ve been ascribed to hyponatræmia,[14] salt depletion,[5,15] or water intoxication.[15]

A possible mechanism, which might explain the observed during high-strength dialysis, is n the accompanying figure. We suggest ime factor producing cramps is excessive n plasma volume. If the dialysate sodium on is 132 meq. per litre and the patient's ater sodium concentration is >140 meq. per re, there will be a loss of sodium from plasma down e concentration gradient to the dialysis fluid as well the iso-osmotic sodium and water transfer effected ultrafiltration. This loss of sodium results in the turn to the patient of relatively hyponatræmic asma, a feature which is automatically offset by the ssive movement of water into the somatic cells til osmotic equilibrium across cell walls is restored. he net effect is to produce sodium-ion depletion, ss of plasma volume, and a tendency towards llular overhydration. The last effect is in essence milar to the condition described by Kennedy and lleagues [16] in connection with the dialysis disquilibrium syndrome, but the pathogenic mechanism ggested here is different. This passive movement of ater into the cells results in a further reduction of asma volume over and above that resulting from the ore obvious ultrafiltration loss. It is this extra duction in plasma volume which we consider critical the pathogenesis of cramps. During high-strength alysis, there is no such extra reduction in plasma olume due to sodium loss, and so the reduction in lasma volume which ensues will probably be correondingly less.

We would agree that, during low-strength dialysis, ie specific consequences of hyponatræmia, cellular verhydration, or plasma volume reduction cannot be istinguished. However, certain observations, made uring high-strength dialysis, permit some attribution f cause and effect and support our hypothesis. irstly, during high-strength dialysis, cramps occurred nly when the rate of ultrafiltration had been very igh (more than 800 ml. per hour) or, towards the end f dialysis, if the body-weight had been allowed to ll below the "ideal lower level" found by ial. In both situations a substantial reduction in lasma volume is likely. Hyponatræmia would rtainly not be present in these instances, and it may e assumed that cellular overhydration was absent. econdly, the strongest indirect evidence to support the plasma volume contraction" hypothesis is the peated observation that a patient with cramps often ot relief before the infused saline reached the bubble-ap. Thus an increase in intracorporeal blood volume itself be sufficient to relieve cramp before there any change in plasma-sodium concentration er content.

rolling the rate of ultrafiltration, and by selecting and maintaining the patient's post-body-weight (the "ideal" weight), cramps uring high-sodium dialysis could probably be bolished altogether, even in those patients with an pparently high tendency to cramps. We conclude hat one of the benefits of dialysis against a dialysate odium concentration of 145 meq. per litre is relative freedom from the painful muscle cramps which are a common accompaniment of dialysis with fluid containing 130 meq. sodium per litre.

Requests for reprints should be addressed to W. K. S.

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Methods and Devices

VERY EARLY ABORTION USING SYRINGE AS VACUUM SOURCE

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VACUUM aspiration is becoming the preferred method for terminating pregnancies during the first 12 weeks of gestation. When an early pregnancy, up to 7 weeks from the last menstrual period, is terminated the total volume of aspirated blood, liquor, and tissue is usually less than 30 ml.[1] The simplest possible apparatus for terminating a pregnancy at this stage is a 50 ml. syringe directly connected to a 5 or 6 mm. external diameter Karman cannula (fig. 1).

The syringe should have a well-fitting plunger and a nozzle which will adapt to an aspiration cannula. Commercially available plastic syringes can be modified. The side-arm catchers which flare out to hold the plunger in the extended position, and which are attached to the proximal end of the shaft of the plunger by a rubber ring, need to be made specially (fig. 2). The rubber piston is sutured to the plunger to prevent detachment at a high vacuum, and a flexible plastic connector is attached to the nozzle, moulded to accommodate 5 or 6 mm. Karman cannulæ. Before use the piston and barrel are sprayed with silicone lubricant. A key feature of the apparatus is the very small dead-space between the opening of the cannula and the piston.

After pelvic examination to confirm that uterine enlargement does not exceed a size corresponding to an interval of 7 weeks or less since the last menstrual period, a speculum is introduced, the cervix grasped with a tenaculum, and a paracervical block administered. A uterine sound may be passed. The cannula is normally provided prepacked and gas sterilised. The cannula is attached to the

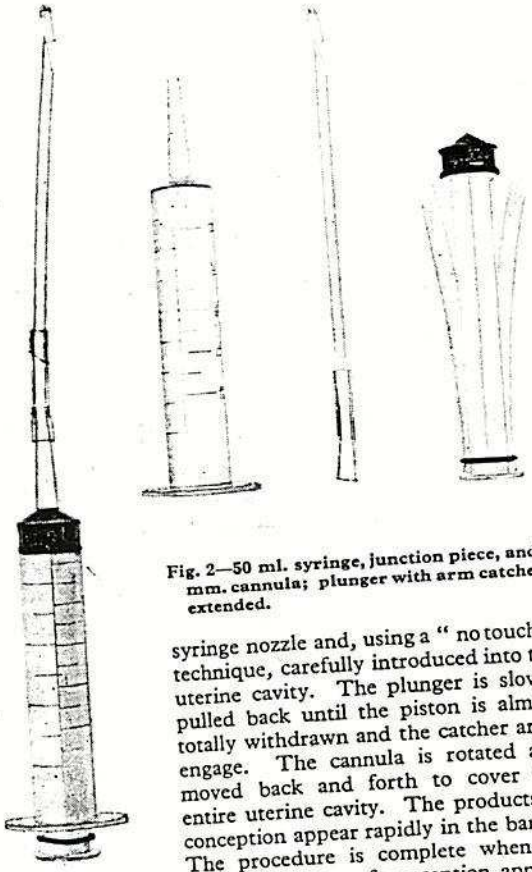

Fig. 2—50 ml. syringe, junction piece, and 5 mm. cannula; plunger with arm catchers extended.

Fig. 1—Syringe with cannula attached.

syringe nozzle and, using a " no touch " technique, carefully introduced into the uterine cavity. The plunger is slowly pulled back until the piston is almost totally withdrawn and the catcher arms engage. The cannula is rotated and moved back and forth to cover the entire uterine cavity. The products of conception appear rapidly in the barrel. The procedure is complete when no further products of conception appear, and the uterine walls are felt to be closely applied to the cannula. A flexible plastic cannula, as a result of the overhanging hood at the terminal openings, transmits a characteristic sensation, when the uterus is empty, similar to that felt with a metal curette. If there is a loss of pressure around the piston or the syringe fills to 30 ml., the syringe and cannula must be either withdrawn from the uterus, emptied, reinserted and the vacuum reinduced, or the cannula disconnected, left in situ, and another syringe attached and the vacuum reinduced. This does not take long and presents no additional hazard, but it is vitally important, because of the danger of air embolism, never to thrust the plunger inwards when it is attached to a cannula in the uterus.

Postoperative observation of the patient is generally limited to 30 minutes to 1 hour. The syringe can be cleaned, sprayed with silicone lubricant, and used again.

The technique is simple and cheap. Unlike conventional vacuum aspiration, the procedure is silent, and the woman may be unaware when aspiration is taking place. The use of a small cannula avoids cervical dilatation, minimising trauma, decreasing pain, and shortening the time taken to perform the procedure. The technique would be suitable for early abortion as an outpatient procedure.

Great care must be taken to limit the procedure to women where the uterus is only slightly enlarged, where the last period is no more than 7 weeks before termination, and to women who have no complicating pelvic disease or abnormalities.

Since the development of this apparatus it has come to our attention that Bykov developed an analogous procedure in 1927.[2]

The Karman cannula is manufactured by Rocket of London, Imperial Way, Watford, Herts WD2 4XX, and Berkeley Bio-Engineering, Berkeley, California, U.S.A. Suitable syringes and Karman cannulæ are available from Medical Concepts, Box 6, El Segundo, California, U.S.A.

Requests for reprints should be addressed to M. P.

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Reviews of Books

The Prostaglandins

Progress in Research. Edited by SULTAN M. M. KARIM, PH.D., professor of pharmacology and therapeutics, Makerere University Medical School, Kampala, Uganda. Oxford: Medical and Technical Publishing. 1972. Pp. 327. £4.75.

Prostaglandins

E. W. HORTON, D.SC., F.R.C.P.E., professor of pharmacology, University of Edinburgh. London: William Heinemann Medical Books. New York: Springer-Verlag. 1972. Pp. 197. £9.35; $18.10.

THESE two books on prostaglandins were published almost simultaneously and will inevitably be compared. Libraries, and interested private purchasers ready to pay more than £14 for 524 pages, would do well to get both. Others should not merely compare the prices per page but should consider which one better meets their individual needs. Neither book is a complete survey of prostaglandins (P.G.s), for which the references alone might occupy a hundred pages. Each reflects the particular interests of its editor or author; thus more than a third of Professor Karim's book is on P.G.s in the reproductive system, whereas Professor Horton deals much more thoroughly with the nervous system and with the extraction and estimation of P.G.s in tissues. The two books are about equally up to date, in general covering the literature to early 1971. The nomenclature of P.G.s is clearly set out early in Horton's book, whereas Karim has only a short section in his last chapter. Horton's chapter on the details of extraction, separation, identification, and estimation might seem tedious to a clinical reader, but in fact it is most important. As the number of known natural P.G.s and P.G.-like substances grows, it is becoming increasingly evident that many claims made on the basis of unreliable identification and assay methods must be suspect. A comparison of the tables on Karim's p. 5 and Horton's p. 1 is instructive: Karim summarises some claims for the occurrence of P.G.s in human tissues, whilst Horton lists instances of the identification of P.G.s by full structural elucidation. Several of the papers listed in Karim's table do not qualify to appear in Horton's. Horton's chapter 11 ought to be compulsory reading for editors and referees considering manuscripts in which estimates are given of P.G. content of tissues. His useful tabulation of systems of thin-layer chromatography has no counterpart in Karim's book. Both books have sections on synthesis and biosynthesis. Karim's contributor gives the fuller account of synthesis, but Horton is the better on biosynthesis. Karim's own work on the use of P.G.s in the induction of labour and therapeutic abortion is well known; his chapter gives a detailed account, with few significant omissions, up to the date of going to press (one omission is an April, 1970, paper by A. C. Turnbull's group describing the useful absence of antidiuretic effect of P.G.$F_{2\alpha}$). The chapter on Prostaglandins and Reproduction in Sub-human Primates tends to mingle results from various species in a confusing way. The sections on reproduction in Horton's book are shorter but clear, and give all the essentials.