorrhage or placenta praevia occurred in 24 cases, maternal toxemia with placental insufficiency due to infarction in 14, prolonged labor with fetal distress in 7 and cord complication, including prolapse and twisting of the cord around the neck, in 17. Although some authors discredit the role of such twisting, it was almost undoubtedly the cause of asphyxia in some cases. No cause for asphyxia was found in 41 cases. Probably a certain number of these deaths could have been prevented by more careful auscultation of the fetal heart during the second stage of labor and by rapid delivery when signs of fetal distress occurred. Morphine,

(5) J. Obst. & Gynaec. Brit. Emp. 53:440-452, October, 1946.

hyoscine or barbiturates were not used in any of these cases.

Atelectasis was found in 23 infants (6.4 per cent). Most died within a few hours but some survived for several days. The etiologic factors were the same as in asphyxia. Prematurity was undoubtedly an important factor in 17 of these cases, as it was in 37 cases of asphyxia.

Infection was responsible for 72 deaths (19.3 per cent of all deaths or 31.7 per cent of those in the neonatal group). More than half were due to lung infections, particularly staphylococcic. Penicillin is now being tried in these infections, but the diagnosis is so difficult and the disease progresses so rapidly that penicillin will have to be given very early to be effective. The authors believe that it is justifiable to give penicillin as soon as an infant, especially a premature one, begins to refuse food. Of the other infections, gastroenteritis accounted for six deaths, but the authors recognize that a small epidemic of enteritis might alter these figures. A variety of infections accounted for the remainder of the deaths. If a child survives the hazards of birth, infection is its greatest danger, and this danger is increased if the child is premature.

Of 34 babies dying from miscellaneous causes, 20 had erythroblastosis foetalis and 3 hydrops foetalis. These conditions, which are relatively common and grave, demand prompt recognition and treatment. Rh testing of mothers and babies should be routine. Labor should be induced in mothers showing a rise in agglutinin titer, and babies with significant drops in hemoglobin level should receive Rh-negative transfusion.

Congenital abnormalities accounted for 39 deaths (10.7 per cent). There was no history of rubella in the early months of pregnancy in the 25 cases which the authors were able to trace. Cause of death was not determined in 36 cases (9.65 per cent).

Because prematurity was an important factor in many of the deaths, the authors feel that premature labor should be induced only for definite reasons and should

whenever possible be delayed until 34-36 weeks gestation.

Prophylaxis against Ophthalmia Neonatorum: Clinical Comparison of Penicillin and Silver Nitrate: Preliminary Report. In a study reported by H. Charles Franklin[6] (Univ. of Tennessee), penicillin was used for prophylaxis in the eyes of each newborn infant delivered at John Gaston Hospital, Memphis, for four months, and for comparison silver nitrate was used for three.

PROCEDURE.—Crystalline sodium salt of penicillin was used in a concentration of 2,500 units per cc. Sterile isotonic solution of sodium chloride was used as a diluent, except during 1½ months, when sterile distilled water was used. A fresh solution was made as needed but was not kept longer than a week. It was kept refrigerated below 59 F. when not in use. Silver nitrate was used as 1 per cent solution in distilled water. A fresh solution was made each day and dispensed in a new dropper bottle.

Prophylaxis was carried out in the delivery room within one hour of birth. After cleansing of the eyelids and adjacent area by gently wiping with a large ball of cotton from the inner canthus outward, gauze on the fingers was used for traction to open the eyelids while each eye was flushed thoroughly with 2 or 3 cc. sterile isotonic solution of sodium chloride (or sterile distilled water). One drop of penicillin solution was then instilled into the conjunctival sac of each eye. In the nursery a single drop of penicillin was instilled daily in each eye of each infant for the first three days of life.

When silver nitrate was used, prophylaxis was carried out in the delivery room in the same manner, except that one drop of silver nitrate was used instead of penicillin, and sterile distilled water was used for flushing the eyes. No prophylaxis was given in the nursery.

Of 961 infants treated with penicillin, 20 (2.1 per cent) showed pus in one or both eyes during or after prophylaxis. Of 749 treated with silver nitrate, 45 (6 per cent) showed pus. Occurrence of pus in relation to the day of life was sporadic in approximately half the infants in the group treated with penicillin but showed grouping around the day of birth and first day of life in the group treated with silver nitrate.

Swelling of the eyelids was noted in 31 per cent of

(6) J. A. M. A. 134:1230-1235, Aug. 9, 1947.

infants after penicillin prophylaxis and in 58 per cent after silver nitrate; conjunctival redness was noted in 42 per cent after penicillin and in 72 per cent after silver nitrate. Gonococcic conjunctivitis did not develop in any of the penicillin-treated group, but did develop in one infant in the group treated with silver nitrate on the fourth day of life. As to infants that could be followed up at home, 93.7 per cent of those who had had penicillin and 96 per cent of those who had had silver nitrate were free from abnormalities of the eyes. Four of the penicillin-treated group and two of the silver nitrate-treated group were hospitalized. No gonococcic conjunctivitis developed in either group during the first two weeks at home.

Franklin prefers penicillin prophylaxis because it is without danger of permanent injury to the eye; instillation is not painful; ocular abnormalities are less frequent during the first days of life; the solution need not be made fresh each day; there is no danger of noxious substances being produced by deterioration, and the penicillin can be used frequently and in any amount desired, and may be used for treatment as well as for prophylaxis.

[Penicillin has been used not only to prevent but also to treat ophthalmia neonatorum. A. Sorsby (Brit. M. J. 2:322-327, Aug. 30, 1947) treated 224 patients locally and systemically. The optimal method for ophthalmia is yet to be determined. Sulfonamides still have the advantage of simplicity of administration over either local or systemic use of penicillin.

In a letter to the J. A. M. A. (135:306, Oct. 4, 1947) L. Lehrfeld mentioned that in June he presented a resolution before the Section on Ophthalmology of the American Medical Association condemning the use of silver nitrate and urging its replacement by antibiotics in the prevention of ophthalmia neonatorum. Lehrfeld says that ophthalmologists have discovered that the efficiency of silver nitrate is in the use of irrigating solutions, principally salt solution and boric acid. "Credé originally emphasized the cleansing of the birth canal, using silver nitrate in the babies' eyes only as a secondary thought. Through the years both the obstetricians and the ophthalmologists forgot completely about the source of infection, namely the birth canal, and found it convenient to believe in the safety of one drop of silver nitrate in the eyes of the newborn. . . . It is unscientific to treat or prevent any disease except at its sources. It is my contention that the babies' eyes should receive no preventive treatment whatever. Emphasis should be placed on partial sterilization of the birth canal for at least twenty-four hours before delivery. This can be accomplished by the use

of penicillin vaginal suppositories or by the parenteral use of penicillin, using a single dose of 300,000 units in oil. . . . Approximately 98 per cent of all babies would escape infection even if 100 per cent of the mothers were infected with pathogenic organisms. In other words, there is a natural safety of 98 per cent by natural means. It is not necessary to put irritating chemicals in the eyes of all newborn babies in order possibly to save infection of the other 2 per cent. It is my personal experience that all cases of gonorrheal ophthalmia in the newborn can be positively cured in a few days. There is no need for blindness to result. . . . The prevention of ophthalmia neonatorum should be directed to the treatment of the infected expectant mother by the use of antibiotics, and the eyes of the newborn should receive no treatment whatever. Should an occasional case of infection in the newborn develop, penicillin will cure it."

If these statements represent the general opinion of ophthalmologists, we shall have to change our state laws concerning the instillation of silver nitrate in all newborn babies and we should give up using any prophylactic measures in the babies' eyes as a routine.—Ed.]

Final Observations on Congenital Defects in Infants Following Infectious Diseases during Pregnancy, with Special Reference to Rubella are reported by Charles Swan, A. L. Tostevin, and G. H. Barham Black[7] (Univ. of Adelaide). Of the 61 children comprising their first and second series, the authors were able to re-examine 49. The most important result of resurvey was detection of deaf-mutism in four additional children. In one patient spontaneous absorption of a cataractous lens had occurred. Many of the children were retarded in their physical development.

In 22 of the 28 cases in which further information was available regarding the period of gestation at which rubella occurred, it was necessary to modify the earlier assessments. In most the duration of pregnancy had been overestimated.

A fourth series of 25 cases was studied. In 17 instances the mother had rubella during pregnancy. One mother also had chicken pox. Of the babies born subsequently, 15 had congenital defects including cataract, deaf-mutism, heart disease, microcephaly, umbilical hernia, bifid uvula, mental deficiency, epilepsy, speech defect and concomitant strabismus. Rubella occurred during the first four months of pregnancy in 13 of the 15 mothers.

(7) M. J. Australia 2:889-908, Dec. 28, 1946.

In the two cases in which the infants were normal, on mother had rubella in the first month and the other i the seventh month of gestation. In the remaining eigh cases infectious diseases during pregnancy included thre cases of morbilli with one abnormal baby, two cases o mumps with both infants defective, one case of scarle fever with a normal baby, one case of "rheumatic in fluenza" with a malformed infant and one case o pustular rash with a defective baby.

Survey of the combined series revealed that among 9 mothers of congenitally defective children from whom information regarding subsequent pregnancies was available, only 34 became pregnant again. Of the 42 children born subsequently to these 34 mothers, only 1 had a congenital defect, and there was no reason to suspect that this was due to the antecedent rubella.

Of the 62 babies in the combined series whose mothers had rubella during the first two months of pregnancy, only 3 were free from congenital abnormalities.

[M. W. Evans (M. J. Australia 1:780-785, June 28, 1947) reports that of 67 children born of mothers who had rubella during pregnancy, 30 showed congenital dental abnormalities, of major degree in 20. All but five of these babies showed other congenital malformations. The main abnormalities occurred in children of mothers who had contracted rubella during the first three months of pregnancy. L. A. Hopkins (Am. J. Dis. Child. 72:377-382, October, 1946) reports 10 cases of congenital deafness in which the mother had German measles during pregnancy. She also reports two cases of deafness in which the mother did not have rubella but had influenza and six cases in which the mother did not have any virus disease during pregnancy.

We must accumulate a great deal more information about the relation of German measles to fetal monstrosities before we can make rigid rules about the conduct of pregnancy in cases when German measles is contracted early in pregnancy. Of course fetal monsters occur in the absence of German measles and there are some women who have German measles early in gestation who give birth to normal babies. However since at present there is considerable evidence that most of the babies born of mothers who contract rubella in the first three months of pregnancy, are abnormal, I believe that an abortion is indicated in such cases. In women who contract German measles after three months of pregnancy, the chances of a monstrous development are not great.—Ed.]

Etiology of Mongolism. Theodore H. Ingalls[8] (Harvard Univ.) presents epidemiologic and teratologic proof

(8) Am. J. Dis. Child. 74:147-165, August, 1947.

that the causative agents related to mongolism are relatively numerous and that changes effected by these agents in the placental circulation are limited in number and exert their action on the embryo at about the eighth week of gestation.

Frequency of mongoloid infants at the Boston Lying-in Hospital during 1931-44 was 3.4 per thousand live births. From this sampling, it may be estimated that about 7,000 mongoloid infants are born in the United States each year.

Beidleman estimated that 145 mongoloid males were born for every 100 females, as compared with 105 males to 100 females in the normal population. Other authors question these figures and state that females are frequently kept at home, whereas males are more likely to be committed to an institution. Of the 1,002 mongoloid persons in three series, 580 were males and 422 females.

Bleyer states that the peak maternal age in the United States in 1934 was 24, whereas the peak age of mothers producing mongoloid offspring was 41. In a selected group of primiparas the risk of producing a mongoloid baby was shown to be significantly greater with advancing age.

Lahdenshu and others reported data showing that the more children there are in the family, the more likely it is that the child with mongolism will be last.

According to Schröder, 19.5 per cent of 99 women who gave birth to mongoloid babies had severe bleeding. Of 75 mothers of mongoloid children surveyed by Benda, 24 per cent either attempted abortion or were threatened with spontaneous abortion as evidenced by hemorrhage during pregnancy.

Conte and associates report that five patients who had rubella during early pregnancy gave birth to infants with congenital defects, these authors conclude that environmental factors operating for the first time after fertilization of the ovum can cause congenital abnormalities. The total reported congenital deformities after rubella number less than 500, but this includes three instances of mongolism.

Teratology is useful in classifying and dating the origin of many embryologic disturbances. Study of the frequently occurring synchronisms grouped about the primary stigma of mongolism suggests that in the search for etiologically related agents attention should be centered on the sixth to ninth weeks of fetal life. It is then that anomalies susceptible of embryologic orientation apparently arise.

Available data suggest that mongolism occurs about 58 per cent of the time in males. If verified, this would have a counterpart in the incidence of other congenital conditions such as harelip and pyloric stenosis.

There is ample teratologic evidence that the times of origin of the arrests which characterize mongolism synchronize at about the eighth week of gestation. There is ample epidemiologic evidence of a significant association between mongolism and maternal disease such as hemorrhage, threatened abortion, pathologic abnormalities of the uterus and certain intercurrent acute infections, present or operating at about the same period.

[Ingalls also wrote on the pathogenesis of mongolism based on 50 autopsies (Am. J. Dis. Child. 73:279-292, March, 1947). H. Cummins and R. V. Platou (South. M. J. 39:925-928, December, 1946) maintain that early diagnosis of mongolism can be made by the use of hand prints with about 90 per cent accuracy. They present three dermatoglyphic traits which are important.

J. J. H. Ingalls and J. A. V. Davies (New England J. Med. 236:437-438, Mar. 20, 1947) report seven cases of mongolism associated with intercurrent maternal infections in pregnancy. The fact that in six of the seven cases infection occurred in the second month of pregnancy is thought to be provocative. In answer to this, Madge T. Macklin (J. A. M. A. 135:52, Sept. 6, 1947) points out that in all instances of mongolism in one or both members of a pair of twins, monozygous twins are both affected, and in dizygous twins only one is usually affected. This speaks strongly for a genetic and not a congenital basis for mongolism. This does not preclude the influence of extrinsic factors. C. Benda who wrote an interesting book on the subject (*Mongolism and Cretinism* [New York: Grune and Stratton, Inc., 1946]) found that most patients with mongolism weighed 4,000 Gm. (9 lb.) or over at birth.—Ed.]

Pathogenesis of Spina Bifida and Related Congenital Malformations in relation to maternal isosensitization was investigated by Alexander S. Wiener[9] (Jewish Hosp.

(9) New York State J. Med. 47:985-988, May 1, 1947.

of Brooklyn) in a series of 19 patients. A correlation was found between particular malformations, especially spina bifida and hydrocephalus and erythroblastosis foetalis, and the importance of maternal isosensitization in producing these conditions was shown, even when these anomalies occurred in families without clinical evidence of erythroblastosis foetalis.

A hypothesis concerning pathogenesis of such anomalies is suggested. The antigen-antibody reaction may give rise to intravascular clumping of the fetal erythrocytes. If, early in the development of the fetus, this mechanism interferes with circulation in terminal blood vessels to localized regions, this may prevent closure or "healing," thus producing such defects as harelip and cleft palate, spina bifida and diaphragmatic hernia. If necrosis of an anlage of a limb or an organ is produced by this mechanism, congenital amputations or absence of the kidneys may result. The process occurs early in pregnancy, at a time when the placenta is still relatively impermeable to the passage of antibodies. It therefore becomes necessary to postulate the fortuitous occurrence of a defect in the placental barrier, for example, by infarction or premature separation, permitting the passage of antibodies from mother to fetus. This additional requirement may explain the sporadic incidence of these malformations, so that only occasionally is more than one case found in the same family.