as well, applying the phosphomolybdate method of Denigès (1921) to the usual trichloroacetic acid filtrate. The results are shown in the accompanying table. The significance of the differences observed was calculated by the method of Fisher (1938), and a value for *P* of less than 0.01 was found. The rise in the serum potassium is thus statistically significant. Although marked and consistent, the observations upon the serum phosphate are too few for statistical methods to be applied.

Table of Results

Case No.	Duration of Ischaemia (Mins.)	Position of Tourniquet	Serum Potassium			Serum Phosphate		
			Before Removal	7 Mins. Later	Rise	Before Removal	7 Mins. Later	Rise
1	90	Top of thigh	19.5	22.6	3.1	—	—	—
2	50	Below knee	22.2	23.6	1.4	—	—	—
3	80	Half up thigh	21.2	27.6	6.4	—	—	—
4	50	Top of thigh	18.6	21.2	2.6	4.5	5.2	0.7
5	70	Above knee	20.3	20.2	-0.1	—	—	—
6	70	Above knee	18.6	19.2	0.6	—	—	—
7	70	Right arm	16.7	16.5	-0.2	—	—	—
8	45	Below knee	17.4	18.7	1.3	—	—	—
9	100	Above knee	17.1	19.2	2.1	5.4	7.4	2.0
10	90	Half up thigh	19.5	20.0	0.5	3.3	4.0	0.7
11	35	Top of thigh	16.9	18.5	1.6	3.2	3.8	0.6
12	60	Top of thigh	19.7	21.4	1.7	4.3	4.8	0.5

The values for the serum potassium and phosphate are in mg. per 100 c.cm.

Discussion

Houssay *et al.* (1937) found that in chloralosed dogs general asphyxia for from two to four minutes led to an increase in the serum potassium, but that this did not occur after removal of the liver or suprarenal cortex or section of the splanchnic nerves. It is to be assumed, therefore, that the potassium was released from the liver by parasympathetic stimulation. Thus in the present series there are two possible sources of the extra potassium found in the serum. It might have come either from the asphyxiated cells, presumably those of the muscles, or from the liver by the action of a hypothetical substance present in the ischaemic limb and suddenly released into the circulation—such a substance as Blalock (1930) postulated in his experiments on the production of shock. It should be noticed that in only three cases—Nos. 5, 7, and 9—was severe trauma applied to the limb during its period of ischaemia, and that these showed no exceptional rise in serum potassium. The other operations were for the removal of semilunar cartilages, or manipulations of similar severity.

The only feature in common between this series and cases of the "crush syndrome" is the period of ischaemia undergone by the muscles. Recent observations on that condition—e.g., those by Beall, Bywaters, Belsey, and Miles (1941) and by Bywaters and Beall (1941)—have shown that a steady and prolonged rise in the serum potassium occurs. This is possibly due to the concomitant renal failure, and would certainly mask the small and transient change noted here, as also would any marked release of potassium by direct trauma to the muscle cells.

No attempt has been made to find any correlation between the duration of the asphyxia, the weight of muscle involved, and the amount of potassium released. This might shed light on the origin of the potassium, but it cannot be attempted without a larger series than the present. In this connexion it should be noted that if it could be assumed that equilibrium between the blood and the intracellular fluids of the tissues had been reached, every rise of 1 mg. % in the serum potassium would mean that 0.19 g. of the ion had been released into the circulation. The weight of the muscles of the calf and foot is about 1,300 g. (Roessle and Roulet, 1932), while the potassium content is about 0.3% (Gamble *et al.*, 1923; *Tabulae Biologicae*, 1926), so that in Case 9 of the present series the ischaemic muscle would have to give up about 10% of its potassium to account for the whole of the rise observed in the serum.

Summary

A series of observations is reported in which the serum potassium showed a significant rise after the removal of a tourniquet applied to a limb during the course of orthopaedic operations.

The extra potassium in the circulation might have come from the cells in the ischaemic area or from the liver by the action of a hypothetical substance released in the limb.

I have to thank Mr. E. S. Jamieson for the opportunity of making these observations on his cases.

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Medical Memoranda

Manual Dilatation of the Pelvis: Four Further Cases

In 1936 I reported (*British Medical Journal*, **2**, 282) a case in which the pelvic girdle was dilated to avoid the death of a patient in parturition. On that occasion the measure was adopted as one of desperation. The result was gratifying. Since then we have made considerable use of the method as one of election, and experience has been progressively encouraging. I am now able to single out four definite cases in which we feel justified in ascribing to its use the getting of a live undamaged child from an undamaged mother. (We acknowledge its valuable help on other occasions.)

Three cases do not need a separate description. All three (a) were primiparae; (b) had a minor degree of pelvic contraction which ante-natally justified an expectation of successful delivery (perhaps assisted), given normal opportunity for natural dilatation of the passages and moulding of the head; (c) were complicated by early rupture of the membranes; (d) required intervention on account of signs of foetal distress; and (e) required this intervention at a stage when, although labour was already more or less protracted, the size-relation of the head and passages was unfavourable.

The fourth case was that of a 1-para with marked general contraction, and properly a hospital case; she was a new-comer to the district, and an unexpected call. The membranes ruptured at the onset of labour. A good degree of moulding was allowed. When delivery was undertaken it was necessary to make full use of manipulation.

PURPOSE AND INDICATIONS

The purpose is to minimize damage to the mother, and damage, especially cerebral damage, to the child. It is not meant to replace any current practice, except forceful dragging of a child through unnecessarily narrow passages. It is indicated in proportion to the expectation of difficulty. It would appear to be indicated whenever forceps are used to overcome resistance by the bony passages to the transit of the head, and to be as rational on behalf of the child as completing the dilatation of the soft passages is on behalf of the mother.

In at least some cases of disproportion (particularly with early rupture of the membranes), when the head gets an unfavourable entry at the brim, the disproportion tends up to a certain stage to become worse. Although confident that this can occur, I feel that an attempt to analyse the mechanics of the process might bring me into one-sided conflict with the anatomist. The labour may survive this phase successfully; but if for any reason delivery has to be undertaken before the head has become adjusted to the passage, corrective measures should be addressed to the bony as to the soft passages. In the first degree this correction is, in the jargon of the moment, a "de-worsening," but some further stretching of ligaments and easing of joints are almost always attainable with comparative ease and with safety.

TECHNIQUE

The technique is essentially elastic. Leverage must be from bone to bone, and may be done with the finger-tips on one and the knuckles or the back of the hand against another, or with the knuckles on one and the back of the hand against the other. Much depends on the size of the operator's hand and other local conditions. One must ensure that bone is underneath the finger-tips, as there is usually some degree of oedema of the soft tissues, and these are easily damaged. Leverage

should be applied only for a second or two at a time, the changes being rung from one pair of points to another. The degree of pressure used is comparable to that used on a joint stiff from disuse—say an elbow which has been immobilized for some weeks. It can be more than this, but should not be much more. Firm stroking across their axis with the pulp of the finger-tip helps to stretch ligaments which are still taut. The gain may not be appreciable during the application of pressure, but becomes clear as one works round and returns, as one repeatedly does, to points already treated. A most useful increase of room for the passage of the head can be obtained without haste and without trauma in two or three minutes. When one feels that the best has been done, the hand already in the vagina guides the blade of the forceps. The anaesthesia is not significantly prolonged.

CONCLUSION

It is submitted that manual dilatation of the bony pelvis can be safely and successfully used to minimize birth trauma; that it is specially indicated in cases of slight disproportion which have to be delivered at an unfavourable stage; and that it constitutes a useful rejoinder to early rupture of the membranes.

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Treatment of Fusospirillary Balanitis

The aetiology of this type of balanitis was proved by Corbus and Harris in 1909 to be due to the symbiosis of a Gram-negative spirochaete and fusiform bacillus, and the resulting clinical features, described in detail by them, are briefly recapitulated here.

Predisposing factors are a tight prepuce, wetting the prepuce with saliva, and unnatural sexual gratification. About 3 to 4 days after intercourse there is a feeling of irritation under the prepuce, soon followed by the appearance of a copious frothy yellow offensive discharge and superficial ulceration of the glans penis and under-surface of prepuce. Phimosis with inability to retract the prepuce may subsequently occur, but usually only develops after 8 to 14 days in the absence of treatment. The inguinal glands may be slightly enlarged but do not suppurate.

On examination, after retracting the prepuce and removing the pus, small greyish-white patches are found in the preputial area, with erosions on either side of the coronal sulcus. The edges of the ulcerated areas are often circinate in outline. Diagnosis is made by staining a smear of the pus with gentian violet or neutral red—when large numbers of spirochaetes and fusiform bacilli are seen—or, alternatively, by dark-ground illumination. Prevention, apart from circumcision when there is a tight prepuce, consists in the regular cleansing of the preputial area, especially after sexual intercourse. The condition may be treated by frequent bathing with hydrogen peroxide or other mild antiseptic. A preparation of stovarsol as a jelly (containing merfenil 1:100,000) has been tried in a series of 38 cases. The advantages of this preparation are several. It is dispensed in a small collapsible tube which can be carried by the patient in his pocket or haversack, and may be applied quickly without mess in the secrecy of the lavatory; it relieves the irritation after the first application, and is rapidly curative. It contains no sulphonamide, and therefore cannot produce sulphonamide sensitization.

In all, 38 cases have been treated with this preparation—32 as out-patients and 6 as in-patients. After washing the glans penis and subpreputial space with saline a small quantity of the ointment is squeezed from the tube and spread gently over the area. The prepuce is drawn forward and any excess wiped off. When the preparation could not be applied direct to the subpreputial areas on account of phimosis the subpreputial space was washed out with saline, and a cotton-wool-tipped probe soaked with the jelly was then passed all around under the prepuce. In most cases the ointment was applied twice daily, but in-patients were treated three times a day. The average number of applications of jelly for all cases was 5.5 (minimum 2; maximum 13) and the average number of days taken for complete healing was 3.5. Several mild infections cleared up in two days. Four cases relapsed, but were cured by further treatment.

I regard this new method of treatment as highly effective, but the independent observations of others are desired.

I wish to thank Dr. R. C. L. Batchelor for permission to study those cases in the Edinburgh Venereal Diseases Department, and to Pharmaceutical Specialities (May and Baker) Ltd. for supplies of stovarsol jelly.

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Reviews

PERMEABILITY OF MEMBRANES

The Permeability of Natural Membranes. By Hugh Davson, D.Sc., and James Frederic Danielli, D.Sc. With a foreword by Prof. E. Newton Harvey. (Pp. 361; illustrated. 25s.) Cambridge: The University Press. 1943.

The subject of the permeability of membranes, and more particularly that of their differential permeability, is one of the most fundamental and important in the whole of biological science. It lies at the root of most of the phenomena of life in animals and in plants of all degrees of organization. The phenomena involved are primarily physico-chemical, and studies of permeability have been made by the most varied methods and upon the most diverse kinds of cells. It is no light task, therefore, to assemble and critically to review and digest the results of the numerous investigations which bear upon the subject of permeability, and to deal with the frequently abstruse physical chemistry which has been directed to the elucidation of the manifold phenomena which have emerged from those studies.

This formidable task has been very well performed by these authors, and they have produced a treatise which should serve as a loadstone for some years to all who wish to enter this perplexing territory. Much of the work discussed concerns the permeability of the red cells, which are obviously well suited for investigation. But it is made clear that what holds good for the erythrocyte cannot necessarily be transferred to other cells, or even from erythrocytes of one species to those of another. Much of this work is that of the authors themselves. The illustrations are clear, the bibliographies comprehensive, and altogether the work is a mine of carefully compiled and well-digested information. Perhaps some of the physico-chemical explanations are a little optimistic; and one would have liked to see more, if more is known, about the permeability of the lung membrane to gases. But the general impression is one of excellence.

UROLOGY IN GENERAL PRACTICE

Urology in General Practice. By Nelse F. Ockerblad, B.S., M.D., F.A.C.S., and Hjalmar E. Carlson, B.S., M.D., F.A.C.S. (Pp. 383; illustrated.) Chicago: The Year Book Publishers; London: H. K. Lewis and Co. 1943.

The preface to this book points out the desirability of stimulating an interest in and knowledge of urology among general practitioners and medical students. It was written for this purpose. Those who read the preface will expect to find something worth while in the pages which follow, and they will not be disappointed. General surgeons who have a leaning towards urology and make it their hobby (which is far better than specialization in the narrow sense) will find in this small volume a fund of practical information presented and illustrated in an attractive manner.

The authors are masters in the art of instruction. The technique of cystoscopy is described adequately in simple language. There is a good summarized account of medical ailments such as nephritis. These references are relevant and are too often omitted from surgical textbooks. The authors believe that doctors "are coming more and more to realize that the urologist knows more about the kidney and the diagnosis of its diseases than anyone else." The chapter on lithiasis is vague and is not quite up to the high standard set in other sections, but any omissions here are counterbalanced by the clear and detailed accounts given of carcinoma of the prostate, sterility, and the use of sulphonamides in urology.

There are 362 pages (excluding the index and preface) with 98 illustrations. In so confined a space some good material of necessity must be omitted. Nevertheless, the doctor who masters the contents of this book, and puts its precepts into practice, will be able to deal in an expert fashion with the majority of urological cases. His knowledge will not be confined to the commonplace, for he will find illustrations of certain rare conditions such as wide dilatation of the lower third of the ureter, without obstruction, probably congenital in origin.