or could not (1 case) be reinserted, or the needle was removed too soon, or the tubing became disconnected, or the catheter became plugged, resulting in return of pain, all 10 being classified as 'technical interruptions' of the method. Six patients had incomplete relief in two of whom anesthesia was unilateral only. In 9 other cases of incomplete anesthesia, the deficiency was remedied by technical corrections such as addition of the vasoconstrictor suprarenin (2 cases) where it had been omitted, increase in the concentration of pontocaine (4 cases), and reinsertion of the needle (5 cases). In 1 case the subarachnoid space was entered; in another this was suspected. No complications resulted. . . . Surgical removal of broken caudal needles was necessary in two cases. . . . Mild blood pressure fall was recorded in 34 cases, but in only six of these was the fall greater than 30 points systolic. . . . Five patients complained of pounding headache during the injection. One complained of momentary chest pain, one of palpitation and one had nausea and emesis after the first injection. Four had chilly sensations. In three patients severe chills were present after injection, one lasting fifty minutes. Three others developed chills with fever. In one the temperatures went to 104° F., and she was disoriented for three hours. In two patients relaxation was so marked that the cervix protruded externally after delivery. Two patients had severe post-partum hemorrhage. There were 13 cases of mild endometritis, 3 of pyelitis and 5 that required catheterization post partum, which is no more than in cases without caudal anesthesia. Motor loss was present to some degree in 154 cases and in 60 of these it was marked. In most cases the onset of motor paresis was delayed for some time after the first injection. One patient had fecal incontinence for three days. One patient developed anal sphincter relaxation, bladder paralysis, and a bilateral foot drop. This patient was a luetic who had received four neosalvarsan injections (2 neo of 0.3 with 0.13 bismuth and 2 neo of 0.6 with 0.13 bismuth) during pregnancy and from whose hair arsenic was recovered post partum. Nevertheless, the paralysis developed during labor. The rectal sphincter gradually regained its tone over a period of ten days but the foot drop improved very slowly and even after nine weeks muscular control is still imperfect. In our experience labor was not shortened. . . .

"Pontocaine-suprarenin-saline solution has proved a safe agent for this method providing 3 to 5 hours of relief from the first dose, and 1 or more hours of relief from subsequent injections. . . . We find that cervical dilatation is not accelerated in this series. The incidence of operative deliveries is increased. . . . One hundred seventy-one of 200 cases were completely satisfactory. . . . There was no maternal mortality. Fetal mortality was 3.0 per cent." 3 references.

J. C. M. C.

MALPAS, PERCY: *The Pattern of the Contractions of the Pregnant Uterus under Spinal Anaesthesia and the Attendant Changes in the Reactivity of the Myometrium.* J. Obst. & Gynaec. Brit. Emp. 51: 112–120 (Apr.) 1944.

"Spinal anaesthesia has two readily demonstrable effects on the pregnant uterus: it releases contractions and it heightens the reactivity of the myometrium to various stimuli. In virtue of these effects spinal anaesthesia provides a method by which certain aspects of the physiology of the pregnant uterus can be studied, notably the pattern of the uterine contractions and the factors which maintain uterine qui-

escence during pregnancy. It is with these effects of spinal anaesthesia and their implications that the present paper is concerned; not with the clinical advantages or disadvantages of this form of anaesthesia. The observations to be discussed have been made over a period of 6 years in a series of patients in whom pregnancy had to be terminated by abdominal section at various periods of gestation from the 10th week onward. . . . Supplementary observations were made in about 20 cases of Caesarean section performed nearer term or during labour. For most of the cases spinal anaesthesia was used. Some of these operations, however, were performed under local or general anaesthesia, and the observations made in these cases served as controls of the special anaesthesia effects. . . .

"The solutions used for the spinal injections were either hyperbaric 10 per cent procaine in a dosage of 0.6 to 1 cc., or hypobaric 1:1,500 percaine in a dosage of 7 to 10 cc. The injections were given in the fourth lumbar interspace and the anaesthesia usually rose to 1 inch below the umbilicus. . . . The effects of spinal anaesthesia suggest that the action of the central nervous system on the human pregnant uterus is one of sustained inhibition. This inhibitory effect is most pronounced in early pregnancy, up to about the sixteenth week, reappearing nearer term. It is an important factor in the maintenance of uterine quiescence, and it is suggested that some cases of spontaneous abortion are due to a sudden suspension of this nervous inhibition. The contractions released by spinal anaesthesia are of two types. In early pregnancy the contractions appear as travelling waves in a pattern which can be correlated with the Müllerian architecture of the uterus, the contractions appearing to spread along paths where the muscle fibres are most condensed. These wave contractions start in symmetrical areas near the Fallopian tubes. As an answer to the dilemma of why the contractions should begin where they do in the absence of any specialized structure which could be called a 'pace-maker,' it is suggested that the nervous inhibition is primarily exerted on these areas. The contractions of late pregnancy are mass contractions affecting all parts of the upper segment equally without dominance of one area over another. The change in the type of contraction is mainly due to an alteration of the mechanical conditions of the muscle fibres, in part to a diminution in the relative importance of nervous inhibition. The reactivity of the myometrium to mechanical stimulation is heightened by spinal anaesthesia. This increased reactivity is most marked in early pregnancy and along the path of the travelling waves. It is suggested that nervous inhibition of the uterus is one of the ways in which an early pregnancy is protected from casual traumata, traumata which otherwise would set up spreading contractions which in turn might determine an abortion." 14 references.

J. C. M. C.

MENGERT, W. F.: *Continuous Caudal Anesthesia with Procaine Hydrochloride in 240 Obstetric Patients.* Am. J. Obst. & Gynec. **48**: 100–102 (July) 1944.

"The use of continuous caudal anesthesia at the University of Iowa began in August, 1942, and this report is concerned with the first 240 obstetric patients on whom the method was tried. The patients were largely unselected, although the major obstetric complications were avoided. Nine men were responsible for the administration of the anesthetic, a fact which must be borne in mind when the failures in this series are discussed, since it is well