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CEPHALOPELVIC DISPROPORTION IN UGANDA
ITS INFLUENCE ON THE PRACTICE OF OBSTETRICS
ITS AETIOLOGY AND ITS MANAGEMENT

A THESIS

SUBMITTED FOR THE DEGREE OF
MASTER OF CHIRURGERY
OF
THE UNIVERSITY OF GLASGOW
BY

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I N T R O D U C T I O N

"Compared with the values obtaining in European women, every Muganda woman has a contracted pelvis".

SIR ALBERT COOK
(1933)

I N T R O D U C T I O N

In a developed and sophisticated community, the practice of Obstetrics has almost ceased to be an art. Every woman has the opportunity to be cared for by a skilled and efficient organisation during pregnancy, labour and the puerperium. Antenatal care does not only mean the care of women with regard to the pregnancy but also the maintenance or improvement of their general health to ensure that at the time of labour, delivery and in the puerperium these women will be as healthy as it is at present possible to make them. Visits to an antenatal clinic consist of a series of routine questions and tests. These are undertaken with a view to detecting any abnormality at an early stage so that appropriate therapy or preventive measures may be carried out without delay. Each question or test, either by itself or along with others will give some indication as to the final outcome of pregnancy.

Statistical analysis, computed from seemingly unrelated data will often enable the clinician to forecast the outlook for both mother and child. This type of research was pioneered in Great Britain by Baird (1945) in studies of Aberdeen women. More recently Butler and Benham (1963), in "Perinatal Mortality" have shown how important routine questioning and laboratory testing are in the prediction of the health of the baby. They also stress the deliterous effect that may occur if this routine is neglected or ignored.

Maternity work has thus become scientific. Hospitals have become large laboratories with highly trained and well organised staff. The standard of anaesthesia is good, ancillary services

are efficient and many of the personnel are engaged in highly technical and often complicated laboratory work. All these are designed to improve fetal and maternal mortality and morbidity and to enable those engaged in the discipline of Obstetrics to gain a better understanding of the physiology, biochemistry and pathology of pregnancy and labour. It is upon these things that further progress must be judged.

Over the past twenty years in the more developed world there have been dramatic improvements in maternal and child health which have been accompanied by a reduction in maternal and fetal mortality. Some of this has been due to an improvement in the quantity and quality of those practising midwifery and an increase in hospital accommodation but most of it has been due to the advancement of social benefits. Better nutrition among the children and adolescents of those countries has almost eliminated contracted pelvis and reduced severe anaemia to a minimum. Such improvements in the standard of living have progressed together with the development of rapid communications. Many a life has been saved and a tragedy averted by a public telephone, an ambulance and a speedy journey to hospital along a tarmacadam road from a readily identified house.

Many of the tragedies that still occur during pregnancy today are either due to the unwillingness of the patient to avail herself of the services which are provided or alternatively, and of more importance, to neglect or error on the part of her attendants. The limitation of such error is dependent more upon the judgment rather than the skill of those who undertake midwifery. Skill is easier to obtain. One of the most important functions of most modern obstetric units is the training of the younger generation of doctors and midwives to a high standard of skill, but judgment is less easy to teach and

is gained only by experience, diligence and conscientiousness. Obstetrical operations to deliver the baby become fewer in number as time progresses as do the instruments required. Caesarean section through the lower uterine segment, outlet or low midcavity forceps delivery, vacuum extraction and the assisted breech delivery of a moderately sized baby through a roomy pelvis are the only operative procedures which remain worthwhile out of a multitude which were once employed.

Some older obstetricians may regret the passing of the breech extraction, the high cavity forceps delivery and the internal podalic version. In the past these operations were the art of obstetrics and his skilled performance of them distinguished the good obstetrician from his less competent colleagues. Even he would now admit that the replacement of these operative techniques by the less dramatic but more successful Caesarean section done under modern conditions has led to an improvement in maternal and perinatal mortality.

Although there is pride in the success obtained by a more scientific approach to obstetrics, much remains to be done. Pre-eclampsia, placental dysfunction, fetal abnormality, dysmaturity, rhesus isoimmunisation and premature labour remain as yet partially explored fields for research. The final understanding of these problems lies not so much in the study of the patient herself, but in the understanding of her physiological and biochemical behaviour. This will entail the application of pure science to what was until recently regarded as a mechanical subject.

This is the background of obstetrics in the highly developed world. It should not be forgotten that these conditions exist in only about one-third of the Earth's surface and that the vast majority of women do not live in a sophisticated and scientific environment. Many of them are uneducated and

pregnancy is a process shrouded by tradition, taboo and fantasy. Obstetric problems are basically similar in those areas but the external influences and the mode of presentation are so different that they may pass unrecognised. In view of this, management and treatment must likewise differ to suit the conditions which prevail.

There are now several well staffed and well equipped maternity hospitals in the developing world. Although the standard of work which is undertaken in them may be high, the results in terms of maternal and fetal mortality and morbidity are often disappointing and not comparable to those obtained in the developed world. There are of course variations but on the whole this is true. This is not necessarily a reflection on the hospitals or upon those who work in them but rather upon the conditions which are present and which influence the practice in those areas.

This thesis is concerned with cephalopelvic disproportion as it exists at present in Uganda and methods which have been adopted to deal with it.

Before embarking upon the subject matter it is necessary to give some indication of the conditions which prevail in Uganda, how they influence obstetric practice and why it is thought necessary to alter the standard approach to the problem.

C H A P T E R I

UGANDA

"The Pearl of Africa"

East African Airways
Travel Brochure

"As childbirth is not regarded as an abnormality, but as a normal physiological process, many women still prefer to be delivered at home without skilled assistance and come into hospital only as a last resort. Transport difficulties, especially at night, long distances and inaccessability of the villages add considerably to the delay in admission"

UNA G. LISTER

(1960)

U G A N D A

Uganda is a small country which lies to the East side of Equatorial Africa. It covers an area of 91,134 square miles but so much of this is taken up by lakes and swamps that only 74,748 square miles are land surface, with the result that communication in the more remote areas is difficult except by aeroplane, boat or by road over complicated bridge systems and causeways. Eighty-four per cent of the land surface is relatively flat, lying between 3,000 and 5,000 feet above sea level, but with more mountainous areas on its northern, western and eastern borders. To the south lies Lake Victoria, the second largest fresh water lake in the world.

For practical purposes Uganda may be divided by the River Nile into two distinct areas, the North and the South West (Fig.1/1). Although this division is arbitrary it separates people of two distinct cultural, ethnic and habitual backgrounds. The population density of the two areas is also different as is the climate, and the agricultural and farming practices.

The people of the South West are of Bantu extraction. They are small and squat in build. In the North the people are Nilotic, Nilo-Hamitic and Sudanic and are tall and slender. The difference is striking and at first sight would appear to be genetic as ethnically the people are quite unrelated. However, as will be shown later, there is a more subtle and perhaps more important explanation which better accounts for the variation in pelvic size and consequent behaviour in labour.

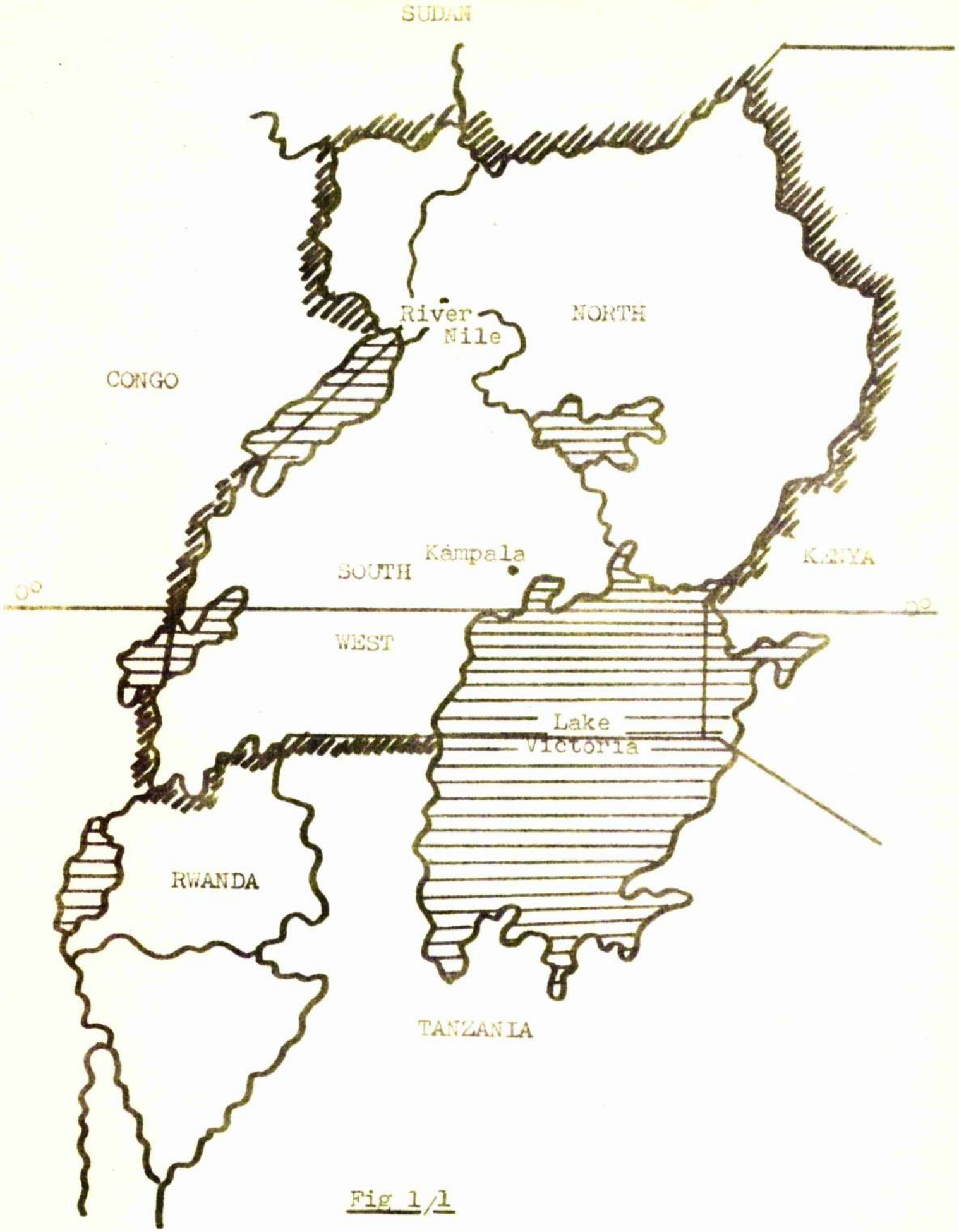

SUDAN
River Nile
NORTH
CONGO
Kampala
SOUTH
KENYA
0°
0°
WEST
Lake Victoria
RWANDA
TANZANIA

Fig 1/1

Kampala, the capital city of Uganda, is situated in the South and lies within sight of Lake Victoria. It is a relatively new city with a marked Asian and European influence. Adjoining Kampala is Mengo Municipality, the seat of the former Government of the ancient Kingdom of Buganda. The Baganda are the largest tribe in Uganda with a population in 1962 of 1,004,878 or one seventh of the total population of Uganda. For many years this tribe had a civilisation of its own under the leadership of the Kabaka or King. Speke, when he discovered the source of the Nile in 1862, made this area his headquarters. Moorehead (1957) in "The White Nile" has described through the writings of Speke and later Burton, the conditions which existed in Buganda before the advent of Western civilisation. The organisation was feudal and autocratic but there was a strong community life and spirit.

The first hospital in Uganda was erected and opened in Mengo in 1896 by Albert Cook of the Church Mission Society.

It is probable that because of the previous existence of some organisation, Buganda has become more developed and more influenced by Western civilisation than any other area in Uganda. People were quick to accept medicine. This was partly due to the personalities of the early medical personnel and partly due to the inherent inquisitiveness of the local people and their more disciplined background. Even today this is not so in many other parts of the country, particularly in the North which in some areas is almost untouched by civilisation. The people prefer a more nomadic and warlike life. They seldom visit hospital, are haughty and proud of their own traditions and way of life.

Although they have readily accepted civilisation, and are now a peaceful people, the Baganda still have many customs and traditions which defy outside influence. Some of these are related to pregnancy and labour and affect the practice of Midwifery.

From some of these too can be gleaned information about pregnancy, labour and delivery as it existed in the past and indeed still exists today. Almost all women drink a native potion of herbs either before or just after the onset of labour. This mixture contains an active oxytocic principle (Cook, 1933) which has a marked effect upon the uterine muscle and which may cause the uterus to undergo tetanic contraction. Originally this medicine was given to encourage uterine action when it was sluggish, for the same reason that synthetic oxytotics are used today in more organised obstetrics. The passage of time however has altered the status of this medicine and the taking of it has become a necessity, else something might happen to the baby. The tradition is so strong that even midwives who are aware of its dangers have been known to imbibe and many patients have been discovered surreptitiously drinking it whilst being prepared for elective Caesarean section. The meaning of this custom and of others will be discussed later.

Among certain tribes in Uganda, it is a sign of complete motherhood to deliver a baby through the vagina. To have a Caesarean section is a disgrace in the eyes of the community and if this happens a woman may become an outcast. She is no longer permitted to share the house or the bed of any man and is shunned by all but her own family. Whilst this practice is not generally observed by the Baganda it is common among the Banyarwanda and the Barundi, the tribes of the neighbouring countries to the West of Uganda. These people make up the second largest tribal group in the area around Kampala, having come originally as servants to the Baganda or more recently as refugees from troubled countries. This dislike of Caesarean section is found frequently in Africa, particularly among certain tribes

in Kenya, Nigeria and the Congo. Gradually Caesarean section is becoming more acceptable to these people but herein lies a danger of its own. A woman in whom it is traditionally a disgrace to be delivered abdominally might now be taken back by her husband and become pregnant later. This time, in order to demonstrate her womanhood, she may ignore the advice of the hospital to return when she is pregnant and prefer the ministrations of the local tribal attendants. The village midwife, well acquainted though she may be with the problems of prolonged and obstructed labour, will hardly appreciate the uterine scar. The rate of uterine rupture and maternal death in these circumstances will never be known.

In spite of the traditions and tribal taboos which surround pregnancy and labour, antenatal care and hospital delivery have become accepted by many women in the South West of Uganda. Credit for this is largely due to the medical missions which have been present for many years, to the handful of foreign doctors and midwives who have devoted part of their lives to Government service in Uganda and to the ever increasing number of locally trained personnel.

In 1923 Makerere University College was founded and in 1946 a recognised Medical School came into being. Mulago Hospital, the Government hospital in Kampala, was opened in 1921 and from 1928 it has served as both the local Government service hospital and also the teaching hospital for nurses, medical assistants and later, medical students. University and Hospital are close both in situation and in work. In 1962 a new hospital was built and opened. It contains 887 beds, of which 100 are available for the practice and teaching of Obstetrics. Medicine is free in all Government hospitals and there is no charge for in-patient accommodation. Although the new hospital is modern and well equipped, the beds available for midwifery are

not meant to accommodate the numbers who have flocked to the antenatal clinics and to the labour wards. No one is ever turned away. Figure 2/1 represents the growth in the number of deliveries which has taken place since 1953. The temporary drop in the numbers in 1962 was due to the transfer from the old hospital to the new one when many patients could not be accommodated. The antenatal wards, labour suite and lying-in wards were designed to accommodate about 3,000 patients annually. In 1965 over 8,000 patients were delivered and another 2,000 were looked after in the annexe which is situated in the old hospital. When it is remembered that the total number of trained nursing staff employed would be considered inadequate to care for 3,000 deliveries in Britain, a better realisation of the difficulties involved will be obtained. That this staff coped with over 10,000 deliveries in 1965 says much for their fortitude.

With overcrowding of such degree (Plate 1/1) general standards suffer. This does not necessarily mean that individual standards will be affected but it follows that many women who require immediate attention will fail to get it because the staff are engaged elsewhere or the theatres are occupied. Consequently the maternal and fetal mortality and morbidity rates will be affected.

Overcrowding also means that it is seldom possible to admit patients for the sole purpose of awaiting the onset of labour.

In the last census of Uganda taken in 1959 (Atlas of Uganda, 1962) the total African population was estimated to be 6,449,000 and the African population of the Kampala and Mengo areas together as just over 91,000. Developing countries have a tendency to population explosion and there is a constant drift towards the larger towns so that in the 8 years since the census was taken

Deliveries, Mulago Hospital

1953 - 1966

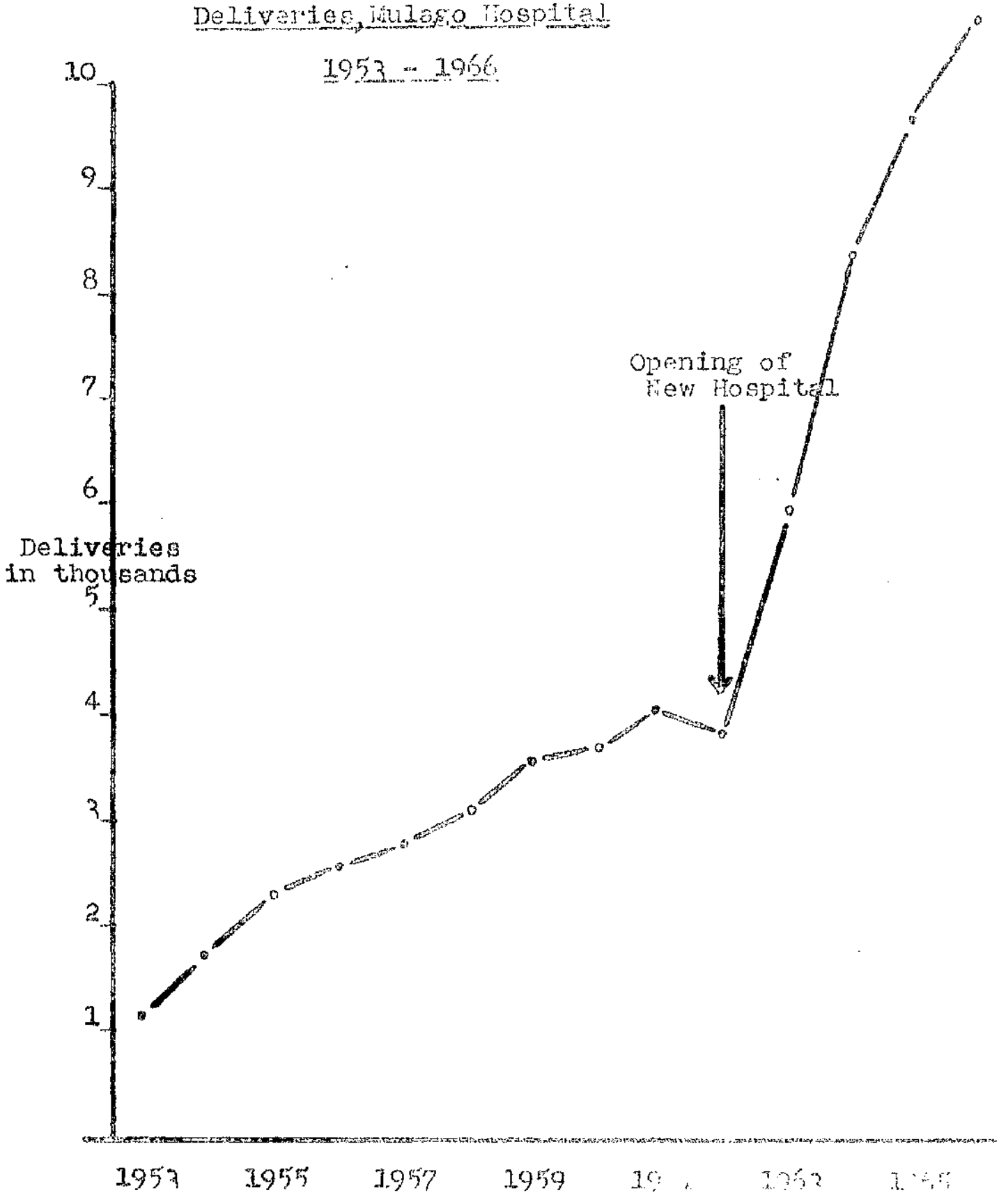


Figure 2/1

"About the only thing in plenty were

the patients who came in their thousands"

Sir Albert Cook (1935)

Plate 1/1

there has probably been an increase in both figures. The birth rate of a country such as Uganda is stated to be over 40 per thousand of the population. Mulago Hospital therefore with its present figure of 10,000 deliveries each year is draining a population of well over 250,000, which means that the area covered is far greater than the urban combination of Kampala and Mengo Municipality. Many women therefore must travel long distances on their way to hospital. Such journeys may be fairly easy during the daytime when there is a regular bus service and many private taxis, but at night there are few vehicles on the road and those which are dare not stop for fear of attack and robbery.

As Uganda strides the Equator, each day has 12 hours of daylight and 12 of darkness. Twelve hours of darkness is long enough for a labour to become obstructed or a uterus to rupture. There are few telephones available to summon aid and even if there were, the ambulance service could not cope with the numbers. Although just over 10,000 women were delivered under the care of the staff at Mulago Hospital in 1966 more than 15,000 women attended the antenatal clinics. Whatever happened to the missing pregnant women will never be known.

The level of education is not high. Until 1965 approximately 50% of the children were receiving primary school education, 10% junior secondary education and 1.2% a senior secondary education. The result is that over half of the population is illiterate, even in the vernacular. The date of the last menstrual period is seldom known and the guess at the maturity which is made by either the patient herself or by the doctor or midwife may be inaccurate by several months either way. Sometimes luck has it that the date of the period coincided with

some festive occasion and if the observer is acquainted with the dates of these holidays, a fairly accurate estimation of the expected date of delivery may be calculated. The time of quickening is also unreliable as this phenomenon has been observed in cases of hydatidiform mole, uterine fibroids, ovarian tumours and even in pseudocyesis. The optimum time to undertake induction of labour in cases of pre-eclampsia, diabetes, and rhesus incompatability or elective Caesarean section in cases of placenta praevia and previous Caesarean section which is difficult enough to gauge in an educated community, becomes almost magical in Uganda where guesswork between the doctor and the patient is the only yardstick. The patients, because of the uncertainty which exists, will refuse surgical intervention until full maturity is heralded by the onset of labour, or until bleeding is of such severity that they realise their lives to be in danger. Under such conditions, post maturity is something which is not possible to diagnose.

No matter how poor the circumstances may seem in the Kampala area the women are much more fortunate than those who live in rural areas in that there is a modern hospital to come to which has trained staff, efficient anaesthesia and a good supply of drugs and equipment. Blood transfusion is readily available if needed and the roads which surround Kampala are tarred. Many of these things do not apply to the more rural areas in the surrounding countryside. Most of the hospitals are staffed by one or at the most two, doctors. They have to undertake all the disciplines of Medicine and often have to administer the hospital as well. If they are lucky they may have had some post graduate experience in obstetrics but only too often all the obstetrics which is known is what was learned as a student. All emergencies have to be dealt with single-handed.

"It was a ruptured uterus and I was alone on the station. In my Mulago days the next step would have been to dial zero and ask for the consultant." (Rwabugahya, 1965).

This was the cris de coeur of one recently trained doctor during the initial stage of his first posting to an up-country station. Many of the emergencies which occur are of the type which would be dealt with by the most senior members of the obstetric staff in Britain, if they occurred there at all. The standard achieved by the doctors working alone in the periphery depends largely upon the keenness and natural skill of the individual. It is not surprising that the fetal and maternal mortality rates are high and morbidity in the form of uterine rupture and vesico-vaginal fistula is commonly found. Many previous Caesarean scars are suspect, purely because the original operation was performed by an inexperienced doctor or even a medical assistant.

Within recent years maternity centres have been appearing throughout Uganda. It is intended that these will become the back-bone of the future Maternity Services of the country. These centres are built and staffed to deal with normal delivery alone and the cases which are dealt with are screened antenatally for lack of abnormality. Normal labour however is a retrospective diagnosis after delivery has been completed. Many difficulties will arise unexpectedly and the patient will require to be transferred to the nearest hospital. This may be over 50 miles away and no centre has transport of its own. Neither is it equipped with a telephone or radio communication. Many hours may therefore elapse before the patient eventually reaches hospital. By then operative intervention may be long overdue. The idea of a maternity centre is sound for Uganda in its present state of development but unless

it is backed by a telephone and by transport it cannot hold its place. Patients soon realise that skilled aid may be difficult to obtain and prefer to bypass the centre for fear of this, even although it may mean a prolonged journey early in labour.

Many women are still not willing to accept or do not know about the Maternity services which are provided at the present time. Tribal custom or fear may prevent their going to hospital or other maternity unit. Often too there is the belief that one attendance at an antenatal clinic is sufficient to ensure that all will be well although regular attendance is gaining in popularity.

Having a baby at home in most of Uganda means confinement in a family hut of one room with mud walls and a metal roof. This room is shared with the other members of the family who may be present during labour. The unglazed window is small to prevent the entrance of thieves and there is usually no running water, nor is there any attempt to catch rain water from the roof as it is the traditional duty of women to collect all water from the local well. Light is provided from a small paraffin lamp but occasionally electricity is found in even the meanest of dwellings. Furniture is sparse and the delivery bed will be a mat on the floor. The oldest and most experienced woman in the area will be in attendance. She may have a certain degree of skill but there are many problems that are beyond her scope and as time passes the relatives of the parturient will become anxious and eventually a decision may be taken to remove her to the nearest medical unit which may be a dispensary which does not deal with maternity cases. If it is difficult for a trained midwife in a maternity centre to obtain transport for her patients who require hospitalisation how much more difficult will it be for the relatives

Many unregistered maternal deaths will surely occur in this way, as well as countless suffering to mothers and their babies.

The following is an account of marriage, pregnancy and childbirth which occurs within the Buganda tribe. Modern influences are changing the overall pattern but it is still relevant to the practice of midwifery today and occurs among the more rural and less sophisticated people. The account has been compiled with the aid of doctors, medical students and nurses who belong to the tribe.

When a girl reaches the age of about 12 years, her father seeks a husband for her. His choice, limited to the young men in the neighbourhood who are interested, will be the man who is willing to pay the highest bride price. When this has been agreed the girl is sent to the husband. An aunt invariably accompanies the girl as a representative of the father. Her function is to ensure that an extra payment is handed over if the girl proves to be a virgin. This is usually a goat or perhaps several if the husband is wealthy. Marriage may not be consummated at once if the girl is young and the aunt remains until the first night of union after which she will leave with the goat, if the husband is satisfied of his wife's fidelity. During this time the husband will have other wives to provide his pleasures. As a result of such polygamy, many men have no wives. Accordingly, the aunt has to guard her charge by day and night from the advances of other men, otherwise there would be no goat to take home. Its absence would incur displeasure in the eyes of the father and disgrace to the aunt. Sooner or later the time comes for the aunt to leave and shortly thereafter the girl will became pregnant. Throughout pregnancy she will be given much advice from the older,

more experienced women in the area, and along with it a drug to take regularly. Little is known of this drug but its supposed action is to relax the bones and joints of the pelvic girdle in preparation for labour.

At the onset of labour the young woman will retire to a hut, adjacent to that of her husband. The older women will accompany her. In view of her youth it is unlikely that there will be incoordinate uterine action or primary inertia. Thus delay in labour will almost certainly be due to cephalo-pelvic disproportion. If there is no disproportion labour will be rapid and spontaneous delivery will occur, but when there is disproportion labour may last for several days. When this happens a secondary inertia will supervene with the uterus in a state of semi-tonicity. Abdominally, a constriction ring will be seen, accentuated by a full bladder. The fetal heart will stop beating and the softening process of maceration will relieve the disproportion with the eventual delivery of a dead baby, the formation of a vesicovaginal fistula and the addition of puerperal sepsis.

Prolonged labour is to the attendants a sign of laziness in the girl or a sign that she has been unfaithful to her husband. Such people are often chastised in any community. This is no exception. The girl will be beaten by hand and by stick and may be seriously injured.

An exhausted inert uterus will respond to oxytocic drugs and as there is one available locally this will be given in large doses.

That this type of supervision in labour is still practiced is evident to anyone who undertakes obstetrics in South West Uganda. Patients are often admitted in obstructed labour showing signs of external injury and if their stomachs are emptied, preparatory to

general anaesthesia, vast quantities of Kiganda medicine are recovered. Modern practice is also creeping into tradition as it is by no means uncommon to find that a large episiotomy has been undertaken by the attendants.

In such circumstances the practice of Obstetrics in Uganda is still an art.

CHAPTER 2

CEPHALOPELVIC DISPROPORTION IN UGANDA

"The height of a woman is easily taken and gives some indication of her nutritional state in early childhood"

SIR DUGALD BAIRD

(1945)

CEPHALOPELVIC DISPROPORTION IN UGANDA

There is strong circumstantial evidence to suggest that cephalopelvic disproportion has existed in Uganda for generations. The first direct recorded evidence was published in 1884 by Felkin. As a Medical Student in 1879 he travelled through Uganda for the Church Mission Society and witnessed the performance of an abdominal section at Kajura in Bunyoro, a neighbouring Province to Buganda.

"The operation is performed by men, and is sometimes successful; at any rate one case came under my observation in which both survived. It was performed in 1879 at Kajura. The patient was a fine healthy looking woman of about twenty years of age. This was her first pregnancy. I was not permitted to examine her, and only entered the hut just as the operation was about to begin. The woman lay upon an inclined bed, the head of which was placed against the side of the hut. She was liberally supplied with banana wine, and was in a state of semi-intoxication. She was perfectly naked. A band of mbugu or bark cloth fastened her thorax to the bed, another band of cloth fastened down her thighs, and a man held her ankles. Another man, standing on her right side, steadied her abdomen. The operator stood, as I entered the hut, on her left side, holding his knife aloft with his right hand, and muttering an incantation. This being done, he washed his hands and the patient's abdomen, first with banana wine and then with water. Then, having uttered a shrill cry, which was taken up by a small crowd assembled outside the hut, he proceeded to cut in the middle line, commencing a little above the pubes, and ending just below the umbilicus. The whole abdominal

wall and part of the uterine wall were severed by this incision, and the liquor amnii escaped; a few bleeding points were touched with a red-hot iron by an assistant. The operator next rapidly finished the incision in the uterine wall; his assistant held the abdominal walls apart with both hands, and as soon as the uterine wall was divided he hooked it up also with two fingers. The child was next rapidly removed, and given to another assistant after the cord had been cut, and then the operator, dropping his knife, seized the contracting uterus with both hands and gave it a squeeze or two. He next put his right hand into the uterine cavity through the incision, and with two or three fingers dilated the cervix uteri from within outwards. He then cleared the uterus of clots and the placenta, which had by this time become detached, removing it through the abdominal wound. His assistant endeavoured, but not very successfully, to prevent the escape of the intestines through the wound. The red-hot iron was next used to check some further haemorrhage from the abdominal wound, but I noticed that it was very sparingly applied. All this time the chief 'surgeon' was keeping up firm pressure on the uterus, which he continued to do until it was firmly contracted. No sutures were put into the uterine wall. The assistant who had held the abdominal walls now slipped his hands to each extremity of the wound, and a porous grass mat was placed over the wound and secured there. The bands which fastened the women down were cut, and she was gently turned to the edge of the bed, and then over into the arms of assistants, so that the fluid in the abdominal cavity could drain away on the floor. She was then replaced in her former position, and the mat having been removed, the edges of the wound, i.e. the peritoneum, were brought into close apposition, seven thin iron spikes, well polished, like acupressure needles, being used for this purpose, and fastened by string made from bark cloth. A paste prepared

by chewing two different roots and spitting the pulp into a bowl was then thickly plastered over the wound, a banana leaf warmed over the fire being placed on the top of that, and, finally, a firm bandage of mbugu cloth completed the operation".

Mother and baby survived. The wound healed by first intention and when Felkin left on the eleventh day, all was well.

If this account of Felkin's is accepted as authentic, three major conclusions may be drawn. (1) That the operator was skilled and that he performed many such operations. (2) That there was known to be a need for abdominal delivery amongst the populace, and that need must have been cephalopelvic disproportion as it is unlikely that any other condition which necessitated Caesarean section would be frequent or readily recognised. (3) That the banana was widely grown in Southern Uganda in 1879; the significance of which will become apparent later.

Felkin made three drawings of the operation which are reproduced in Plates 1/2 and 2/2. He also obtained a replica of the knife which was used and it is now the property of the Wellcome Historical Medical Museum. A photograph of this knife appears in Plate 3/2 by courtesy of the curator of the Wellcome Historical Medical Museum.

It has already been mentioned that the Baganda may be given two differing types of drugs during pregnancy and labour. The first, which is taken throughout pregnancy, is given in the hope of softening the bones and the joints of the pelvis, so that they may separate during labour to allow the easier passage of the baby. There is no evidence that such a drug is ever taken by any woman belonging to a tribe in which disproportion is rare. The need for such an effect among the Baganda in whom disproportion is common has therefore long been recognised. The oxytotic principle given

ABDOMINAL SECTION IN UGANDA

1879

THE PLACE

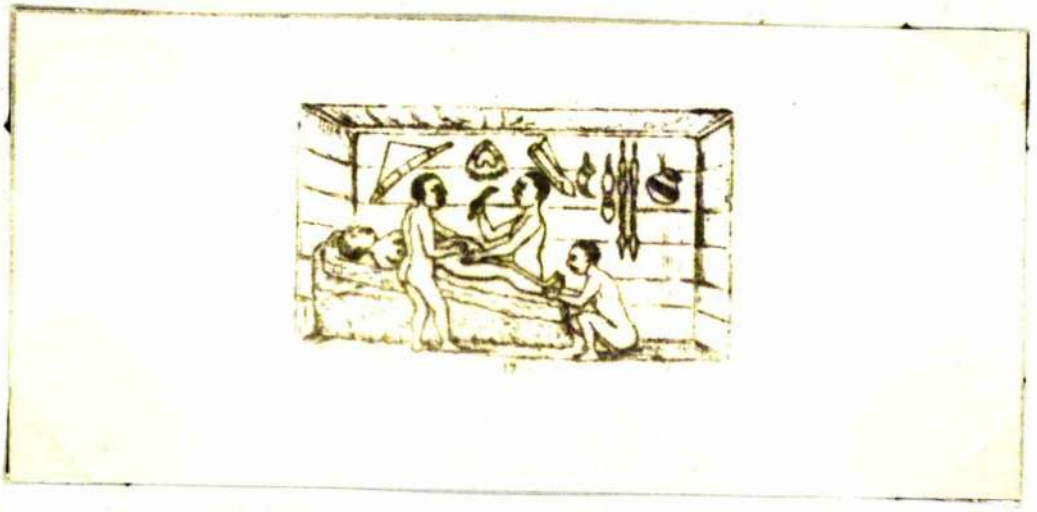


PLATE 1/2

THE INCISION AND THE KNIFE

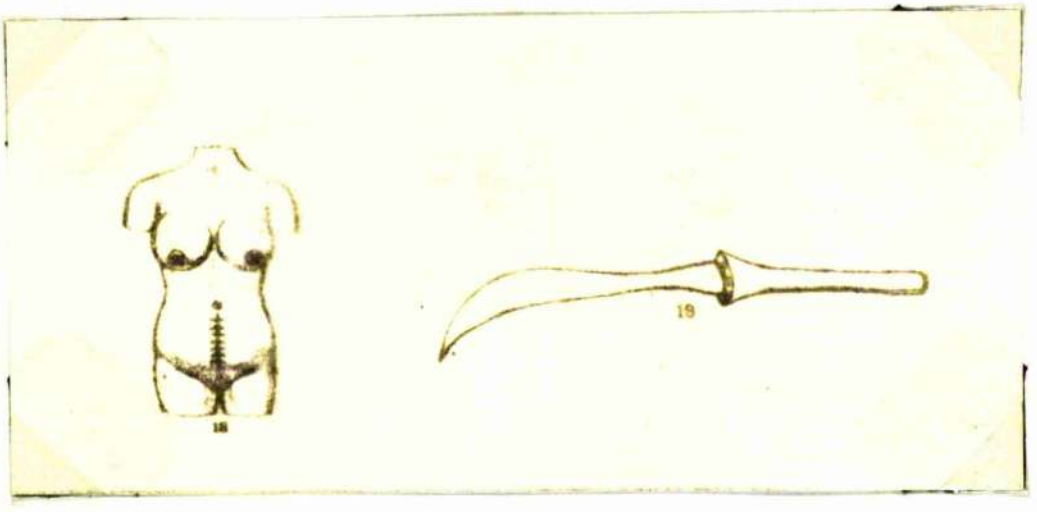


PLATE 2/2

ABDOMINAL SECTION IN UGANDA 1879

THE KNIFE WHICH WAS USED

(Property of the Wellcome Institute of the History of Medicine)

Plate 3/2

in labour also serves the need to force the head of the baby through the small pelvis.

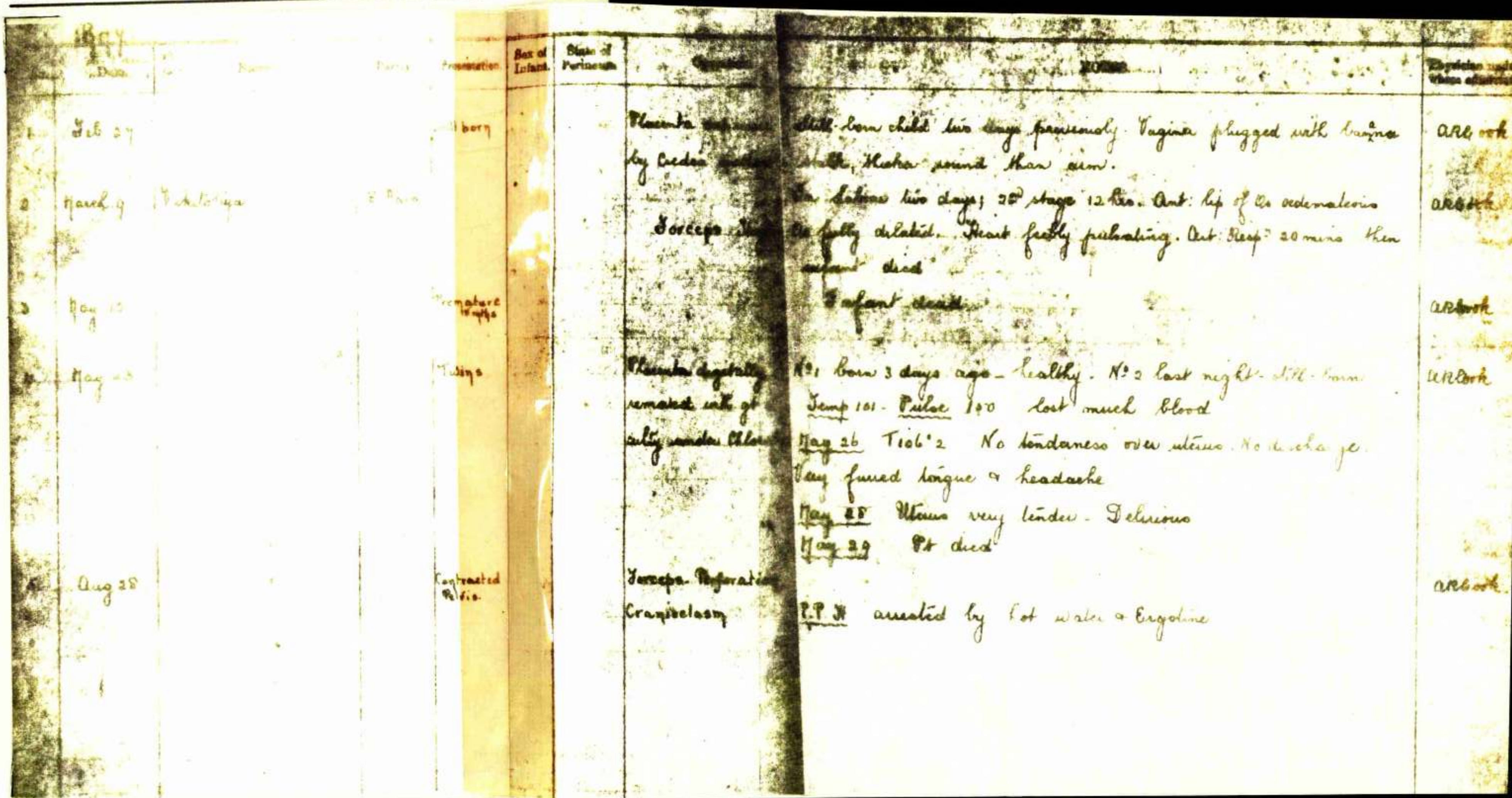
In 1896, Mengo Hospital was opened by Albert Cook of the Church Mission Society. The first obstetric cases were admitted in 1897. Fig. 1/2 is a photocopy of the Obstetric Record Book for that year when five cases were looked after. It will be seen that both case number 2 and case number 5 were obstructed labours; the first requiring a high forceps delivery and the second perforation, forceps and craniociasm.

In subsequent years the Records show little change. There were few beds for obstetric cases and they were either occupied by women connected with the Mission who, in the main, had normal deliveries, or by cases admitted in obstructed labour who required forceps delivery from high cavity or above the brim or a destructive operation.

On 20th July, 1905, Monika Alibakiriza was admitted to Mengo Hospital. The case history is reproduced in Fig. 2/2. She was a primigravida and had been, she said, in labour for eight days. As usual, Kiganda medicine had been taken but labour did not progress at home so she came to Mengo Hospital. She was in obstructed labour and the second stage had been in progress for at least 5 hours before an attempt was made to deliver the baby by forceps. When there had been two failed attempts and the fetal heart had disappeared, the fetal head was eventually perforated and the craniocIast applied. Delivery was still unsuccessful. When the forceps were reapplied the head was finally delivered, only to be followed by shoulder dystocia.

The patient had a large perineal tear, severe puerperal sepsis and there is the suggestion that a vesico-vaginal fistula occurred as on the fourth day there is a note to say that she

MENGO HOSPITAL - Admissions for First Year 1897



	Date	Name	Parity	Presentation	Sex of Infant	State of Perineum	Operation	Notes	Physician under whose attendance
1	1897 Feb 27			[illegible] born			Placenta [illegible] by Credes [illegible]	Still-born child two days previously. Vagina plugged with [illegible] [illegible], [illegible] sound than [illegible].	ARC [illegible]
2	March 9	[illegible]	[illegible]				Forceps [illegible]	In labour two days; 2nd stage 12 hrs. Ant. lip of Os oedematous Os fully dilated. Heart freely pulsating. Art. Resp.² 20 mins then infant died.	ARC [illegible]
3	May 12			Premature [illegible] mths				Infant [illegible]	ARCook
4	May 23			Twins			Placenta digitally removed with great difficulty under Chloroform	No 1 born 3 days ago - healthy. No 2 last night - still-born. Temp 101. Pulse 100 lost much blood. May 26 T 106°2 No tenderness over uterus. No discharge. Very furred tongue & headache. May 28 Uterus very tender - Delirious. May 29 Pt died.	ARCook
5	Aug 28			Contracted Pelvis			Forceps. Perforation Craniotomy	P.P.H. arrested by hot water & Ergotine	ARCook

Fig. 1/2

MENGO HOSPITAL

L. WARD. [illegible]

Name. Monika Ali Vaturi[illegible]

Date of Admittance. July 20/1905

Religion. R.C.

Disease [illegible]

Date of Discharge [illegible]

Result. [illegible]

History of Present Illness.

Pains set in she stated 8 days ago

Kiganda med[icine] failed to relieve so she came in here. [illegible]

Previous Illnesses.

Present Condition.

9.45 a.m. Pains [illegible]

[illegible]

F.H. heard best to left

P.V. Head nearly on [illegible]

11.30. Pains lessening. no progress.

1.30. Pains apparently ceased (? Tonic contraction) [illegible]

Patient anxious & restless.

2.40. T. 101.8. P. 130. F.H. 170 no progress

5.20. Patient in statu quo. No progress

Caput succedaneum

Axis traction forceps [illegible]

F.H. good but rapid

Long forceps applied & strong [illegible] made at regular intervals failed to [illegible] with foot against bed. The F.H. became [illegible] & then stopped. At 6.20 the head was perforated [illegible]

[illegible]

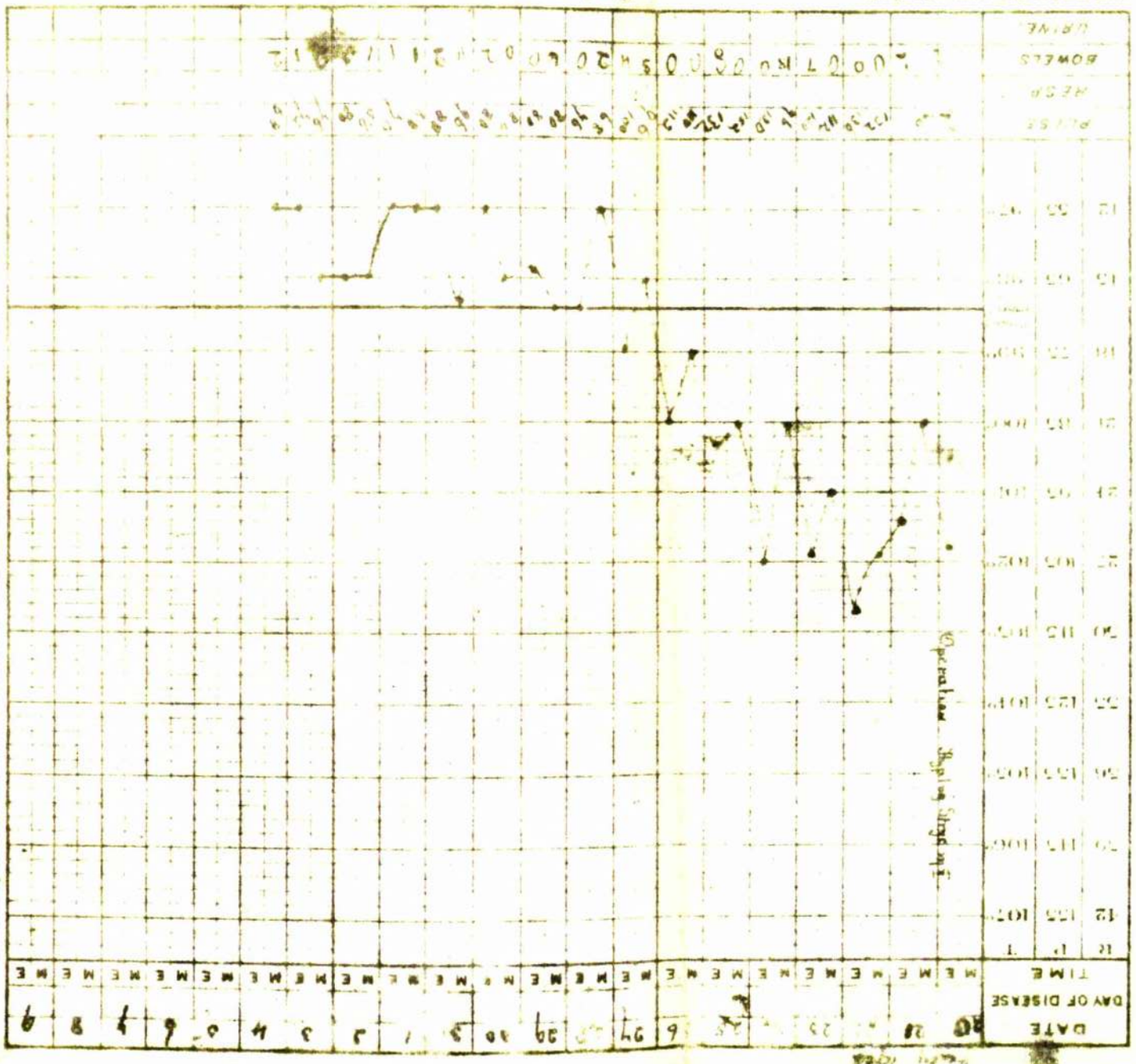
CONTINUATION SHEET.

Name Disease No.

ifficulty was experienced in getting shoulder low enough for
ook. Finally the body of rather a small infant was
elivered. Just before perforation the mother's pulse was 160.
She had had Strych. ½ gr. hypod. during labour.
The placenta was expressed shortly after the body & an
ntra uterine Douche of very hot 1 in 3000 Hyd Perch. given
& hypod injection of ergotine & strychnine was given.
1 p.m P 120. Uterus well contracted. Took 0j. of milk
Perineum ruptured to sphincter - 3 stitches inserted.
y 21 Woman very exhausted but no further haemorrhage.
Bladder had to be relieved by Catheter. T. 100.
7 p.m Catheter passed again.
Some pus in urine. Intra uterine douche given.
General condition good.
ly 24. Passes water without knowing.
ly 30. Stitches removed - perineum had broken down.
ug. 4 Discharged - cured.

MONIKA ALIBAKIRIZA 30 = Primigravida - JULY 1905

[redacted]



"passes water without knowing". Otherwise the patient made a satisfactory recovery and was discharged on the fifteenth day, "cured".

This is typical ofmany other cases which are extremely well documentated in the Records of Mengo Hospital. This case is however particularly interesting in that the patient was re-admitted almost exactly one year later on 19th July, 1906, (Fig. 3/2) in somewhat similar circumstances. This time labour had been in progress for three days. There was a Bandl's ring present and the patient was exhausted. On vaginal examination the cervix was noted to be dilated to the size of a 5/- piece and there was a large caput succadaneum. The apex of the vagina was scarred. Four hours after admission there had been no progress. Accordingly, a Champetier de Ribes' bag was introduced through the cervix in an attempt to encourage cervical dilatation. Traction on the bag for two hours only succeeded in rupturing the bag and the uterus as well. The uterine tear was in the thinned out posterior aspect of the lower uterine segment. As the child was still alive a Caesarean section was undertaken by the Porro technique. Mother and baby survived. When the patient was discharged from hospital on the fifty-eighth day the comment was that she was "cured and sterilised". This was the first Caesarean section ever performed on a living woman in Uganda by a qualified medical doctor. At this time, sixty years ago, Caesarean section was regarded in more civilised countries as a dangerous operation, particularly when undertaken on a patient who had been in labour for a long time and especially if the membranes had ruptured.

Looking back at the Records of Mengo Hospital in the early years one is struck by the similarity between the cases which presented then and those which are seen today. In the early part of the 20th Century cephalopelvic disproportion was common in

MENGO HOSPITAL.

O. WARD. Relatives BED. NO. 891

Name. Monika Alibakiriza
Disease. Parturition [illegible] - Caesarian Section followed by Porro
Date of Admittance. July 19 1906
Date of Discharge. Sep 15
Religion. R C
Result. Cured & sterilized.

History of Present Illness.

Pains set in 3 days ago (?)

Previous Illnesses.

had one previous child in hospital last year child removed by forceps, [illegible] see the notes [illegible] July 20 1905 extracted with the almost [illegible] [illegible] infection

Present condition. [illegible] [illegible] Bird.

[illegible]

[illegible] [illegible] of Bandl.

[illegible] right, head engaged in pelvis

[illegible] right front

[illegible]

[illegible] rather painful.

[illegible] cicatricial ring, dense & unyielding, at site of [illegible] os.

[illegible] given

12 noon [illegible] with some difficulty owing to [illegible] stuff [illegible]

1.30 pm [illegible] Head did not descend into it but could be pushed back [illegible] was not wedged. Chloral [illegible] & Pot. Brom given. Catheter passed. Ext. [illegible] painted with Cocaine. Dist. between ant. spines 8" intercristal diameter 9". The [illegible] notes were obtained & showed the full gravity of the case. Caesarian section debated. Champetier de Ribes bag was found to contain 13 oz of fluid when fully distended.

MONIKA ALIBAKIRIZA - Primipara - JULY 1906

CONTINUATION SHEET

MONIKA ALIBAKIRIZA - Primipara - JULY 1906

-25-

Monika Alibakiriza   Obstructed labour
Porro.

1.45 p.m. The bag was introduced but very little lotion would go in, it was removed & re-introduced. This required some little force & it slipped in rather suddenly [? rupture occurred at this point] About 11 oz of lotion ran in. Firm traction was made on the dilated bag. All this under light anaesthesia

1.55 p.m. Woman more comfortable. P. rapid. Pains at intervals ? ceased. On strong traction on bag it burst. Digital exploration showed a large rupture in thinned lower uterine segment. Moderate haemorrhage & shock. Bowel prolapsing into rent.

p.m. Cesarian section. Incision in skin & uterus 6" long, 3" above umbilicus to pubes. Infant rapidly extracted through anterior incision in uterus. Placenta removed, very little amniotic fluid. Very free haemorrhage controlled by elastic ligature round lower uterine segment. Infant handed over to Mrs A.R. Cook soon breathed.
Galabin's ecraseur was then applied as low down as an adherent sigmoid flexure would permit & the Porro's operⁿ completed. A broad strand of Iodoform gauze was brought out through the rupture into the vagina & the abdominal wall closed. Pulse just perceptible ...

CONTINUATION SHEET

Mónika Alibakiriza — Obstructed Labour

worst The abdomen was swilled out with Porro boiled water A Morphine suppository (gr ¼) was given.

Assistant Surgeon. Dr J.H. Cook. 2nd assistant Dr Shepherd.

Anaesthetists. Mrs A.R. Cook & Miss Piffin.

Sister in charge of instruments. Miss Barry.

Total operation lasted 1 hr. & 5 mins.

5.30 p.m.	Pulse 104.	Fair volume & force.		Patient was turned on side		
6.30 p.m.	Pulse 118.	Good volume, strong.		do	do.	Water 4 oz.
9 p.m.	Pulse 108	do	do	do	do.	Milk 4 oz
10.40 p.m.	Pulse 108	do	do	do	do	Milk 4 oz. Water 4 oz.
11.45 p.m.	Pulse 108	do	do	do	do	Milk 4 oz.
1 a.m.	Pulse 108	do	do	do	do	water 4 oz
2.50 a.m.	Pulse 100	do	do	do	do	milk 2 oz
2.15 a.m.	(Catheter passed - Urine drawn off 3 ¾)					
3 a.m.	Pulse 105	good volume strong.				water 2 oz
4 a.m.	Pulse 112	"	"	"		milk 2 oz.
5.30 a.m.	Pulse 108	-	-	- Temp 98. R 28		milk 2 oz.
8 ..	Pulse 104	"	.	fair		Water 4 oz.
8.30	Baby put to both breasts					
9.15	Catheter passed. oz vi drawn off.					
9.20	Urine Sp 1010 nil alb. Cloud of alb. acid.					Milk oz iv/ii
V.						"
11.30	Pulse 116					Water " ii
1.	Baby put to breast					
3.	Catheter passed. Urine drawn off 3 iv					Milk 3 iv
	Pulse 118. Temp. 99.4					
6.30 p.m.	P. 128. T. 99.8. R. 36.					Milk 2 oz
9 p.m.	Milk 2 oz					
9.45 p.m.	Water 2 oz hiccough heard.	(Catheter passed with drawn off 13 ¾. P. 132				

MONIKA ALIBAKIRIZA - Primipara - JULY 1906

11 p.m. Pulse 126. Milk ℥i. The only unfavourable sign is the meteorism. A rubber tube with wide calibre [illegible] to relieve this symptom. ? a little flatus passed [illegible]
Vulva changed at 9.20 p.m. Natural sleep [illegible]

July [illegible]
7 a.m. Pulse 128. Baby put to breast [illegible]
1 a.m. Pulse 112. Milk ℥i given.
3 a.m. Pulse 116. Cath. passed. Urine ℥viii [illegible]
Distension increasing. Abdomen not tense [illegible]
4 a.m. Pulse 116. Milk ℥ii
5 a.m. Pulse 114. Baby put to breast. Wind rumbling in abdomen.
5.45 a.m. Pulse 110. Temp. 97.6 R 28. [illegible]
Still distended but not tense
8 a.m. Pulse 128 compressible.
Turp. enema. Flatus passed. Urine passed naturally.
9.30 a.m. Wound dressed. Slight oozing on gauze. Ecraseur tightened.
Meteorism, not extreme. Borborygmi heard. An occasional [illegible]
P. 128. No signs of local or general peritonitis. Abdomen [illegible] in respiration. 9.30 Brandy ℥ss Water ℥iv
10.30 Hot Water ℥iv. Baby put to breast.
11. Sugar cane to suck.
12 Pulse 120 Hot Water. P. said she passed flatus three times. Strychnine [illegible]
1.30 Patient sleeping quietly. Seems much more comfortable
2. P.m. Temp 101. P.144 R. Beef ess. ʒii
Tube still in Rectum. Baby put to breast.
3. P.M. Brand's Ess. ʒiii
Passed urine in bed
4.30 catheter passed ℥i drawn off.
" " Strychnine m v injected
6. " P. Passed flatus. Pulse 130.
6.30 Strychnine injected
" " Brand's ess. ʒiii
8 p.m. P. 128. Abdomen - not so distended, flatus had been passed. Drowsy.
9.30 p.m. P. 124. Brand's essence ℥i
[illegible] 30 p.m. Inj. Strych. Hyp. m x. Brand's ℥ii. Urine drawn off. Vulva dressed.
[illegible]

MONIKA ALIBAKIRIZA - Primipara - JULY 1906

CONTINUATION SHEET

[illegible] Monika

July 22 3 a.m. Inj. Strych. Hyp. ℳ x given ---
8 a.m. Pulse 112 compressible but good. Very drowsy. For last 24 hrs no milk only Brand's essence. Urine drawn off by catheter at 11.30 p.m. - copious deposit of uric acid - specimen put up in Esbach's albuminometer showed of Albumen. T. 97.4.
8.15 Wound dressed. Meteorism distinctly less. Gauze drain removed (after 63½ hrs) apparently not much pain. Rectal tube removed. Patient had passed water into bed, residual urine (2oz) removed by Catheter. Vagina & [illegible] in lower uterine segment [struck-through word] irrigated with warm 1 in 5000
Brand's essence. 1¼ oz taken. Urotropine ex Aq. 15 gr. Inj Strych Hyp. ℳ x given
Infant put to breast. Pulse after dressing 110.
Midday. Ate matoke. Sugar-Cane has cleaned up mouth. Brand's ℨ iij
T. 98.
4 pm. Sugar-cane. Patient sleeping well.
6.30 p.m. P. 120. Passed Catheter. 10 oz drawn off. Only faint cloud of albumen. Urotropine 15 gr.
July 23. P. 112. Douched & dressed. Urine apparently passed without knowledge
6.30 p.m. Ate matoke as yesterday. P. 128. Catheter passed this morning. 10 oz drawn off.
July 24 P. 108. eve. 124. T. 101.8. Passed water freely
July 25. B.O. naturally - only one small lump. Urotropine stopped. Ol. R.C. given
Pulse (after dressing) 96. Abdominal wound dressed - gauze inserted p.v. by Speculum
July 27. A little Diarrhoea -
July 28 Much of gangrenous stump cut away.
July 29. Écraseur removed. Lotion syringed right through.
Aug 2 P. 64. m. Lotion syringed from vagina to abdomen.
Sept 7. A large [illegible] piece of silk removed
Sept 8 Only a tiny sinus left

MONIKA ALIBAKIRIZA - Primipara - JULY 1906

DISEASE

Ruptured Uterus
Caesarian Section
Porro.

NOTES OF CASE

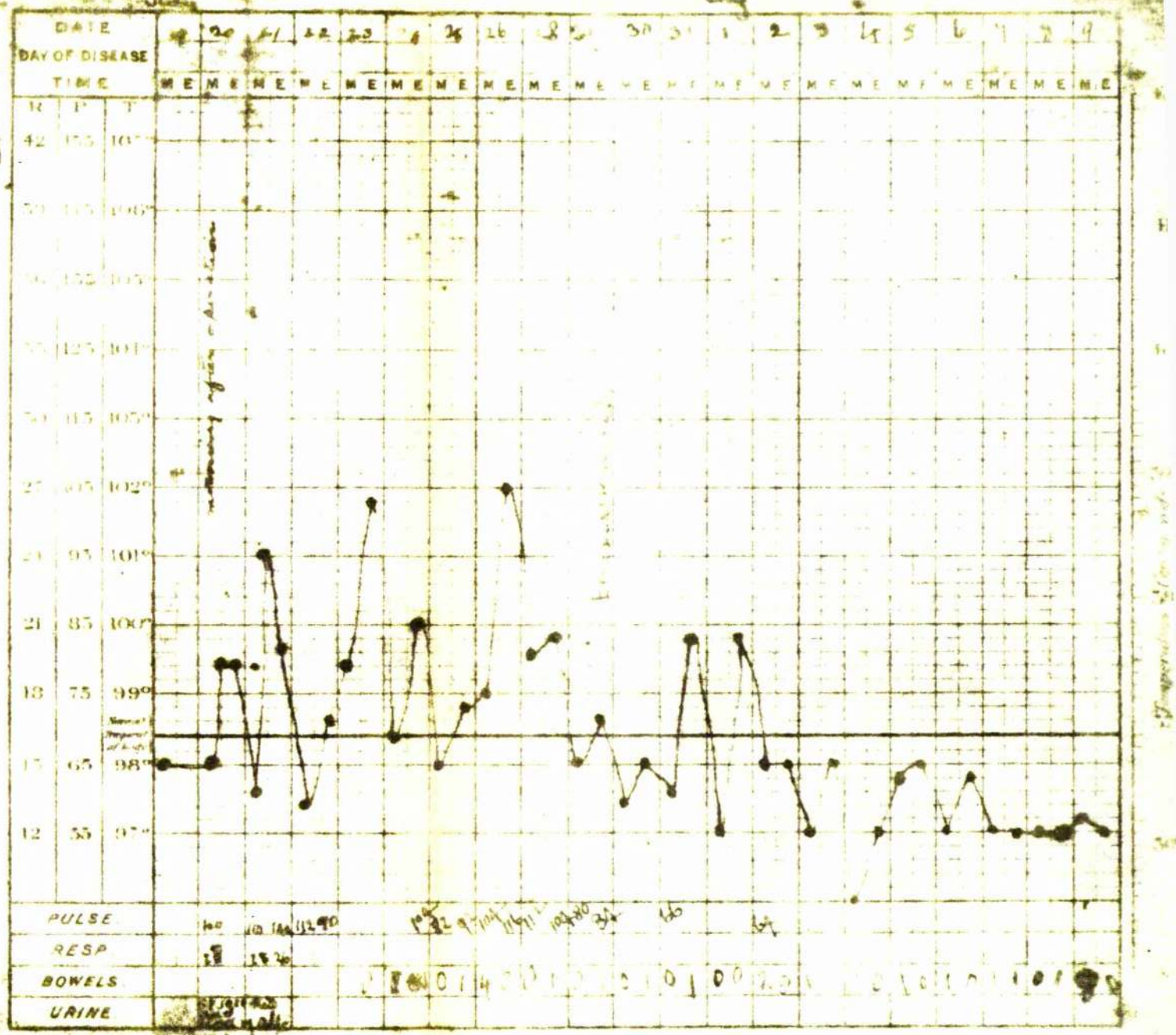
NAME

AGE

DIET

CASE BOOK N°

DATE OF ADMISSION



Industrial Europe. Sixty years later it has become rare. No such obvious change has occurred in Uganda in spite of any developmental progress that may have occurred. There must be a reason for this. Wherever contracted pelvis has been common it has had a nutritional background. Rickets, due to deprivation of Vitamin D was the problem in Industrial Europe (MacLennan, 1944, Baird, 1945) and osteomalacia or adult rickets due to Calcium deficiency in Asia (Maxwell, 1947, Mukerjee, 1967) have always been the two types of malnutrition which have been widely quoted as interfering with pelvic development. Malnutrition also occurs in Uganda. On casual acquaintance with the predominently Bantu women who attend the Antenatal clinics in South West Uganda it is noticed that they are healthy, well fed and lack all evidence of deformity, quite unlike women with rickets and osteomalacia. However, they are small. Shortness of stature could be explained by genetics, but it is unlikely that a race which is small, with a small pelvis, yet a baby which is not small in proportion, would survive long and, indeed, such discrepancy is antagonistic to all laws of natural genetics.

It was pointed out in Chapter 1 that the rainfall and the agricultural habits of the people in Uganda differ in the South West from the North. In the South West there is a heavy annual rainfall of between 40 and 70 inches of rain. There is little seasonal variation. Consequently the soil is continually fertile and the people agrarian, living almost exclusively on the produce which they grow. Most men have a small-holding or 'shamba' where the family lives and which they cultivate. The staple diet is matoke, a non-sweet banana. When it is cooked matoke looks and tastes like a coarse mashed potato. Enough matoke is grown on the shamba to feed the owner and his family. So well loved and so abundant is the growth of the fruit (Plates 4/2, 5/2) that in

MATOKE GROWING IN ABUNDANCE

PLATE 4/2

Matoke on Sale in the Market

(Eggs are Also Available)

Plate 5/2

many house-holds little else is ever eaten. Chickens and goats are often kept on the farm but they are seldom eaten as they are sold, along with eggs in the markets, to the more urban and wealthier members of the community to provide cash to buy clothes and other necessities which cannot be produced at home. Chicken and eggs are actually forbidden to many female members of the house-hold in certain areas. Large platefuls of matoke may be consumed at each meal to provide a high bulk diet but its quality as a foodstuff is limited in that it contains only 1 per cent protein. (Dean, 1959).

Occasionally the family meal is augmented by the addition of a sauce of groundnuts, goat meat or fish. These commodities are relatively expensive and are reserved for the more senior members of the family. Dean reckoned that this source of protein does not become significant in the diet of the children until they are well on in the second year of life. Children are weaned directly on to matoke at approximately nine months. The food is prepared communally in one large dish filled with matoke with perhaps a sauce on the top. The small hand of the infant takes his supply from the side of the plate where there is no sauce and where the food is sweet. (Stansfield, 1966). Rutishauser (1965) has studied the growth in height of Baganda infants and pre-school children. Her material was selective in that it consisted of children of a middle class background who could be compared with American, South African and British children. Until weaning the growth curves compared favourably with those of the American and British children. Thereafter that of the Baganda children dipped significantly (Fig. 4/2) and was not restored until the children were about four years old. From this it was deduced that the traditional diet of even the more well-to-do families was inadequate to maintain growth. The possibility and

Mean Heights of Baganda Girls Compared with Similar Data from American Children after Rutishauser (1965)

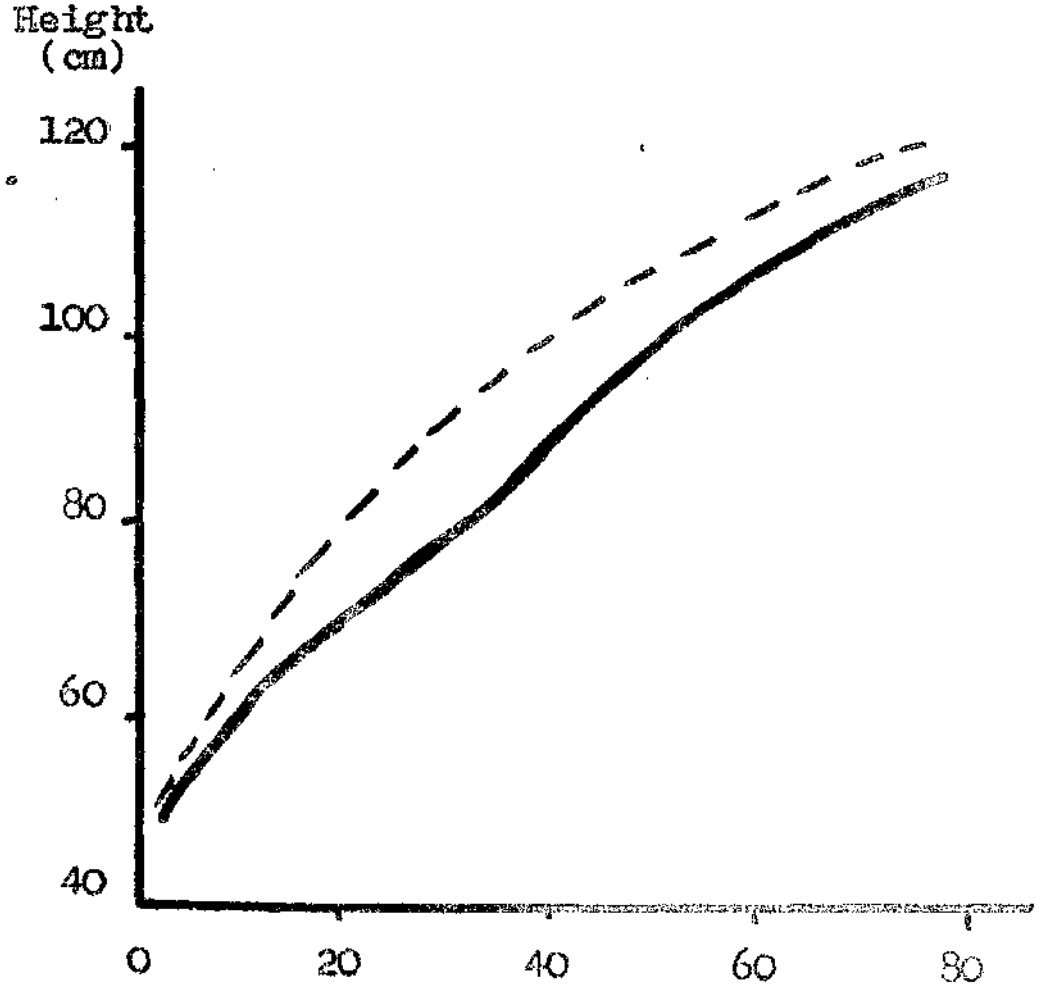


FIG. 4/2

unlikelihood of this being a genetic variation has been discussed by Burgess (1960). If the best traditional diet cannot supply enough protein to developing pre-school infants it must follow that the poorer diet of the mass of the population is abysmally low in its protein content. This is reflected in the amount of gross protein malnutrition which is found among the pre-school children of South West Uganda. Kwashiorkor, the most outstanding clinical evidence of such malnutrition is rife and accounts for a high proportion of hospital admissions to Mulago Hospital among pre-school children (Jelliffe, 1966). Similar findings are reported from Nigeria (Hendrickse, 1966) and other developing countries. In 1959 Jones and Dean described the follow-up studies of children suffering from Kwashiorkor. They found that even after treatment and supplementation of the diet height gain showed no evidence of acceleration after discharge and that skeletal development as measured by tibial length remained backward into adolescence. It is suggested here that skeletal development is retarded for life and that this is manifested by the prevalence of contracted pelvis and cephalopelvic disproportion fifteen years later when the first pregnancy occurs. Baganda women are small women with small pelves, miniatures in fact of their genetic selves. This problem is not solely met with among the Baganda and other related Bantu peoples but is found wherever protein deprivation and Kwashiorkor are manifest in childhood.

In the North of Uganda conditions are quite different. The rainfall is more seasonal and not quite so heavy (30-50 inches per annum). In December, January and at the beginning of February there is a period of drought. The soil is thus less fertile and the

crops are seasonal. Matoke cannot survive prolonged periods without rain so few bananas are grown. The crops are finger millet and sorghum which have a higher protein content. Instead of owning land the Northerners own cattle and goats which denote their wealth. A porridge is made from millet and there is plenty of milk to drink. Cattle are not often slaughtered but they are bled and the blood is drunk. The diet therefore is rich in protein but not bulky. Babies are weaned on this diet, consequently Kwashiorkor is rare, the people are tall and disproportion is seldom encountered among the adult females.

To illustrate the extent to which cephalopelvic disproportion exists in the area served by Mulago Hospital 500 primigradidae have been studied. These were the first 500 Baganda primigravidae who delivered in Mulago Hospital in 1965. The Baganda have been chosen because this tribe makes up 61.5% of all deliveries in Mulago Hospital (Hamilton and Anderson, 1965). The remaining 38.5% consists of over 23 other tribal groups. These 500 women represented 62.3% of all primipara who delivered between 1st January and 16th May, 1965, or 15.8% of the total deliveries. Multiple pregnancies, of which there were 6 have been ignored. It is appreciated that hospital statistics are not community statistics, but it is claimed that this in no way detracts from their importance. The errors which will occur are due to the emergency admissions and will bias the figures in favour of the obstetric problems which exist within the community and bring them into full emminence.

Four hundred and seventy-eight of these women were seen personally during their stay in hospital. The patients' heights and the babies' weights were checked and all information which had been omitted from the case records, such as age, was entered. This has ensured a fair degree of accuracy in the findings.

The percentage height distribution of the women is shown in Fig. 5/2. It is seen that 139 women (27.8%) were under five feet in height.

Whereas height is a scientific fact which may be recorded accurately, age among African women is not. The standard of education of these women is such that the date of birth is seldom known with certainty. A patient may guess her age or the doctor or nurse who attends her may guess in her stead. The net result is the stated age which is entered in the case record. Fig. 6/2 represents the stated age distribution of the 500 primigravidae under study. The distribution is normal with the slight exception of 17 which appears to be relatively unpopular. If the stated age is correct, 206 (41.2%) of these women had their first babies before their 17th birthday. There is some indirect evidence to suggest that the stated age is accurate. Burgess and Burgess (1965) prepared a growth curve of middle class Baganda girls (Fig. 7/2). This showed that they grew steadily until the age of 16 when the curve flattened considerably and there was little growth thereafter until the age of 20 when further growth ceased. From this it would be expected that there would be a significant difference in the height of young women under the age of 17 and those of 17 and over. This is confirmed in Figs. 8/2 and 9/2. It will be seen that of the 206 girls whose stated age was 16 or less, 80 (38.8%) were under 5 feet ((152.0 cm.) in height. For comparison, of the 294 women whose stated age was 17 or over, 58 (19.9%) were under 5 feet (152 cm.) in height. This suggests that stated age may be fairly accurate. If it is not it is certainly important. The difference in height distribution is shown in Fig. 10/2.

In summary, 2 out of every 5 Baganda primigravidae who deliver in Mulago Hospital are under 17 years of age and the young women are significantly smaller than the older ones. Over one quarter of all Baganda primigravidae are under 5 feet (152 cm.)

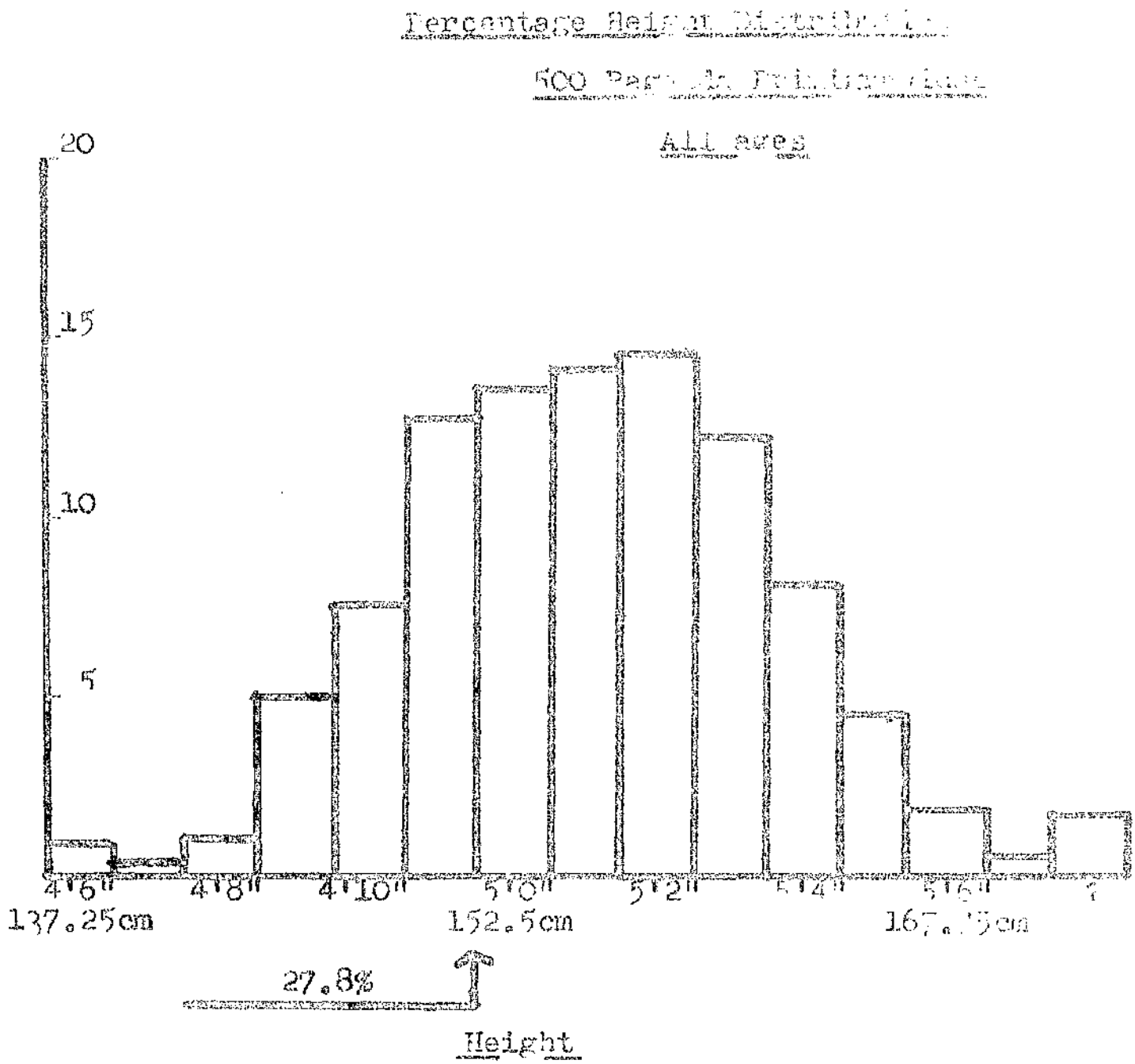

Percentage Relative Distribution
500 Persons Enumerated
All ages
20
15
10
5
4'6"
4'8"
4'10"
5'0"
5'2"
5'4"
5'6"
137.25cm
152.5cm
167.64cm
27.8%
Height

FIG. 5/2

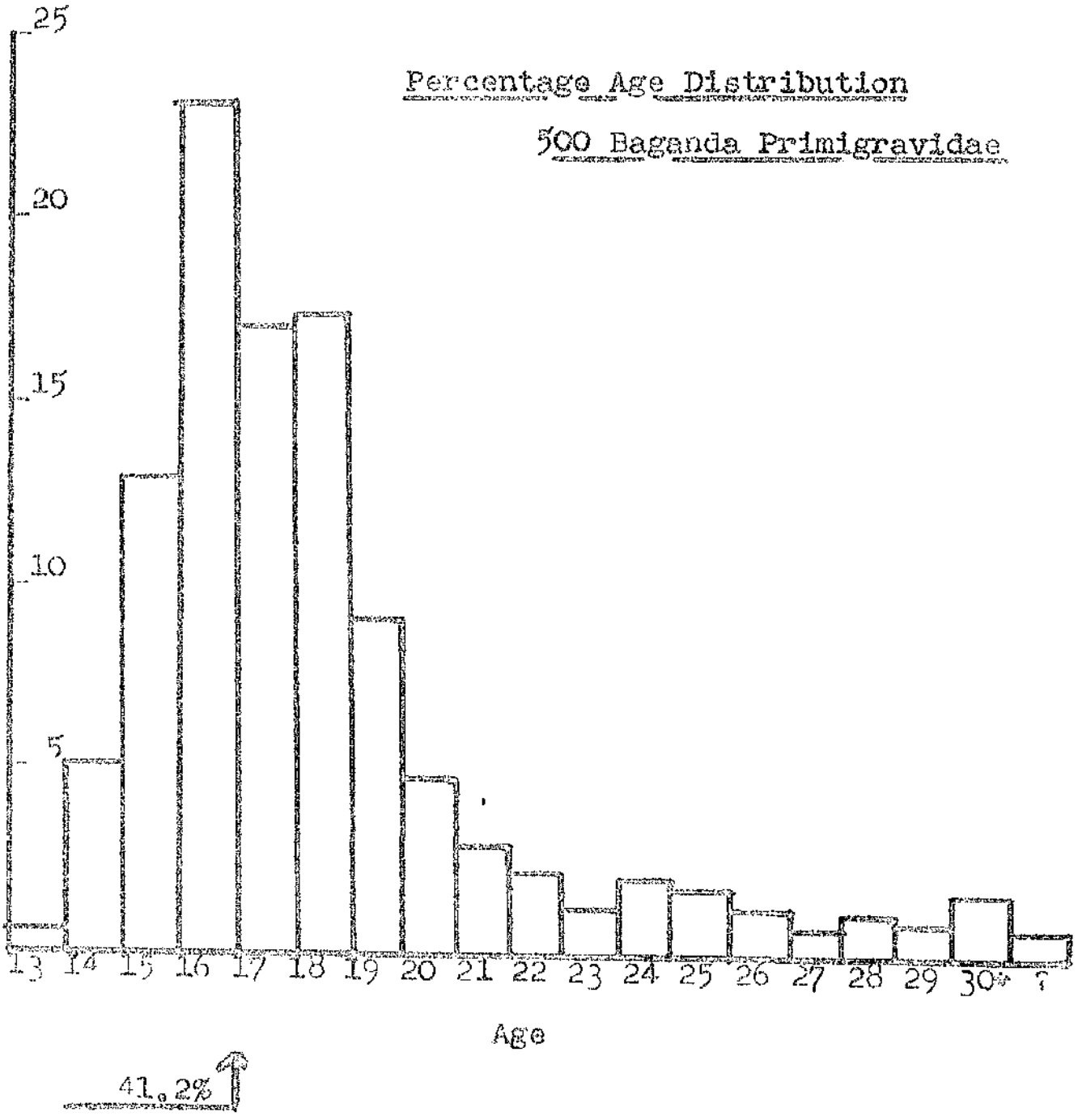

Percentage Age Distribution
500 Baganda Primigravidae
25
20
15
10
5
13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30+ ?
Age
41.2%

FIG. 8/9

The Mean Heights at Each Year of Age for Baganda Girls

Burgess and Burgess (1965)

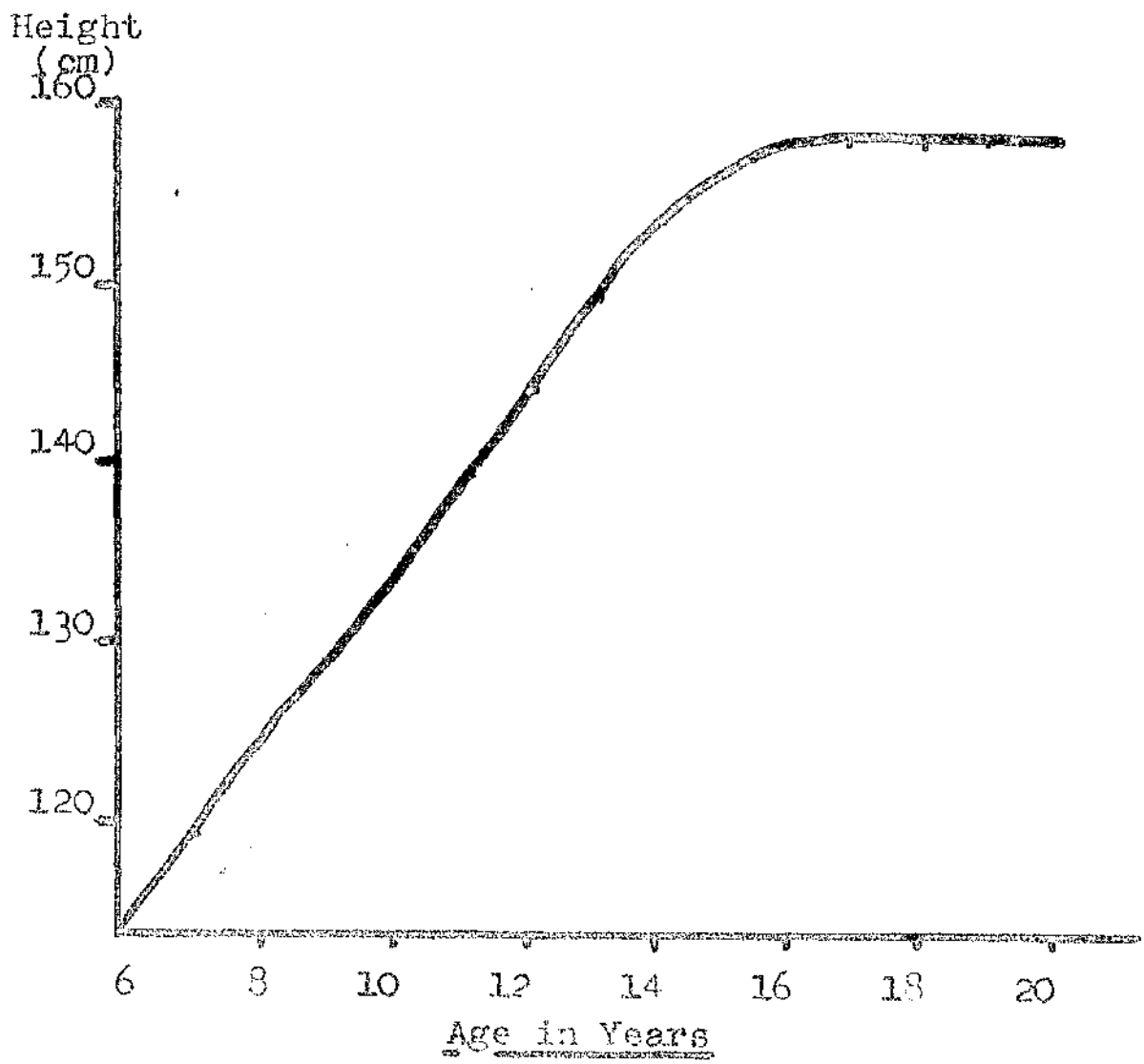


FIG. 7/2

Percentage Height Distribution

206 Baganda Primigravidae

Aged 16 and under

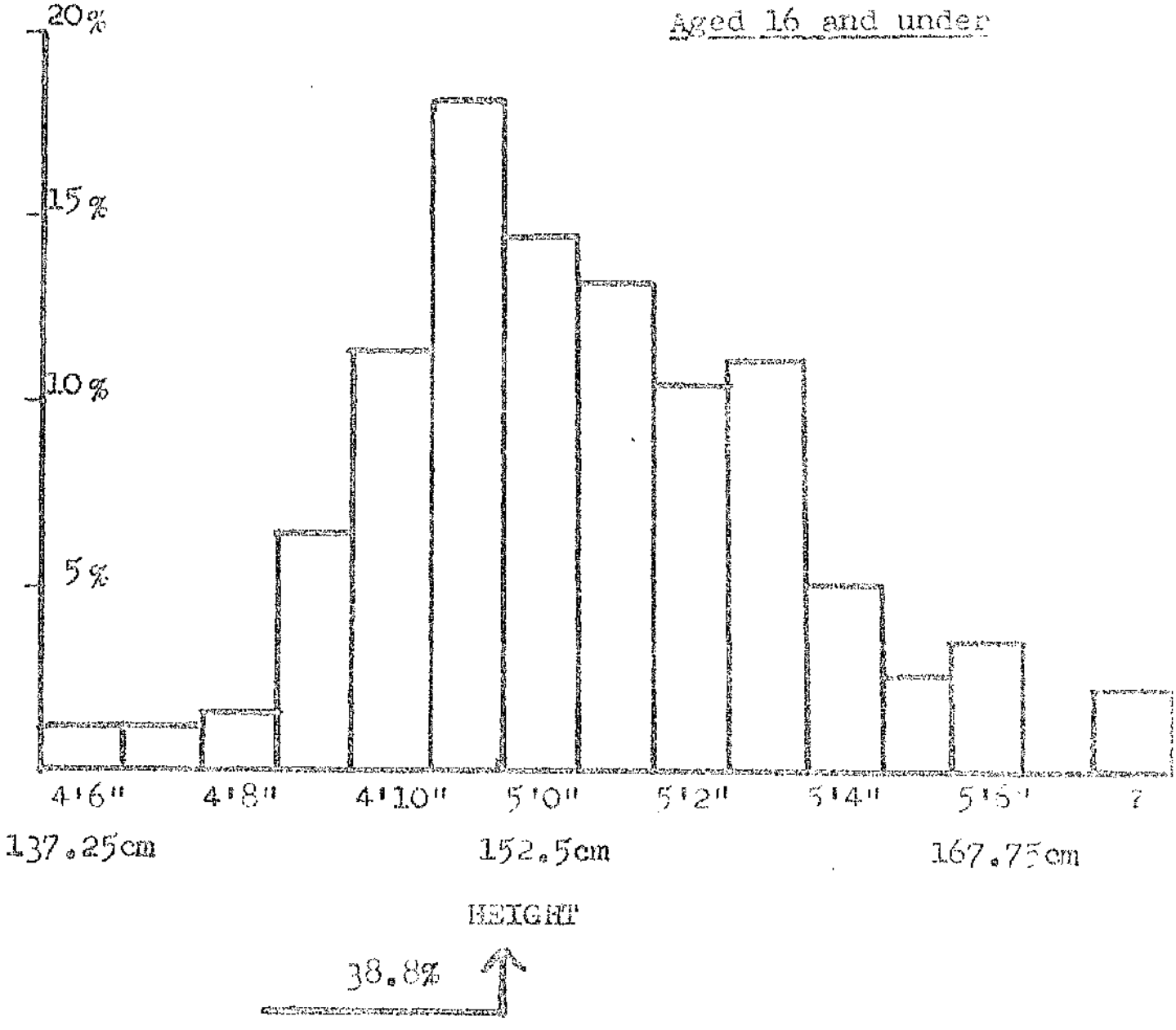


FIG. 8/2

Percentage Height Distribution

294 Baganda Primigravidae

Aged 17 and over

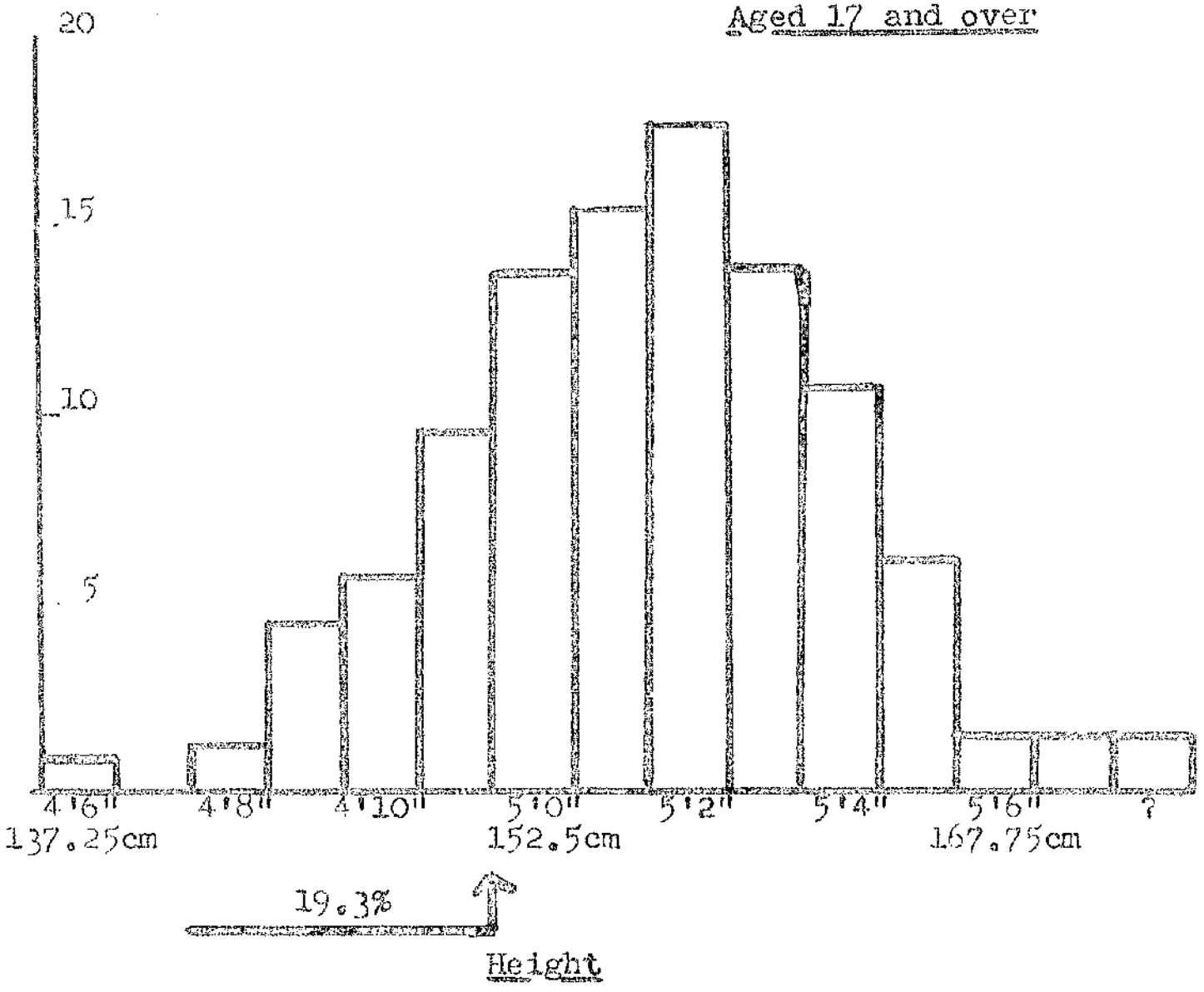
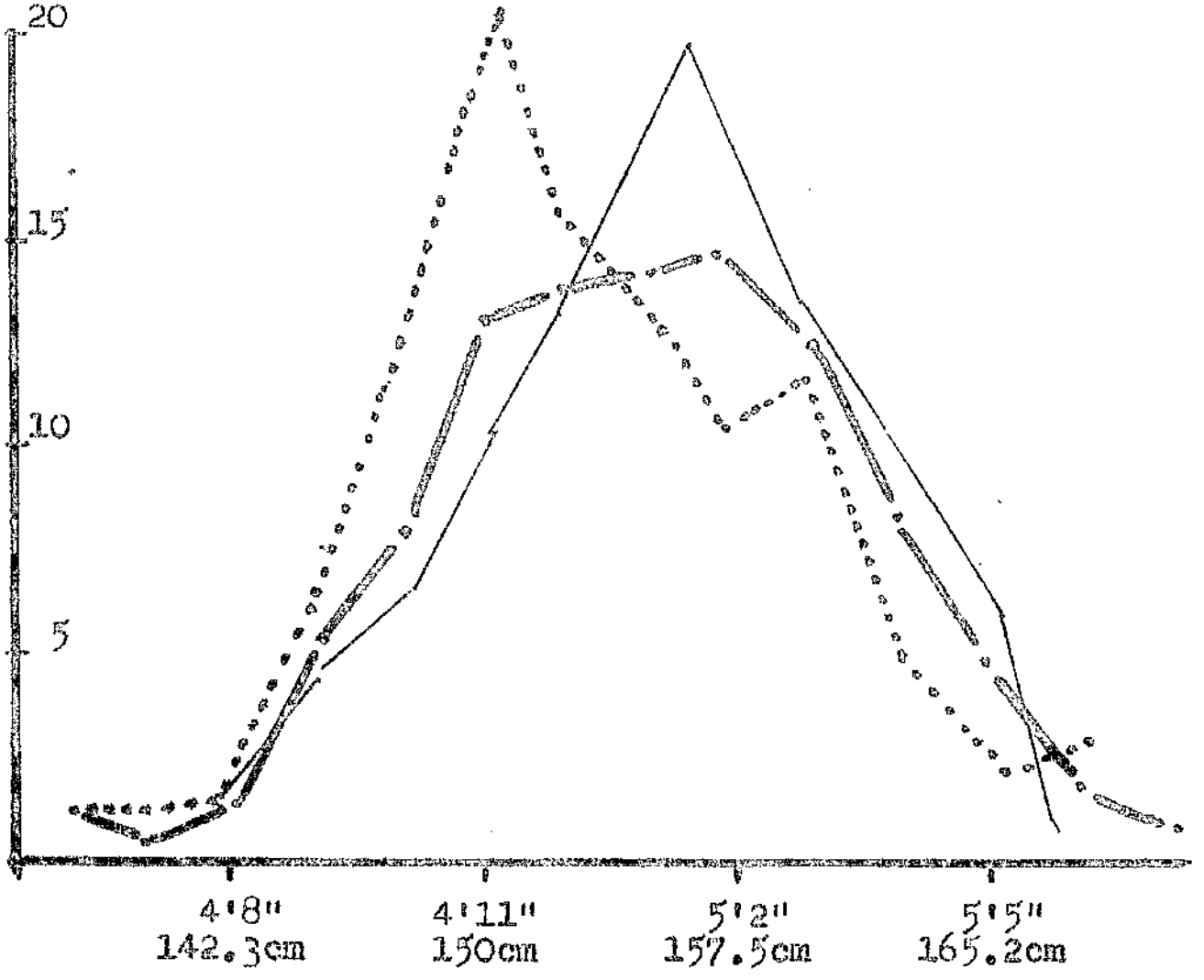


FIG. 9/2

Percentage Height Distribution Graph

Baranda Primigravidae

According to Age



All Primigravidae

Primigravidae 16 and under

Primigravidae 17 and over

FIG. 10/2

in height.

Height is important only if it bears some relationship to pelvic size. Bernard (1952), in a study of Scottish primigravidae showed that maternal stature was clearly related to the true conjugate and the pelvic brim area. Ch4n and her colleagues (1964), reporting on a series of over 1,000 pregnant Hong Kong Chinese women in whom pre-natal radiological pelvimetry had been carried out, was able to show that although two-thirds of the patients were 5 feet (152 cm) or under in height, cephalopelvic disproportion was rare. Of the 994 single pregnancies in the series, 93.4% had normal deliveries, 1.6% required Caesarean section and 1.6% forceps delivery. The perinatal mortality was 2 per thousand. The Chinese pelvis is not much smaller than the European one. Although the average maternal height was only 60.4 inches (154 cm.) the average obstetrical conjugate was 11.51 centimetres. Only one Caesarean section was undertaken for disproportion.
Tow (1966) confirms similar findings from Singapore. The Chinese figures, illustrating as they do the safety of pregnancy and delivery in young women in the absence of cephalopelvic disproportion are irrelevant to the main argument as individual races or tribal groups vary in genetic stature and critical heights require to be established. The brim area in her series was proportional to the height of the patient and it could well be that the critical height in the Chinese Hong Kong women is as low as 4 feet 6 inches.

An attempt has been made to evaluate the size and shape of the Baganda with the prevalence of cephalopelvic disproportion in that tribe by several authors. Cook (1938) and Mitchell (1938) argued the point in a lively correspondence in the East African

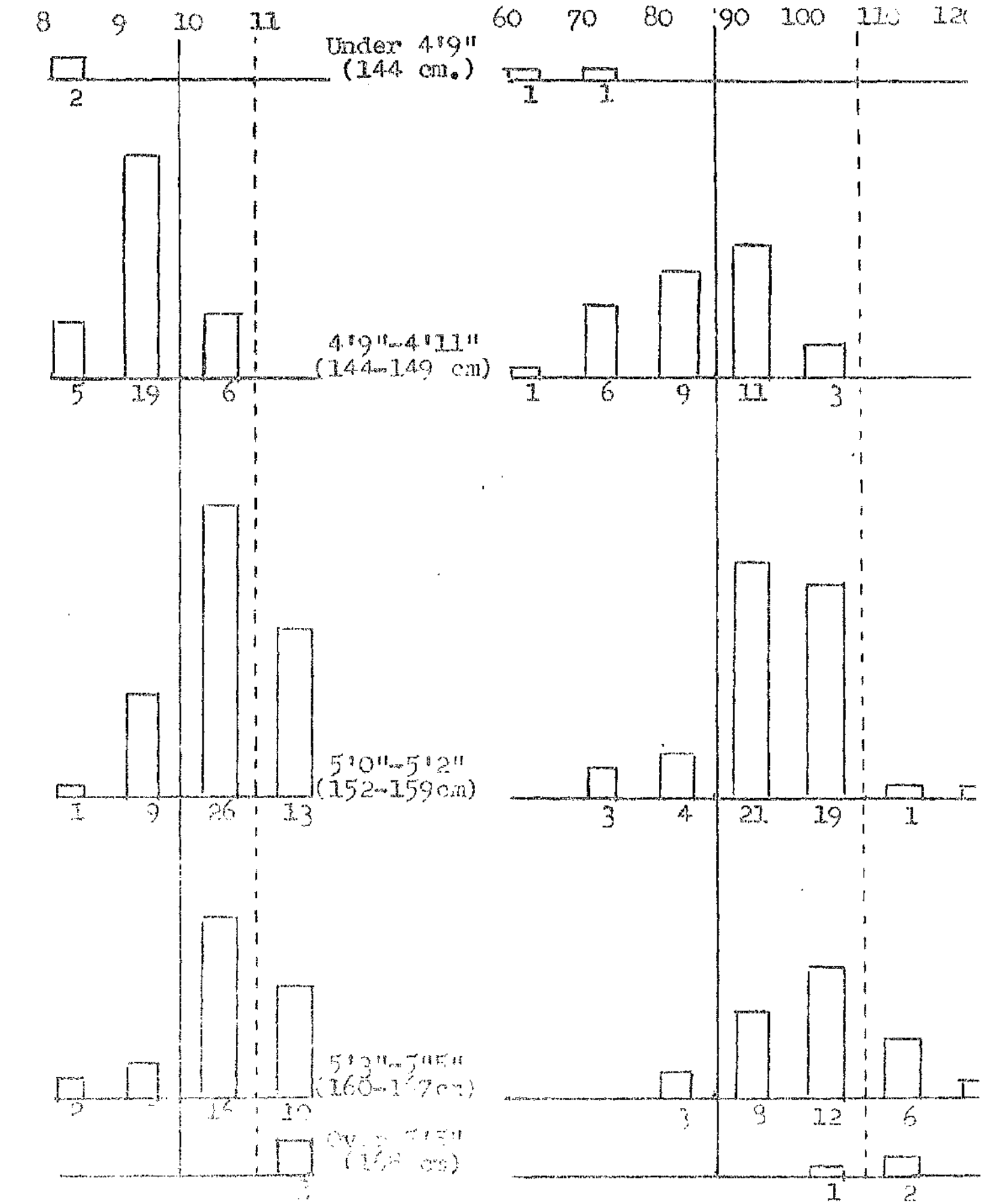
Medical Journal. Both had extensive experience of obstetrics in Buganda and both held their own views. Mitchell, from a study of 10 dried pelves, was of the opinion that because of the rather anthropoid shape of these pelves the contraction was due to anthropological development and that the Baganda had not yet achieved full development in an upright position. Cook, on the other hand, having noted that on clinical assessment the sacral promontory could easily be reached in most cases, assumed that the pelvic brim was of a platypelloid shape and similar to that of contracted pelvis found in rickets. Doubt was later cast on Mitchell's specimens as at least half of them were thought to be of male origin.

Allbrook (1962) and Sidthorpe and Allbrook (1959, 1961) have made a full study of all aspects of the Baganda pelvis, both from radiological examination and the examination of dried specimens. They concluded that the pelvis is of gynaecoid shape and that inmany ways it is a miniature of the normal European pelvis. This would be expected if the general contraction was due to a protein deficiency which would affect all aspects of the pelvis without altering its shape. Although they took the height of the women that they studied they did not relate this to the degree of contraction.

The Bantu people of South Africa live in a similar environment to those in Uganda. In 1945 and 1946 Heyns carried out a full survey of pelvic size, fetal head size and behaviour in labour of these women. The pelvis he described is similar in size and shape to that which occurs among the Baganda. Heyns set out to prove that uterine action was more efficient among the South African Africans than among the European community. The average brim area of their pelves was under 100 sq. cm. and the average true conjugate under 10 cm., yet the measurements of the

fetal heads were not much smaller than those of European babies. He concluded from these findings that the Bantu women were small and had small pelves because of the nutritional neglect that was present when they were infants. Reasonable nourishment in adult life, however, ensured satisfactory growth of the fetus in utero. Most of these women delivered normally, often at the expense of the baby's life or the development of a fistula. In view of the ability of the uterus to expel the fetus in such disproportion he credited it with outstanding efficiency. Unfortunately, the ages of his patients were unknown and it is probable that most patients were young and the uterine efficiency was therefore due to this factor rather than to any other reason.

Radiological pelvimetry has been carried out on 115 consecutive Baganda primigravidae at the antenatal clinic who had reached 36 weeks gestation. The height of these women was carefully measured and recorded at the same time. Two views were taken, an erect lateral view, to give the true conjugate along with other antero-posterior measurements and an antero-posterior view to measure the maximum transverse diameter of the pelvic brim. From these two readings the area of the pelvic brim was calculated. In Fig. 11/2 the true conjugate and the brim area are shown against maternal height. Heights are given in groups. It is seen that the height of the mother is a fair reflection of the size of the pelvic brim. Of the 32 women (27.8%) who were under 5 feet (152 cm.) in height, 26 (81.2%) had a true conjugate of less than 10 centimetres and 18 (56.2%) had a brim area of less than 90 square centimetres. The taller women, that is those of 5 feet (153 cm.) and over, had similar pelvic contraction of 19.2 and 12.0% respectively. Very few women had pelves which by European standards would be considered to be normal. To the



Distribution of Maternal Height to Pelvic Size
115 Baganda Primigravidae

Fig. 11/2

left of the continuous line are those cases in which major pelvic contraction was present and to the right of the interrupted line are those whose pelvic size Baird (1957) would consider to be normal for Scottish women.

Pelvic flattening as defined by a brim index of 81% or under was found in 31 cases (27.2%) but in only two occasions was this of marked degree. Flattening was present in half of the pelves of women under 5 feet (152 cm.) in height but only in 17% of those of 5 feet 2 inches (159 cm.) and over. The other main deviation from the normal was the presence of a straight sacrum in almost one third of the cases. In general the pelvis is small gynaecoid, the dimensions improving in the lower straits. Heyns (1945), in his study of the Bantu pelvis in South Africa and Sidthorpe and Allbrook (1961) and Allbrook (1962) in their studies of the pelvis in Uganda described similar features but their frequency of the flat or platypelloid type of pelvis was less.

Such pelvic contraction as exists predisposes to a high rate of operative intervention unless babies are small and the uterine action good.

The percentage birthweight distribution of the 500 babies born to these women is given in Fig. 12/2. Three hundred and fifty nine (71.8%) babies weighed between just over 5½ pounds and 7½ pounds (2505 to 3410 grammes). The low birth weight babies, that is those babies weighing 5½ pounds (2500 grammes) or less numbered 78 (15.6%).

The next histogram (Fig. 13/2) gives the percentage birthweight distribution of the 206 babies born to the mothers who were sixteen years of age or less at the time of delivery. The distribution is similar in all respects showing that birthweight

Percentage Baby Birth-weight Distribution

500 Baganda Primigravidae

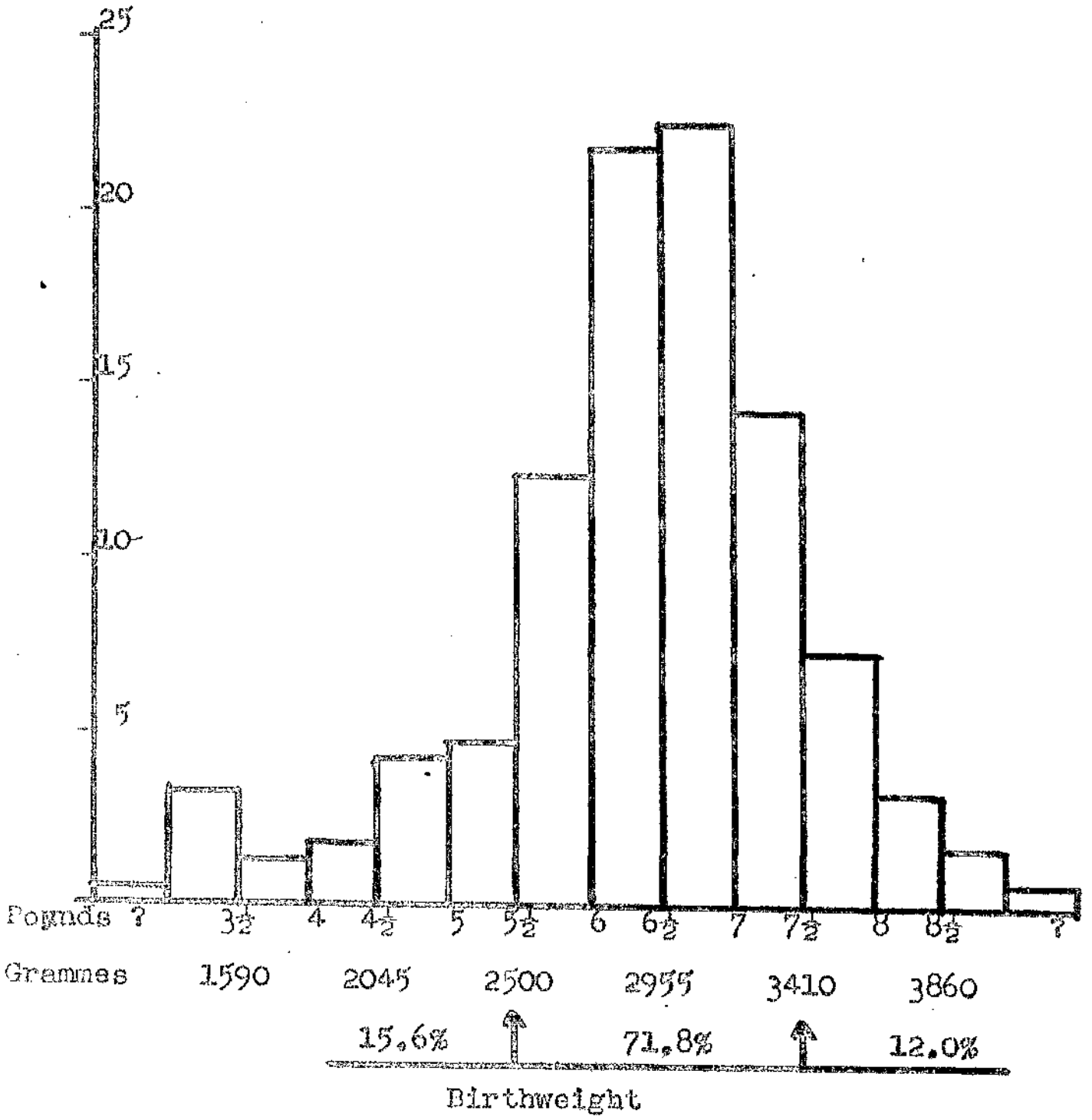


FIG. 12/2

Percentage Baby Birth-weight Distribution

206 Baganda Primigravidae 16 and under

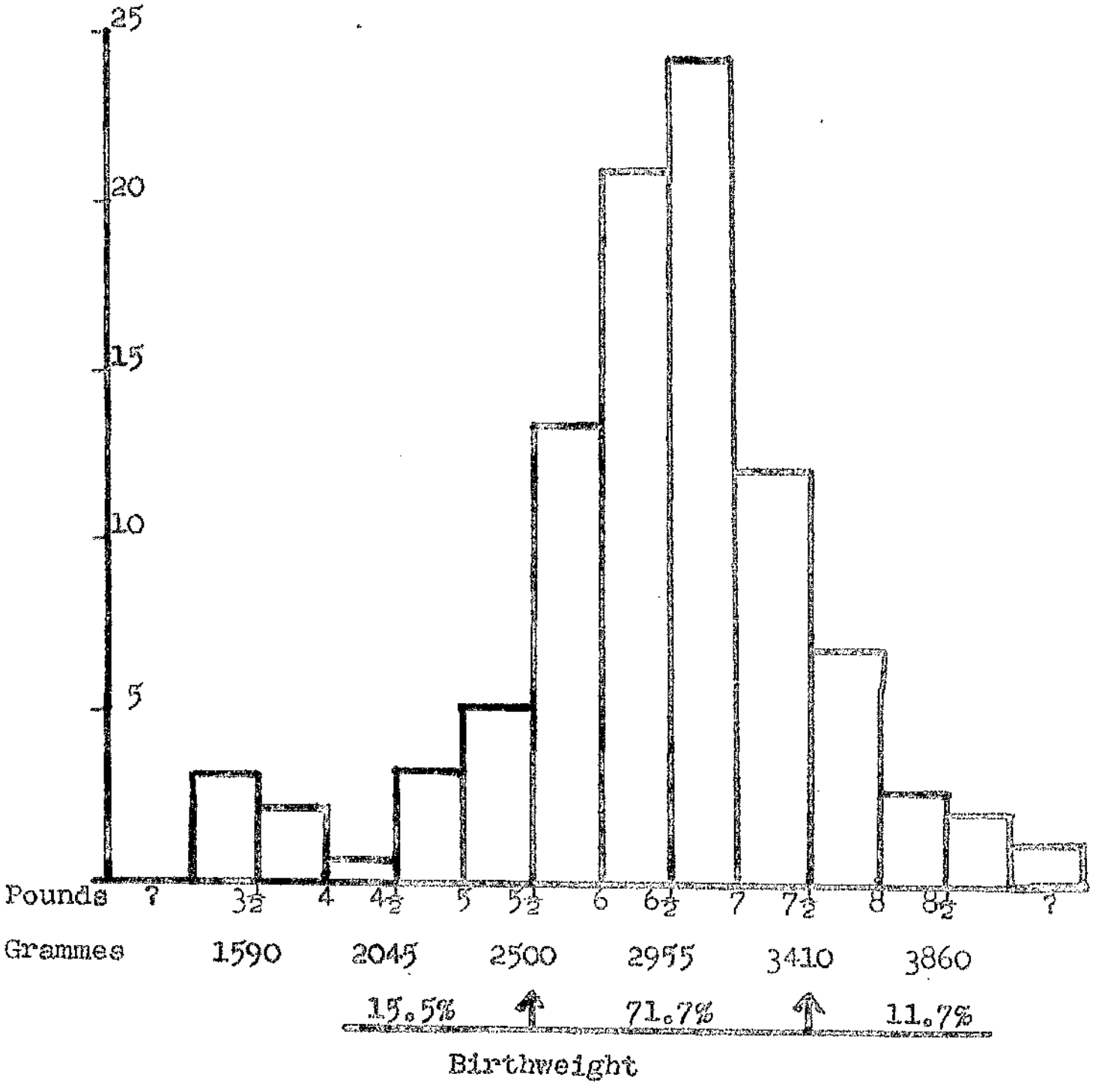


FIG. 13/2

of first babies is not dependent upon maternal age. The histogram, Fig. 14/2 shows the relationship of maternal height to birthweight of the baby. Of the 139 mothers who were under 5 feet (152 cm.) 68.4% had babies weighing between just over 5½ pounds and 7½ pounds (2505 to 3410 grammes). The number of low birth weight babies was greater (22.2%). This suggests that there is some co-relation between maternal height and weight of the baby. It may be a genetic factor within the tribe but socio-economic and nutritional factors cannot be excluded. Fig. 15/2 shows the age and height effect on birthweight in graphic form.

It was interesting to discover that maternal age had no effect upon birthweight. It has been shown that these young mothers contain a higher percentage of small women and it has been suggested that they are not yet fully grown. The fact that the higher incidence of smaller women did not in this instance give smaller babies provides further indirect proof that the stated age is reasonably correct.

The lower birthweight of babies born to smaller women does not compensate fully for the smaller pelvic dimensions. In Fig. 16/2 percentage columns have been constructed to show the incidence of operative delivery in relation to maternal height and age. This time all babies weighing 4 pounds (1820 grammes) or less have been excluded. The Caesarean section rate in the 481 such cases considered was 6.6% and the operative vaginal delivery rate was 11.4%. When the patients are divided into two groups according to whether they were under 5 feet (152 cm.) or 5 feet and over as they have been in the second and third columns of Fig. 16/2, it will be seen that the Caesarean section rate (12.9% as compared with 4.4%) and the operative vaginal delivery rate (21.2% as

Percentage Baby Birth-weight Distribution

139 Baganda Primigravidae under 5 feet

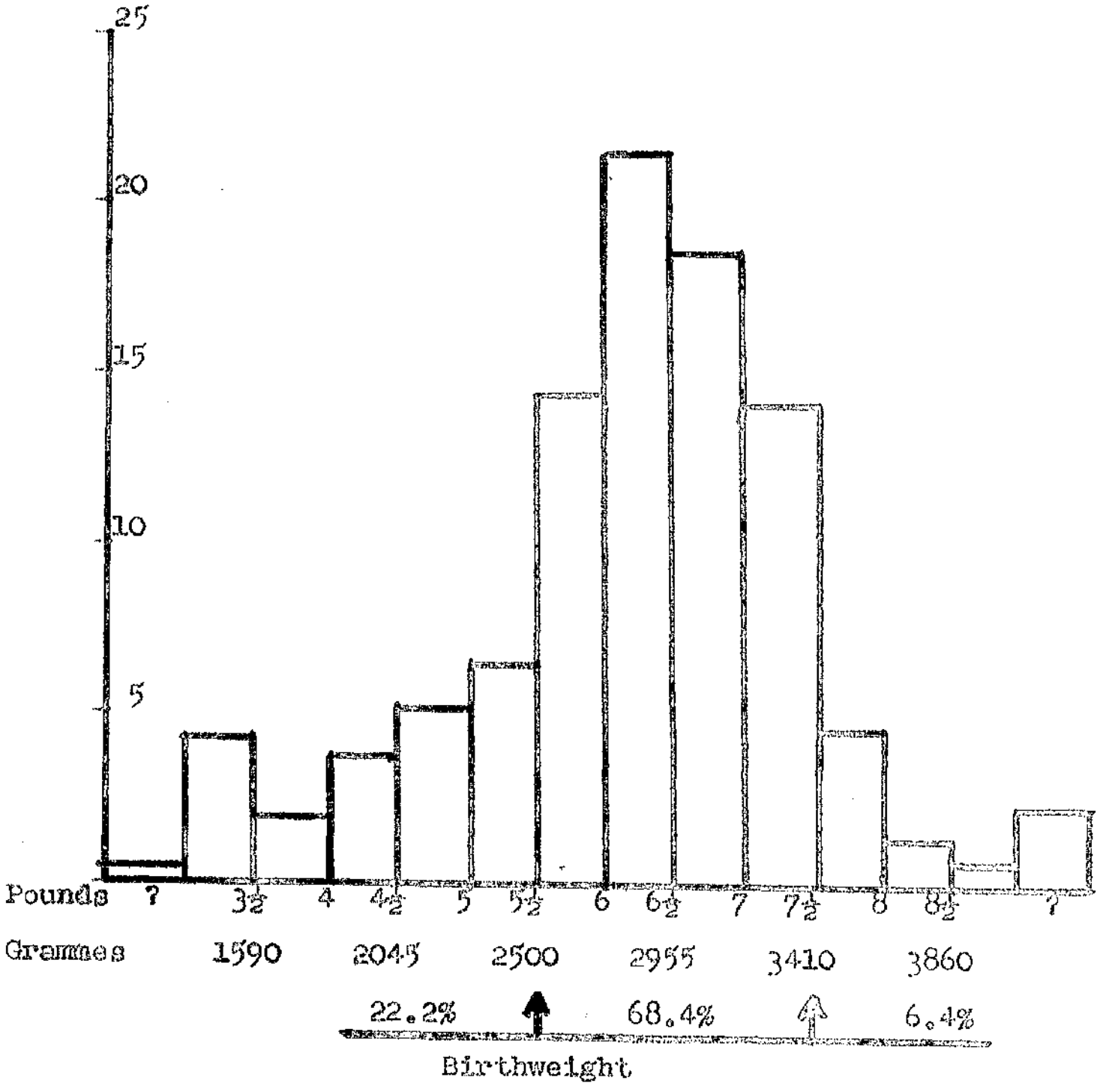


FIG. 14/2

Percentage Baby Birth-weight Distribution

Baganda Primigravidae

Effect of Age and Height.

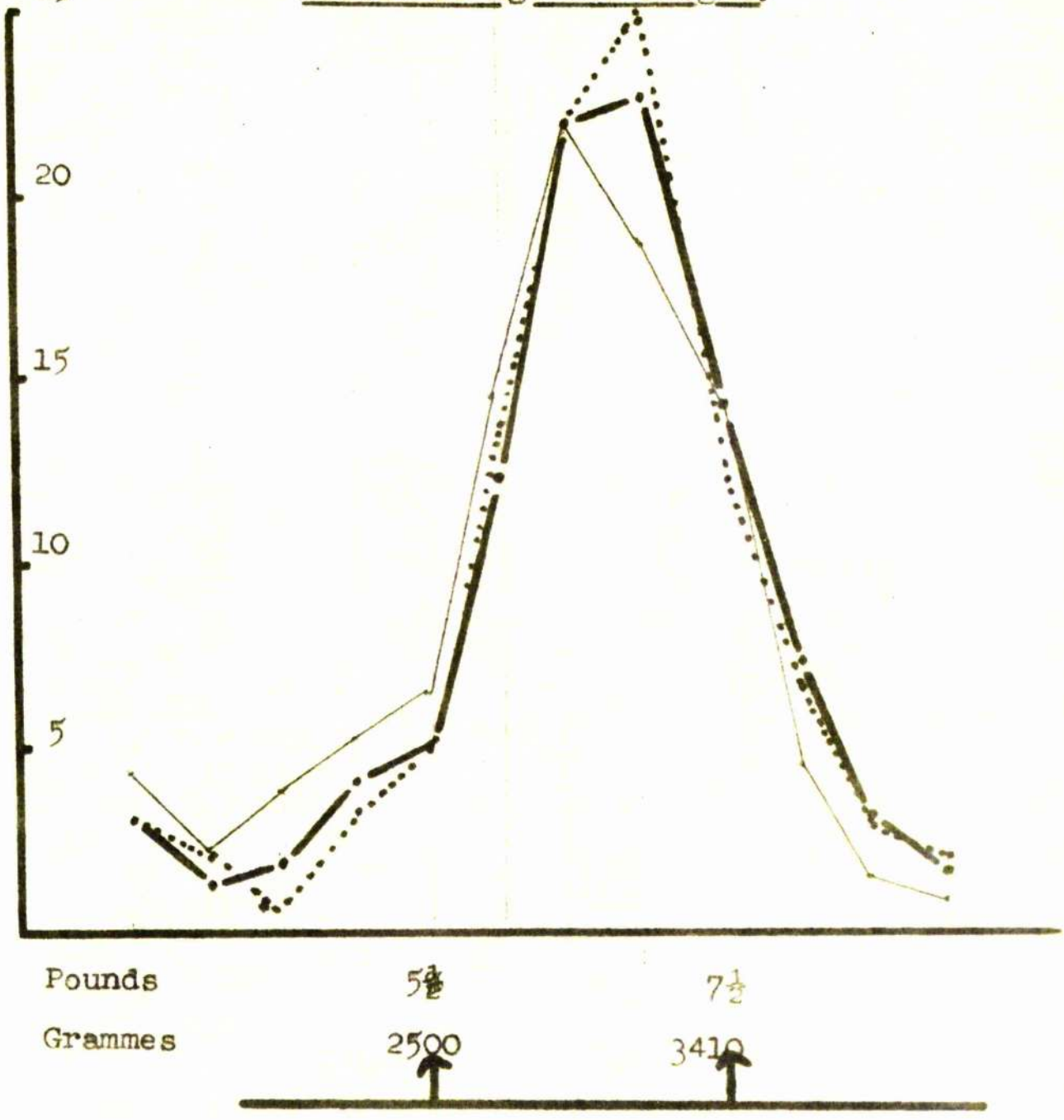
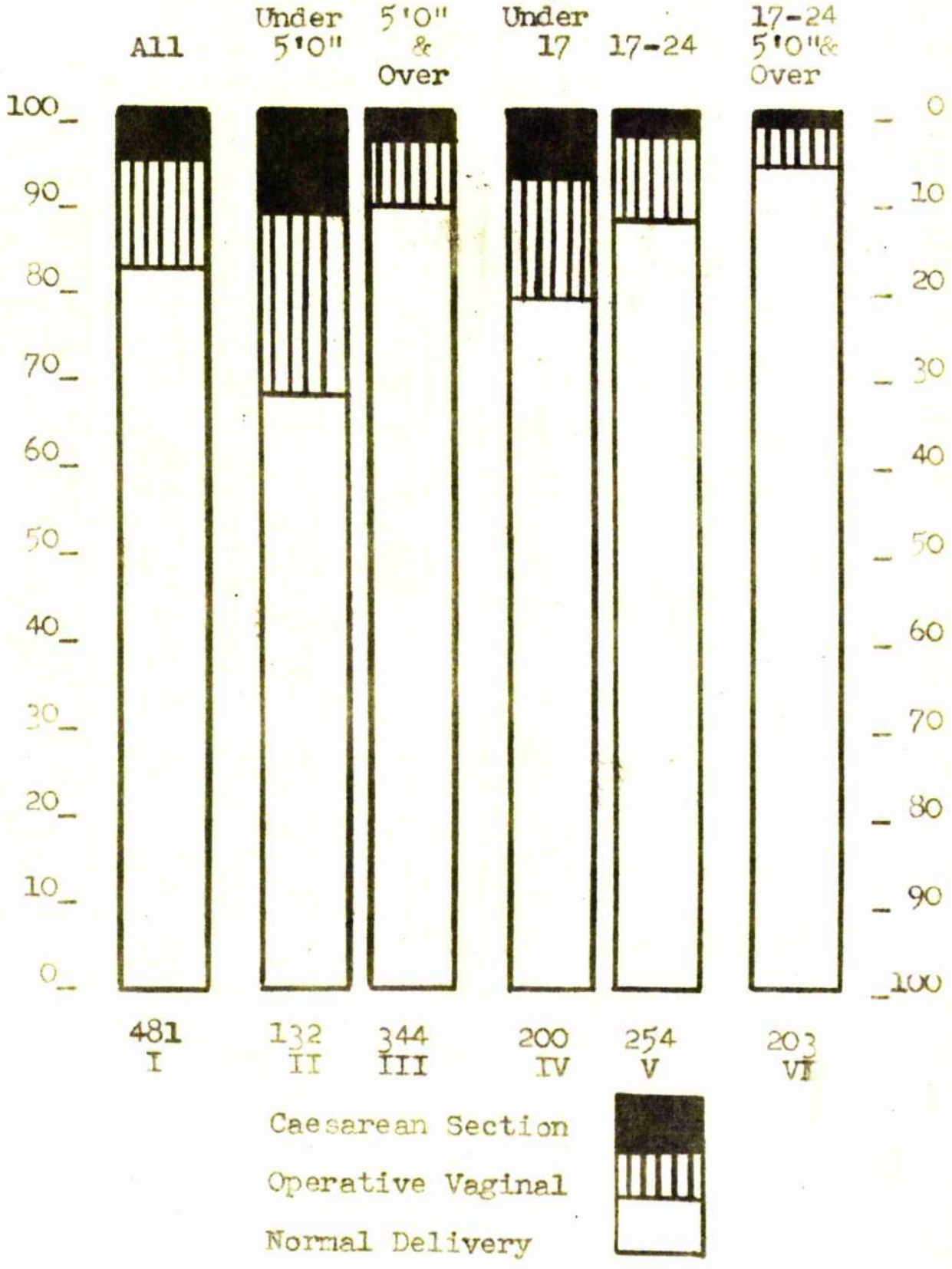


FIG. 15/2

The Effect of Maternal Height and Age on Type of Delivery

481 Baganda Primigravidae

Baby Weight over 4lb. (1820 grammes)



compared with 7.8%) were almost three times as great in the smaller women as they were in the taller. It must be mentioned here that all patients were permitted a trial of labour and that operative intervention was undertaken usually because of prlonged labour or fetal distress. In about one half of the cases height was not recorded until after delivery and it is doubtful if height at this stage in the investigation played any part in the decision to operate.

When age is considered, Columns IV and V (Fig. 16/2), a difference is also found in the Caesarean section and operative vaginal delivery rates. This time mothers over 24 years have been excluded from the study in order to eliminate the possible effects of the ageing uterus. The Caesarean section rate in the young mothers was 8% as compared with a 3.5% Caesarean section rate in the older mothers, whereas the operative vaginal delivery rates were 14.5 and 9.8% respectively. In the final column the 203 mothers whose ages were between 17 and 24 years and whose heights were over 4 feet 11 inches are considered. In this selected group the Caesarean section rate was as low as 2.0% and the operative vaginal delivery rate was 5.4%.

In Fig. 17/2 similar percentage columns have been constructed to relate maternal height and age with the condition of the babies at birth if they survived or to perinatal mortality. In Uganda each baby is given one of the letters A, B, C or D according to its condition at birth. A Class A baby is one who cries immediately and requires no resuscitation. Class B babies are fairly active at birth but need minor resuscitative measures. Class C babies are limp at birth but respond to more active procedures within 10 minutes; whereas Class D babies either die

The Effect of Maternal Height and Age on Birth Condition

481 Baganda Primigravidae

Baby Weight over 4lb. (1820 grammes)

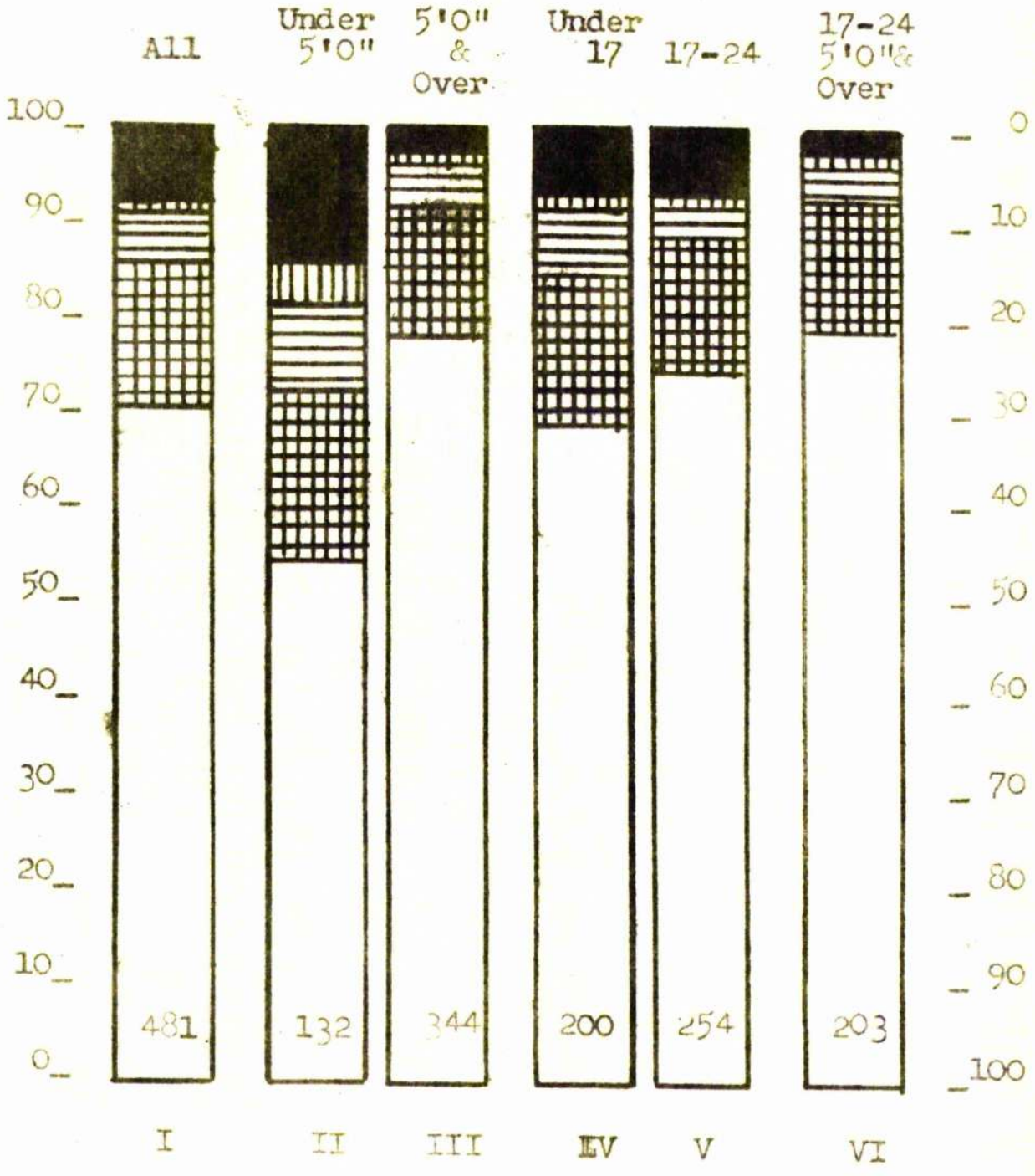


FIG. 17/2

within a short period of time, fail to breathe spontaneously within 10 minutes or require intubation. A classification of this type, although subject to individual variation, is easily made and is possible under most conditions even by a midwife who works alone.

Out of the 481 babies under consideration 6.5% died and another 7.6% were either Class C or D at birth. The effect of maternal height is striking (Columns II and III, Fig. 17/2). In the mothers whose height was less than 5 feet (152 cm.) the perinatal mortality (14.4%) was over 4 times greater than in the mothers whose height was 5 feet (153 cm.) and over (3.2%) and there were twice as many poor condition babies. This time age showed little or no effect (Columns IV and V, Fig. 17/2) and the baby condition of those mothers between the ages of 17 and 24 inclusive who were 5 feet 0 inches and over and those who were 5 feet 0 inches and over irrespective of age shows a similar distribution in all respects.

The relevant data is tabulated in Tables 1/2 and 2/2.

It follows from this study that among Bantu primigravidae, as represented by the Baganda, the most favourable outcome in pregnancy is to be expected in those patients who are over 16 years of age and who are 5 feet (152 cm.) or over in height. Height, however, is of greater importance than age.

The measurement of maternal height may be the most important investigation to be undertaken at the antenatal clinic in many areas of Africa. It gives a fair estimation of the pelvic size and an excellent guide as to the outcome of pregnancy

	Caesarean Section	Operative Vaginal	Normal Delivery
No.	33	55	393
%	6.8	11.4	81.8
All Primigravidae - 481			

No.	17	28	87
%	12.9	21.2	65.9
Primigravidae under 5'0" - 132			

No.	15	27	302
%	4.4	7.8	87.8
Primigravidae 5'0" and over - 344			

No.	16	29	155
%	8.0	14.5	77.5
Primigravidae under 17 years - 200			

No.	9	25	220
%	3.5	9.8	86.6
Primigravidae 17-24 years - 254			

No.	4	11	188
%	2.0	5.4	92.6
Primigravidae, 17-24 years and 5'0" and over - 203			

The Effect of Maternal Height and Age on Type of Delivery
Baganda Primigravidae Baby Weight over 4lb. (1820grammes)

TABLE 1/2

	A	B	C	D	N.N.D	S.B.	?
No.	335	71	26	10	10	21	8
%	69.4	14.8	5.4	2.1	2.1	4.4	1.7

All Primigravidae - 481

No.	67	24	12	5	7	12	5
%	50.7	18.2	9.1	3.8	5.3	9.1	3.8

Primigravidae under 5'0" - 132

No.	264	47	14	5	3	8	3
%	76.7	13.6	4.1	1.5	0.9	2.3	0.9

Primigravidae 5'0" and over - 344

No.	135	32	15	4	3	9	2
%	67.5	16	7.5	2	1.5	4.5	1

Primigravidae under 17 years - 200

No.	181	35	10	6	7	9	6
%	73.2	13.8	3.9	2.4	2.8	3.5	2.4

Primigravidae 17-24 years - 254

No.	157	26	6	3	3	5	3
%	77.3	12.8	3	1.5	1.5	2.4	1.5

Primigravidae, 17-24 years and 5'0" and over

The Effect of Maternal Height and Age on Birth Condition

TABLE 2/2

as far as operative intervention, fetal mortality and poor birth conditions are concerned. It should never be overlooked. It is the quickest, easiest and perhaps the most accurate way to suspect pelvic contraction and therefore potential cephalopelvic disproportion. Even in the most experienced hands the detection of such disproportion by clinical means is not easy. The fetal head rarely engages within the pelvic brim in most African patients before labour has been established for some time and attempts at various abdominal manoeuvres to make it engage have proved in Africa, where the need is greatest to be unreliable. In experienced hands the measurement of the diagonal conjugate by vaginal examination may be accurate and satisfactory but because of the shallow pelvis the fetal head may be felt with ease from the vagina and a false sense of adequacy between fetal head and pelvic brim may be obtained. Radiology may give an accurate estimation of pelvic size but it cannot prove disproportion unless labour is well established. Such radiology is expensive and at the moment only available in the larger centres.

With so much disproportion from contracted pelvis to be found among the women, elective Caesarean section would at first seem to be the best way to deal with many of these women. It will be shown in the next Chapter that such practice is not entirely justifiable as Caesarean section in Uganda brings with it its own peculiar problems and dangers.

C H A P T E R 3

CAESAREAN SECTION IN UGANDA

".....care must be taken that the art of surgery does not replace the art of vaginal delivery"

"The justification for caesarean section, and particularly for its extension in the obstetric field, must finally rest upon the maternal results"

C.J.K. HAMILTON

(1963)

CAESAREAN SECTION IN UGANDA

The early history of Caesarean section in Uganda has been referred to in Chapter 2. It was another five years before Albert Cook undertook his second operation on a living mother, although in the intervening years there had been a few post mortem operations performed. Thereafter its performance became more frequent. Cook (1935) admitted that he found much difficulty with the practice of Midwifery in Uganda in the early years at Mengo Hospital. He had been trained in England in the days when Caesarean section meant almost certain death to the mother and when high forceps delivery was common practice. He soon found that the latter deliveries were often impossible to perform and that craniotomy and other destructive operations were necessary, even on the living child. The fetal mortality was appalling and maternal mortality and morbidity were little better. Consequently he became more and more convinced that Caesarean section was often obligatory in spite of the dangers of haemorrhage and sepsis. Ruptured membranes were no deterrent to undertaking Caesarean section even at a time when the presence of ruptured membranes was a contra indication in Britain. His plea was that the end, a lowering of the death rate of both mother and child, justified the means.

The obstetric environment of Uganda has changed little in the intervening years. Today, antibiotics and blood transfusion counteract sepsis and haemorrhage but the basic problem remains in spite of sixty years of progress and civilisation.

There can be no doubt that Caesarean section is the

operation of choice for dealing with cephalo-pelvic disproportion in the civilised world. It carries with it such good results that it has become accepted by patient and doctor alike. Claye (1961), addressing the Glasgow Obstetric and Gynaecological Society in a William Hunter Memorial Lecture, warned against too much complacency. Reviewing Caesarean section and its associated maternal mortality he pointed out the dangers which existed. Lack of skill and experience of the surgeon or the anaesthetist, performance of the operation in an ill-equipped environment, wrong indication and delay in undertaking the operation, all contributed to maternal death. In most parts of Uganda all these factors exist. Added to this list, which is mentioned but not stressed by Claye, is maternal health at the time of the operation. It should be possible in Britain to ensure that every pregnant woman who approaches the birth of her child is in the best possible state of physical health, so that she may be able to withstand the physiological adjustments which are necessary when major operative intervention is required. This is not true in Uganda. Chronic anaemia, due to hookworm, malaria, folic acid deficiency, debilitating disease and sub-standard nutrition is common. The antenatal services are not yet adequate to eradicate these factors, nor will they be for many years to come. It will be appreciated that any operative procedure undertaken in these circumstances must carry with it a high risk to the patient. There are only a few centres in Uganda such as Mulago Hospital which can hope to achieve a standard approaching that obtaining in Britain, but even this falls short. In the years 1952 to 1957 inclusive, the mortality rate associated with Caesarean section in England and Wales was 3.5 per 1,000, although this was as low as 1.2 per 1000 in some areas (Claye, 1961). Table 1/3 has been constructed to show the maternal mortality from Caesarean section in Mulago Hospital in the ten year period from 1956 to 1965 inclusive. Out

C A E S A R E A N S E C T I O N:

MULAGO HOSPITAL

1956 - 1965:

YEAR:	NUMBER:	MATERNAL MORTALITY:	PERCENTAGE PERINATAL MORTALITY:	INCIDENCE OF ALL DELIVERIES:
1956	112	2		
1957	132	6	3.1%	16.6%	4.1%
1958	142	4		
1959	227	6		
1960	270	3	1.8%	10.5%	6.8%
1961	335	5		
1962	340	3		
1963	391	3	0.9%	8.9%	5.0%
1964	510	4		
1965	444	3	0.7%	5.5%	4.3%
TOTAL	2761	39	1.4%	9.9%	6.1%

The incidence of Caesarean section in Mulago Hospital and of associated perinatal and maternal mortality.

Table 1/3

of the 2,761 Caesarean sections which were undertaken, 39 mothers died, a maternal mortality rate of 14.1 per 1,000. Over the years the mortality rate has decreased from 31 to 7 per 1,000 but this is still twice the reported British figure over ten years ago. It would not be surprising if the rate in the country as a whole was ten times as great. Carr (1962) gave a figure of 110 per 1,000 in Mbale Hospital which is situated 137 miles East of Kampala.

At a recent seminar on Obstetrics and the Newborn in East Africa, one of the subjects discussed was maternal deaths. Each delegate stated the causes of death in his area. Over 200 deaths were mentioned although only a small proportion of the doctors practicing obstetrics in East Africa were present. It soon became apparent that in a significant proportion of these women, death followed Caesarean section. It is appreciated that these operations were often performed on ill patients who might have died anyway, the operation being incidental, but many other deaths were due to lack of blood, inadequate antibiotic therapy, pre-existing debility and to lack of skill and experience on the part of the surgeon or anaesthetist.

At this point it may be said that Caesarean section is an operation primarily for a developed and civilised community. Yet in Uganda, no matter how poor the results may seem, it is still a very necessary operation even although it were only performed to prevent uterine rupture, the most tragic of all obstetric catastrophies which carries with it a much greater mortality. Randle Short (1960) has discussed uterine rupture in Uganda. She pointed out that this condition may be more common in South West Uganda than anywhere else in the world. In the 7 year period from 1952 to 1958 inclusive there were 171 cases out of 15,908 deliveries

in Mulago Hospital, a frequency of 1 in 93. The maternal mortality was 36.9%. The death rate was higher in spontaneous and traumatic rupture than it was in rupture through a previous scar. Uterine rupture is the cause of just over one third of all maternal deaths in Mulago Hospital (Rendle Short, 1961). Here again, this hospital with its better facilities and trained staff should have better results than the remainder of the country.

It will be seen from Table 1/3 that Caesarean section does not guarantee a living child. In the ten year period under review, the fetal mortality was just under 10%. Again the results have improved over the years but the perinatal mortality is still appreciable. This figure is to a certain extent misleading as no attempt has been made to correct for such things as prematurity, toxaemia or antepartum haemorrhage, in circumstances where the operation was conducted more in the interest of the mother than of the child; but neither has it been corrected for elective Caesarean section where fetal mortality should be low. It has proved impractical to carry out these corrections retrospectively but experience has shown that the operation, undertaken to relieve obstructed labour, when the baby was still alive, has often been followed by a disappointing neonatal death.

Although the prognosis from Caesarean section leaves much to be desired, the dangers from the operation do not end there. Most of these women become pregnant again and present their own particular problem, that of the previous Caesarean scar. Mitford-Barberton and Sidthorpe (1964) have discussed pregnancy and labour in the presence of a previous Caesarean section scar as it occurs in Uganda. Eight hundred and one cases were admitted to Mulago Hospital in the seven year period from 1953 to 1959 inclusive. Out of these, 312 (39%) had received no antenatal

supervision at all and many of the others had appeared only once or twice to ensure a hospital booking. Most of the patients went into labour at home and 3 patients died before any operation could be started. The overall maternal mortality was 2.4%, the uterine rupture rate was 5.6%, and the stillbirth rate was 10.7%. No figures are given for the neonatal death rate. Table 2/3 gives a more recent picture of the outcome of pregnancy following previous Caesarean section. The numbers increase each year and although both fetal and maternal mortality rates are decreasing there is no corresponding satisfactory reduction in the actual number of ruptured uteri, maternal deaths or fetal deaths. It is estimated (Gebbie, 1966) that by the late 1970's at the present rate of increase in number of cases of previous Caesarean section admitted to Mulago Hospital each year, there will be over 1,000 to be dealt with per annum. At the moment, the problem of the previous Caesarean section scar is difficult to solve; by then it may well be insoluble unless more hospitals, more obstetric beds and more trained staff become available.

Table 3/3 illustrates the number of ruptured uteri which were dealt with at Mulago Hospital in the ten year period from 1956 to 1965. Four hundred and seven cases were admitted. The maternal mortality was almost 25%. It will be noted that the numbers dealt with each year have varied little, the mortality is dropping slightly but what is the most important fact of all is that the incidence of rupture in the presence of a previous Caesarean section scar remains fairly constant and accounts for over one quarter of all cases. The maternal mortality in this group is less but still remains a serious contribution at 1 in 8 cases. The fetal mortality is not given in this Table but is

The Incidence of Uterine Rupture and of Maternal and Fetal Mortality in Pregnancy Following Previous Caesarean Section

MULAGO HOSPITAL 1956 - 1965

YEARS:	NUMBER OF CASES:	UTERINE RUPTURE:	MATERNAL MORTALITY:	PERCENTAGE FETAL MORTALITY:
1956 - 1958	411	26 (6.3%)	5 (1.2%)	14.8
1959 - 1961	604	43 (7.1%)	10 (1.6%)	12.5
1962 - 1964	965	33 (3.4%)	7 (0.7%)	11.8
1965	333	7 (2.1%)	1 (0.3%)	7.8
TOTAL:	2313	109 (4.7%)	23 (1.0%)	12.7%

NOTE: The maternal deaths include some patients who died of conditions other than uterine rupture, conditions which may or may not have been associated with the previous Caesarean section.

Table 2/3

U T E R I N E R U P T U R E:

MULAGO HOSPITAL:

1956 - 1965:

YEARS:	ALL CASES:	MATERNAL MORTALITY:		PREVIOUS C.S.		MATERNAL MORTALITY:	
1956 - 1958	106	37	(34.9%)	26	(24.5%)	3	(11.5%)
1959 - 1961	130	28	(21.5%)	43	(33.1%)	6	(14.0%)
1962 - 1964	131	29	(22.9%)	33	(25.2%)	4	(12.1%)
1965	40	7	(17.5%)	9	(22.5%)	1	(11.1%)
TOTAL:	407	101	(24.8%)	111	(27.3%)	14	(12.6%)

Table 8/3

approximately 50% where rupture has occurred through the previous scar (Rendle Short, 1960, 1961).

Carr (1962) attempted to present a less serious picture of the dangers of Caesarean section in Uganda. He was stationed at Mbale for a short time as a Government Medical Officer. The proportion of people of Nilotic extraction is greater in that area but the number of Bantu who live there is sufficient to make the obstetric environment similar to that which exists in Kampala. He tried to defend Caesarean section in spite of the fact that the maternal mortality associated with the operation was 11%. Most of the deaths were attributed to other conditions such as haemorrhage and pre-existing morbidity and he attempted to correct the mortality to 4.6% by the elimination of these cases. To do this is wrong as these are the conditions under which obstetrics is generally undertaken in Uganda. Later in his paper Carr discussed maternal mortality in patients with previous Caesarean section scars. There were 92 patients in his series. Two of these women were so ill on admission that death took place before any operative intervention was possible. These 2 women were conveniently omitted from the maternal mortality rate, if they are included, 6 mothers died (6.5%).

His comments on the incidence of uterine rupture may also be misleading. Two cases are presumed, which were confirmed at laparotomy. Neither of the cases who died before operation were considered to be possible uterine rupture nor were the three cases of incomplete rupture which were found at the time of repeat Caesarean section. Furthermore, he describes one patient who died following internal podalic version and breech extraction, another who died after the forceps delivery of a stillborn infant and a third who died of an unexplained post partum haemorrhage two hours after normal delivery. It is extremely likely that all of

these patients had uterine rupture. Thus the total number may have been 10 and not 2, an incidence of 10.9%. No post mortems were undertaken and no vaginal examinations were performed to ascertain whether the uterus was intact or not.

Such criticism may appear harsh but Carr was not a trained obstetrician and he did not work long enough in Uganda to fully appreciate the conditions which exist and their influence on obstetrics. His comments are on the whole dangerous both to the patients and their babies and to those who may come to practice obstetrics in Uganda after him.

A much more practical approach to Caesarean section in Africa was given by Verzin (1964) who reported from Khartoum in the Sudan, a country which borders Uganda. In the teaching unit 12% of the patients were delivered by Caesarean section. One quarter of the operations were undertaken for disproportion. There was a 1.5% maternal mortality rate and the perinatal mortality rate was 13.5%. He deduced from the records of the hospital that many of these operations were undertaken unnecessarily, that the dangers of ruptured uterus in subsequent pregnancy were paramount when considering the operation as a whole and that every effort should be made to avoid a Caesarean section in a young primigravida because of the wish for large families among the population.

Ashworth (1963) in Rhodesia, writing of his experiences of obstetrics in an under-developed area, had 5 maternal and 26 perinatal deaths in his series of 71 successive Caesarean sections. Describing this as "a grim record" he blamed "the unenviable position where infection and maternal and fetal distress are combined, and Caesarean section is performed in a desperate attempt to save at least the life of the mother".

There can be no doubt that mass performance of elective Caesarean section for disproportion would have an immediate beneficial effect on perinatal mortality. Such operation would be necessary in approximately one quarter of all patients who present themselves for delivery. In primigravidae alone in Mulago Hospital some 500 would be undertaken each year. Under present conditions, 5 of these patients would die, another 5 would die in a subsequent pregnancy, 25 would present later with uterine rupture and approximately 60 babies would be lost in each subsequent pregnancy.

Trial of labour is therefore usually undertaken in most cases unless the pelvis is so small or so deformed that a successful outcome of labour is remote. Because of the patients youth, labour is not unduly prolonged and inco-ordinate uterine action is rare. The first stage of labour is mainly concerned with cervical dilatation rather than with descent of the fetal head. Towards the end of the first stage the head begins to negotiate the pelvic brim and it is only now that the presence or absence of cephalopelvic disproportion can be diagnosed with certainty. From this point onward moulding of the fetal head will take place and the extent will be related to the degree of disproportion. Severe fetal head moulding and prolongation of the second stage of labour have a more serious effect on fetal mortality than delay in the first stage by itself. Proof of this will become apparent when symphysiotomy is discussed.

From now onward the mother too will be affected by the obstruction. Infection is more than likely, devitalisation of the anterior vaginal wall and bladder neck with subsequent vesico-vaginal fistula is by no means rare and pressure of the disproportionately large head on the sacral nerve roots which

leads to lower limb paresis and foot drop is frequently seen. In the multiparous patient uterine rupture will take place but in primigravidae, in whom uterine rupture is extremely rare, there will be secondary inertia, the uterus remaining in a semitonic state without exhibiting regular contractions.

These are the things that are to be avoided in trial of labour and sometimes Caesarean section will be required. Too many cases are admitted annually in which the baby is either already dead, anterior vaginal wall necrosis present or paresis already established to condone an ultra conservative attitude to trial of labour. A time limit must be set which is contrary to all obstetric teaching. When labour has been in progress for 30 hours in a primigravidae or for 20 hours in a multiparous patient an excellent reason must be presented if labour is to be permitted to continue. If delivery is not within sight at this stage the chances of a live baby will diminish and it is unlikely that the mother will escape some form of morbidity. Caesarean section thus has its place in the management of trial of labour when the uterus is intact but only if there is no better alternative and only when it is essential that the baby be delivered.

It is the first Caesarean section that is the most important one in Uganda. Often it is performed with full justification but it should never be undertaken lightly. The patient's future has also to be considered.

When one Caesarean section has already been performed an entirely different attitude is necessary. Uterine rupture will occur in 5% of these patients and it is possible for this rupture to take place in hospital almost as easily as it is in the patient's home. Each case should be regarded as a potential

ruptured uterus, no matter the intervening history since the operation was performed. A succession of normal deliveries following the Caesarean section is no guarantee of uncomplicated vaginal delivery on this occasion. Labour and delivery cannot strengthen the scar of previous Caesarean section, they can only leave it unchanged or weaken it. Small unrecognised and non haemorrhagic tears of the scar are by no means uncommon after vaginal delivery which may precipitate further rupture at a later date. The reason for the previous Caesarean section is seldom known unless the patient has been delivered in the same hospital, has retained the same name or has safely kept the discharge note. Often too, the experience and skill of the operator is uncertain as is the puerperal progress. At the most, careful questioning about the length of labour, the size of the baby, the birth condition of the baby and an accurate assessment of maternal height and pelvic size may lead to the correct diagnosis. The presence of an even moderately contracted pelvis precludes an attempt at vaginal delivery.

Fortunately, Classical Caesarean sections are rarities in Uganda. They are usually recognised by the site of the abdominal scar but sometimes the subumbilical midline incision hides even a classical scar which may pass unrecognised.

If trial of labour or test of uterine scar is embarked upon there must be a time limit which is even more rigid than that set for trial of labour when the uterus is intact. Twelve hours of good uterine action is sufficient before interference is undertaken. The addition of another uterine scar to the one already present carries with it little extra danger to the patient in the future. In fact it may augur a better prognosis as future labour is not worth contemplating. Two or more

previous Caesarean section scars should mean an elective operation on this occasion. Most patients will accept this policy and within recent years there has been an actual demand for sterilisation after the third operation if all babies are alive. Many other patients, however, will not give permission for tubal ligation and there is the prospect of repeated Caesarean section to be considered. If one remembers that almost half of the women have their first baby before their 17th birthday and that pregnancy succeeds pregnancy at 2 yearly intervals, unless gonococcal salpingitis or puerperal sepsis produces a similar effect to tubal ligation, the number of Caesarean sections in the one patient could easily be as high as 14.

Caesarean section has a well established place in obstetrics in Africa. It will be many years before that place will be similar to that which it has in a more developed community. Many women are not fit enough to have a Caesarean section undertaken in an emergency, but the main danger lies in subsequent pregnancy. Any alternative warrants careful investigation.

CHAPTER 4

OPERATIVE VAGINAL DELIVERY IN UGANDA

"It has been well said that some forceps operations are no better than craniotomies in disguise".

LANCET
(1894)

"When I left Englad in 1896 it was with the firm belief in the efficiency of extraction by forceps in difficult labour. .....Greater experience has taught me the folly and danger of this course".

SIR ALBERT COOK
(1935)

OPERATIVE VAGINAL DELIVERY IN UGANDA

The records of Mengo Hospital from 1896 to 1901, although in many ways full of detail and interesting in context, are of little benefit for statistical and comparative purposes. It is seldom clear how long labour has been in progress before forceps delivery was attempted, nor is it always certain whether the baby was alive at the time. What is obvious however is that neither Albert Cook nor his colleagues in those days found such delivery easy. There were many instances of repeated application of the obstetric forceps and a resort to the cranioclast when efforts to delivery by other means had failed. Of the first 100 attempted forceps deliveries on babies which may have been alive at the time, the evidence suggests that only 28 babies survived although this figure is by no means accurate. Before decrying Cook and his colleagues it must be remembered that the patients were in the main emergency admissions after prolonged labours at home. Caesarean section was considered dangerous to the mother and, as will be shown later, the British teaching of the day, to which Cook and his colleagues had been subjected, recommended a conservative attitude to obstetrics.

Cephalopelvic disproportion is not necessarily a cause of prolongation of the first stage of labour. In most cases full cervical dilatation will be reached, often after a relatively short period of time. It is at this time or shortly before that the fetal head begins to negotiate the pelvic brim and it is then that moulding begins to take place. Until this happens it is impossible to be certain of the true extent of the disproportion. In most Buganda pelves, and presumably in those of similar tribes

as well, it is the pelvic brim which is most contracted and if uterine action is good enough considerable moulding may take place to enable the head to pass through this plane of least dimensions. Once through the brim further difficulty is not to be expected.

It therefore should follow that in cases where there is no disproportion the second stage is short. This is borne out by clinical experience. Out of the 1,000 cases of attempted operative vaginal delivery which is the main subject of this thesis only 78 (7.8%) were undertaken with the head in the lower part of the pelvic cavity. Most of the interference was necessary with the fetal head in mid or high cavity. The presence of a straight sacrus, which is met with in many pelves, tends to prevent internal rotation of the fetal head until it has descended well into the pelvis. This is particularly true if it is association with contraction, as the moulding of the head when it negotiates the pelvic brim will by itself discourage rotation. Delay with the occiput posteriorly and high traverse arrest are therefore often encountered. It is difficult for the inexperienced to detect the position of the fetal head. In Uganda this is made even more difficult by the presence of a large caput succedaneum and overlapping of the skull bones which together obliterate the suture lines and fontanelles. It is important, when applying forceps, to be certain of the position of the fetal head. When in doubt a search for the baby's ear is recommended and the position confirmed by the direction of the pinna. In cases where there is disproportion this is not possible unless the head is disimpacted, a procedure which is undesirable.

Forceps delivery in Africa can be very difficult, more difficult in fact than Caesarean section. A great deal of

experience and skill is required but even then the results are not always good. When second stage intervention is necessary and the baby is alive one of three decisions has to be made:-

(1) That vaginal delivery is not possible.

(2) That vaginal delivery may be possible.

(3) That vaginal delivery is probable.

In the past Caesarean section was the method of dealing with the first alternative. Those in the second group were taken to theatre for a trial of forceps under general anaesthesia with equipment and personnal prepared to undertake Caesarean section if the trial failed. The necessity of ever having to perform trial of forceps at all is proof that clinical judgment is unreliable and often erroneous. In many instances, following the application of forceps an easy delivery was achieved. On the other hand mistakes were just as readily made in the third group when vaginal delivery was thought probable and the operation undertaken in the labour suite under local anaesthesia. Unforeseen difficulties arose and the natural reaction was to pull with extra force. This is of course damaging to the intracranial contents. In the presence of varying degrees of cephalopelvic disproportion, under which most operative vaginal delivery in Kampala has to be undertaken, the fetal head is impacted within the pelvis. However slender the forceps blades may be, slipping them between the moulded skull of the baby and the rigid pelvis of the mother can only cause increased compression of the fetal head. Often this does not matter but in cases where the tentorium, the falx cerebrum and the intracranial vessels are stretched to a maximum by the pre-existing moulding, the extra compression due to forceps application is enough to cause rupture.

Table 1/4 gives the results of forceps delivery in Mulago Hospital from 1956 to 1961 inclusive. All of these babies were alive at the time of delivery. Eight hundred and seventy six cases were undertaken with a perinatal mortality rate of 21.9%. It will be noted that stillbirths outnumbered neonatal deaths. Much of this mortality may be explained by the condition of the baby at the time of application of the forceps. Many were emergency admissions after many hours of labour and several hours in the second stage at home or in other institutions. Yet such a high mortality can hardly be acceptable as inevitable and it is thought that trauma at delivery also played some part in the high mortality rate.

The vacuum extractor was introduced to Mulago Hospital in 1962. In that year the instrument was under trial. Because of the reports from Britain (Chalmers and Fothergill, 1960, Willcocks, 1962), it was assumed that wholesale replacement of obstetric forceps by the vacuum extractor would not be possible to any great extent as it had been shown that the instrument was of little use in the presence of cephalopelvic disproportion. In 1962 the instrument was used in a haphazard fashion (Table 2/4). Most operators were keen to try its effects but experience was lacking and on occasion it was applied for too long a period, reapplied too often or used in unsuitable cases. This resulted in a perinatal mortality (14.1%) which was little better than that from forceps delivery (16.2%). Stillbirths still outnumbered neonatal deaths. The following year (1963) it became more popular and its use was attempted in 114 cases out of 274 (41.6%). The failure rate was high (21.1%). In this year a fairly definite pattern emerged (Table 3/4). When vaginal delivery was

FORCEPS DELIVERY

MULAGO HOSPITAL 1956 - 1961

YEARS	NUMBER	STILLBIRTHS	NEONATAL DEATHS	PERCENTAGE PERINATAL MORTALITY	RATE
1956 - 1958	424	66	43	25.2	4.5%
1959 - 1961	452	51	32	17.2	4.4%
TOTAL	876	117	75	21.9	

Table 1/4

FORCEPS DELIVERY and VACUUM EXTRACTION

MULAGO HOSPITAL 1962

INSTRUMENT	NUMBER	STILLBIRTHS	NEONATAL DEATHS	PERCENTAGE PERINATAL MORTALITY
Forceps	154	14	11	16.2
Vacuum Extractor	41	3	2	12.2
Combined	6	1	1	33.3
V.E. (All cases)	47	4	3	14.1
Total	201	18	14	15.9

Assisted vaginal delivery rate 6.2%

Table 2/4

FORCEPS DELIVERY AND VACUUM EXTRACTION

MULAGO HOSPITAL 1963

INSTRUMENT	NUMBER	STILLBIRTHS	NEONATAL DEATHS	PERCENTAGE PERINATAL MORTALITY
Forceps	160	14	9	14.4
Vacuum Extractor	90	2	2	4.4
Combined	24	5	5	41.7
V.E. (All cases)	114	7	7	12.3
Total	274	21	16	13.5

Assisted vaginal delivery rate 4.3%

Table 3/4

successfully accomplished by the instrument alone, as it was in 90 cases, the fetal mortality was low (4.4%). Whereas the 24 cases in which there was failure to deliver and forceps had to be applied thereafter the fetal mortality rose to 41.7%. In these 24 cases more than moderate cephalopelvic disproportion was presumably present. Some of these babies were already doomed and the method of delivery immaterial to their ultimate fate, but there were undoubtedly others who died as the result of operative intervention and the trauma associated with difficult vaginal delivery. At present it is not possible to detect beforehand the baby that will survive the effects of prolonged labour and severe moulding from the one in whom cerebral injury and anoxia have progressed to a stage incompatible with life. In many instances the fetal heart may beat satisfactorily although meconium is nearly always present in the liquor. Often, too, the liquor is infected. There may be a temptation to undertake craniotomy even although the baby is alive but such decision is difficult to make (and even abhorrent to many obstetricians). In many cases Caesarean section is out of the question because of the mother's condition and the likelihood of a live baby remote. Live babies are born under these circumstances but only too often, although the heart may beat strongly and continue to do so for some hours, spontaneous respiration is not established.

No matter the method chosen to assist delivery under these conditions the fetal mortality will be high; reducing it to an absolute minimum should be the aim.

It is evident that in both 1962 and 1963, the introduction of the vacuum extractor had little effect in the overall reduction of perinatal mortality. When all cases which had vacuum

extraction, either alone or followed by forceps, are considered the percentage perinatal mortality is little different from that of the cases which had forceps delivery alone. Thus the instrument by itself can offer little in the improved management of cases. However the relatively low perinatal mortality which followed successful vacuum extraction in 1963 is encouraging. From this it may be deduced that the vacuum extractor may be used for two distinct purposes. The first is in the delivery of babies when there is little or no disproportion present and the second is in the detection of disproportion when it is present. The latter may be the most useful and important function.

It has been shown earlier in this Chapter that forceps delivery following vacuum extraction is accompanied by a high perinatal mortality rate. Thus this type of delivery is undesirable. It was also pointed out in the previous Chapter that Caesarean section should be avoided wherever possible. Neither of these alternatives is considered satisfactory in Uganda and for this reason symphysiotomy has been introduced. This operation was not new in Mulago Hospital. It had been performed on selected cases in the past, usually along with forceps under general anaesthesia. The numbers undertaken were small and did not alter the general pattern of obstetric practice.

CHAPTER 5

THE VACUUM EXTRACTOR

"The effectiveness of the vacuum extractor... and the safety of the mother and baby do not lie in the instrument itself, but in the hands of the doctor who uses it".

SAROJ PORAPAKKHAM
(1962)

"The advent of the Ventouse should be regarded as a major advance in operative obstetrics".

IAN DONALD
(1964)

THE VACUUM EXTRACTOR

Chalmers (1963) has reviewed the early history of the use of suction traction as a method of assisting vaginal delivery. To James Yonge in 1649 goes the credit for the first recorded use of such instrumentation in an attempt to deliver a baby. The attempt failed and was followed by craniotomy. From that time other devices have been described, none of which was successful. In 1829 Neil Arnott suggested an adaptation of a plaything beloved of small boys in Scotland. This consisted of a circular piece of leather attached to a string which, when wet, was applied to flat stones and other objects and kept in place by suction. He suggested that a modification of such a device could be adapted for use in obstetrics. It was not until 1849 however that James Young Simpson proved that delivery by this method was feasible. The history of suction traction is much less complicated than that of symphysiotomy but none-the-less fascinating in that it provides an example of dissatisfaction in existing instruments and methods and an attempt to improve upon them.

The modern history of vacuum extraction began in 1954 when Tage Malstrom in Sweden described an instrument which he finally perfected in 1957. It is upon this instrument that the present day Vacuum Extractor is based. Success has been due to the recurvature of the suction cap to give better adhesion to the fetal scalp and to the flexibility of its component parts.

Since that time the vacuum extractor has been used in most parts of the world and there can be no doubt that it has an established place in present day obstetric practice although there

is widespread controversy as to its usefulness. The instrument was designed as an alternative to the obstetric forceps but since then it has also been used as an alternative to Caesarean section and as a method to accelerate the first stage of labour.

Most enthusiasm has come from the Continent of Europe, Ricaux and Price (1956), Snoek (1960), Brandstop and Lange (1961) and Malstrom (1961), have shown that it has replaced forceps altogether in their practice. Others, Dexens and Dexens (1961), Hammerstein (1963) and Bradt (1965) have also reported large series to demonstrate that in their experience the need for forceps delivery becomes less as time passes. None of these authors regret the passing of the obstetric forceps and all report a subsequent reduction in maternal morbidity and fetal mortality.

The more conservative British obstetricians have shown a more cautious approach. Chalmers (1959), introduced the instrument to British practice and subsequently alone (1960, 1961, 1964 and 1965), or with Forthergill (1960, 1961), has done much to encourage its use. Only Willocks (1962, 1963) has written much in support of Chalmers from Britain but there have been many other less extensive reports which suggest that there is a widespread interest if not enthusiasm.

Lillie (1960, 1961) from Ireland was less favourable about the use of the vacuum extractor as an alternative to forceps but welcomed it as a complementary instrument to be used mainly before full cervical dilatation to avoid Caesarean section.

Editorial comment in the Lancet (1961) was at first favourable. This was mainly due to the reports from the Royal

Society of Medicine (1960) at which British and Continental speakers presented encouraging views. One year later (1962) however, Editorial comment was less encouraging. By then there had been reports (Boon, 1961, and Huntingford, 1961) of extensive damage to the baby from the use of the instrument. Caution was suggested before the instrument was acclaimed as a definite progress in obstetric practice. The controversy was further stirred by an Editorial in the British Medical Journal in 1967, sparked off by an American report (Shenken and Serr, 1967), in which the use of the vacuum extractor was shown to be limited but the lively correspondence which ensued proved that there were many who still favoured the instrument in Britain and that the controversy had by no means been settled.

American experience has not been favourable. In spite of some good reports (Triconi and Amoresi, 1961, Guardino and O'Brien, 1962, and Barth and Newton, 1965) the experience of Mishell and Kelly (1962) and of Nyerjesy et al. (1963) as well as the unfavourable paediatric report of Aquero and Alvarez (1962) have made American obstetricians unwilling to accept the widespread use of the instrument, although few obstetricians in other countries would accept the statement of Eastman (1960) that ..."the state of the baby's scalp after delivery by the vacuum extractor is not a thing which you would want to show to a new mother". Nor would all accept the fear of litigation as a deterrent to the use of vacuum extraction which is Greenhill's condemnation of the instrument (1961).

Cunningham (1958) has shown that the instrument is in use in

Australia, Porapakkham (1962) has reported on a large series in Thailand, Lancet (1963) from Israel, Hassim and Lucas (1966) from Zambia, Ashworth (1963) from Rhodesia, Mathout and Tanner (1963) from Egypt and Monteglio Springer (1960) from South America, all provide evidence of the world wide use of vacuum extraction. Ten years after the introduction of his instrument, Malmstrom (1964), was able to collect over 200 references from world literature from at least forty difference countries.

In some areas of the world vacuum extraction has come to stay, in others it is either condemned or finds the occasional use where it alone can effect delivery at a given time under given circumstances.

There is no reason why there should be any maternal mortality associated with the use of the vacuum extractor. If the instrument is used with care, delivery will follow an entirely physiological pattern with the result that the incidence of injury to the maternal soft parts should be no greater than that which follows normal delivery. When the vagina is lax and the head high a portion of the vagina may be sucked into the cup which may result in a vaginal laceration. Frequent checks should eliminate this. Cervical laceration is possible when the cup is applied before full dilatation. Brandstrup and Lange (1961) have found this to occur in 1% of cases but suggest that it is not encountered often enough to be a contra indication. No cases of cervical incompetence have been proved (Chalmers, 1967) in spite of this theoretical suggestion by Huntingford (1961).

There are three main objections and disadvantages to the

use of the vacuum extractor:-

1. That it is of little use in the presence of disproportion.
2. That it takes time to apply and is therefore of little value, if not dangerous, in cases of fetal distress.
3. That it may be the cause of fetal injury.

Fothergill and Chalmers (1961) and Willocks (1962) considered that disproportion was the main cause of failure to deliver with the vacuum extractor in their series. The failure rate of Willocks (18%) has been the highest recorded in Europe. This tends to confirm that cephalopelvic disproportion still exists in Glasgow, whereas the Swedish and other Continental reports with their low failure rates would suggest that such disproportion no longer occurs. The former authors considered that the presence of disproportion of moderate degree was no deterrent to the use of the instrument.

"When a moderate degree of disproportion occurs the ventouse is successful. If, however, assessment of the extent of the disproportion is incomplete experimental application of the ventouse may provide final evidence for decision as to the mode of delivery in such cases".

Such 'trial of vacuum extraction' is almost certainly the most beneficial feature of the use of the instrument in Africa.

The time factor, particularly in cases of fetal distress, has led many to prefer the use of obstetric forceps. Most authors recommend that 8 minutes be allowed to elapse between the preliminary application of the suction cup and the start of traction, and it has been suggested that this period of time is too long in some cases of fetal distress. There can be little argument that this is so, yet if local anaesthesia is used the

vacuum extractor may be applied before a pudendal block is undertaken with minimal upset to the patient. By the time the local anaesthetic has been given and has become effective traction may start immediately. It is the author's view that there is little delay and in fact the time factor is similar in both forceps and vacuum extraction. If the alternative is forceps delivery under general anaesthesia the preliminary manipulations of the anaesthetist take much longer than application of suction cup and pudendal block.

It is in the sphere of fetal mortality and morbidity that there should be more caution in the appraisal of the vacuum extractor.

Rose (1955) and later Snoek (1960) put forward mathematical evidence which suggested that there is less intracranial compressive force with the use of vacuum extraction as compared with the use of forceps. De Boer (1960, 1961) disputing this, presented equally convincing mathematical evidence to prove the opposite, concluding that "...the forceps are quicker, safer and more efficient". Saunders (1960) monitored the fetal heart rate by means of a phonocariogram during delivery by vacuum extraction and found that there was neither slowing nor acceleration of the fetal heart. Fothergill and Chalmers (1961) confirmed this. Awon (1964) using a fresh stillbirth showed radiologically that the vacuum extractor does produce compression of the fetal head when traction is made against resistance.

For many years it has been taught that the obstetric forceps acts as a cage into which the fetal skull is fitted. This cage will protect the fetal head as it descends through the maternal pelvis. All traction will be transmitted through the more solid facial bones where the blades have maximum grip. There can be no

doubt that this is true provided the baby's head is small and the pelvis capacious. When the obstetric forceps are locked, as they must always be during delivery, there is a fixed diameter between the most widely separated aspect of the cephalic curve. Large babies have larger cephalic diameters than this and when the blades are applied some compression is bound to occur. In most cases little harm will be done, otherwise no baby would survive the compression of natural moulding. If, on the other hand, natural moulding is already present any increase caused by the application of forceps may be sufficient to cause irreparable cerebral damage. When disproportion is present there is usually considerable moulding and the fetal head will occupy all the available space within the pelvis. Application of obstetric forceps, no matter how slender the blades may be, must surely compete for some of that space and compress the fetal head as they can hardly be expected to enlarge the maternal pelvis.

Although the vacuum extractor may also increase compression within the fetal skull, it will only do so to the extent of the resistance which is present. In other words it will further increase the moulding that would naturally occur were labour allowed to proceed. In the absence of resistance, due to disproportion, to a rigid cervix or to certain types of malpresentation and malposition cerebral compression will be minimal. In their presence the vacuum extractor will either become detached if the pressure exerted is too great or there will be delay in delivery. It has been shown previously that in Uganda where disproportion is frequently present, when assisted delivery becomes necessary, the baby will survive vacuum extraction better than it will survive forceps delivery, provided that the disproportion, whenpresent, is relieved by symphysiotomy.

INTRACRANIAL INJURY

The vacuum extractor may cause all forms of intracranial injury. The main damage is either tearing of the falx cerebri, the tentorium cerebellum or rupture of an intracranial vessel. Huntingford (1961) has reported a case in full as has Willocks (1962). In the former a 23 year old primigravidae had been in labour for 41 hours at a maturity of 41 weeks. The cervix was 4 fingerbreadths dilated. A suction cup was applied to the fetal head, through the cervix, and traction was undertaken for 30 minutes before delivery was achieved. They baby, which was severely asphyxiated at birth, died within 24 hours. POstmortem revealed a large scalp haematoma, a cephalhaematoma and a tear within the falx cerebri, associated with intracranial haemorrhage. That the vacuum extractor contributed to these injuries there can be no doubt. However if the associated factors are considered it is not difficult to understand why those injuries took place. In many cases of cervical dystocia, which seems to have been present in this case, there is a large caput succadaneum projecting through the rigid cervix. Often too, if the bones of the fetal skull are malleable, the fetal vertex will endeavour to negotiate the narrow opening which to it is a resistance. Moulding will occur and distortion of the tissues within the cranium will take place. When a suction cup is applied it will increase the extent of the natural caput and the moulding. There will come a point in time when the vessels within the caput and the tissues within the cranium will no longer be able to withstand the strain of both natural and artificial distortion, particularly when there is resistence to descent of the fetal head. Similar injuries occur naturally when resistance to descent of the fetal head causes prolonged labour and excessive moulding.

The post mortem findings in Willock's case were somewhat similar. This time disproportion was the cause of the resistance.

EXTRACRANIAL INJURY

The artificial caput in the shape of a 'chignon' which is a mould of the inside of the suction cup has been variously described as either insignificant (Martius et.al. 1963) or as a serious injury (Aquero and Alvarez, 1962). At most it might be compared with the forceps marks which appear on the cheeks of babies delivered in that way. The chignon rapidly subsides within a few hours and all that is left is a circular area of small petechial haemorrhages denoting the site of the original application.

Boon (1961) was the first to draw attention to extracranial haemorrhages. He described them as large cephalhaematomata which transcended the suture lines. These may be the cause of immediate death, of neonatal anaemia or of jaundice due to the absorption of blood pigment. Distinction must be made between true cephal-haematoma and scalp haemorrhage which is either bleeding into the subgaleal space or subcutaneous bleeding. (Malmstrom, 1964). There is a variable incidence of both types. Nyirjesy (1963) has reported that 25.7% of all cases of vacuum extraction show cephalhaematoma but in the series reviewed in Kampala it was as low as 1.5% (Chapter 7). There is certainly an increased incidence of this condition in babies born after vacuum extraction. Because of the nature of a true cephalhaematoma it seldom causes much concern Bleeding will be limited when the pressure within the haematoma exceeds that of the vessels which have ruptured. No death due to this type of bleeding has been reported. Of more importance is the other type of haemorrhage which is in the scalp rather than under the periosteum. When this occurs the bleeding will not be self-limiting and fatal death will occur if the lesion is not recognised at an early stage. Two forms of scalp haemorrhage are seen. The

first consists of bleeding into the chignon and is fairly easily recognised as a fluctuant, boggy swelling at the site of the artificial caput. The second type of haemorrhage is much more difficult to recognise as there are few obvious signs. The bleeding consists of a confluent haematoma which extends over most of the scalp which causes the baby's head to enlarge. Unless accurate measurements are taken, this enlargement will not be noticed. It has been reported that the formation of a cephalhaematoma is not dependent upon the length of time of application of the suction cup but it is generally believed that the other types of haemorrhage are probably due to prolonged traction, particularly against resistance.

Laceration of the fetal scalp is also frequently encountered after vacuum extraction. This varies from a few minor vesicles at the edge of the chignon to sloughing of large areas of the scalp. Grafting has been necessary on occasion and alopecia has been reported as a later complication. Secondary infection of these lesions is possible and care is always essential in their management.

NEONATAL JAUNDICE

The occurrence of otherwise unexplained neonatal jaundice in a baby following vacuum extraction suggests that there has been absorption of pigment from haematoma formation. The extent of the jaundice will vary according to the size of the haematoma. Kernicterus is a theoretical possibility but it is doubtful whether this will often occur. The jaundice is usually transient.

OTHER INJURIES

Depressed fracture of the skull and retinal haemorrhage have

also been reported but their true significance in relation to vacuum extraction is doubtful.

TIME OF APPLICATION

Chalmers and Fothergill (1960) suggested that it would be safe to allow application of a suction cup for one hour. Later Chalmers (1964) reduced the period of time to 40 minutes. Other authors (Roloff, 1959 and Rosebeth, 1959) state that a maximum of 30 minutes is permissable if fetal injury is to be avoided. A time limit is certainly advisable and it is thought that this limit will vary from place to place and according to the length of time that labour has been in progress, the size of the natural caput and the extent of moulding. In the two cases of intracranial damage that have already been referred to traction had been in progress for at least 30 minutes before the babies were delivered. Under the circumstances in which delivery was undertaken, against resistance after prolonged labour, it is possible that some degree of cerebral injury already existed.

The series of Huntingford (1961) of 11 cases undertaken before full cervical dilatation of the cervix is often quoted by those who deplore the use of the vacuum extractor. This is not surprising as the babies exhibited much in the way of delivery trauma. The indications for delivery were either cervical dystocia or incoordinate uterine action. Two babies died and four had neonatal cerebral irritation. Four babies had some form of scalp injury. Only one baby was entirely normal. It is interesting to note that labour had been in progress for an average of 55 hours (range 26 to 86 hours) before the vacuum extractor was used and that the application to delivery time averaged 41 minutes (range 13 to 72 minutes). Such a series requires a control study

but it might be very difficult to find over a short period of time in most hospitals a series of primigravidae whose labour averaged 55 hours. Butler and Bonham (1963) in 'Perinatal Mortality Survey' have shown that in labours of that length of time in primigravidae, the perinatal mortality is over 1½ times the average and over twice that of those who labour for less than 24 hours. Huntingford's series should be used not as a condemnation of the instrument but rather as a warning to others of the limitations of its capabilities. It is cases like these which prompted Porapakkham (1962) to write the words which preface this Chapter.

It has always been a principle in obstetrics that there should be no unnecessary interference with the course of labour unless it is in the interest of either the mother or child. When a decision to interfere is made it should be final and delivery should take place within a reasonable space of time without heroic measures or accouchment force. Prolonged application of the vacuum extractor is injurious to the fetus, just as prolonged traction with forceps. The latter is no longer practiced, why should the former?

Caesarean section and vacuum extraction are complementary. Experience has taught most authorities (Malmstrom, 1964) that only a few Caesarean sections can be avoided with the use of this instrument. Fetal distress, late in the first stage of labour, in a multiparous patient is often an ideal indication for applicatio of the suction cup instead of undertaking Caesarean section or anxiously awaiting full cervical dilatation. So, too, may be incoordinate uterine action if gentle traction produces rapid cervical dilatation. In such circumstances the use of the

instrument as a trial procedure has much to commend it, but persistence against resistance will only discredit what may yet prove to be one of the greatest advances in modern operative obstetrics.

In Uganda, as indeed in many developing communities, particular care is necessary. Many patients are admitted in obstructed labour from cephalopelvic disproportion. By then the fetal scalp is oedematous and often devascularised. Many of the injuries which have been reported as being due to vacuum extraction are seen even after spontaneous delivery. The time limit under these circumstances must be very short, recent practice has been 10 minutes, and if there is no progress then an alternative method of delivery must be sought. That alternative is symphysiotomy.

C H A P T E R 6

SYMPHYSIOTOMY

"The operation of symphysiotomy has had a most chequered career".

J. MUNRO KERR
(1954)

"Symphysiotomy....., has followed an eventful course before reaching its present perfection".

ENRIQUE ZARATE
(1955)

"The main barriers against symphysiotomy remain in the minds of obstetricians".

ALAN D.H. BROWNE
(1968)

SYMPHYSIOTOMY

THE EARLY HISTORY

Until well into the 16th Century it was believed that the symphysis pubis, along with the other joints of the pelvis, opened up during labour to allow the fetus to scramble out from the uterus and vagina. Such was the teaching of Hippocrates and Galen and their doctrines remained unquestioned for centuries. Under such circumstances there was no need for symphysiotomy, Nature herself was providing its effect.

There is however some evidence to suggest that symphysiotomy is a much older operation than is generally appreciated.

At the end of this thesis there is an extract from a poem, which was written in the 14th Century by Arnold of Villanova in which division of the symphysis pubis is recommended as an alternative to Caesarean section. If this poem is authentic then the operation was being undertaken at that time, despite the influence of Hippocrates and Galen.

Pereira (1964), in a study of obstetric practice in primitive communities, discussed some of the operations which have been handed down from generation to generation. One of these was undertaken from the vagina in which an incision was made "... from back to front and from above downwards". This operation was, and probably still is frequently performed among the coastal tribes of Mozambique and similar operations have been recorded in the islands of the South Pacific and in Ghana. (Bowesman, 1960). They were formerly described as a type of extraperitoneal Caesarean section but from their description and from the complications of vaginal haemorrhage and urinary

incontinence, it is more likely that they were attempts at symphysiotomy. In the North of Nigeria, obstructed labour is often dealt with by inserting a sharp knife into the vagina and making a cut into the anterior wall. The pubic symphysis is seldom divided but vesico-vaginal fistula is a common sequella. (Mess, 1962). The Hausa who inhabit Northern Nigeria are travellers and are found all over West Africa. It is possible that this operation is an attempt to copy the more successful one undertaken in Ghana.

Most textbooks dealing with the history of obstetrics credit Jakob or Jaques Nufer, a Swiss sow-gelder, as being the first man to undertake a successful Caesarean section on a living woman with the delivery of a living child. In the early part of the 16th Century he carried out an operation on his wife "...after the midwives and lithotomists had failed". Frau Nufer subsequently delivered six babies normally. Because of the success in the following pregnancies it is unlikely that this was a Caesarean section as it is known today. Mettler and Mettler (1947) appreciate this point and suggest that the pregnancy was an advanced extrauterine one. This is more plausible but the alternative suggestion of Pereira (1964) that it was a symphysiotomy is even more likely. Nufer, she argues, in view of his trade as a sow-gelder, would most likely have some anatomical knowledge of the genetalia and pelvis.

THE SIGAULTEN ERA

By most accounts (Mettler and Mettler, 1947), (Speert, 1958), (Wright St. Clair, 1963) and (Cutter and Viets, 1964), the first authentic symphysiotomy undertaken on a living woman was performed during the night of September 30th - October 1st, 1777. The

patient was a rachitic Parisienne dwarf, Madame Souchet. Her height was 3 feet 8 inches (112 cm.) and Levret, the premier obstetrician in Paris at that time had estimated the diagonal conjugate to be just over 2½ inches (7 cm.). MadameSouchet had a bad obstetric history; all four previous pregnancies had ended with craniotomies, at least one of which had been undertaken on a living child. Her accoucheur this time was Jean-Rene Sigault assisted by Alphonse-Louis-Vincent le Roi although Gould and Pyle (1900) in their textbook 'Anomalies and Curiosities of Medicine', whilst they agreed to the name of the patient, suggest that the surgeon was Ferrarar.

Nine years earlier, in 1768, Sigault had outlined the operation to the Faculty of Medicine in Paris and had spent the intervening years searching for a suitable case.

There was apparently much consultation in the home of Madame Souchet that evening among Sigault and the leading obstetricians of Paris. None of them had the courage to recommend or perform symphysiotomy. After the experts had left, Sigault divided the symphysis pubis and with it a large portion of the clitoris, vagina and urethe as well. Le Roi delivered the baby which was a breech presentation. The baby survived.

Ten weeks later, at a meeting of the Faculty of Medicine of Paris, Sigault presented his case. He was given a standing ovation, a silver medal inscribed with the dates 1768 and 1777, bearing the words 'Nova Lucinia', and a life pension from Louis XVI. Madame Souchet walked into the meeting on two sticks which were not discarded during the rest of her life. She also had a large utero-vaginal prolapse, numerous abscesses around the vulva and Dr. Richard Dennison who witnessed the proceedings is quoted to have said "I would have considered her quite healthy

had not my nose informed me that she could not retain her urine". (Wright St. Clair, 1963).

It is not possible today to say whether Sigault deserved the acclaim. Symphysiotomy has been described as a mutilating operation (Wright St. Clair, 1963) and no one would dispute that Madame Souchet had been mutilated. But we have little idea of the state of obstetrics in those days. Caesarean section meant almost certain death and there must have been many women with ambulation difficulty and vesico-vaginal fistulae following childbirth with no living children to compensate for their morbidity. Almost 100 years later, in 1864, J. Marion Sims was fully occupied in Paris, demonstrating his repair of vesico-vaginal fistula (Lancet, 1864); by then no symphysiotomies were being done and he seems to have had no lack of patients. What is certain however is that the doctors in Paris were aware of the appalling maternal and fetal mortality and morbidity which accompanied contracted pelvis. The need for a new approach to the management of delivery in its presence was there. Sigault had demonstrated that in symphysiotomy he had a possible solution and in undertaking it he had done so for the correct reason; as analternative to difficult or destructive vaginal operation.

There was immediate widespread interest in the operation throughout Europe. William Hunter in 1776 attacked the Faculty of Medicine of Paris for embracing this innovation in Surgery, "....with unbounded approbation, and by their public testimony and honours publicly conferred, give credit and splendour to an opinion, which should be put in practice with great circumspection, and finally judged by much experience, a door may thereby be opened to great and irreparable mischief, by letting loose upon mankind, the most mischievous members of society, the ignorant and rash practicioners". Hunter carried out some experiments upon cadavers whereby he divided the symphysis pubis to show that

there was very little pelvic enlargement. When the pubic bones were separated to an extent that would permit the passage of a baby, the sacroiliac joints were torn. The pelves he used were those of women who had died following Caesarean section and as this operation was never undertaken unless the disproportion was absolute from grossly contracted pelvis and vaginal delivery therefore impossible by any means it is small wonder that he obtained the results that he did. His argument that vaginal delivery in these cases would just have been as impracticable if a symphysiotomy had been undertaken, was probably true but Sigault did not claim his operation to be an alternative to Caesarean section. Hunter was like most of his British colleagues, then and afterwards, an extremely conservative obstetrician, believing that "....the forceps (Midwifery instruments in general I fear) upon the whole has done more harm than good". He advocated the crochet with which he had fair skill and experience because he believed that it was safer for the mother and gave less suffering than "....to have the strongest joints of the pelvis cut and torn asunder, to secure a chance only of a living child". Hunter too was not averse to the destruction of a live baby, believing that the life and health of the mother were "....of incomparably greater value than that of an unborn child".

In this one relatively small paper Hunter gave 3 points which were going to be of great importance in the succeeding two hundred years in the history of symphysiotomy.

1. He foresaw that the operation would fail in the hands of the unskilled. Harris (1894), reviewing the history of symphysiotomy from 1777 to 1858, was able to trace 150 operations and obtain details of 114. Forty mothers

and 73 infants died, a maternal mortality of 34.67% and a fetal mortality of 63.6%. With such disastrous results it is not surprising that the operation had to be abandoned and for the reasons given by Hunter, inexperience, lack of skill and the bad selection of cases.

2. He compared the operation with Caesarean section. The latter had a mortality of almost 100% at the time and was never undertaken in the interests of the fetus, but rather as a last resort on women who were dying in obstructed labour, when vaginal delivery was impossible. He speculated that in these cases division of the symphysis pubis would not aid vaginal delivery unless the pelvis was rent asunder. Sigault at no time considered the operation to be an alternative to Caesarean section and undertook the first case in the interests of the child. It will be shown later that the comparison of the two operations prevented the spread of symphysiotomy in Britain and elsewhere and has been used on many occasions as ill judged proof of its inadequacy.

3. He advocated the destruction of the child in the interest of the mother. This practice persisted in Britain for another 150 years. In Catholic areas of Europe, where the life of the mother and her as yet unborn baby were equally important, such practice could not be condoned. It is only within recent years, with the introduction of antibiotic therapy, blood transfusion ans safer anaesthesia, that both views have at last begun to coincide. Operative intervention is now undertaken in the interests of both mother and child and it is part of the argument of this thesis that symphysiotomy fulfils this dual role.

In spite of the loud acclaim given to Sigault in the early days, symphysiotomy had a very brief period of popularity. Only one operation was performed in Britain, by Welchman in 1780. It was not long before it was abandoned and it is interesting to record that another Parisian, the great Baudelocque, was chiefly responsible for the decline. He condemned the operation as "A murderous and unphilosophical procedure".

THE MORISANI REVIVAL

In 1860, the first revival of symphysiotomy began. At his Clinic in Naples, unbeknown to the rest of the world, Morisani and his assistant Novi started to practice the operation again. Although they are rightly credited with this revival, Piccinini a rival from Asti was first to press. In 1874 at the Turin Medical Congress he described one successful case of symphysiotomy and his paper, republished in 1878, is interesting in that it described an operation which is almost exactly that which is practiced today. He also gave his reasons for the abandonment of the operation in the previous century which to him were of greater practical importance than the maternal morbidity so often quoted.

1. The favoured practice of destroying the child in the interests of the mother.
2. The invention by Baudelocque of the cephalotribe for that purpose.
3. The tendency to induce premature delivery in the management of cephalopelvic disproportion from contracted pelvis.

In his opinion none of these practices was ever justified and resulted in a far greater mortality than symphysiotomy.

Morisani's first series of 50 cases was published in 1881. The maternal mortality was 20% and the fetal mortality 16%.

At that time results of this nature from any operative procedure were good but little notice was taken. When the paper was repeated at the 3rd International Congress of Medicine in London later that year, the audience was astonished at the temerity of anyone who could undertake any operation which had been condemned once and for all, by Baudeloque fifty years previously. Morisani was dismissed as a crank. Undismayed, he returned to Naples and continued to perfect the operation. Notice was at last taken in 1890 when one of his assistants, Spinelli, was asked to Paris to demonstrate the operation to Pinard at the Clinique Baudeloque. In November of that year the operation returned to its birthplace. (British Medical Journal, 1891). Fate had it that this clinic, named after the man who had been most responsible for the abandonment of the operation was to play a leading part in the spread of symphysiotomy over the following thirty years. France was the ideal country for symphysiotomy. It had been conceived, born and had died there only now to be revived. So much was the enthusiasmengendered by Pinard and his colleagues that two years later, in 1893, Champentier in an address to the Academie de Medicine stated: "Do not abandon to the foreigner the benefits of an operation which was first successful in our country. Try once more symphysiotomy which, while avoiding the evil results of embryotomy and Caesarean section, will allow you to save almost certainly the lives entrusted to your care. Remember that in this respect you hold in your hands a means of diminishing infantile mortality, an aim towards which all your efforts ought to tend, for now more than ever France has need for all her children".

There was an element of emotion prevailing amongst the French but also an enthusiasm which is praiseworthy as minute details were studied, the technique improved and the true

indications for the operation were established. The spread of the operation was encouraged by Spinelli (1892) who claimed 24 living mothers and 23 infants out of his most recent 24 cases. Morisani (1892) presented the results of his second series of 50 cases. This time the maternal mortality had dropped to 4% and the fetal mortality to 12%. The reason for this was the introduction of an aseptic and antiseptic technique along with attention to detail, rigid indications and experience.

Pinard published the results of his first 29 cases in 1893. All mothers survived, with the loss of three babies. These figures were remarkably good particularly as he used the same patients as a control. In all, there had been thirty previous pregnancies, with the survival of only two children.

In the same year (1893), Vernier collected a series of 124 cases that had been undertaken outside Italy from 1890 to 1893. One hundred and twelve mothers were alive (90.3%) and 92 babies survived (74.2%). When an antiseptic technique had been used on non-infected patients (117 cases), only one mother died, and when the series was corrected for intrauterine death, fetal abnormality and syphilis, (101 cases), only nine babies were lost.

From Italy and France, the operation spread to other parts of Continental Europe and many series of cases were published during the next fifteen years. Pinard remained its most devoted exponent and he reported his results annually in the Annales de Gynaecologie et d'Obstetrics until early in the 20th Century. In 1896, when he reviewed the 69 cases which had been undertaken at his clinic with an 89.9% maternal and 88.4% fetal survival, he was able to reply to all critics of the operation. Pelvic stability, he stressed, was not affected, and he warned against any direct comparison with other methods of dealing with disproportion. The results obtained

from elective Caesarean section, he agreed, were just as good for the mother and better for the child. But symphysiotomy was not an operation of election, nor was it performed in early labour when the condition of the mother and the baby were favourable. Induction of premature labour was dismissed as a procedure which carried with it almost certain death to the fetus, if not immediately then certainly within the first year of life and also was associated with a high risk of maternal infection. He concluded by stating: "In any future history of symphysiotomy, a very important place will have to be assigned to the work done at the Clinique Baudeloque". Pinard was a devout Catholic and the idea of any destructive operation on a living child was abhorrent to him. He steadfastly maintained that no matter how supposedly poor the condition of the child might appear before delivery, it deserved a chance of separate existence. In 1894 he summed up his attitude by saying: "The Physician must never kill".

By the end of the 19th Century, symphysiotomy had become common practice in some areas of Europe. It was discussed at the 3rd International Congress of Gynaecology and Obstetrics in Amsterdam in 1899 (Lancet, 1899). Argument was sometimes heated and bitter and often, by modern standards, quite unfounded. Pinard, who opened the proceedings, was supported by delegates from Italy, France, Spain and Germany and opposed by the delegates from Denmark, Finland, Britain and Holland. Already the operation was connected with the religious views of those who practice obstetrics.

Symphysiotomy was not popular in Britain. At this time Ireland was part of Britain and it is significant that the first operation which was done in the British Isles during the revival was undertaken in Catholic Dublin by Smyly (1892), Master of the

Rotunda. It has never been adequately explained why the operation found little favour in Britain. The reason is not difficult to find. It has already been shown how William Hunter in the late 18th Century preached a very conservative attitude to operative midwifery of all types. Osborn (1792) was even more conservative and actually criticised Hunter for conceding that symphysiotomy might rarely be indicated. Fifty years later in 1827 this attitude was still prevalent and was expressed in a series of lectures given to medical students in Guy's Hospital Medical School by Dr. Blundell. His subject was laborious labours. Caesarean section was a most dangerous operation at that time. Contracted pelvis was frequently seen and the advice given to those women with small pelves was that they should "avoid intercourse with the opposite sex". If this were not possible then a portion of each Fallopian tube should be removed and the woman "for ever rendered sterile". Even this was not a simple operation. "The abdominal incision - that is bad. True, but the Caesarean incision, that is worse. Is not that true also. Again!" Therapeutic abortion was also recommended on women with grossly contracted pelves. If these were common practices in Britain and in other places in the world, it is little wonder that the more romantic Italians and French looked elsewhere for their management of disproportion.

"Observe", Blundell went on to say, "it is a rule - an axiom of British Midwifery, that we are never to deliver by the Caesarean operation, providing we may deliver by the natural passages".

It might be thought that with that axiom there would be a place for symphysiotomy on occasion. This was not Blundell's view. Simple division of the pubic symphysis was believed to enlarge the pelvic capacity "but little" and mannual separation of the joints to the extent of "one, two perhaps I may say three or four inches..... but if moreover the bones be separated from each other to this

extent, then in consequence of the injury done to the sacroiliac synchondrosis and the lesion of the sciatic nerves, and the strains of the soft viscera, which are connected with the pelvis, the operation becomes of considerable pain and is perhaps scarcely less dangerous than Caesarean incisions themselves even in the present condition of that mode of delivery".

Neither Caesarean section nor symphysiotomy therefore were recommended but in further discussion Blundell suggested that the latter might be an alternative to craniotomy of the living child.

"Why is it not the section of the pubic symphysis substituted for the operation of embryotomy? Why!, for this reason; it is an axiom of British Midwifery to sacrifice the child to the safety of the mother, and, in these cases without injury to the parent the child may be brought away by laying open the head".

In the widest sense Blundell was correct, symphysiotomy was not an alternative to Caesarean section but he was wrong in his contention that the operation could never be an alternative to craniotomy of a living child or even a difficult forceps delivery. Routh (1911), quoting Churchill, Munro Kerr and Blacker, pointed out that the maternal mortality after craniotomy, fifty years later, was over 20%. It is most likely that in Blundell's day the mortality was even worse and certainly not much better than the 34.75% which caused the abandonment of symphysiotomy. At least the symphysiotomists had some living babies.

The rigid conservatism adopted by Blundell and presumably by his colleagues is summed up in his final paragraph.

"In the morning you apply the forceps, but cannot extract the cranium. Well!, no dangerous symptoms manifesting themselves you wait till evening, and try the forceps again".

In 1894 when the revival of symphysiotomy was taking place in most countries other than Britain, Harris, who was doing much to popularise the operation in America, was invited to address the Obstetrical Society of London. The overall maternal mortality from the operation in America was just over 9% and the fetal mortality was 38%. Fifteen doctors had undertaken the operation, many for the first time. Better results were being obtained from the larger centres such as New York where the experience was greatest. His audience was not impressed. By then fairly good results were obtained fromelective Caesarean section, performed either just before or just after onset of labour. The maternal mortality from this type of Caesarean section was approximately equal to that of symphysiotomy but the fetal mortality was negligible. Caesarean section was therefore the safer and the better operation. Such comparison was unfair. The elective Caesarean sections were being undertaken on patients who were fit and uninfected and not "performed on patients already exhausted by protracted labour, injured, and infected with septic poison," which was often the case when symphysiotomy was done.

Although Harris had been careful to point out that when symphysiotomy was performed by an experienced person on a suitable case there was no residual ambulation difficulty, this point worried the London obstetricians. Horrocks (1894) described a case which had been performed by a colleague for the first time and who was in an Infirmary, unable to walk, six months after the operation. The continued conservatism of the London obstetricians was evidenced by Napier (1894) who gave some insight into obstetric practice in London at that time. He stated that in the several years he had been working in the Royal Maternity

Charity of London, there had been no need to perform either Caesarean section or symphysiotomy although over 4,000 women were delivered annually. He could understand the necessity of undertaking Caesarean section if the true conjugate measured less than 3 inches (7.5 cm.), but if it were greater, forceps, version, or craniotomy were preferable. He gave neither maternal nor fetal mortality. They would have made interesting comparison with the mortalities from symphysiotomy as practiced elsewhere.

At this time the management of cephalopelvic disproportion was threefold:-

1. Elective Caesarean section.
2. Induction of premature labour at about 32 weeks gestation:
3. Trial of labour followed by operative vaginal delivery.

The maternal mortality from the first alternative was between 5 and 10%. This was acceptable at the time as, in cases of gross disproportion when labour was permitted, the mother was almost certain to die.

In 1894, the Lancet, in what can only be described as a bitter attack and indictment on the obstetricians of the day, published an Editorial in favour of symphysiotomy and against induction of premature labour and operative vaginal delivery in the presence of disproportion. It recognised the need for Caesarean section if the disproportion was gross but pointed out that the maternal mortality was no less than that of symphysiotomy undertaken on infected and exhausted patients. It was argued that in view of the better results obtained by Morisani in his second series of fifty cases, the operation must be based on sound principles "....for no improvement in the results of an operation unsound in itself is likely to be produced by experience, however considerable".

The practice of induction of premature labour was then attacked. It was doubted if any baby delivered at 32 weeks gestation was alive one year later. This point was taken up by Buist in 1903, who undertook a series of symphysiotomies in general practice in Industrial Dundee. Contracted pelvis, he maintained, was met with almost solely among the working classes and the environment in which they lived was not conducive to the rearing of premature infants. Fashionable obstetricians he contended were never concerned with the baby after it had been born, nor had they much experience of obstetrics among the poor.

The Lancet was also not impressed with the methods in current use for operative vaginal delivery.

"Then, as to delivery with forceps, there appears to us to be no antagonism between symphysiotomy and the use of forceps; rather the contrary, for they occupy different parts of the obstetric field. When reasonable efforts to deliver by forceps have failed in a case where the pelvis is only slightly contracted we have the most valuable indication for symphysiotomy. We say 'reasonable efforts' because it has been well said that some forceps operations are no better than craniotomies in disguise; and in forceps cases it should be remembered that 'force' (beyond what can be used without fatal injury to the child) is no remedy".

There was no reliable reference to the fatal results from craniotomy on the living child, difficult forceps delivery, internal podalic version and breech extraction which were the operations in vogue in the late 19th Century in cases of disproportion once the second stage had been reached. One can only assume that they were so bad that no one dared to publish. The Lancet concluded by stating that "...all those with experience (of these operations) in cases of contracted pelvis know that this mode of delivery is attended with considerable risk to the child".

Hirst and Dorland (1896), in the American Year Book of Medicine and Surgery, also took the London obstetricians to task. They pointed out that symphysiotomy and elective Caesarean section were not comparable operations. If the maternal mortality of all cases of Caesarean section undertaken in London between 1886 and 1893 was taken, which was as high as 38%, this would give a more just comparison with the 9% maternal mortality following symphysiotomy in the United States. This mortality was equal to that which had caused the abandonment of symphysiotomy 100 years earlier.

Not all British obstetricians were against symphysiotomy. Lewes (1893) had presented a most successful case in which the mother was perfectly normal and the baby alive three months afterwards. This was the first operation of its kind undertaken in England at this time. In 1900, Herman, who had been so critical six years previously, described seven cases with complete success, and Buist from Dundee wrote several papers in its praise. In spite of these favourable reports, there was much criticism and few operations were in fact undertaken. Most of those who condemned the operation had never performed it or even seen it done. Their grounds were purely theoretical.

At a meeting of the obstetric section of the 76th Annual Conference of the British Medical Association in 1908, symphysiotomy was again discussed. The theme was Caesarean section versus other methods of delivery in contracted pelvis. This meeting took place at the height of the revival of symphysiotomy in Europe and America and also at the time when Caesarean section was becoming a much safer operation although sterilisation was recommended at the same time. Jardine opened the proceedings. He had little to say in favour of symphysiotomy in his opening remarks yet proceeded to describe several which he

had performed with eminently successful results. There had been no regrets at undertaking any of these operations which included one case on whom symphysiotomy had been done in three successive pregnancies and another in which a living baby was delivered following failed forceps both at home and in hospital. Normal delivery took place in the next pregnancy. The new extraperitoneal approach to Caesarean section had however revolutionised obstetric practice in Glasgow to such an extent that such pelvic operations, in his opinion, were no longer required. The invited speakers, Zweifel and von Kronig, from Germany, who had taken over from Pinard as the most enthusiastic exponents of symphysiotomy in Europe, replied. The maternal results were now extremely good and it was rare to expect any maternal death. Fetal mortality was however in the region of 10%. This point was immediately taken up by most of the delegates in the discussion which followed. Symphysiotomy, they claimed, was being undertaken in the interests of the fetus, and if 1 in 10 died the operation could not be justified. No one however was prepared to undertake Caesarean section late in the first stage of labour or in the second stage, particularly if labour had been in progress for some time and the membranes ruptured. Craniotomy, internal podalic version and breech extraction and high forceps delivery were still preferred. No comparison between the fetal results from these operations and the fetal results from symphysiotomy was forthcoming. The true significance of the operation was again missed. No one realised that symphysiotomy might be the alternative to these operations. Three years later, Routh (1911) carried out an extensive survey of Caesarean section in Great Britain. He collected a series of 1272 cases which had been undertaken in 1910. The maternal mortality was 12%. The series contained a high proportion of elective operations. If it can be assumed that the mortality in these

patients was negligible, as everyone claimed it to be, then the maternal mortality associated with prolonged labour must have been considerable. Even as late as 1921, Caesarean section was not without risk. Holland collected 4,192 cases which had been performed in Great Britain and Ireland between 1912 and 1921. Most of these (3,792) had been undertaken for contracted pelvis. The maternal mortality was 1.7% when the operation was performed either electively or in early labour. When the operation was undertaken late in labour, the maternal mortality rose to 10.7% and when it was done after a failed forceps it was as high as 27%. In the latter patients the fetal mortality was 37.9%. Holland commented on this "...deplorable state of affairs..." but could offer no solution other than the abandonment of forceps delivery in the patient's home. In the same year he reviewed the outcome of pregnancy following Caesarean section. Sterility of both voluntary and involuntary types was common. Of the 406 cases that he was able to trace who had become pregnant again, almost 80% required a repeat Caesarean section and 4.6% had uterine rupture. The ratio of normal vaginal delivery to uterine rupture was 4.3 : 1. In 1927 Miller discussed the management of failed forceps. He presented a series of 88 cases which had been admitted to hospital in Edinburgh to the 95th Annual Conference of the British Medical Association. The 17% maternal and the 52% fetal mortality rates represented higher mortality rates than from any other type of obstetric operation or condition. More mothers died after Caesarean section than after craniotomy but he doubted if the latter operation was even justifiable on a living baby. He had solution to offer to the problem but the Irish delegates, led by Bethel Solomons, were in no doubt that these were the cases for symphysiotomy or pubiotomy.

So much interest was engendered by Miller's paper that one

year later he enlarged upon his series by collecting cases from Birmingham, Edinburgh, Glasgow and Manchester. In all 588 cases of failed forceps were presented. Fifty-four mothers died (9.2%) and 367 babies were lost (64%). In almost one quarter of the surviving mothers there had been a morbid puerperium. Henry, who took part in the discussion, admitted that even he himself had had the "mortification" of performing a Caesarean section in a failed forceps case with the delivery of a stillborn child with a fractured skull and both cheeks very badly torn by forceps. Surely these were ideal cases for symphysiotomy yet although all participants were horrified at these results, no one suggested this as an alternative. As late as 1949 Stabler collected a series of 376 cases of embryotomy from Edinburgh, Leeds, Liverpool, Glasgow, Manchester and Newcastle. There were 78 maternal deaths (20.7%). Some of these cases had appreciable intra-uterine manipulation. As a comparison, of the 153 cases of Caesarean section undertaken on similar circumstances, 31 mothers had died (20.0%). At least a few babies survived the Caesarean section. Could the results have been worse with symphysiotomy? In 1950, Freeth, when reviewing 100 cases of the still present problem of failed forceps between 1941 and 1948 showed that the maternal mortality had dropped considerably to 2%. This he attributed mainly to the advent of antibiotics. There were 38 fetal deaths and only 30 of the remaining 62 babies had a birth condition which could be described as good. Five facial palsies, 2 fractured skulls and 6 cases of scalp injury and haematoma were recorded. Over one third of the mothers had notifiable puerperal pyrexia, four had third degree tears and there was one vesico-vaginal and one recto-vaginal fistula.

At last Miller, Stabler and Freeth had accumulated some statistics which could be compared with those following symphysiotom

In 1913, some fifteen years before Miller's work, Frank from Germany published what is generally regarded as one of the last major European contributions to symphysiotomy before the operation returned for the second time from South America. He gave the results of 117 cases. One mother died and 11 babies were lost. All of the operations had been performed late in labour and many had been undertaken after a failed forceps. When the results are compared with those quoted above, which are fairly comparable, there can be no doubt as to which was the preferable management.

Symphysiotomy did not die out in Germany. As late as 1934 Haupt presented 32 cases from Bonn and collected a series of 424 cases which had been performed in Germany between 1922 and 1930. There were 11 maternal deaths in the longer series (2.6%) whereas the maternal death rate from the 4,450 Caesarean sections over the same period of time was 4.2% (185). Peritonitis was the commonest cause of death in the patients after Caesarean section whilst this complication hardly existed after symphysiotomy. Haupt was able to quote 12 references on the subject from the German literature of the late 1920's and early 1930's.

There can be no doubt that symphysiotomy has been a misjudged operation in Britain. Misjudged and maligned by those with no experience of its use and benefits.

At the turn of the Century meanwhile, in America, a much more logical approach to the whole problem of disproportion was being carried out. Harris (1894) had done much to popularise symphysiotomy in that Continent. In 1896 Hirst and Dorland collected a series of 212 cases which had been performed in America since 1880. The overall maternal mortality was 12.75% and the fetal mortality 20%.

Jewett (1901) put forward a strong case for undertaking the operation in neglected patients whatever the results. He believed that in inexperienced hands it was much safer than any attempt at abdominal surgery. Reynolds (1901) presented a most thoughtful, precise and extremely clear approach to delivery in the presence of cephalopelvic disproportion. His three points are worth repeating as they apply equally well today in many a poorly developed country.

1. Caesarean section, as an elective procedure, carries with it little danger either to the mother or her child.
2. Caesarean section in late labour or in the presence of infection or other complicating constitutional condition is dangerous, with such maternal mortality and morbidity as to be unjustifiable.
3. Symphysiotomy is not a direct alternative to Caesarean section in the widest sense but it may be used in neglected cases or when the extraction of a living child by other means is difficult or impossible. Done in such circumstances it carries with it no higher a maternal mortality than craniotomy, high forceps delivery or other operation and will in these cases reduce the fetal mortality considerably.

None of the enthusiasts were well known obstetricians and although their arguments were sound they carried little weight. The revival was only temporary. Whitridge Williams, the most honoured and famous obstetrician of his day, whose writings and teaching were most followed, was not impressed. In the first edition of his book "Obstetrics", published in 1903, he wrote, "Personally I do not expect to perform symphysiotomy under any circumstance and consider the present enthusiasm for it will eventually disappear".

It did.

The passage of time has a habit of mellowing thought as just before he died, Whitridge Williams (1930) admitted that there was a definite place for operations undertaken to enlarge the pelvis particularly when there was a contracted outlet in a funnel shaped pelvis, ".....the operation will not only permit the delivery of the child, but quite probably will lead to such permanent enlargement of the outlet that spontaneous labour will be possible in the future. In such cases it is preferable to Caesarean section".

It is doubtful whether anyone in America was by this time able to take such sound advice.

THE SOUTH AMERICAN ERA

Although enthusiasts like Frank (1914) and Haupt (1934) endeavoured to keep symphysiotomy alive in Europe until the early 1930's, the operation was no longer undertaken to any great extent. It has always been believed that Caesarean section, particularly the lower segment operation, killed it completely. This is only partially true as this period of time coincides with the beginning of a social revolution. It also coincides with the development of improved methods of communication. Proper road mechanised transport and the telephone have all contributed their share to improved obstetrical facilities. Patients began to accept hospitalisation if the prognosis for the outcome of their pregnancy was unfavourable and not as a last resort. Less and less heroic obstetrics were being undertaken at home and although neglected labour was still found the cases were few in number and symphysiotomy was seldom indicated even if it had been considered.

An increase in the number of Caesarean sections brough with it problems of its own. How many could reasonably be done on

one patient? How serious was the threat of uterine rupture in subsequent pregnancy? In non-Catholic countries the dangers were relatively minor. On the advice of her doctor a patient would readily accept sterilisation or contraception and in most instances she was only too eager to limit her family. Most women were educated enough to realise that a pregnancy after a Caesarean section meant hospitalisation for a few weeks before the expected date of delivery or if labour began prematurely they knew that an ambulance could quickly be summoned and they could be under skilled care within the hour. Such was not entirely the case in predominantly Roman Catholic countries but it took some time for the full significance of Spain's (1949) "bogey of the repeat section" to become fully appreciated.

Many doctors were leaving Europe, where they had been trained, to work in the less developed areas. South America was developing rapidly and like most places in similar evolution it soon had two separate communities, the educated rich minority and the masses who were poor, undernourished and ignorant. It was not long before the more enlightened obstetricians began to recognise that Caesarean section, the operation for the sophisticated whenever a serious problem arose, was not so successful among the poor. Wherever there has been poverty, overcrowding and malnutrition, disproportion has followed in its wake. Urbanisation of the populace in search of work has created this type of society and brought with it serious obstetric problems. Coupled with this in South America was the strict Catholicism of the populace and their medical attendants. Disease, anaemia and poor resistance to illness increased the mortality from major surgery and Caesarean section was no exception (Chamorro, 1916). Ignorance and lack of responsibility on the part of the patient forbade proper antenatal care in subsequent pregnancy and few

patients could be made to realise that hospital supervision was essential if uterine rupture was to be avoided. Even if the patient was willing to accept the care that was necessary, it was often impossible for her to do so as there were no roads, no proper transport and no way to summon aid. The conditions were similar to those which exist in many areas of Africa today. Chamorro, (1916) and Zarate, (1916) were first to appreciate the value of symphysiotomy in such conditions. Both worked in the Argentine. From Uraguay, in 1921, Pou Orfila gave a rationalised account of the operation in which he considered that it may be worth while not to carry out Caesarean Section in the first stage of labour in moderate to severe cases of disproportion but to await until symphysiotomy was possible in later labour. Any increased fetal mortality following such practice might be justified by a lessened fetal and maternal mortality from an easier delivery in subsequent pregnancies. He admitted that such practice was sometimes difficult to justify but, as most cases were admitted late in labour anyway, such a decision was seldom required.

For the next 40 years symphysiotomy continued to be widely practiced in South America. It is not possible to review all of the literature in view of the number of publications involved. Zarate was the chief exponent of the operation and it was his teaching which did much to popularise the operation in most South American countries. Between 1916 and 1954 he contributed at least 11 different papers on the subject as well as being the author of a comprehensive textbook, "Subcutaneous Partial Symphysiotomy" in 1955. His main interest was in his own technique which became the type of operation performed universally in South America.

Maternal mortality and morbidity had now been reduced to a minimum (Bazan and Escala had no maternal deaths in their series of 264 cases undertaken between 1931 and 1948) and most discussion revolved around the indications for the operation, the reduction of fetal mortality and morbidity and the maternal complications.

Zarate (1926) suggested that a true conjugate of 8 cm. or less represented an absolute contraindication and that Caesarean section was indicated in those very small pelves. Whilst agreeing with this in theory, Vautrin (1947) pointed out the dangers of relying on exact pelvic measurements as the size of the baby and its position were also relevant. In many cases too it was impossible to obtain accurate pelvic measurements, particularly when the patient was admitted in advanced labour. He suggested that the fetal head must be engaged in primigravidae but that non engagement was not necessarily a contraindication in multiparous patients. Iraeta however was not in favour of the operation being performed in primigravidae at all and was against untrained obstetricians doing it outside the large maternity hospitals. Zarate, on numerous occasions and Vautrin (1947) took the opposite vie In their opinion, symphysiotomy, if it were to have any worthwhile effect in obstetric practice in South America, was needed most in the young primigravidae and in patients who lived far from the larger centres.

The place of symphysiotomy in malpresentation was also discussed and most authors agreed that in breech and in face presentation the results were good but in brow and shoulder presentation when it was undertaken preparatory to internal version and breech extraction, the results were so bad that these presentations should be considered to be absolute contraindications.

There was very little support for symphysiotomy early in the first stage of labour although Vautrin commented that if the cervix was three quarters dilated at the time of operation, division of the pubic symphysis might be followed by immediate descent of the fetal head and subsequent full dilatation. In cases such as this the operation was strongly indicated, particularly if the uterus was active. He warned of the dangers of haemorrhage from the site of operation and disruption of the sacroiliac joints if symphysiotomy was undertaken too early and the patient permitted to labour for some time thereafter.

Symphysiotomy was usually followed by normal delivery which was sometimes encouraged by the intramuscular injection of small doses of pituitrin. Bazan and Rossi Escala preferred this to the use of the obstetric forceps as they had found that application of forceps could be followed by vesico-vaginal fistula and stress incontinence of urine. None of these complications were found in patients who delivered normally.

By the mid 1940's the number of symphysiotomies which were being undertaken in the larger centres had begun to fall. The operation was still recognised as being useful in many instances but Duek (1948), when he reviewed the history of the operation in Brazil, pointed out that in 1931 the incidence of its performance had been 0.55% of all deliveries whereas in 1945 the incidence had fallen to 0.06%. Over the same period of time the Caesarean section rate had risen in proportion. He foresaw that by the early 1960's, it would have fallen out of favour altogether. The decline in popularity he took to be due to Caesarean section being a better operation but it is equally possible that an improved standard of living in South America, coupled with improved communications had lessened the incidence

of contracted pelvis and eliminated most cases of obstructed labour which had formerly led to the need for symphysiotomy.

From South America, symphysiotomy returned to Europe. It is not surprising that the first cases were undertaken in Spain in 1931. Spain still had many links with the South American continent and in many respects conditions were similar. Poverty, malnutrition, overcrowding and large families made disproportion common and its treatment by Caesarean section hazardous. In 1949 Torrents published an account of the 67 cases which had been undertaken by him in Barcelona from 1931 to 1949. Most of his cases were primigravidae (85%). At first the results had been disappointing, 3 mothers and 9 babies were lost in the earlier part of the series, but in the last 37 cases, all mothers and babies survived. The improvement was attributable to earlier recourse to the operation, either at the end of the first stage of labour or early in the second stage. To await two hours of full cervical dilatation and failure to deliver by forceps he considered to be unjustified. Symphysiotomy, he argued, was unlikely to be in itself the cause of fetal death as this operation relieved disproportion, therefore mortality was probably due to the severe moulding and cerebral compression which accompanied a prolonged second stage. To avoid this early intervention was essential.

In 1949, Spain presented his experience of 49 cases of symphysiotomy undertaken at the National Maternity Hospital, Dublin. Sporadic cases had been performed in Dublin for many years but with little enthusiasm until the late 1930's. Barry continued with this work and in 1952 was able to report on a further 42 cases and McVey (1956) described his experience of a small series.

All were agreed that there was a great need for the operation in Roman Catholic Ireland where disproportion remained a frequent problem. Young primigravidae in their teens, on whom Caesarean section was undertaken in their first pregnancy faced a "....lifetime of repeat operation with all the hazards of uterine rupture, adhesion and bladder injury...." (McVey). They could not choose to limit their families because "....sterilisation and contraception were repugnant...." (Barry).

It was realised that the timing of the operation was all important. Spain initially waited until the end of the first stage of labour before interfering but Barry, realising the possible ill effects to the child from prolonged labour began to undertake the operation when the cervix was two finger breadths dilated. Often labour would be allowed to proceed for up to 24 hours thereafter. On the other hand McVey, fearing that such premature symphyseal division of the pubic symphysis might result in injury to the bladder neck or the sacroiliac joints, undertook Caesarean section and divided the symphysis at the same time. "Why not unite the age-old enemies...., and let them rest in peace under the one abdominal scar". By so doing, he argued, the fetal mortality in the present pregnancy would be low and the permanent enlargement of the pelvis would ensure subsequent vaginal delivery.

An attempt was made in 1949 to popularise the operation in Scotland. Greig (1954) described 11 cases which he had undertaken in Dundee. His paper was mainly concerned with the mechanism of pelvic enlargement. Unfortunately one of his patients developed a large vesico-vaginal fistula which was difficult to repair. Such a paper could hardly be an encouragement to others.

Few symphysiotomies will ever be undertaken in Britain again but there is some evidence to suggest that another revival is on its way in view of the recent influx of immigrants to the large cities bringing with them their own special obstetric problems (Best, 1967).

SYMPHYSIOTOMY IN THE DEVELOPING WORLD TODAY

The African continent is large and contains many people. Most of it is poorly developed and the population increases year by year to add to the numerous social and medical problems which abound. Some of the factors which influence obstetrics have been dealt with in an earlier chapter. Conditions vary from place to place but there is a solid background of malnutrition, anaemia and disproportion, which have to be considered before standardised Western obstetric practice is undertaken. The first doctors who worked in these areas were medical missionaries and today much of the obstetric practice is still carried on by them. Often these people have no specialised training in obstetrics with the result they have become more adaptable to the conditions which are encountered. Often too these missionaries have been brought up in the poorer European countries such as Ireland, Spain and Italy where during their years as medical students they were able to witness operations which were undertaken to enlarge the capacity of the pelvis. These doctors soon began to realise that symphysiotomy was often preferable to other operations in the management of certain cases of disproportion and obstructed labour.

For several years symphysiotomy has been practiced throughout Africa receiving little publicity as it was often undertaken without report and proper appraisal.

In St. Luke's Hospital, Arua, Eastern Nigeria, symphysiotomy has been performed since the early 1940's. In the 12th Annual Report (1958) 73 cases are described which made up 15.5% of all deliveries. To the Ibo of Eastern Nigeria Caesarean section is an operation which is disliked and avoided wherever possible. Permission is not readily given and the mention of the operation is often enough to make the patient discharge herself from hospital no matter the stage of labour or how ill she may be. On the other hand symphysiotomy is welcomed and the simplicity of the operation and the good results that it gave prompted the comment "we still find symphysiotomy the answer to the Obstetrician's commonest dilemma in Eastern Nigeria, i.e. obstructed labour".

It is believed that the risk to the baby from permitting trial of labour to proceed to full or almost full cervical dilatation is less than the risk to the mother of Caesarean section as the women on whom this operation has been undertaken are seldom seen again.

In Kenya, the Roman Catholic Maternity Hospital at Thika has no resident doctor. When the midwife is certain that there is disproportion, no matter the stage of labour, she summons the doctor who lives 15 miles away and the pubic symphysis is divided. Labour is permitted to continue and either normal delivery results or the sister in charge applies the vacuum extractor at full cervical dilatation. Such practice may well be condemned by Western standards but it is claimed by those who work there that it is preferable to awaiting confirmation of the disproportion in late labour and then summoning the doctor who may be engaged at another hospital in the neighbouring 50 mile radius.

Bonte (1965) reported that symphysiotomy has been regularly practiced in the former Belgian countries, the Congo, Rwanda and Burundi, for many years. There its incidence is sometimes greater than Caesarean section. Women in that part of the world will not accept Caesarean section as the inability to deliver vaginally prevents their re-entry into society.

In South Africa, Crichton (1958) first alluded to the need for a reappraisal of symphysiotomy in Natal where the predominately African population were poor, malnourished, small and often unwilling or unable to attend hospital until labour was well advanced. By 1962, he and Seedat had collected 505 cases This has been the largest series ever published from a single institution and, apart from initial difficulties with technique, timing and the selection of cases, their results have more than justified its introduction.

Most of their cases were undertaken after a properly conducted trial of labour and if labour was prolonged an intravenous infusion of oxytocin was given in order to correct incoordinate uterine action. Symphysiotomy was not undertaken unless the cervix was at least 3 fingerbreadths dilatation, unless uterine action with or without oxytocin was good, or unless one fifth of the head had entered the pelvic brim. Symphysiotomy was also not considered in cases with a previous Caesarean section scar, brow presentation, transverse lie, or in breech presentation when the pelvis was small. The fetal mortality was 5.6%. In emergency cases the fetal mortality was considerably higher, few babies surviving. A dead baby was no contraindication to performance of the operation if a Caesarean section or a difficult craniotomy were the alternatives. Neither was breech presentation nor previous Caesarean section if the patient was admitted as an emergency.

Lesbrey (1963) made an effort to follow up 110 cases of symphysiotomy which she had undertaken in South Africa. She was able to show that there were no lasting after effects and that symptoms of pelvic pain, stress incontinence and general debility were no greater than in a matched series of patients who had normal deliveries.

From Kenya (1966), Bird and Bal have reported on their experience of symphysiotomy. Many of the cases were undertaken in the first stage of labour. They were unable to reduce the overall fetal mortality rate but the hospital Caesarean section rate declined.

Cox (1966) made an extensive review of symphysiotomy in Nigeria where the operation is undertaken in at least 11 hospitals. He had no difficulty in concluding that the operation was a valuable procedure in the circumstances pertaining in Nigeria.

In spite of the favourable results from most places in Africa, there is some criticism of the operation. Cannon and Hartfield (1964) working in Ilesha in Northern Nigeria were not, without trying the operation, certain whether it could offer anything better than the more traditional methods of dealing with disproportion. They went on to admit that forceps delivery can be extremely difficult with a fetal mortality of 39.5%. An enthusiast would claim that this alone represented a need for symphysiotomy.

At the University Hospital, Ibadan, Nigeria, symphysiotomy is not often performed. Lawson (1965) admitted to its usefulness occasionally but went on to say "....a balanced decisio to perform a symphysiotomy requires just as much obstetric skill

and experience as the decision to do a Caesarean section, and it is in areas where obstructed labour is commonest that obstetric skill is most rare. The operation undoubtedly has a place in the relief of obstructed labour but not in my opinion, in the planned management of labour complicated by disproportion. In this it is rather like domicilliary midwifery; who ever heard of an obstetrician's wife having a symphysiotomy?" The first part of this statement is in many ways a balanced criticism of mass symphysiotomy and an attempt will be made later to answer it. The second part is quite irrelevant: whoever heard of an obstetrician's wife dying of a ruptured uterus through a previous Caesarean section scar? If anyone has (and this is not unlikely), would it not have been better if she had had a symphysiotomy the first time?

CHAPTER 7

VACUUM EXTRACTION AND SYMPHYSIOTOMY IN UGANDA

"The greatest majority of the world's population belongs to countries which, to speak frankly, we can consider as backward. Africa, Asia, a good part of South America and some areas of Europe. It is there where symphysiotomy has its greatest value. It is the general practitioner occasionally faced with obstetrical problems, who most appreciates the new method. It will give him solutions where no other course would offer an adequate solution. Simple symphysiotomy, with the minimum of complications, that is what we must teach them".

ENRIQUE ZARATE

(1961)

VACUUM EXTRACTION AND SYMPHYSIOTOMY IN UGANDA

At the beginning of 1964 it was suggested to the medical staff of the Department of Obstetrics and Gynaecology at Mulago Hospital, Kampala, Uganda, that the vacuum extractor should replace the obstetric forceps as the instrument of choice when operative vaginal delivery of a living child was contemplated. If the vacuum extractor failed to deliver the baby, symphysiotomy was to be employed. It was appreciated that if an initial trial of vacuum extraction seemed unwarranted or, if the baby presented by the face, symphysiotomy could be undertaken and the vacuum applied subsequently or the patient allowed to deliver spontaneously.

There was not complete acceptance of this proposed policy. Some obstetricians were reluctant to abandon the forceps altogether, particularly in cases when fetal distress was present. It was also realised that junior doctors in training required some experience in this method of delivery and that Medical students too had to be shown the forceps in use. Notwithstanding these objections, by the 1st May, 1964, the number of forceps deliveries had declined rapidly and almost 95% of all operative vaginal deliveries were being undertaken by vacuum extraction. Symphysiotomy was not so readily accepted. Within a few months, however, well over 75% of all failed vacuum extractions were being dealt with in the recommended manner.

The technique was explained to the staff and the operation of symphysiotomy was demonstrated in order to ensure standard practice. Minor variations became necessary as the time passed, mainly because experience widened the indications for symphysiotor

and emphasised the dangers of and contraindications to vacuum extraction.

No attempt has been made to present a personal series, although the author was responsible for over one half of the symphysiotomies that were undertaken. In a busy obstetric unit, such as exists in Mulago Hospital, it is impossible to be present in person at each operative delivery. Young doctors have to be trained rapidly to as high a standard as is possible in the 6 months that they spend as interns. After their residency they are posted to the more remote hospitals in Uganda where they are expected to work on their own. Before this happens they must obtain as much practical experience under supervision as possible. Twenty-four operators were involved in the series, ranging from senior consultants to junior doctors, often in their first pre-registration post. All symphysiotomies were undertaken by the more senior staff which included Registrars undergoing the two year qualifying period for membership of the Royal College of Obstetricians and Gynaecologists.

It was decided to omit all patients who were delivered in the paying wing of the Hospital where women of all races belonging to the higher socio-economic groups are looked after. The management of these patients is similar to that undertaken in a more developed community. The study was thus confined to African patients in the non-paying part of the Hospital. Only those cases in which the baby was alive at the time of operation have been considered.

By the 24th July, 1966, almost 27 months after the starting point of the series, 1,000 deliveries had been attempted by vacuum extraction, symphysiotomy or both. Over the same period of time there were 55 attempted forceps deliveries on living infants and the total number of deliveries in the non-paying part

of the obstetric unit was 20,400. This represents an operative vaginal delivery rate of 5.2%, a figure which is slightly higher than it had been in previous years. This increase may have been due to three factors:-

1. The vacuum extractor is easier to use than forceps. There is therefore a tendency on occasion to interfere early instead of waiting for a short period of time in the hope that spontaneous delivery may take place. It has the added advantages that a proportion of cases can be undertaken without moving the patient to a special room and that general anaesthesia is seldom necessary.
2. Full cervical dilatation is not always compulsory. Many cases can be dealt with late in the first stage of labour. This is of particular advantage in some cases of fetal distress occurring in parous patients. In these instances rapid delivery is possible without performing Caesarean section or anxiously awaiting full cervical dilatation. In the present series intervention was undertaken in the first stage of labour in 9.1% of cases.
3. In some cases symphysiotomy was undertaken as a direct alternative to Caesarean section.

It is impossible to determine how often the performance of either vacuum extraction or symphysiotomy prevented Caesarean section. It is interesting however to record that in 1965 the upward trend in the number of Caesarean sections which were undertaken in the Hospital fell for the first time, (Fig. 1/7) in spite of the continued increase in the total number of deliveries. The number undertaken in 1962 is misleading as in that year the Department was transferred from the old Mulago Hospital to the new one and many patients were delivered elsewhere. It is hoped that if this trend continues the number of patients who are admitted in the future with previous Caesarean section scars will also decrease.

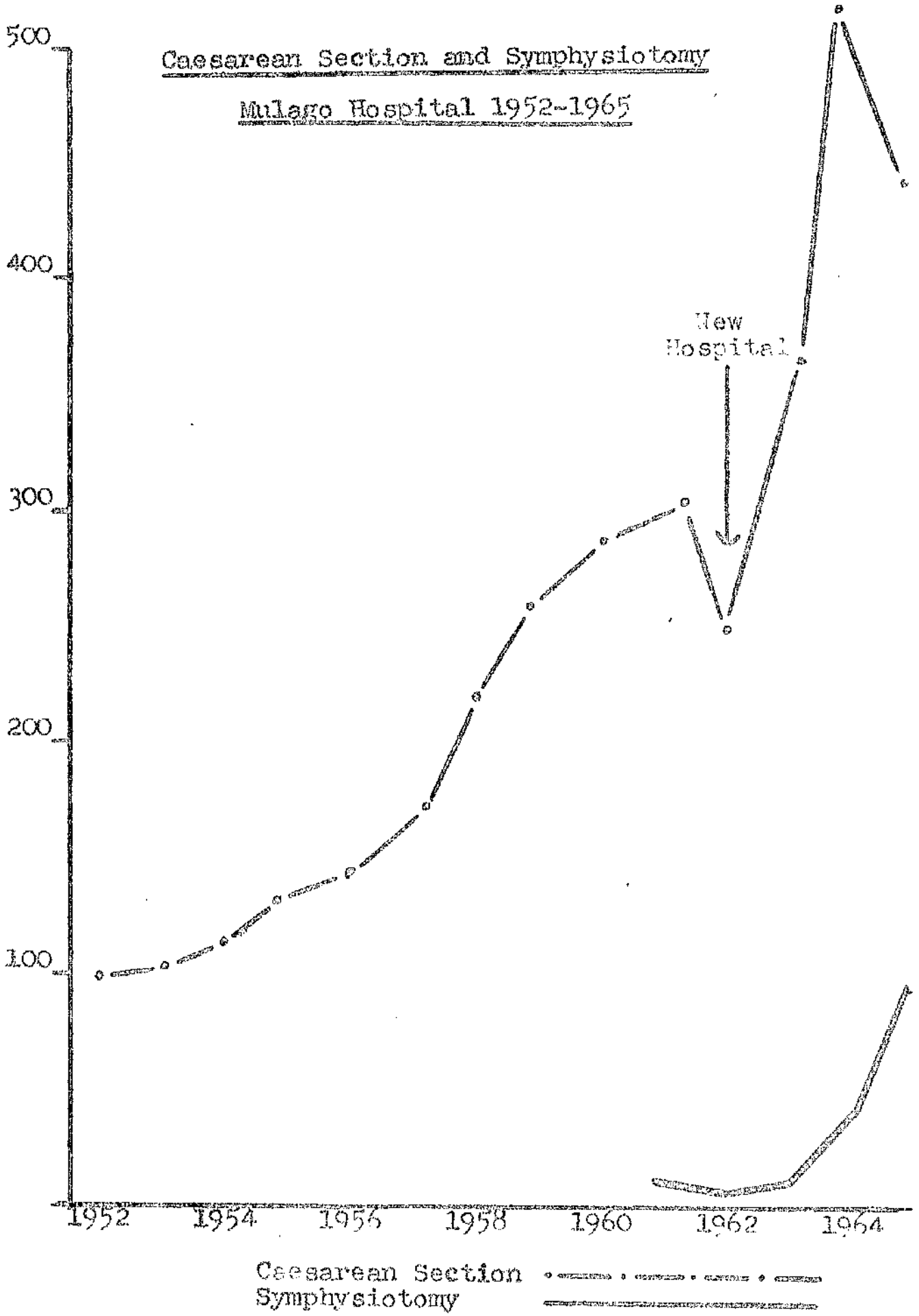

Caesarean Section and Symphysiotomy
Mulago Hospital 1952-1965
500
400
300
200
100
New Hospital
1952
1954
1956
1958
1960
1962
1964
Caesarean Section
Symphysiotomy

Fig. 1/7

Trial of vacuum extraction, followed by symphysiotomy, also eliminated the necessity to undertake trial of forceps under general anaesthesia in theatre.

The final method of delivery of the 1,055 cases is shown in Table 1/7. It is seen that 968 (91.8%) patients, in whom operative vaginal delivery was attempted, were dealt with in the recommended manner. Of the 998 cases in which vacuum extraction was attempted initially 160 failed to be delivered, a vacuum extraction failure rate of 16%. This figure is considerably lower than expected in view of the prevalence of disproportion and in no way represents the proportion of cases with significant disproportion which was present in the series. Good uterine action and fetal head moulding often by themselves eliminate part of the disproportion which is present. Although these factors contribute to the relative success of the instrument, they also contribute considerably to fetal mortality.

It was recommended that failure to deliver by vacuum extraction was to be dealt with by symphysiotomy. This was undertaken on 128 occasions (80%).

Thus, most of the operative vaginal delivery was undertaken by a new technique. Failure to comply with the recommended method has provided a few cases for contrast.

The perinatal mortality for each combination is shown in Table 2/7. Along with the mortality the birth condition of the babies, if they survived, is given. The method of classification of babies at birth in Uganda has already been explained (page 58).

FORCEPS DELIVERY

Fifty-five forceps deliveries were attempted. Of these, 47 babies were successfully delivered (85.5%), five required

OPERATIVE VAGINAL DELIVERY MULAGO HOSPITAL 1st May 1964 - 24th July 1966.		
Vacuum Extraction alone	838	
Symphysiotomy alone	2	968
Vacuum Extraction and Symphysiotomy	128	
Vacuum Extraction, Symphysiotomy and Caesarean Section	1	
Vacuum Extraction and Forceps	16	32
Vacuum Extraction, Forceps and Symphysiotomy	8	
Vacuum Extraction and Caesarean Section	7	
TOTAL	1,000	
Forceps alone.	47	
Forceps and Symphysiotomy	5	
Forceps and Caesarean Section	3	
TOTAL	55	

Operative Vaginal Delivery Rate 5.2%

Table 1/7

Birth Condition of Babies and Perinatal Deaths

Operative Vaginal Delivery

Mulago Hospital 1st May 1964 - 24th July 1966

Type of Delivery	Classification								
	A	B	C	D	NND	S.B.	?
Vacuum Extraction	427	229	87	21	47	5	22
	78.3%		12.9%		6.2%		
Symphysiotomy	2	-	-	-	-	-	-
V.E. and Symphysiotomy	55	26	22	10	11	4	-
	63.3%		25.0%		11.7%		
V.E. and Other Methods	8	7	5	4	4	4	-
	46.9%		28.1%		25.0%		
Forceps	19	7	5	4	9	8	3
	41.7%		20.0%		30.9%		

Table 2/7

symphysiotomy in addition (9.1%) and the remaining three were eventually delivered by Caesarean section.

The perinatal mortality among the forceps deliveries as a whole was 30.9% (17 babies). This is a much higher rate than that of previous years and is probably due to selection of cases. The number of stillbirths almost equalled the number of neonatal deaths and the number of babies born in satisfactory condition (Class A and B) was less than half (47.2%). One mother died. A difficult forceps delivery was attempted, abandoned and followed by symphysiotomy. Death was due to a large pericervical haematoma. Although symphysiotomy, if badly performed, might give rise to such bleeding the findings at post mortem suggested that the trauma was more likely to have been due to the initial attempt at forceps delivery as there was no connection between the symphysiotomy incision and the haematoma.

As the number of forceps deliveries was small in comparison with the number of vacuum extractions it cannot be used as a comparative group, yet the results emphasise once again that fetal condition after forceps delivery is not good and that the obstetric forceps is not the ideal instrument for use in this type of obstetrics.

THE PATIENTS ON WHOM VACUUM EXTRACTION OR SYMPHYSIOTOMY WAS ATTEMPTED

Of the 1,000 patients in the series 417 were primigravidae. In decreasing incidence the parity fell until para 13 (one case). The parity distribution is shown in Fig. 2/7; all abortions have been ignored. In general, this distribution follows the Hospital pattern for parity except that, as expected, there are almost twice the number of primigravidae quoted by Hamilton and Anderson in 1965. They gave a figure of 25.6%. The number of multiparae is greater than is found in operative vaginal delivery in Britain.

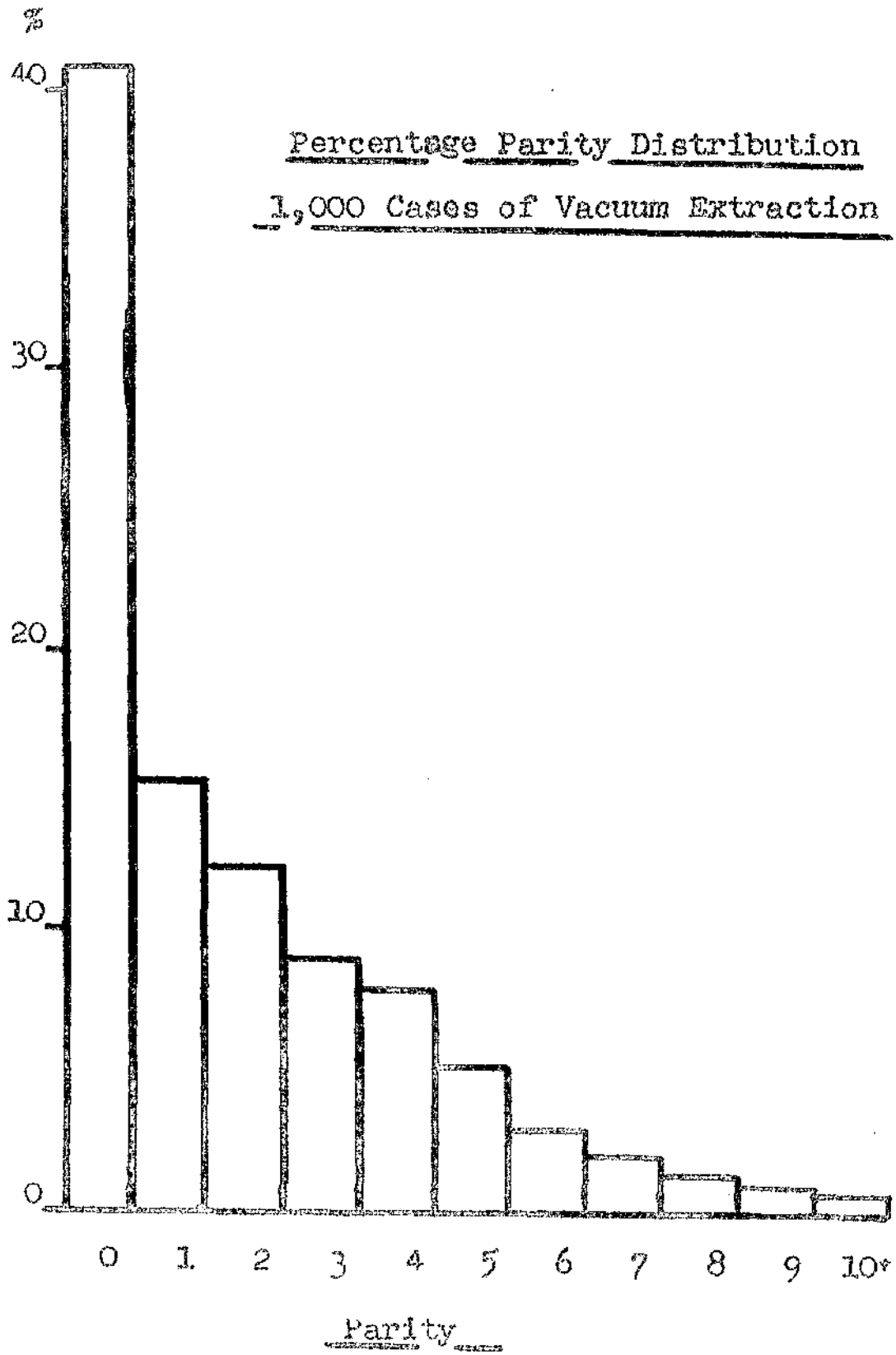

%
40
30
20
10
0
Percentage Parity Distribution
1,000 Cases of Vacuum Extraction
0
1
2
3
4
5
6
7
8
9
10+
Parity

Fig. 2/7

One hundred and sixty-three (27.8%) of the 583 multiparous patients admitted to a history of either Caesarean section (obvious from the abdominal scar) or operative vaginal delivery which could not always be proved. There had been 1,863 previous deliveries over 28 weeks gestation, 223 (11.9%) had been operative deliveries and 317 (17%) perinatal deaths had occurred. It is probable that the number of operative vaginal deliveries and the number of deaths are under-estimations as many patients omit mentioning perinatal deaths and some are unaware of operative intervention.

VACUUM EXTRACTION ALONE

Many of the cases in which vacuum extraction was successful by itself were relatively straightforward and the baby was born showing little evidence of operative intervention. Several however, particularly in the earlier part of the series before symphysiotomy became more acceptable, required prolonged traction and reapplicatio of the suction cup. It was in these cases that most of the neonatal morbidity was found. Fifty-two babies did not survive, a mortality rate of 6.2%, which is the lowest mortality rate in the whole series It is freely admitted that many of these cases could equally well have been dealt with by forceps delivery and the mortality would have been similar. However, these cases are the ones in which disproportion was minimal and it was the use of the vacuum extractor rather than clinical observation or judgment which demonstrated this

SYMPHYSIOTOMY ALONE

Two symphysiotomies were undertaken for delay in the second stage of labour due to face presentation. It is not possible to apply the suction cup when the face presents. Both were mento-transverse at the time of operation. Spontaneous rotation and delivery followed within five minutes in both cases. The babies survived.

VACUUM EXTRACTION AND SYMPHYSIOTOMY

Out of the 128 cases in which the combination of vacuum extraction and symphysiotomy was undertaken all but ten had a preliminary trial of vacuum extraction before the symphysis was divided. (Symphysiotomy may be performed with the vacuum extractor in position or the suction cup may be removed and reapplied after the operation). In the others an initial symphysiotomy was performed and the vacuum extractor used to deliver the baby. Fifteen babies died, a perinatal mortality of 11.7%. This mortality was almost twice that of those cases in which the vacuum extractor was successful by itself.

This group was made up of those patients in whom disproportion was greatest. Labour had often been in progress outside hospital for a prolonged period before delivery was attempted and on occasion the patient had been in the second stage of labour for some hours before admission. Under these conditions the baby is often anoxic and the degree of moulding is such that irreversible cerebral damage has already taken place. Provided that the initial trial of vacuum extraction is not prolonged, there should be no further effect from the trauma of delivery. A high fetal mortality should not act as a deterrent to the performance of symphysiotomy. Caesarean section, one of the alternatives, is unlikely to reduce the fetal mortality and has the added disadvantages of major surgery on an ill patient and the permanence of a uterine scar. Forceps delivery, whilst it may be successful in completing the delivery, will increase the perinatal mortality.

Prolonged attempts to deliver by vacuum extraction are futile and may cause trauma to the fetus. In view of this, since this series was completed, many more symphysiotomies are being undertaken without preliminary attempts at vacuum extraction. This has been done in an attempt to reduce the fetal morbidity

and mortality still further but it can in no way eliminate death in babies already injured by the effects of prolonged, obstructed labour.

VACUUM EXTRACTION, SYMPHYSIOTOMY AND CAESAREAN SECTION

The single case in which Caesarean section was necessary following failure to effect vaginal delivery with a combination of vacuum extraction and symphysiotomy is interesting and deserves full comment.

The patient, a young primigravida, reached full cervical dilatation after a fairly short labour. There was no disproportion at the pelvic brim and the fetal head had descended well into the pelvis. After one and one half hours in the second stage of labour there was no progress. The head was visible at the vaginal introitus in the LOA position. Moulding was minimal and only a small caput was present. A tentative attempt to deliver the baby by vacuum extraction failed and it was only then that it was realised that a contracted pelvic outlet was present. Outlet disproportion is rare in Uganda, particularly when the other pelvic measurements are satisfactory and it was for this reason that it was at first not appreciated. Symphysiotomy was performed and although a satisfactory division was obtained the pelvic outlet did not enlarge and vaginal delivery was not possible. Caesarean section followed. It is notable that British Obstetric teaching, if it mentions symphysiotomy at all, recommends it solely in cases of this nature (Moir, 1956).

VACUUM EXTRACTION AND FORCEPS

Although this combination has proved in the past to be dangerous to the health of the baby and was not recommended, sixteen patients were dealt with in this way. Most were undertaken because

of the operator's reluctance to perform symphysiotomy. Little conclusion may be drawn from the small number of cases in this group but one quarter of the babies did not survive, helping again to confirm the unsuitability of the combination.

VACUUM EXTRACTION, FORCEPS AND SYMPHYSIOTOMY

There were 8 cases in which this combination was used. In 3 the sequence was vacuum extraction, forceps, symphysiotomy and vacuum extraction again. Four of the others required vacuum extraction, symphysiotomy and then forceps and in the last case the sequence was vacuum extraction, symphysiotomy, forceps and then vacuum extraction again. It is not surprising that 3 babies (37.5%) died.

In most instances in which vaginal delivery cannot be achieved with a combination of vacuum extraction and symphysiotomy it is almost certain that the fault lies in incomplete division of the pubic symphysis and consequent non-relief of the disproportion. All of these cases were done in the earlier part of the series when there was initial reluctance to undertake symphysiotomy except as a last resort.

VACUUM EXTRACTION AND CAESAREAN SECTION

To follow up a failed trial of vacuum extraction with Caesarean section is gaining in popularity in certain centres in Europe (Malmstrom, 1964). It is a good policy and suits the conditions met with in these areas. The results are favourable, provided that there is not over zealous persistence with the trial of vacuum extraction just for the sake of trying to achieve vaginal delivery. In Uganda, where there is always the potential danger from previous Caesarean section in subsequent pregnancy, such policy has less in its favour. It was undertaken 7 times in this

series. One baby died, which means very little in such a small series. But one mother died. This was a patient who was admitted to hospital after a prolonged labour at home. The membranes had been ruptured for 3 days and intrauterine infection was present. The cervix was almost fully dilated and the fetal head barely engaged. At attempt to deliver by vacuum extraction was made but within a short time it became evident that delivery was not possible and a Caesarean section was performed. The baby survived but the mother died on the 21st post operative day of severe peritonitis accompanied by a large sub-phrenic abscess. Death in this instance was unfortunate perhaps but it emphasises the dangers of Caesarean section in the presence of pre-existing infection even when powerful antibiotic therapy is available. It is tempting to suggest retrospectively that this patient might have survived if a symphysiotomy, which would have been practicable in this case, had been performed.

It is doubtful whether Caesarean section has to offer anything in Uganda as the alternative to symphysiotomy when the conditions are favourable for the performance of that operation. This is particularly true when the patient has been in labour for many hours. A strictly controlled series in such cases would however be difficult to obtain.

Not all the Caesarean sections were undertaken for disproportion. In 2 cases the vacuum cup was applied at a cervical dilatation of 3 fingerbreadths in primigravidae. No further progress was noted after 10 minutes traction. It is likely that the prolonged labour which was present in these cases was due to incoordinate uterine action.

On one occasion the vacuum extractor failed to deliver a brow presentation which was initially unrecognised. When diagnosed early in labour, brow presentation is best dealt with by Caesarean section as there is a high rate of uterine rupture if the

patient is multiparous. In late labour, on the other hand, brow presentation is no deterrent to the performance of symphysiotomy. Three cases have been successfully dealt with. A tense uterus often prevents suspicion of brow presentation on abdominal palpation and a large caput succedaneum and marked fetal head moulding obliterate the landmarks on vaginal examination. Two of the successful cases were not diagnosed before delivery and the third was undertaken in view of the previous successes.

PERINATAL MORTALITY

The perinatal mortality in the series was 7.5%. This is a significant reduction from perinatal mortality from operative vaginal delivery pertaining up to 1964. It is also worthwhile noting that there has been an even greater reduction in the number of stillbirths. In the years from 1957 to 1963 inclusive, when forceps was the instrument of choice for assisted vaginal delivery, stillbirths always outnumbered neonatal deaths. Of the 75 babies who died in this series 13 (17.3%) were stillborn and of those 4 had forceps delivery as well as vacuum extraction. It is claimed that by using the vacuum extractor and symphysiotomy when necessary a baby may be born in a similar condition to that which existed at the time when delivery was attempted. This statement has reservations in that misuse of the instrument makes its own contribution to fetal mortality and morbidity, just as misuse of any operative procedure produces poor results. There has been dispute in recent years as to the merits of vacuum extraction compared with forceps delivery. It would appear that in Uganda, although the forceps may be more effective in delivering babies, if fetal mortality is to be the first consideration then the vacuum extractor is preferable, particularly if the disproportion can be overcome by enlargement of the maternal pelvis, rather than by

compression of the fetal skull. If this is true in Uganda it is equally true in many other countries in the developing world.

Ugandan parents are reluctant to permit post mortem examinations on their dead babies. Accordingly few were done and the results bear little relationship to the series as a whole. It can only be presumed that many of the babies died as a result of cerebral anoxia due to prolonged labour and to cerebral compression due to extreme moulding and distortion.

There are several factors which lead up to the final death of the baby. These will be discussed in full.

THE INFLUENCE OF MATERNAL HEIGHT

It has been demonstrated earlier in this thesis that many mothers in Uganda are of short stature and that operative delivery and fetal mortality and morbidity is related to maternal height. Malnutrition in childhood has been put forward as the cause of this. Pelvic brim size as represented by the true conjugate and the area of the pelvic brim has been shown to be roughly proportional to maternal stature, among the Baganda at least. During most of the time covered by this series an attempt was made to ensure that an accurate measurement of maternal height was taken on all patients who were delivered in the hospital. Of the 1,000 women covered in the series there was no height recorded in 193. The perinatal mortality was 7.2% (14 babies). This figure is comparable with the fetal mortality in the series as a whole (7.5%). Of the others, 513 were 5 feet (152 cm.) or over in height. Thirty babies died, a perinatal mortality of 5.8%. The remaining 294 mothers were under 5 feet (152 cm.) in height. Thirty-one babies died, giving a perinatal mortality of 10.1%, which is almost double the figure for the larger women.

No correction has been made for parity or tribe which does not give exact patient comparison with the Baganda primigravida described in Chapter 2. In 1965, when the study of maternal height was being undertaken on almost every patient, 115 Baganda primigravidae had attempted delivery by vacuum extraction. The height distribution of these women is given in Fig. 3/7, along with the height distribution of the first 500 Baganda primigravidae who were delivered in that year. Sixty-four of these women were under 5 feet (152 cm.) in height (55.7%), which is twice the incidence in the control group of 500 (27.8%). Eleven babies died among the small women (a perinatal mortality of 17.2%) whereas the perinatal mortality among the taller women was three babies (5.9%.) From this evidence it may be assumed that much of the fetal mortality was due to either disproportion itself or to operative delivery in the presence of such disproportion.

THE INFLUENCE OF ANTENATAL CARE

Strict division of patients into booked and emergency cases is not as significant as it is elsewhere. Many patients will attend in early pregnancy for one visit and not be seen again until labour is well established. Other patients, whilst intending to come to hospital in early labour, will fail to do so because of difficulties of transportation and distance. There are also many patients who, although they may have attended an antenatal clinic regularly, omit to bring evidence of this to hospital when labour starts. Classification into booked and emergency cases is therefore often erroneous. The ratio of those patients known to have attended the clinics to those in which there was no evidence of antenatal attendance was 504:496, which is almost 1:1. The perinatal mortality in the former group was 5.6%

Percentage Height Distribution of 115 Baganda Primigravidae Delivered by Vacuum Extraction or Symphysiotomy Compared with Similar Distribution in 500 Unselected Controls

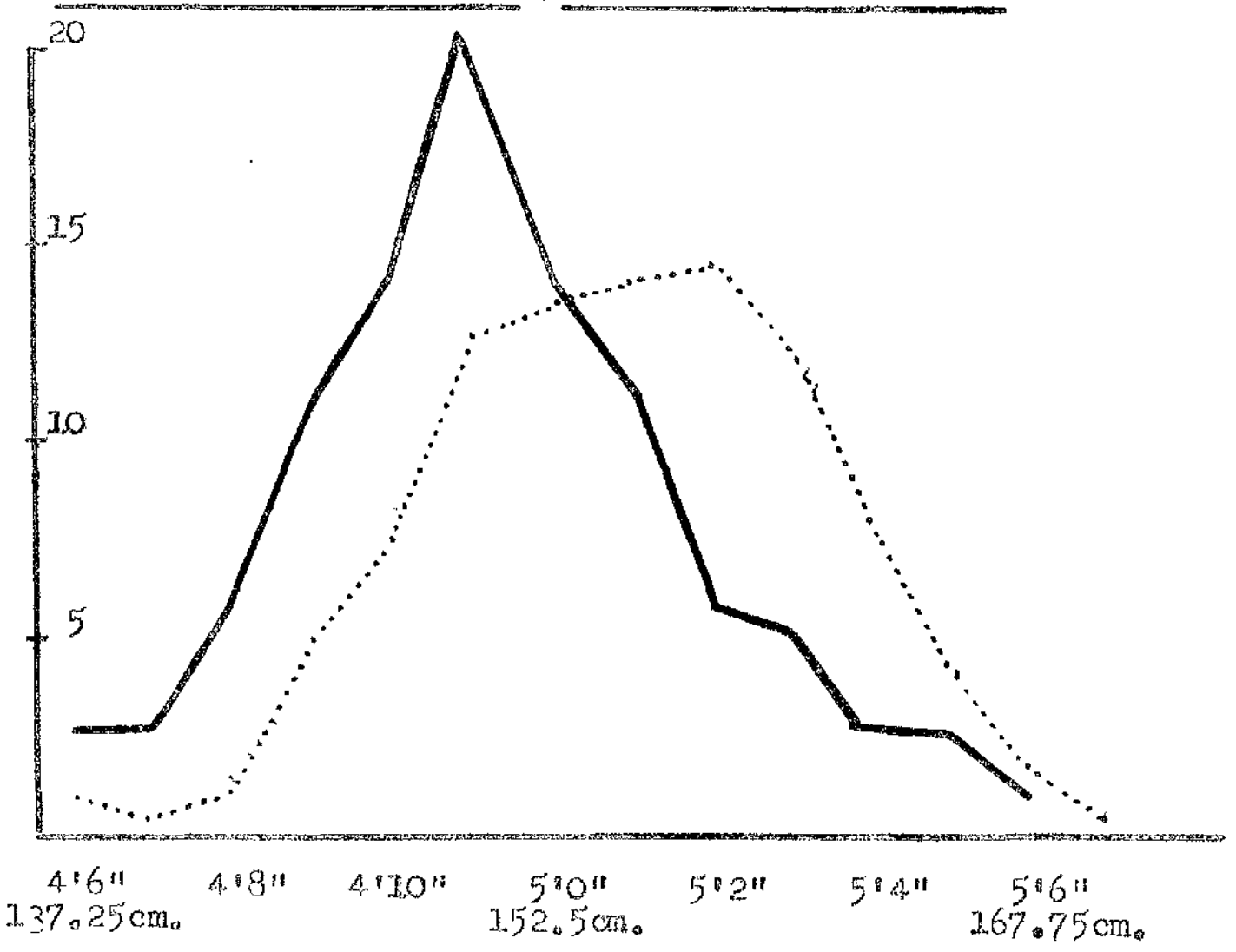


Fig. 3/7

and in the latter 9.4%. It might have been more significant to relate the length of time between admission and delivery to the mortality but this was not appreciated at the time of analysis.

PROLONGED LABOUR AND PROLONGED SECOND STAGE

Butler and Bonham (1962), in the "Perinatal Mortality Survey in Britain", showed that many more babies were lost after long labours than if the labour was short. This was equally true of the second stage of labour. Precise calculation of labour length in Uganda is not so easy as it is in Britain, but approximations can be made and broad differentiation is possible. The length of the second stage can be gauged more accurately if the patient has undergone most of her labour in hospital. For present purposes a labour which has lasted longer than forty hours and a second stage which has lasted over three hours have been considered to have been prolonged. Two hundred and ten cases (21.0%) came into these categories. Of these 109 had a prolonged first stage and a short second stage, 72 had a short first stage and a prolonged second stage and 29 had both a prolonged first and second stage.

The fetal birth condition and fetal mortality rates are shwon in percentage columns (Fig. 4/7). In all groups the fetal mortality and poor birth condition is high but they are appreciably higher in the cases where the second stage was prolonge In all, 37 babies died, which is just under one half of the 75 babi who died in the whole series, although prolonged labour of this type was present in only 21% of all cases.

Delay in the second stage of labour is therefore apparently more dangerous to the baby than prolonged labour itself. There is a logical explanation in that the fetal head in most African patients does not engage within the pelvic brim until labou

Vacuum Extraction and Symphysiotomy

The Effect of Length of First and Second Stages of Labour on Fetal Birth Condition and Mortality

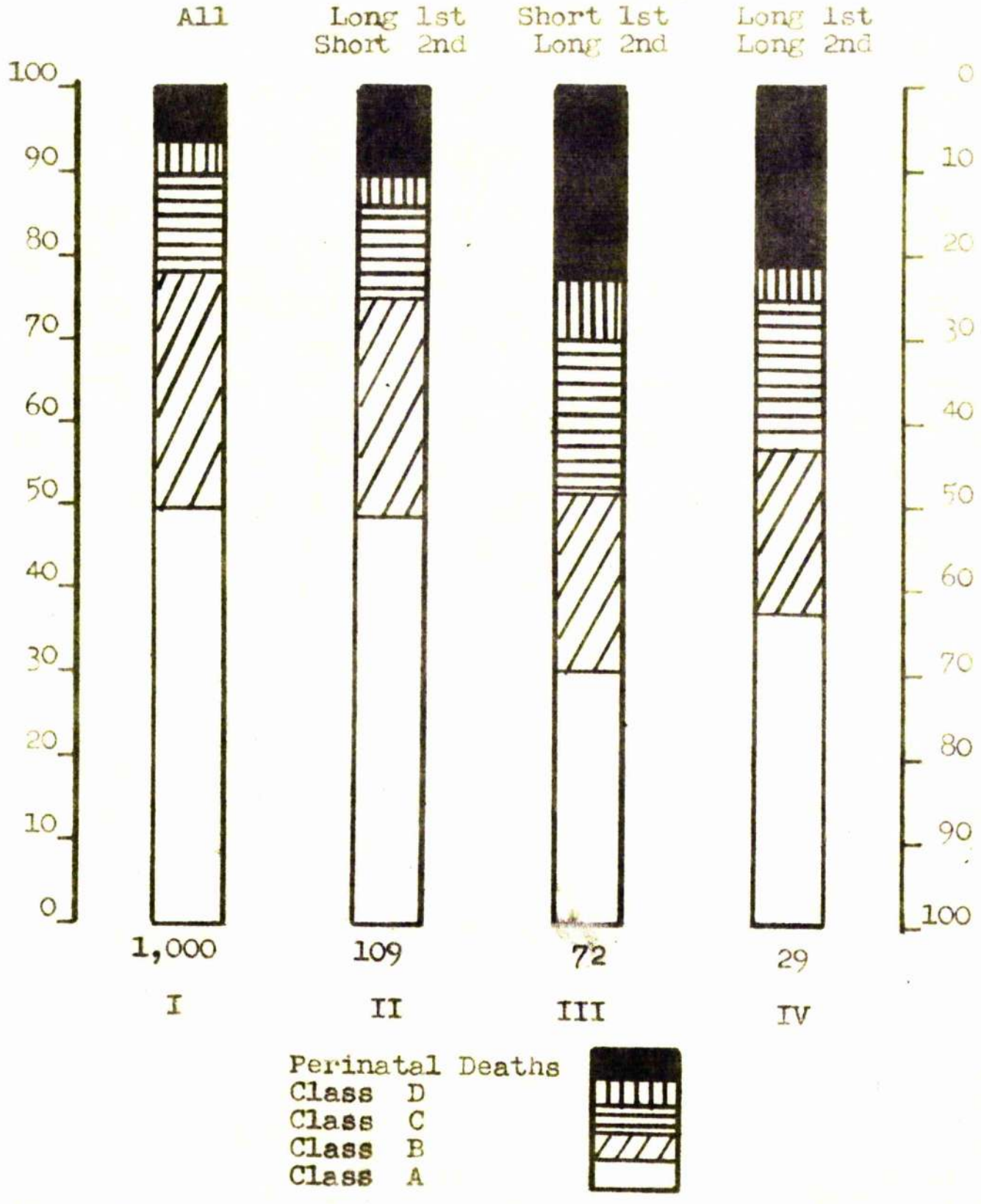


Fig 4/7

has been established for some time and often not until the second stage is reached. During the first stage of labour any anoxia that the baby will suffer will be placental in origin and provided that placental function remains good and that there is no infection, the condition of the baby will remain favourable. As soon as the baby's head has entered the pelvic brim, however, moulding will commence and with it cerebral oedema, compression and rupture of vessels and meningeal folds will tend to occur. The longer the second stage the greater will be the damage. The vital centres will become affected and the anoxia will be central. This factor is more important than placental anoxia as it is more sudden, more irreversible and therefore more fatal.

In order to illustrate this point even more effectively, the 128 cases of symphysiotomy have been considered. They have been divided into two groups according to the station of the head at the time of delivery. It is assumed that if the head was either above the pelvic brim or just engaged little or no moulding would have occurred. On the other hand if the head was fully engaged within the pelvis considerable moulding would be present. There were 78 cases in the 'high' symphysiotomy group and fifty in the other. The condition of the babies at birth is shown in (Fig. 5/7) in the form of percentage columns. The perinatal mortality is over twice as great in the cases in which the head was engaged and the number of babies born in good condition (Class A and B babies) was greater when the head was high (74.3% compared with 46%). Thus, with symphysiotomy, the anomalous situation may well exist whereby the greater the extent of the disproportion and the 'higher' the station of the head the less the fetal mortality will be. From this it should follow that early intervention is justifiable. This would increase the number of assisted deliveries and more symphysiotomies would be undertaken

Symphysiotomy

Effect of Fetal Head Station on

Fetal Birth Condition and Mortality

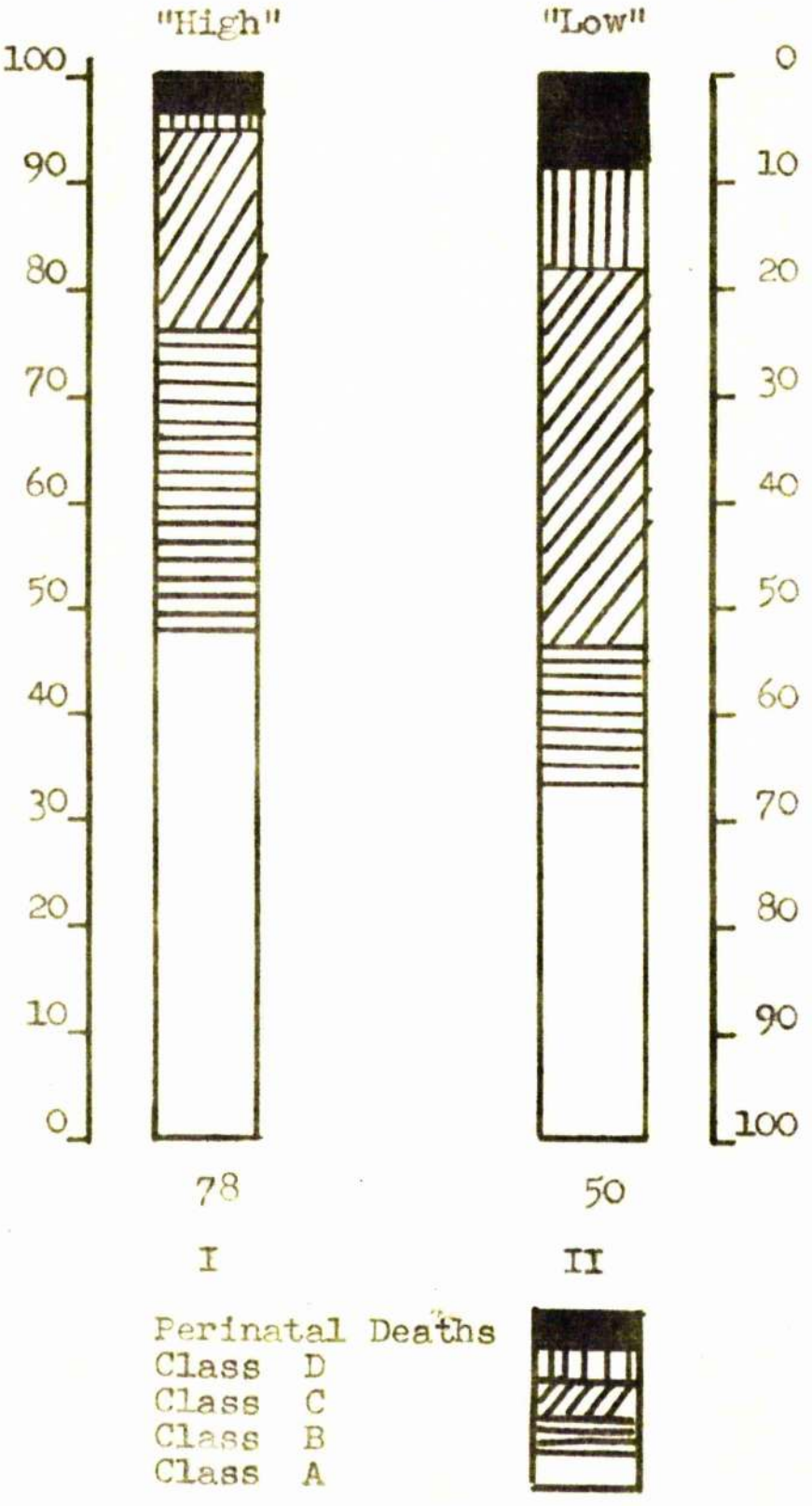


Fig. 5/7

and by so doing a further reduction in fetal mortality might take place.

FETAL DISTRESS

Clinical diagnosis of dangerous fetal distress is seldom straightforward. The presence of a rapid or a slow fetal heart or an irregular one combined with meconium staining of the liquor amnii are very common findings in Uganda. Their presence does not necessarily mean that the baby is going to be delivered in an asphyxiated state, nor does their absence guarantee the delivery of a good baby, with the result absolute reliance cannot be placed on these findings alone. In this thesis, fetal distress has been considered to be present if the fetal heart was recorded at either less than 110 or more than 160 beats a minute accompanied by meconium stained liquor. Out of the 1,000 cases under consideration, 198 showed signs of such fetal distress and the mortality in this group was 41 babies (23.2%) which represents 61.3% of the 75 babies lost.

Short maternal stature, prolonged labour and fetal distress are all inter-related and together they are the greatest cause, through cephalopelvic disproportion, of fetal mortality and morbidity in Uganda and other countries with similar obstetric problems. Gebbie (1966) has pointed out, in a study of primigravidae of all tribes who delivered in Mulago Hospital in 1965, that maternal stature is closely related to prolonged labour, operative intervention and fetal mortality and morbidity. The relevant percentage columns are reproduced in Figs. 6/7, 7/7 and 8/7. To superimpose any form of operative delivery upon these conditions cannot but be associated with a high fetal wastage even if the possibility of delivery trauma is ignored.

PROLAPSE OF THE CORD

In 13 cases delivery was undertaken for cord prolapse. Five

In the following 3 figures:

Column 1 refers to women of under 4' 9" (145 cm.)
Column 2 refers to women of 4' 9" to 4'11" (145-151 cm.)
Column 3 refers to women of 5' 0" to 5' 2" (152-159 cm.)
Column 4 refers to women of 5' 3" to 5' 5" (160-166 cm.)
Column 5 refers to women of over 5' 5" (167 cm.)

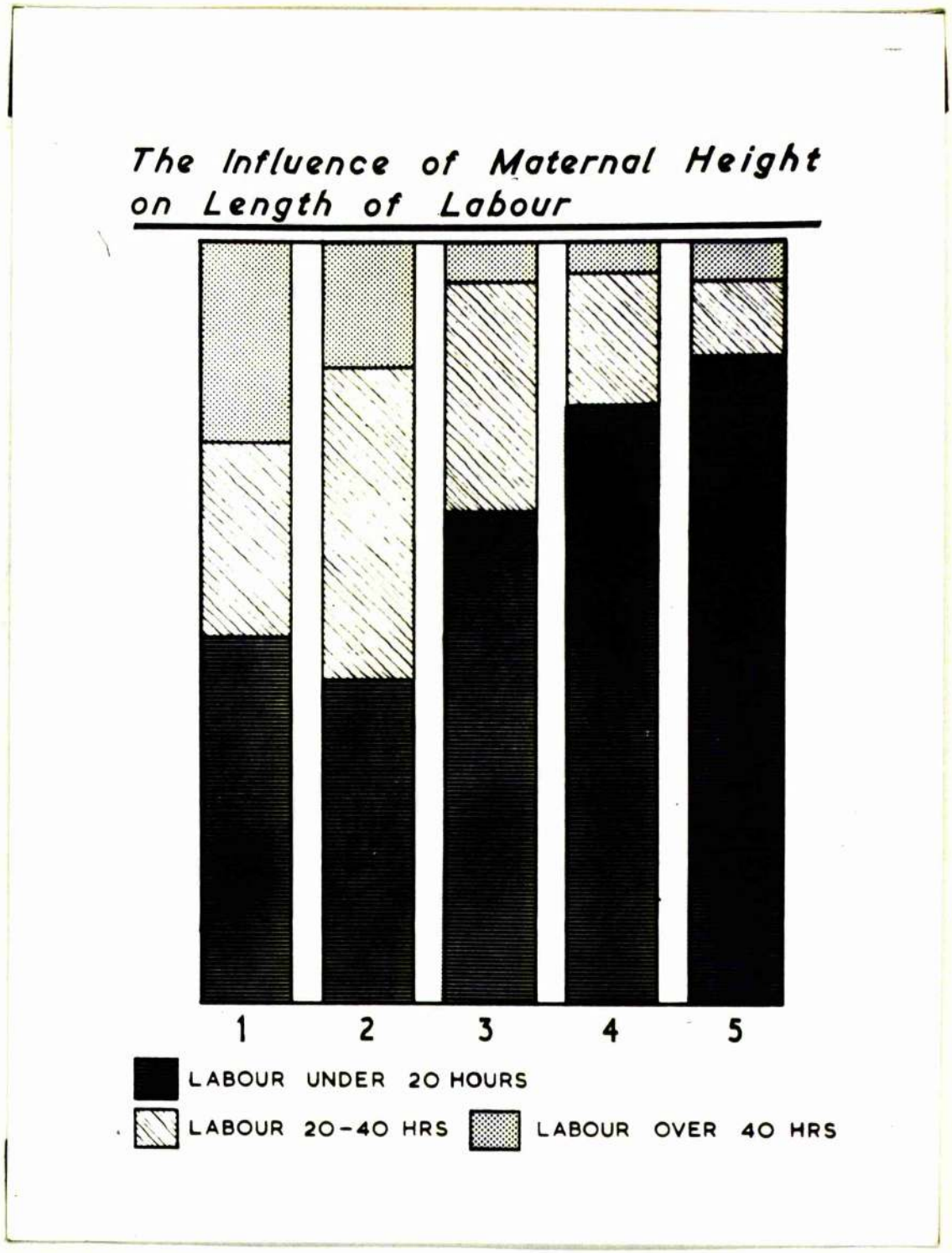

The Influence of Maternal Height on Length of Labour
1
2
3
4
5
LABOUR UNDER 20 HOURS
LABOUR 20-40 HRS
LABOUR OVER 40 HRS

Fig. 6/7

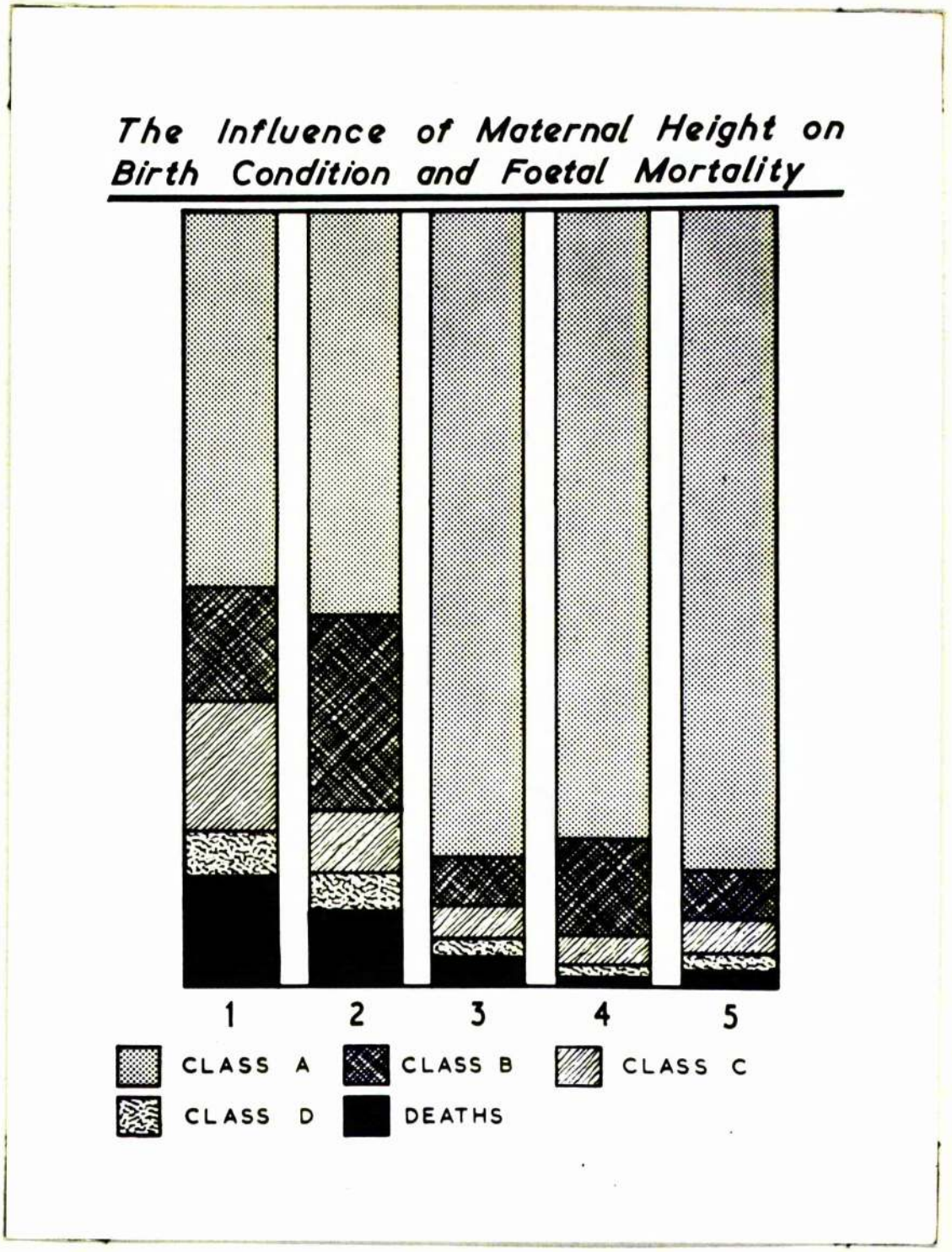

The Influence of Maternal Height on Birth Condition and Foetal Mortality
1
2
3
4
5
CLASS A
CLASS B
CLASS C
CLASS D
DEATHS

Fig. 7/7

The Influence of Maternal Height on Method of Delivery

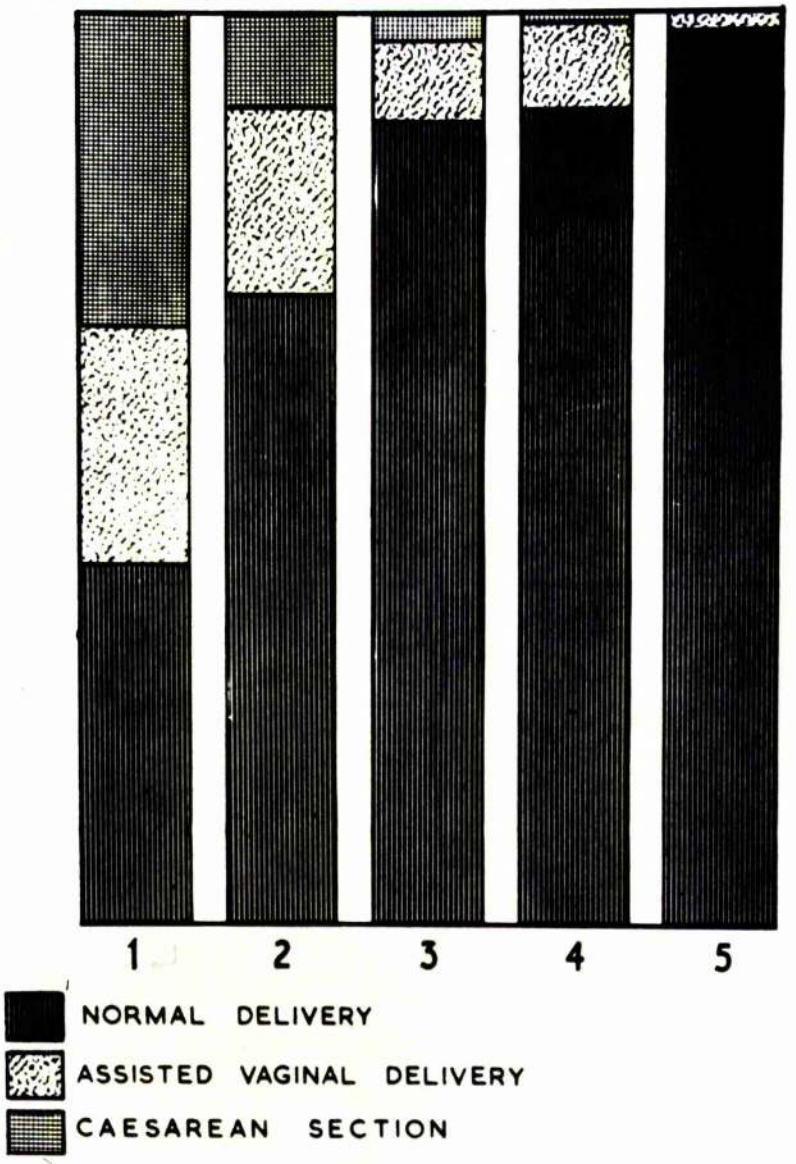


Fig. 8/7

babies did not survive. Four of these 5 cases were admitted with the cord already prolapsed and in 3 pulsation was hardly perceptible.

SEVERE PRE-ECLAMPSIA AND ECLAMPSIA

The pre-eclamptic state is not so common in East Africa as it is in Europe. There are some notable exceptions to this rule, particularly at the Kenyan and Tanzanian Coast and in Zanzibar. A sudden rise in blood pressure may however occur in labour, which is often accompanied by proteinuria and eclampsia may supervene with little warning. Most cases of eclampsia are admitted as emergencies after a series of fits at home and intra-uterine death is quite common in these circumstances.

Thirty patients in this series had either eclampsia or pre-eclampsia of sufficient severity to warrant management along similar lines. Five babies died (16.7%).

CONGENITAL MALFORMATION

Major congenital abnormality is not often met with in Uganda although minor anomalies such as polydactyly, talipes and genu recurvatum are fairly common. Two of the fetal deaths in this series were due to congenital malformation incompatible with life. The absence of post mortem examination precludes the proper diagnosis of the less obvious conditions and some may have been missed.

UTERINE RUPTURE

There were three ruptured uteri in this series. All were diagnosed after delivery and it is likely that rupture took place at the time of delivery. One of the babies did not survive. Two followed simple vacuum extraction and the third was associated with symphysiotomy. It is doubtful if the type of delivery in any

way contributed to the rupture.

FORCEPS DELIVERY

Out of the 24 babies who required forceps after the vacuum extractor had failed to effect delivery seven babies died, a perinatal mortality of 29.2%. It can only be repeated at this point that forceps delivery has little place in the management after the initial attempt at vacuum extraction has failed.

MISCELLANEOUS

Five deaths occurred in circumstances which were not entirely related to the mode of delivery. Two of these babies died during resuscitation when oxygen at uncontrolled pressure was passed into their lungs through an endotracheal tube. Surgical emphysema developed over the anterior part of the thorax. Both of these babies were Class D at birth and may not have survived but ill-directed over-enthusiasm was directly responsible for their deaths.

One baby was accidentally overlaid in bed by its mother. Another developed severe kernicterus as the result of an ABO incompatability which was diagnosed too late. The fifth baby was found dead one morning in its cot from severe umbilical stump haemorrhage.

BABY WEIGHT

Of the sixteen babies who were delivered by the vacuum extractor and who weighed 4½ pounds (2040 grammes) or less at birth, eight died (50%). This may be compared with the 46.2% perinatal mortality in babies of such weight in Mulago Hospital as a whole (Kagwa, 1966).

It might be expected, in view of the prevalence of pelvic contraction, that a high fetal mortality would exist among the larger babies. One hundred and sixty-one babies weighing over

7½ pounds (3400 grammes) were delivered. The mortality rate was 13% (21 babies) which is almost twice the total mortality rate. Out of 135 symphysiotomies, which were eventually undertaken, forty (29.6%) were undertaken in cases where the babies were large. From this it may follow that the large baby is also relavant as a causative factor in the etiology of disproportion, the need for operative delivery and associated fetal death.

THE VACUUM EXTRACTOR

Three babies died as a direct result of vacuum extraction. In each instance death was due to haemorrhage into the scalp. In two cases the suction cup had been in place for longer than thirty minutes and in the other the cup had been reapplied several times. This type of injury was present on several other occasions and it will be discussed in greater detail under fetal morbidity.

In two cases where scalp haemorrhage was the cause of death symphysiotomy was eventually undertaken, demonstrating that traction on the suction cup must have been undertaken against considerable resistance. If the symphysiotomy had been undertaken earlier fetal death may have been avoided.

The factors leading up to fetal death have been tabulated in Table 3/7.

FETAL MORBIDITY

All but 8 of the neonatal deaths in the series took place among babies who were either Class C or D at birth. Death among the Class A or B babies was due either to immaturity or accident, circumstances quite unrelated to delivery. Similarly, most of the neonatal morbidity occurred among those babies whose condition at birth was poor. Many of these babies showed signs of intrapartum asphyxia due to prolonged labour, disproportion or both. It is again impossible to separate pre-existing factors from possible

Case	Women	Labour	Distress	of cord	Toxaemia	Fatty	Fatty	Miscellaneous
1	O	O	O					
2	O	O			O			Shock
3		O						
4	O		O				O	
5	O	O				O		
6	O	O	O					
7					O			
8			O	O				
9	O	O	O			O		Forceps
10						O		
11								Nil
12	O	O	O					
13						O		
14		O				O		Forceps
15								Nil
16	O						O	Congenital
17								Nil
18		O	O			O		
19								Nil
20		O	O			O		Forceps
21	O	O	O					
22		O	O					
23								Nil
24								Surgical Emphysema
25	O	O	O					
26	O		O					
27		O				O		Vacuum
28	O							
29	O							
30			O				O	
31	O							
32	O							
33	O	O	O					
34			O	O		O		Forceps
35	O	O	O					
36			O					
37	O		O			O		ABO Incompatibility
38		O	O					
39	O	O	O			O		
40	O				O			
41		O	O					
42			O				O	
43		O	O			O		
44	O	O						
45		O	O					
46	O							
47			O	O				
48	O	O	O			O		
49					O			
50		O	O					
51			O				O	
52	O		O	O				
53	O							
54		O				O		Forceps
55	O							
56		O	O			O		Surgical Emphysema
57		O					O	
58								Nil
59							O	
60			O		O			
61		O	O					
62	O	O	O			O		
63			O					
64			O					
65		O	O			O		Uterine Rupture
66		O						
67		O						Vacuum + Forceps
68		O	O			O		
69	O	O	O					
70		O	O					
71			O	O				
72	O	O	O			O		
73								Dead in Mother's Bed
74	O							
75		O				O		

Fetal Morbidity in Vacuum Extraction

Class	Immaturity	Congenital Anomaly	Infection	A.B.O. Incompatibility	Jaundice	Scalp Laceration Minor	Scalp Laceration Major	Cephalhaematoma	Scalp Haemorrhage	Cerebral Minor	Cerebral Major	Significant Morbidity
A	0											
B												
C												
A												
B			0									
C			0									
A				0								
A					0							
B												
A						0						
B						0						
D						0						
C						0						
B						0						
C						0						
D					0	0		0				
C						0			0		0	0
B					0	0			0	0		0
C						0						
D								0				
B							0	0		0		0
C							0				0	0
A					0		0				0	0
D					0		0		L			0
B					0		0		0		0	0
D											0	0
C											0	0
C											0	0
D											0	0
C										0		
C										0		
A										0		
A									L	0		
B										0		
B										0		

Table 4/7

delivery trauma. Of the Class C and D babies at birth, 149 survived. Most of them recovered rapidly and were able to join their mothers within 48 hours. Others required more prolonged nursing in the Special Care Paediatric Unit attached to the obstetric wards. All were eventually discharged home with their mothers. Some would perhaps die and add to the considerable infant mortality which exists in Uganda today. Others might survive only to exhibit permanent cerebral damage and reduced intelligence, ending their lives in overcrowded mental institutions. No reliable follow-up of these babies was possible. It is to be hoped that the findings of di Francesco and Accordi (1963) who were unable to demonstrate lasting effects from vacuum extraction in 127 babies at the age of 2 years would apply to the babies in this series and that any permanent damage would be due to the pre-natal asphyxia and not to the method of delivery.

In the earlier part of the study 200 babies delivered by vacuum extraction were closely studied. Sixteen (8%) died. Of the survivors, 159 (79.5%) were either Class A or B at birth and 25 (12.5%) were either Class C or D. There was no apparent abnormality in 141 of the good babies and 8 of the poor ones. Thirty-five babies (17.5%) therefore showed some form of fetal morbidity (Table 4/7).

FACTORS NOT ASSOCIATED WITH DELIVERY

Eight babies were retained in the Paediatric Unit for conditions which were not associated with the form of delivery:-

Congenital abnormality	1	
Infection	2	Total 8 babies
ABO Incompatability	1	
Transient Jaundice	1	
Immaturity	3	

EXTRA CRANIAL INJURY

Sixteen babies (8.0%) showed evidence of some breakage in scalp continuity, haemorrhage into the scalp, cephalhaematoma or a combination of two or three of these.

Minor: The artificial caput succedaneum which appears as a mould of the inside of the suction cup has not been considered to be an injury. All babies born by vacuum extraction exhibit this to some extent. It is transient and leaves behind some superficial bruising or a few petechial haemorrhages at the most.

In 10 cases the scalp injury was of minor degree, consisting of a few vesicles at the site of application of the suction cup and in 6 of these babies there was no other sign of morbidity. These lesions were treated by the application of 1 per cent Gentian Violet to the affected area after shaving the scalp and on discharge the abrasions had healed, leaving little trace. The minor scalp lesions are comparable to the abrasions and cheek lacerations sometimes seen in forceps delivery and, provided they are treated properly and infection does not supervene, are unlikely to cause permanent harm to the baby.

One baby had a cephalhaematoma by itself and another a combination of cephalhaematoma and minor scalp lacerations. Cephalhaematomata are found after normal delivery and the relationship between this condition and vacuum extraction is obscure.

Eight babies therefore exhibited minor external head injury unassociated with other forms of morbidity.

Major: Of the other external injuries there were 5 scalp lacerations of more extensive degree, all of which were associated with other forms of morbidity. Two of these (Plates 1/7 and 2/7) were extensive and likely to leave a permanent scar on the scalp. None became infected and all had healed by the time of discharge. One laceration was associated with a cephalhaematoma. Before this series started there was a neonatal

Vacuum Extraction

Extensive but Superficial Scalp Injury

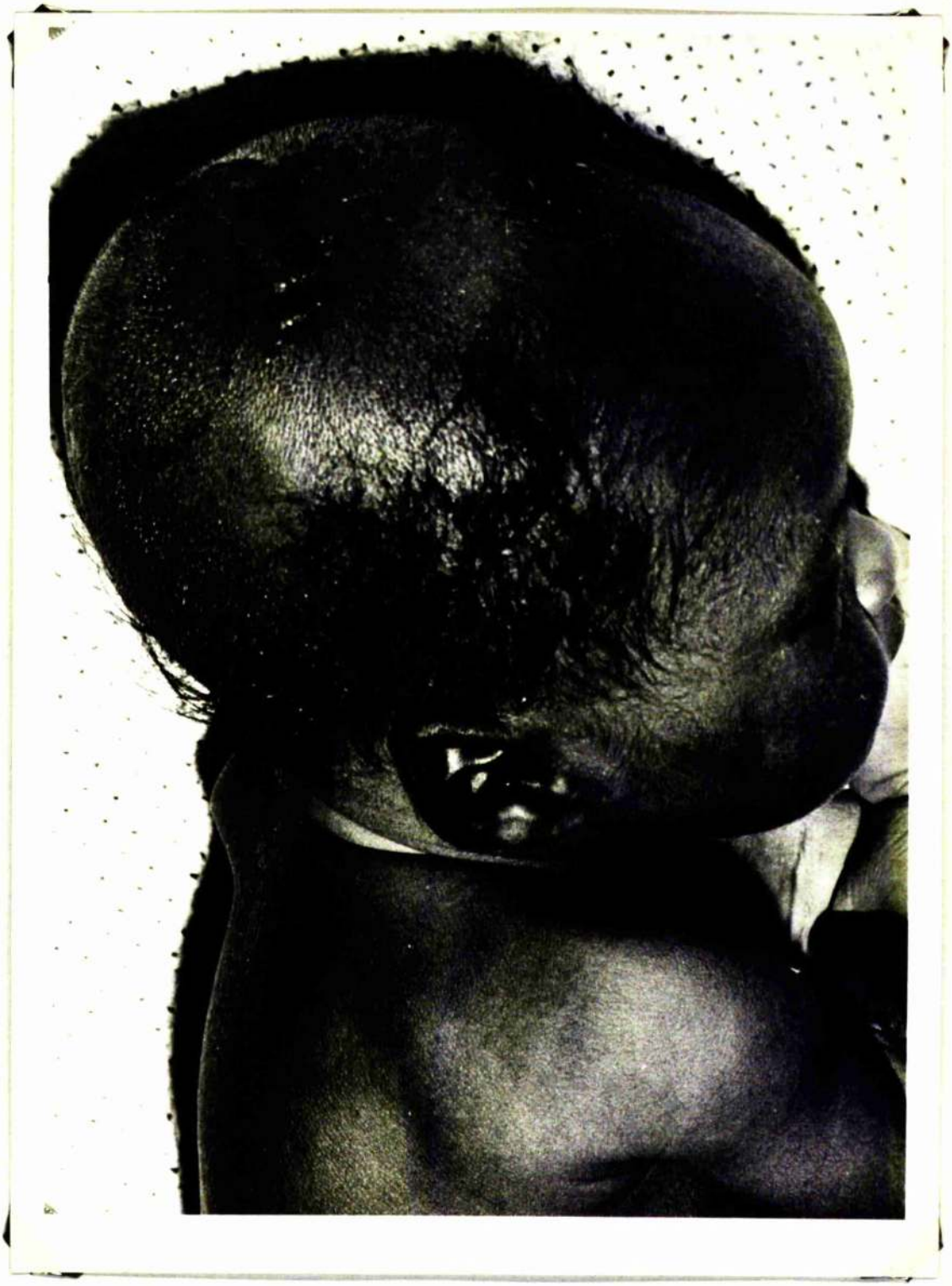


Plate 1/7

Vacuum Extraction

Significant Scalp Sloughing

Plate 2/7

death from septicaemia following infection of a scalp laceration and another baby required a skin graft of the affected area.

There were six cases of extra periosteal haemorrhage, five of which were associated with laceration of the scalp. Two types were recognised. Most of them first appeared as a boggy, fluctuant swelling at the site of application of the suction cup. The haemorrhage was superficial and most likely due to rupture of small vessels within the artificial caput, the blood mixing with oedema fluid. Diagnosis was made by aspiration of the affected area. Such aspiration, contraindicated in the case of cephalhaematoma, is essential in this type of haemorrhage as it is possible to dismiss it as a large caput containing no blood. A more confluent haemorrhage in the sub-galeal space was also found. This type is extremely difficult to diagnose as it causes a confluent swelling over the whole head which will increase in size. Unless accurate measurements are taken and repeated it may escape observation. Both types of scalp haemorrhage may require transfusi Unlike the cephalhaematomata, bleeding of such nature is not self limiting.

NEONATAL JAUNDICE

Otherwise unexplained neonatal jaundice was found in five babies. In all cases there was associated scalp haemorrhage. The jaundice was transient and had disappeared by the sixth day. It is almost certain that jaundice in these cases was associated with reabsorption of pigment from resolving haematomata.

INTRACRANIAL INJURY

Four babies who were Class A or B at birth and fourteen of the Class C or D babies showed varying degrees of cerebral irritability, an incidence of 8%. The signs varied from one

recording of mild twitching to a series of convulsions. The more severe cerebral symptoms appeared in the Class D babies. It is among the latter that permanent damage is most likely. Three babies were significantly affected.

In eight babies the signs of intracranial damage were slight and it is unlikely that there will be permanent disability.

If those babies with minor scalp injury, minor cerebral signs and unrelated factors are excluded (22 babies), there are 13 babies (6.5%) of whom it may be said that significant morbidity was present. Some of this would not necessarily be permanent and some not necessarily related to the form of delivery. Adding this morbidity to the mortality a total of 29 babies (14.5%) is obtained. This figure is equivalent to the perinatal mortality found in previous years.

Much of the scalp injury is preventable by the avoidance of prolonged traction on the vacuum extractor and earlier use of symphysiotomy. In the latter part of the series very few severe lacerations or scalp haemorrhages were seen and more recently when a similar management of operative vaginal delivery has been adopte in Nairobi, Kenya, no significant scalp laceration and only one scalp haemorrhage have been found in over 200 successive cases of vacuum extraction.

MATERNAL MORTALITY

Two mothers died. The cause of death in the first case has already been given. In the other death occurred four hours after an easy vacuum extraction of a third triplet. There was no post partum haemorrhage and in the absence of a post mortem examination no comment can be made.

MATERNAL MORBIDITY

Vesicovaginal fistulae due to devitalisation and necrosis

of the tissues between the fetal head and the symphysis pubis, uterine rupture due to overstretching of the lower uterine segment and ambulation difficulty due to pressure of the fetal head on the sacral nerve roots are all features of prolonged and obstructed labour. All of them are seen in Uganda even after the normal delivery of a living baby. It is unlikely that the vacuum extractor will contribute to such morbidity unless there has been prolonged traction over a considerable period of time. Delivery following symphysiotomy could, however, be the cause of such morbidity. In a given case, particularly if the patient has been in labour for some time, it may be impossible to determine which factor has been the cause of the morbidity. It is certain, however, that if fistula formation and ambulation difficulty are inevitable symphysiotomy will worsen their extent. On the other hand, if undertaken early enough, symphysiotomy will prevent their occurrence.

UTERINE RUPTURE

Three cases of uterine rupture occurred in the series. In 2 of them a fairly straightforward vacuum extraction had been undertaken for delay in the second stage of labour in parous patients (both para 4+0). One baby died shortly after delivery, but the other was Class A at birth and remained healthy. Neither patient was suspected as having uterine rupture until the uterus was explored after delivery because of post partum haemorrhage.

The third patient was a small woman (4 feet 9 inches in height). The one previous pregnancy had ended in the delivery of a stillborn infant by forceps. She attended the antenatal clinic and in view of the history and radiological evidence of contracted pelvis (true conjugate 8.4 cm.) had been booked for elective Caesarean section. At about 36 weeks gestation she defaulted from the clinic and was not seen again until she was admitted in

obstructed labour three weeks later. The second stage had been in progress for some time and the fetal head was impacted in the pelvis. An immediate symphysiotomy was undertaken and the baby was delivered by vacuum extraction. Exploration of the uterine cavity after delivery failed to reveal any abnormality. When the patient collapsed a few hours later it was evident that a haemoperitoneum was present; consequently a laparotomy was undertaken. There was a small complete tear on the right antero-lateral aspect of the uterus. No connection between this and the symphysiotomy wound could be detected. The tear was sutured and mother and baby survived.

It is likely that all these cases were on the point of spontaneous rupture when delivery took place. Such rupture is more usually found when a dead baby is being delivered but it is not rare to encounter it after normal delivery of a living child.

VESICO VAGINAL FISTULA

Eight vesicovaginal fistulae were recognised. In one case the fistula was proven to have occurred in a previous pregnancy. The patient had refused treatment and did not attend hospital until labour had been well established. Delivery was by vacuum extraction and symphysiotomy. On close inspection there wa no evidence of fresh disruption of the bladder neck. One fistula was almost certainly caused by symphysiotomy. There had been a precipitate delivery following the operation and no episiotomy had been done. Numerous lacerations were present on the anterior vaginal wall, one of which extended into the bladder. The fistula closed spontaneously after fourteen days of continuous catheter drainage.

Of the remaining 6 fistulae, 4 were almost certainly due to pressure necrosis. All patients were admitted in obstructed

labour and the second stage had been in progress for some hours before delivery was attempted. In two cases vacuum extraction was successful by itself and in the other two symphysiotomy was undertaken in addition. Three of the babies died. Haematuria was present in all cases before delivery and the bladder was drained for fourteen days after operation. Several days after delivery the vaginal wall sloughed and urinary incontinence followed. None of these fistulae healed spontaneously.

In two cases in which the forceps were applied after symphysiotomy a traumatic opening from the anterior vaginal wall into the bladder was recognised. Primary suture was undertaken and both healed with the aid of prolonged catheterisation.

INFECTION OF THE SYMPHYSIS PUBIS

Osteomyelitis of the pubic bones and infection within the pubic joint are theoretical sequellae of symphysiotomy. Prior to the introduction of antibiotics such infection caused much destruction of bone and chronic disability. All patients in this series were given prophylactic antibiotic therapy which usually consisted of a five day course of penicillin and streptomycin. Consequently little infection was seen and the 6 cases which did occur were due to infection of a small haematoma at the site of operation. Discharge of this haematoma and the continuation of the appropriate antibiotic therapy was always successful in curing the infection. As all patients were retained in hospital for at least ten days the symphysiotomy wound healed before discharge and it is therefore unlikely that subsequent infection would take place. One patient returned three days after discharge from hospital with an infected wound. She was readmitted for rest and a course of tetracycline which cured the infection.

In addition to systemic antibiotic therapy it has been the practice to instil 500,000 units of crystalline penicillin and 0.5 gm. streptomycin into the operation site. Whether this is necessary or justifiable is disputable.

HAEMORRHAGE FROM THE SITE OF THE OPERATION

The area close to the base of the clitoris contains a plexus of veins which may bleed profusely if opened into. Bleeding may be alarming at first but it is easily controlled by pressure. The haemorrhage is self-limiting and invariably stops when the baby has been delivered. With the combination of symphysiotomy and vacuum extraction delivery usually follows within ten minutes. Consequently, bleeding is minimal and in this series no patient lost more than 50 millilitres of blood from this site. This is in marked contrast to the loss of blood in the majority of Caesarean sections. There were no cases of secondary haemorrhage.

AMBULATION DIFFICULTY

Of the 135 cases of symphysiotomy which were undertaken in this series only 8 were retained in hospital for longer than fourteen days because of walking difficulties. Of these, 3 patients have been seen subsequently after a period of six months and none had any symptoms which prevented their return to normal life. Three patients complained of considerable pain in the sacral iliac joints which may have been due to over separation of the pubic symphysis at the time of operation and 2 patients slipped and fell on the ward floor thus reopening the symphyseal joint. Prolonged rest and physiotherapy was required before pelvic stability was restored. There were 2 patients in which a diagnosis of prolapsed intravertebral disc was eventually made. Treatment of this restored proper ambulation. The last case

deserves full comment as it illustrates some of the tragic features of obstructed labour that occur in Uganda today.

A 14 year old primigravida was admitted as an emergency after more than sixty hours in labour and at least eight hours in the second stage. Her height was 4 feet 7 inches (140 cm.). She was dehydrated, febrile and exhausted. The vulva was oedematous and a large caput succedaneum presented at the vaginal introitus, though a large portion of the head was still palpable above the pubic symphysis. Secondary uterine inertia was present and the bladder arose to the umbilicus. A fetal heart was present, beating feebly, slowly and irregularly. Catheterisation was difficult and the head had to be disimpacted before 800 ml of blood-stained and infected urine were drained. Symphysiotomy was undertaken and a 7 lb. 4 oz. (3,290 g.) stillborn child was delivered by vacuum extraction. Delivery was followed by a large quantity of meconium stained pus. The patient survived the puerperal sepsis, the vesicovaginal fistula and the foot drop which followed. She was discharged on the 38th day, walking unsteadily in calipers and with a large bladder neck fistula which would present a formidable problem to repair at a later date.

All these features would have been found no matter the type of delivery undertaken at the time. Symphysiotomy may have increased the extent of the fistula and worsened the extent of ambulation difficulty, but it is unlikely that this patient would have survived a Caesarean section and the other alternative, craniotomy of the (living) child, might have had even more dire consequences.

It has not been possible to follow up the patients on whome symphysiotomy has been performed. Requests to return, just to be

seen, are usually ignored by most patients particularly if they have no complaints. It is likely that if there was residual morbidity of any great extent the patients would return. Only one, the patient with the secondary infection of the symphysiotomy wound, returned with any complaint at all. Others have been seen at the post-natal clinics (which have a 5% attendance), back at the ante-natal clinic in a further pregnancy and a few have been seen personally by the author because an interest was shown in them and their babies when they were in the ward. Twelve have been known to deliver in a subsequent pregnancy. There have been ten normal deliveries, one vacuum extraction and one patient required Caesarean section for transverse lie. The operation was discussed with two patients of high intelligence, one a school teacher and the other a secretary. The school teacher was one of the patients in whom sacro-iliac strain had prevented proper ambulation for some time. It was four months before she was completely better and as she had a Caesarean section in her first pregnancy, she felt that the latter operation was preferable. When her third pregnancy ended in a fairly easy normal delivery however her attitude changed. The secretary walked home on the tenth day after symphysiotomy and had no residual discomfort. She was grateful that a Caesarean section had been avoided.

CHAPTER 8

THE TECHNIQUE OF SYMPHYSIOTOMY

"Dramatic is the operation of Caesarean section. But if you have witnessed an operator making vain attempts to deliver the fetal head (visible at the pelvic outlet by separating the labia) and then seen him divide the symphysis and extract it with ease, you will be forced to admit that the operation of symphysiotomy is just as impressive. And it is so finished, so eminently suitable in the particular circumstances. It is finesse in operative obstetrics of the highest quality, and quality is the only thing that counts".

J.M. MUNRO KERR

William Fletcher Shaw Memorial Lecture

(1948)

THE TECHNIQUE OF SYMPHYSIOTOMY

The first attempts at symphysiotomy in the 18th Century and the type of operation performed earlier by primitive peoples were all ill directed stabs from the vagina in the general direction of the symphyseal joint. Because of this post-operative complications were many and most patients suffered permanent disability. It was because of this and attempts to relieve gross, rather than moderate disproportion, that the operation fell into disrepute. Morisani (1881) attempted to overcome such surgical trauma by a careful selection of cases and by undertaking an approach from the anterior aspect of the joint, cutting from above downwards and displacing the urethra from the mid-line by a solid catheter. He used a stab incision over the joint and his was the first of a series of subcutaneous closed symphysiotomies. Pinard (1893) preferred an open method whereby the tissues were exposed before division of the joint was undertaken. The subcutaneous symphysiotomy has remained the most popular and most writers who have been interested in techniques have described variations. Ayers (1896) inserted a bistuary knife from below and passed it alongside the urethra, cutting from behind forwards, whereas Zwiefel (1908), no doubt influenced by those who advocated pubiotomy, made his incision above the joint and passed a Gili saw round it, using this instrument for division. In 1914 Frank reverted to the original operation of Morisani but he was even more careful in his selection of cases.

In South America most symphysiotomies have been undertaken by the technique described by Zarate. He first presented his variation of subcutaneous partial symphysiotomy in 1916, maintaining that complete surgical division of the joint was unnecessary and that most of the complications of symphysiotomy could be eliminated

by partial division of the joint. The superior ligament, the inferior arcuate ligament and part of the posterior capsule of the joint were left intact. Further separation of the pubic bones was achieved by active abduction of the patient's thighs which acted to tear any remaining fibres. It is claimed that the intact fibres act as a brake which prevents over separation. This operation is fairly widely practiced in Africa today (Ayeni, 1963). Seedat and Crichton (1962) have reverted to a subcutaneous method in which the pubic symphysis is completely divided. The operation is similar to that of Frank. It is this type of operation which has been used exclusively in this series and it will be described later in this Chapter.

Spain (1949) and Barry (1952) introduced an open technique to their practice in Ireland. General anaesthesia is necessary for this more complicated operation and a fairly large incision is required. All cutting is made under direct vision and all bleeding points are identified and ligatured. They claim that this technique has the advantages that the operator is aware of what he is dividing, that all bleeding points may be controlled easily and that bladder and urethral injuries are unlikely. With experience such complications are however extremely uncommon in any type of operation and it is doubtful if the open method has any overall advantage. Furthermore it requires a general anaesthetic which is often best avoided in an ill woman, and in some parts of Africa is either unavailable or takes time to procure. The choice for Africa therefore lies between complete or partial division, undertaken under local anaesthesia, through a stab incision over the joint. Both operations are undertaken by touch rather than by direct vision. It is therefore uncertain how many fibres of which ligament

are in fact divided either by knife or by abduction of the thighs. Ayeni (1952) visualises Zarate's operation being undertaken in the patient's home under the most primitive of conditions with two relatives as assistants. Whilst agreeing that, in the direst emergency, symphysiotomy may be undertaken under such conditions it is doubtful whether through language and other difficulties such assistants will prove efficient thigh abductors. A brake seems unnecessary provided the patient's thighs remain at abduction of no greater than 90°.

The operation which will now be described has the following advantages in African obstetrics:-

1. General anaesthesia is not required;
2. The operation is relatively safe and quick to perform;
3. It is easy to learn;
4. The operator has complete control over the amount of symphyseal separation which occurs. All that is required of the assistants is to steady the patient's legs;
5. The equipment is minimal, can be carried in a small bag and be sterilised in a simple saucepan.

It is good practice to inject 50 milligrammes of pethidine intravenously before commencing the operation unless the patient is well relaxed or unless she has had previous sedation which is still active.

The patient is placed in the lithotomy position. Her feet may be put into stirrups if desired but throughout the operation each leg should be held by an assistant at an angle of abduction of no more than 90 degrees. (Plate 1/8).

After cleansing the vulva and surrounding areas and applying sterile lithotomy towels, a reassessment of the situation is made with particular reference to cervical dilatation, station of the

Throughout the Operation the Patient's Legs must be held and Maintained at an Angle of Less than Ninety Degrees.

Plate 1/8

fetal head, its position, the degree of moulding and the extent of the caput succedaneum. With these in mind, and also the condition of the baby, a decision should then be made whether to undertake symphysiotomy prior to vacuum extraction or to carry out a preliminary trial of vacuum extraction.

A pudendal block is then performed (Transvaginal is preferred, Plate 2/8). When part of the fetal head has descended well into the maternal pelvis it may not be possible to undertake a full regional anaesthetic block of this nature. In such circumstances local infiltration of the vulva will prove sufficient.

Between 10 and 15 millilitres of local anaesthetic is then injected over the anterior aspect of the symphysis pubis (Plate 3/8). The injection is made over the middle of the anterior surface of the joint and should extend from under the clitoris below to 2 centimetres above the superior border of the joint. It is the lower aspect of the joint that is most sensitive and most care should be taken in this area.

A fairly non-resilient rubber catheter is then inserted into the bladder and the urine drained. The presence or absence of haematuria is noted. For the remainder of the operation the catheter remains in place (Plate 4/8). The index finger of the left hand is placed into the vagina between the fetal head and the posterior surface of the symphysis pubis, displacing the catheter, and with it the urethra, to one side away from the site of the operation.

Through a stab incision in the skin, a solid-bladed scalpel is inserted into the middle of the joint, at right angles to the joint and with the cutting surface towards the operator. The knife is gently pushed through the joint until the point is felt just under the anterior vaginal wall by the finger within the vagina (Plate 5/8).

A Transvaginal Pudendal Block is Undertaken if Required.

Plate 2/8

Local Anaesthetic is Injected Over and Into the Symphyseal Joint

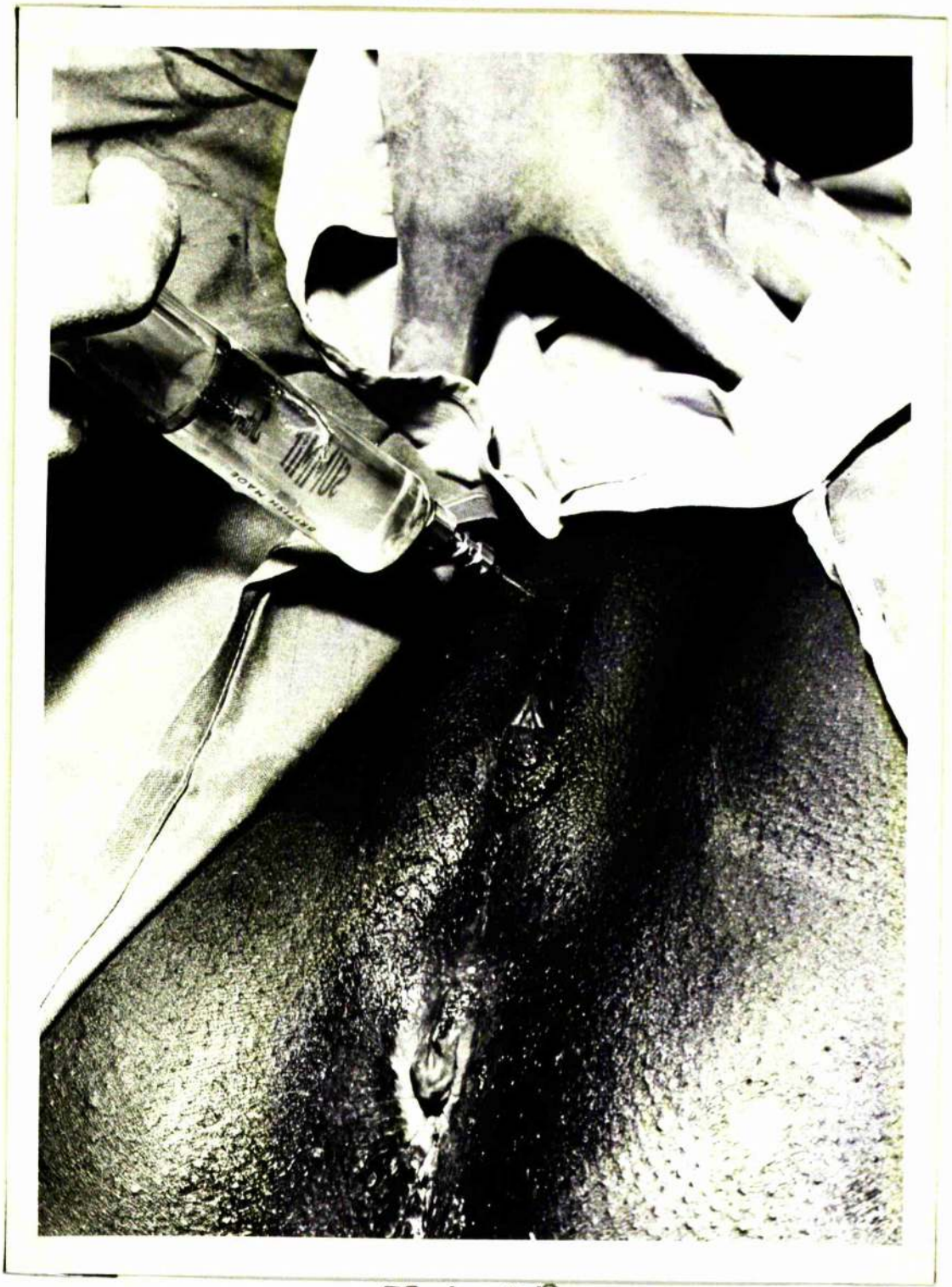


Plate 3/8

Catheterisation by a Firm Malleable Catheter is Essential

The Catheter Remains Throughout the Operation.

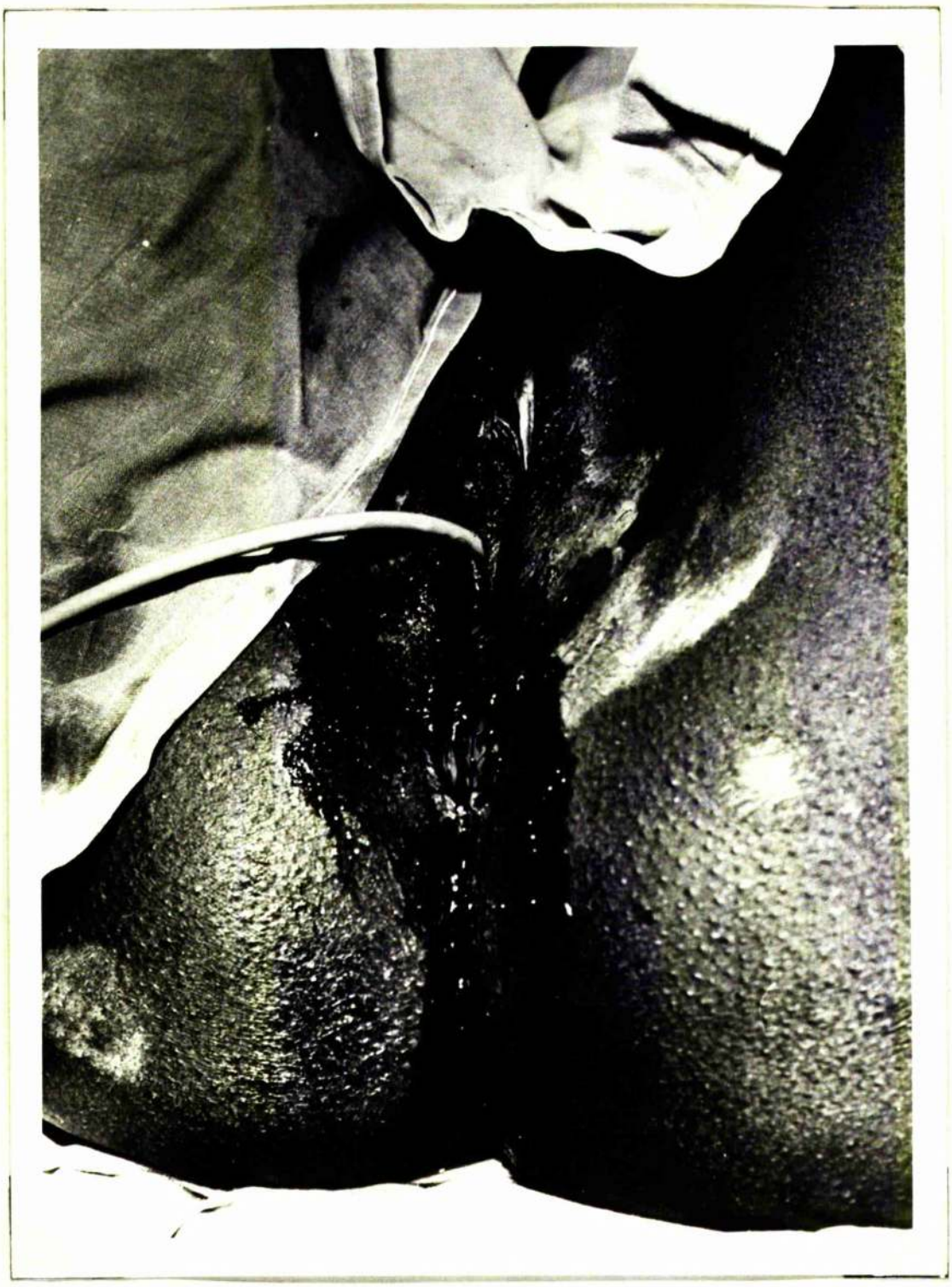


Plate 4/8

The Solid-bladed Scalpel is Inserted Through a Stab Incision

Note the Left Index Finger in the Vagina, Displacing the Urethra

Plate 5/8

Using the upper part of the joint as a fulcrum, the knife is rotated through 90 degrees. Most of the lower half of the joint will now be divided (Plate 6/8 and Fig. 1/8).

The knife is then removed, rotated through 180 degrees and reinserted with the cutting surface away from the operator. (Plate 7/8). By bringing the handle of the knife downwards, the upper fibres of the joint are divided (Plate 8/8 and Fig. 2/8).

The Knife is Rotated Through 90° to Divide the Lower Fibres.

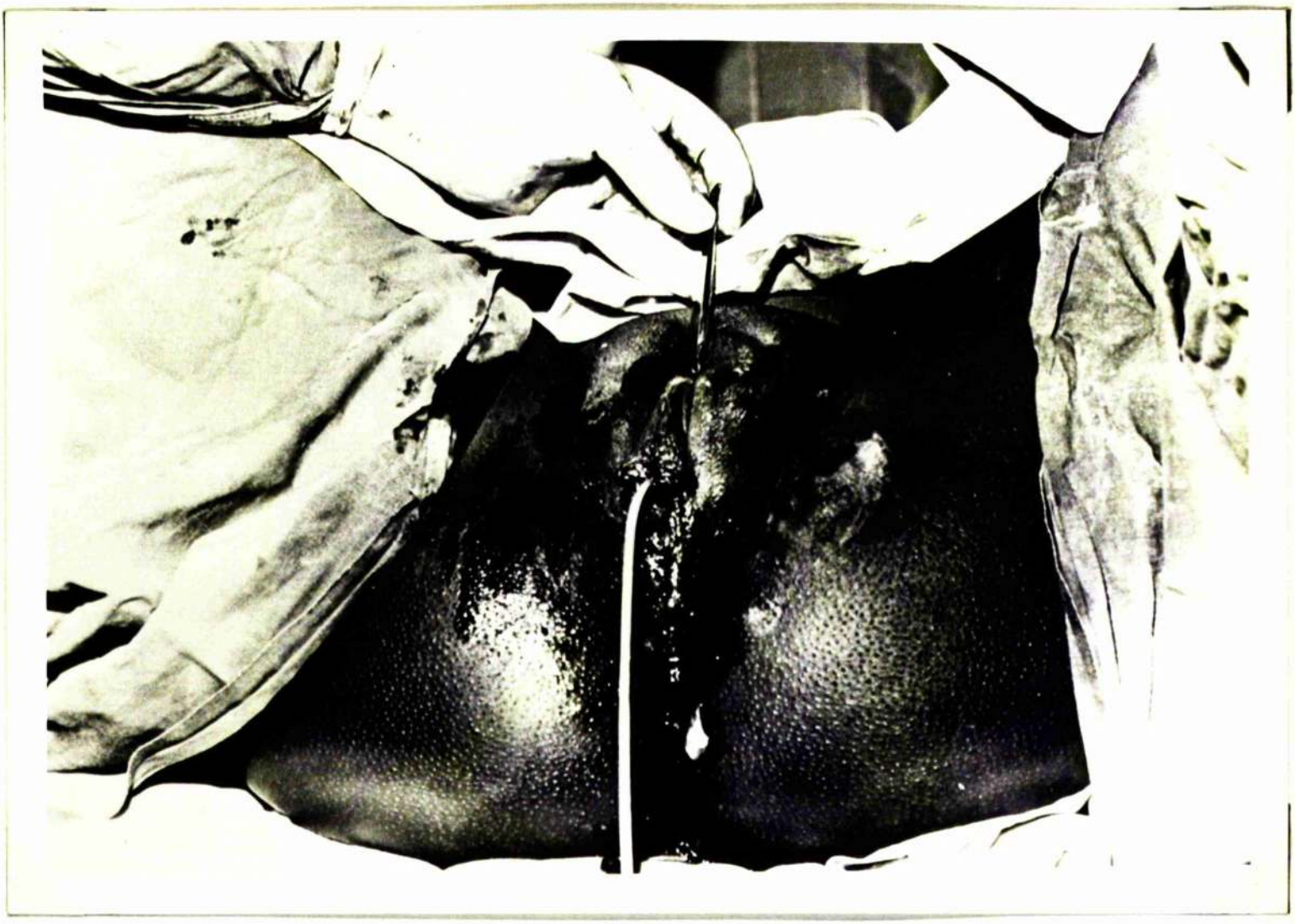


Plate 6/8

Diagram to Illustrate Divis[illegible] of the [illegible]

Half of the Symphysis Pubis

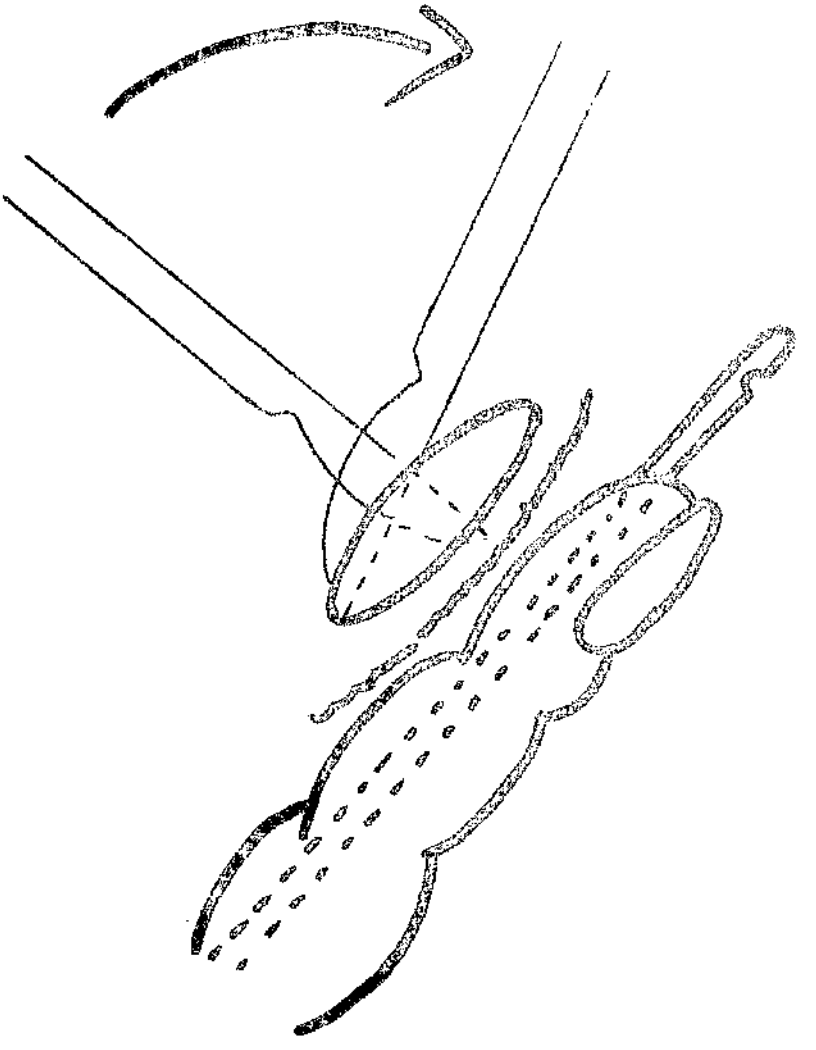


Fig. 1/8

The Scalpel is Re-introduced with the Cutting Edge Upwards

The Left Index Finger Remains in the Vagina

Plate 7/8

The Knife is Rotated Downwards to Divide the Upper Fibres of the Joint

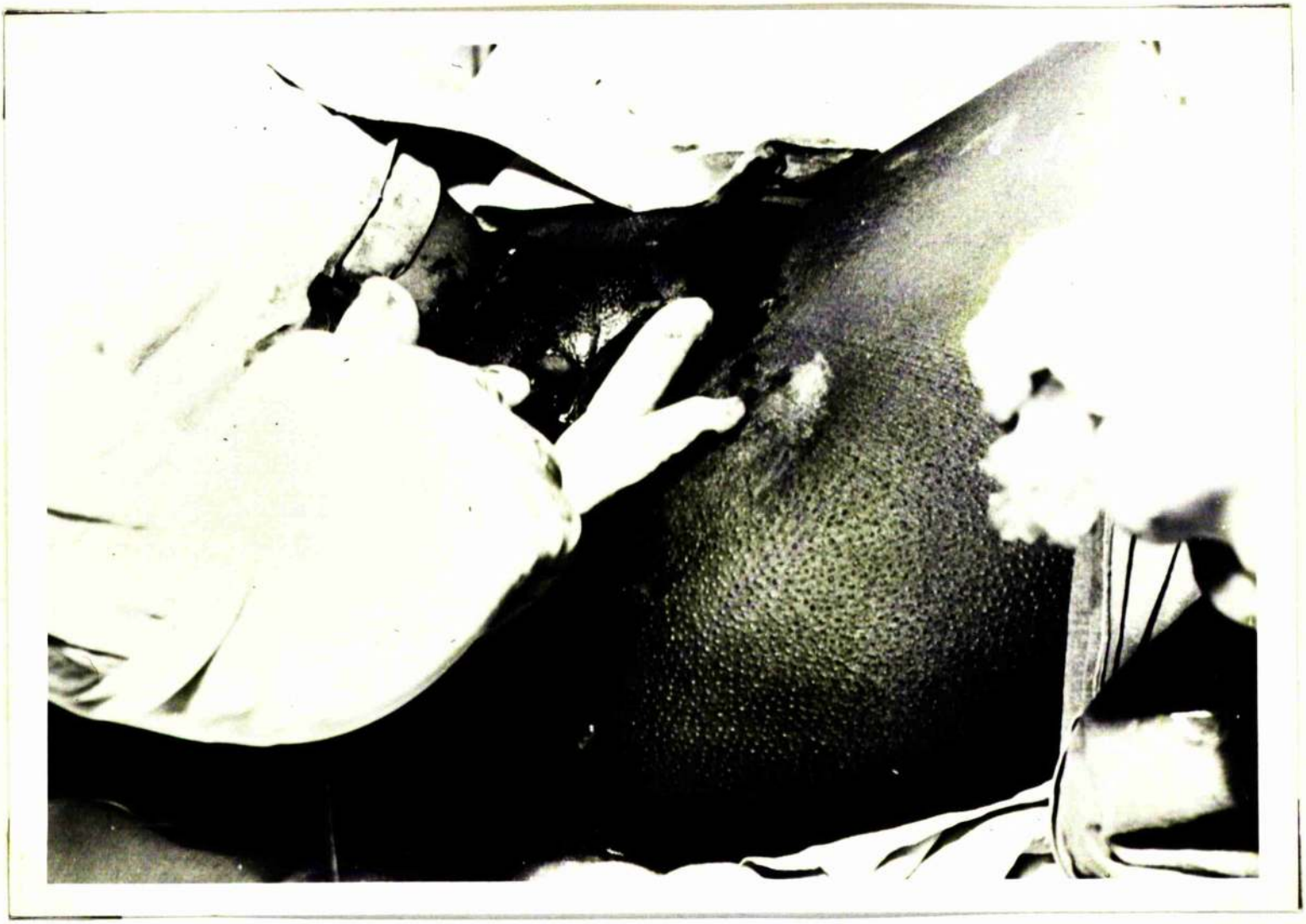


Plate 8/8

Diagram to Illustrate Division of the Upper Half of the Symphysis Pubis

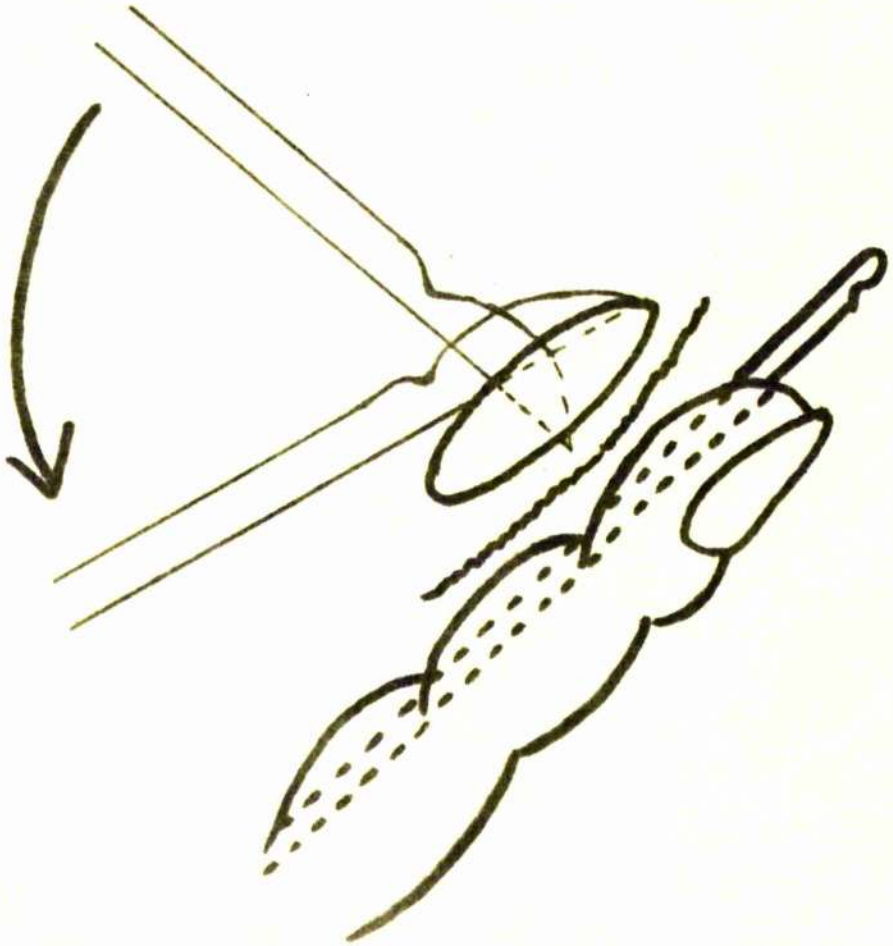


Fig. 2/8

At this point the pubic bones will begin to separate. Usually some fibres remain undivided but these are easily recognised, under tension, by the finger in the vagina which will guide the point of the knife towards them. It is never certain how much of the superior transverse ligament above or the arcuate ligament below are divided by this method but division of all fibres under tension is continued until the vaginal finger can be brought forward to enter the joint space. Such separation of the joint space is sufficient for most cases.

Before delivery of the baby a wide episiotomy is undertaken (Plate 9/8) and the vacuum extractor is applied unless the fetal head descends rapidly. Delivery is always carefully controlled and the baby is brought out as near to the rectum as possible to avoid injury to the unprotected bladder neck and urethra. (Plates 10/8, 11/8, 12/8 and 13/8).

Until the baby is born bleeding from the stab incision may be troublesome. To avoid this, pressure with a cotton swab over the incision is usually sufficient (Plates 9/8, 10/8 and 11/8).

Intravenous ergometrine (0.5 milligrammes) is given routinely with the crowning of the head and the placenta is expressed.

The episiotomy is then repaired and one catgut suture is inserted to close the stab incision over the symphysis. The two assistants then bring the patient's legs together and they are lowered slowly.

It has been the practice to inject 1 million units of soluble penicillin together with 0.5 grammes of streptomycin into the joint space in an attempt to avoid infection.

An Episiotomy Must be Performed.

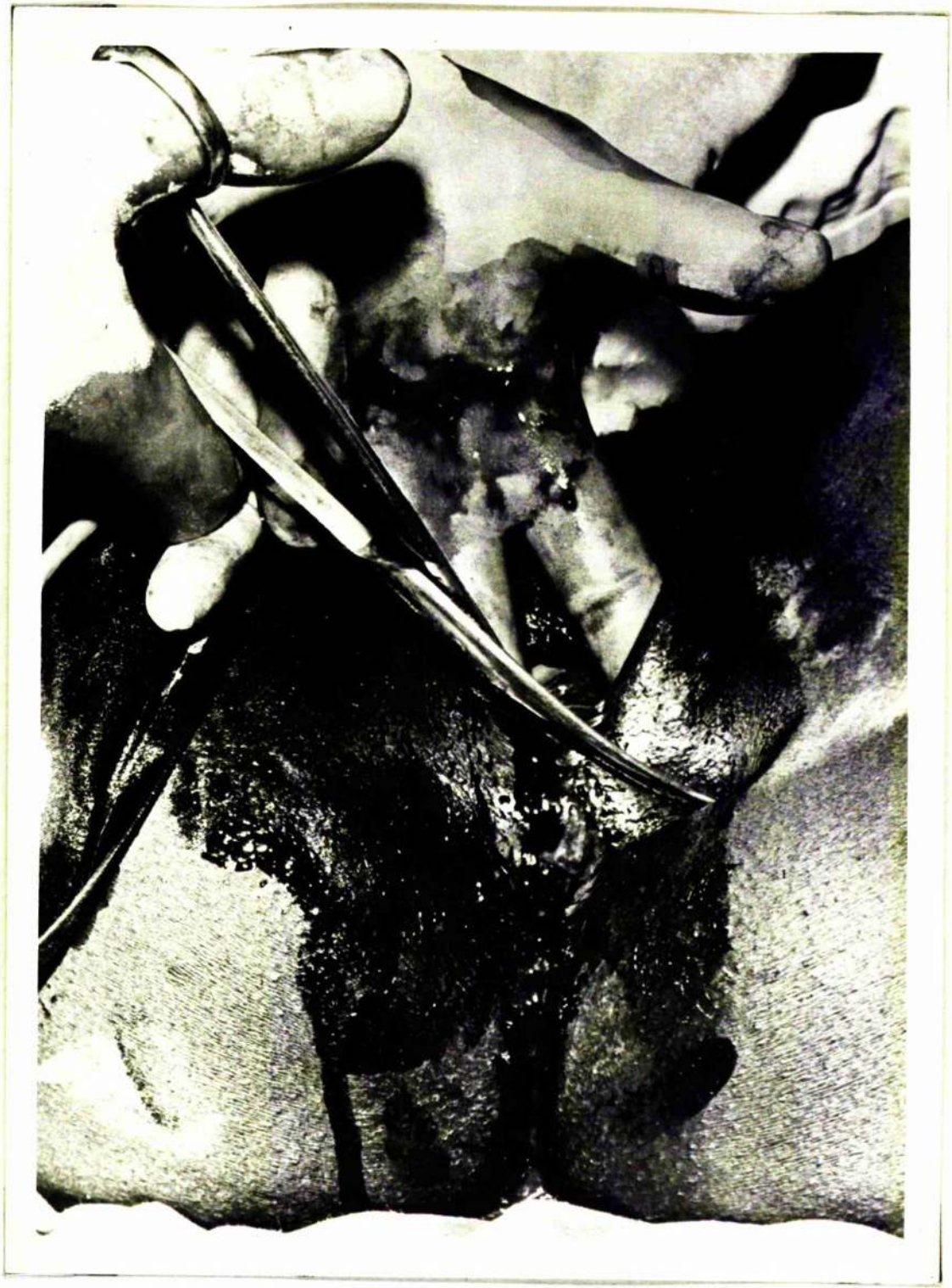


Plate 9/8

The Suction Cup is Introduced

Note that Light Pressure over the Incision Controls Bleeding

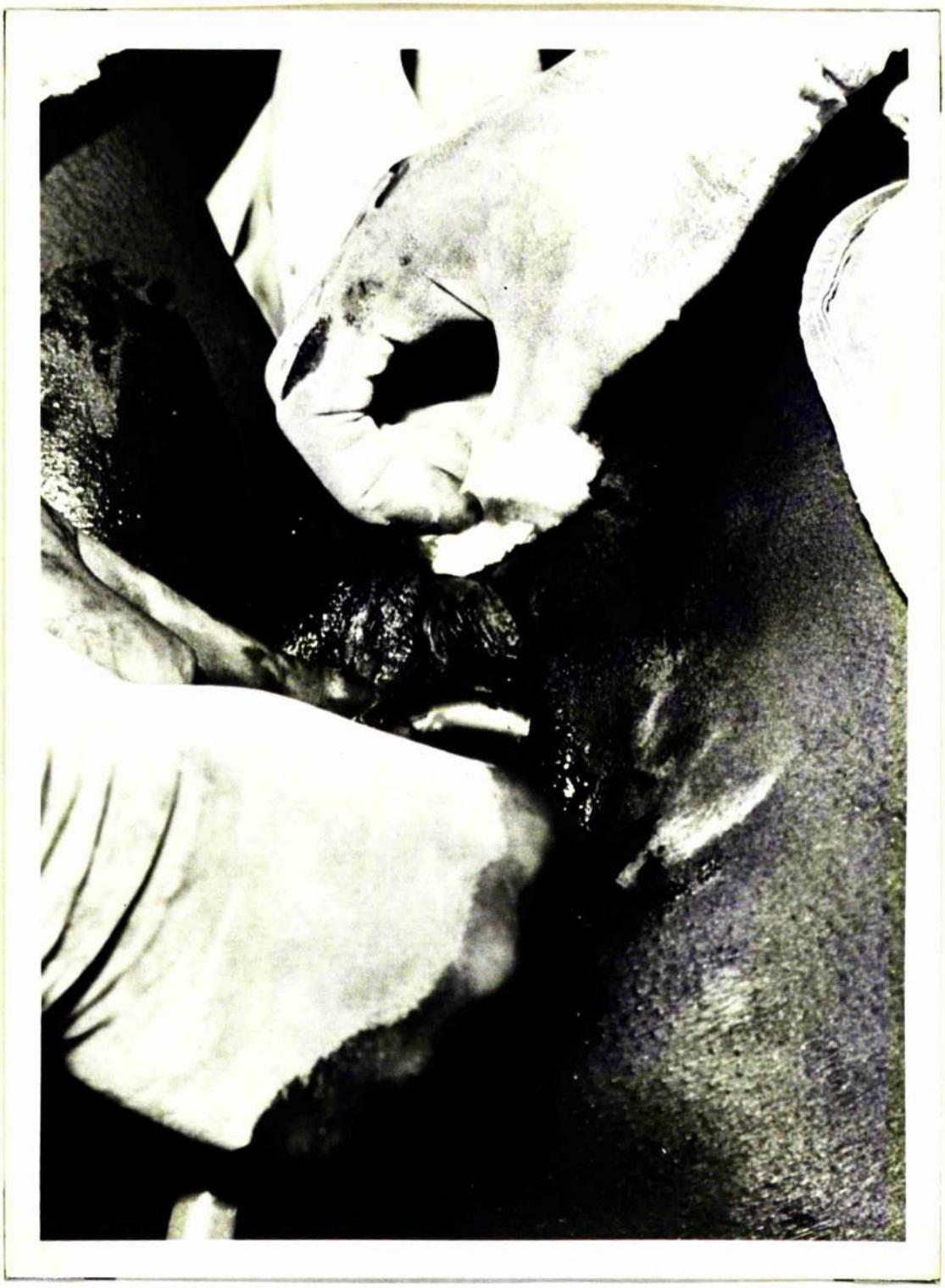


Plate 10/8

Plate 11/8

Plate 12/8

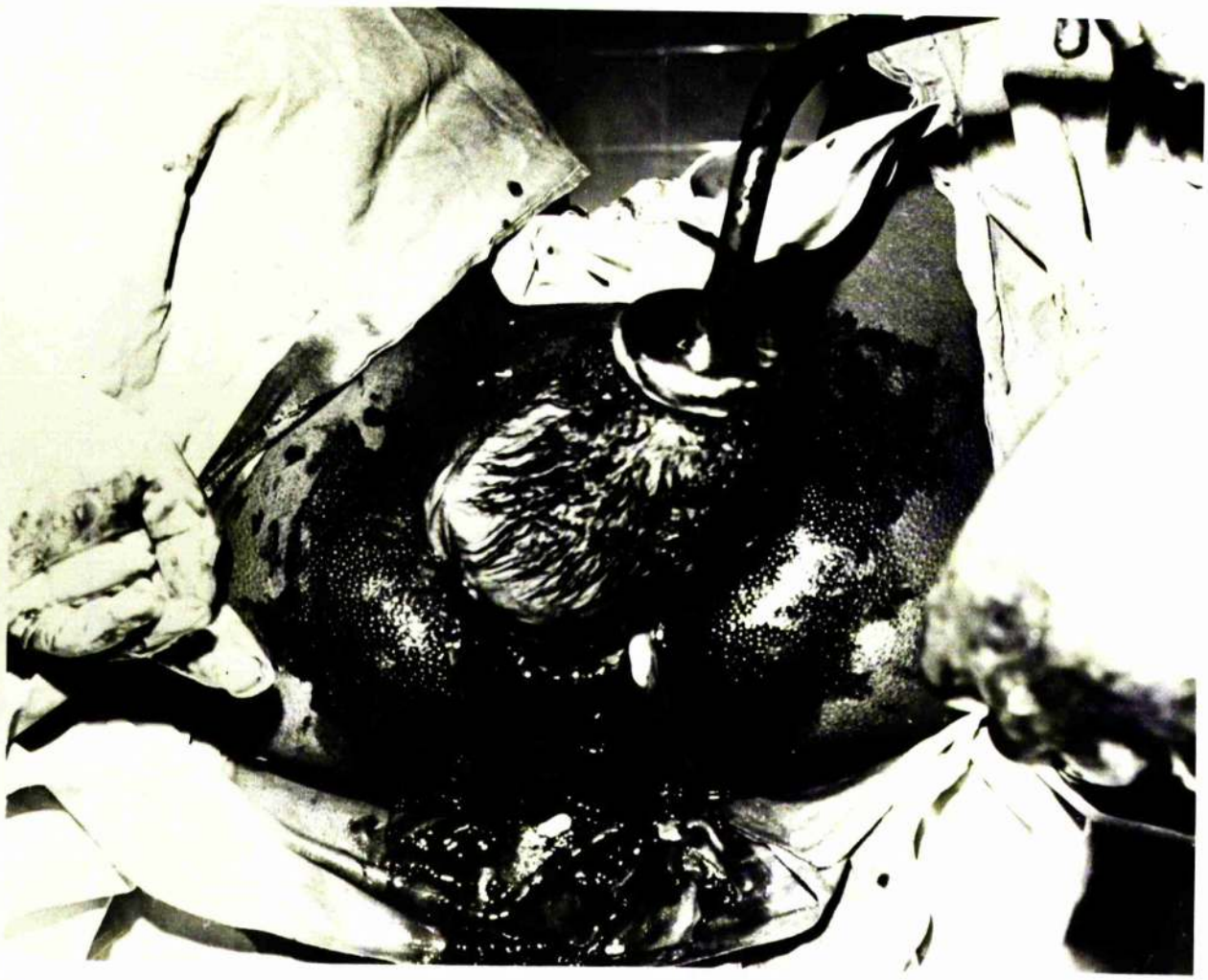


Plate 13/8

A thin cotton bandage is wound around the patient's thighs at the level of the greater trochanters and elastic strapping applied on top of this. To prevent excessive movement and consequent delay in fibrous union of the joint, the patient's legs are tied together at the ankles (Plate 14/8). After one hour the patient is taken to the ward. The catheter is allowed to drain freely. (Plate 15/8).

Strapping is Applied to the Thighs and the Ankles are Tied Together

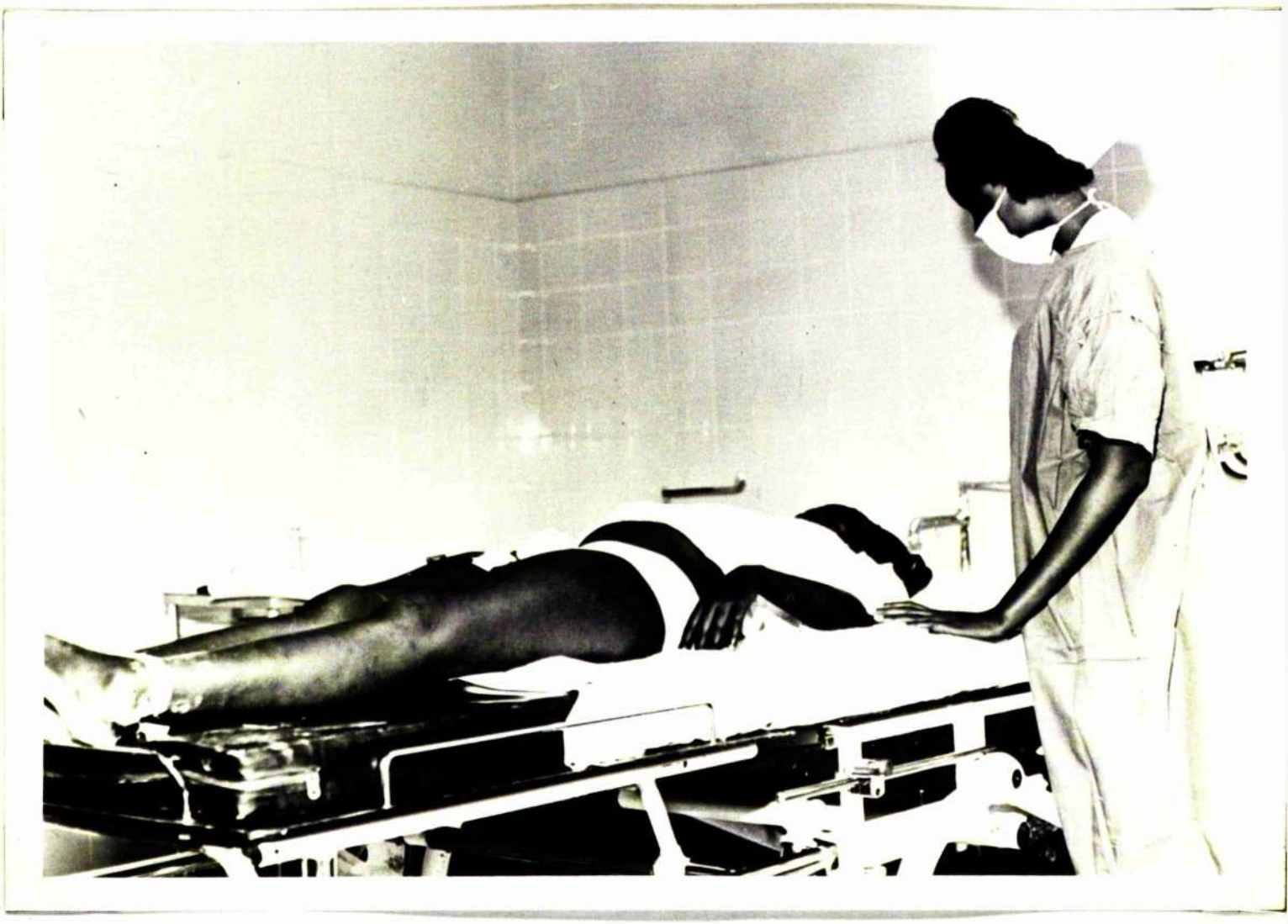


Plate 14/8

Continuous Drainage in the Ward

Plate 15/8

Often the baby's head shows appreciable moulding and a large caput succadaneum as well as an artificial 'chignon' created by the vacuum extractor (Plate 16/8).....

Plate 16/8

..... but usually its birth condition is good (Plate 17/8)

Plate 17/8

Continuous catheter drainage is undertaken for 3 days after the operation unless there has been haematuria when a longer period is necessary.

Most patients are allowed up on the 4th post operative day to sit by the bedside and on the 5th day they are encouraged to walk. At first a wheeled walking chair may be used (Plate 18/8) until the patient gains confidence when it may be discarded. Short, shuffling steps are encouraged or the patient is taught to walk with a broad base. The help of a physiotherapist is appreciated.

Prophylactic antibiotic therapy is given for 5 days. Penicillin and streptomycin or tetracycline have been found useful.

The strapping is removed either just before discharge on the 10th to 14th day, when it is no longer effective or when the patient complains of its presence. It should not be removed before the 7th day.

When the patient is able to ascend a flight of stairs, stand on either leg and kneel or squat unaided, she is allowed home. (Plates 19/8, 20/8, 21/8, 22/8 and 23/8).

Plate 18/8

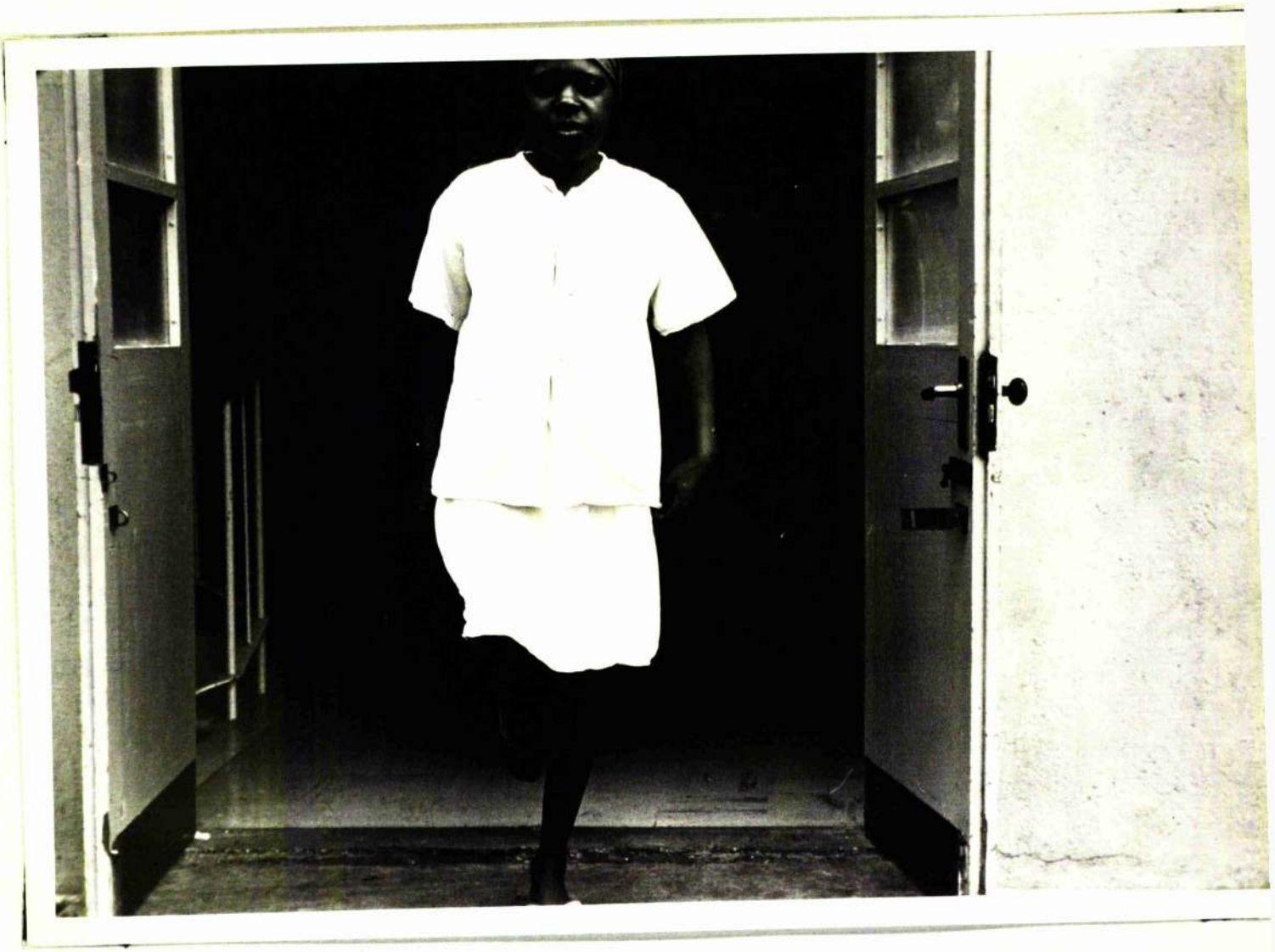


Plate 19/8

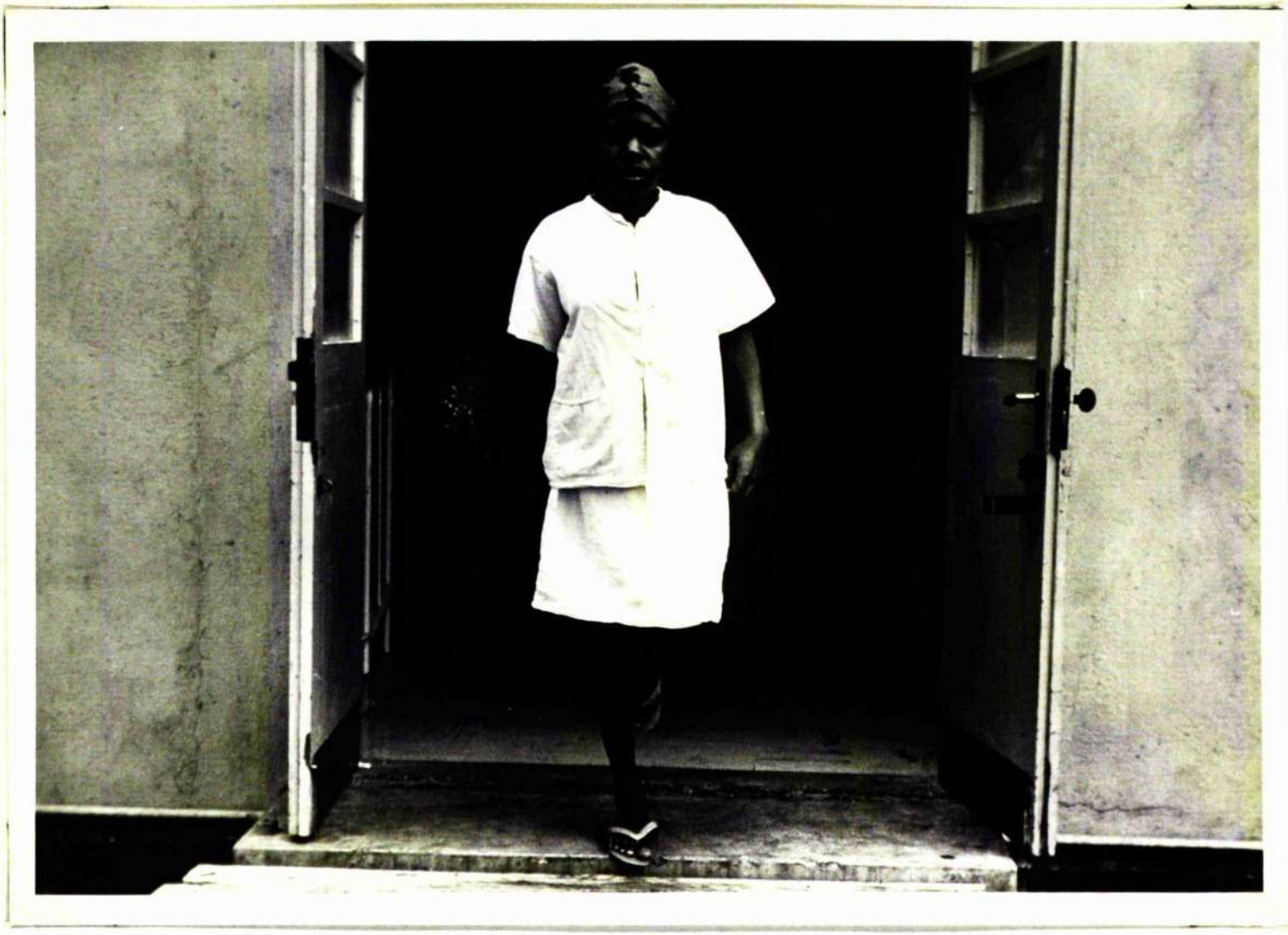


Plate 20/8

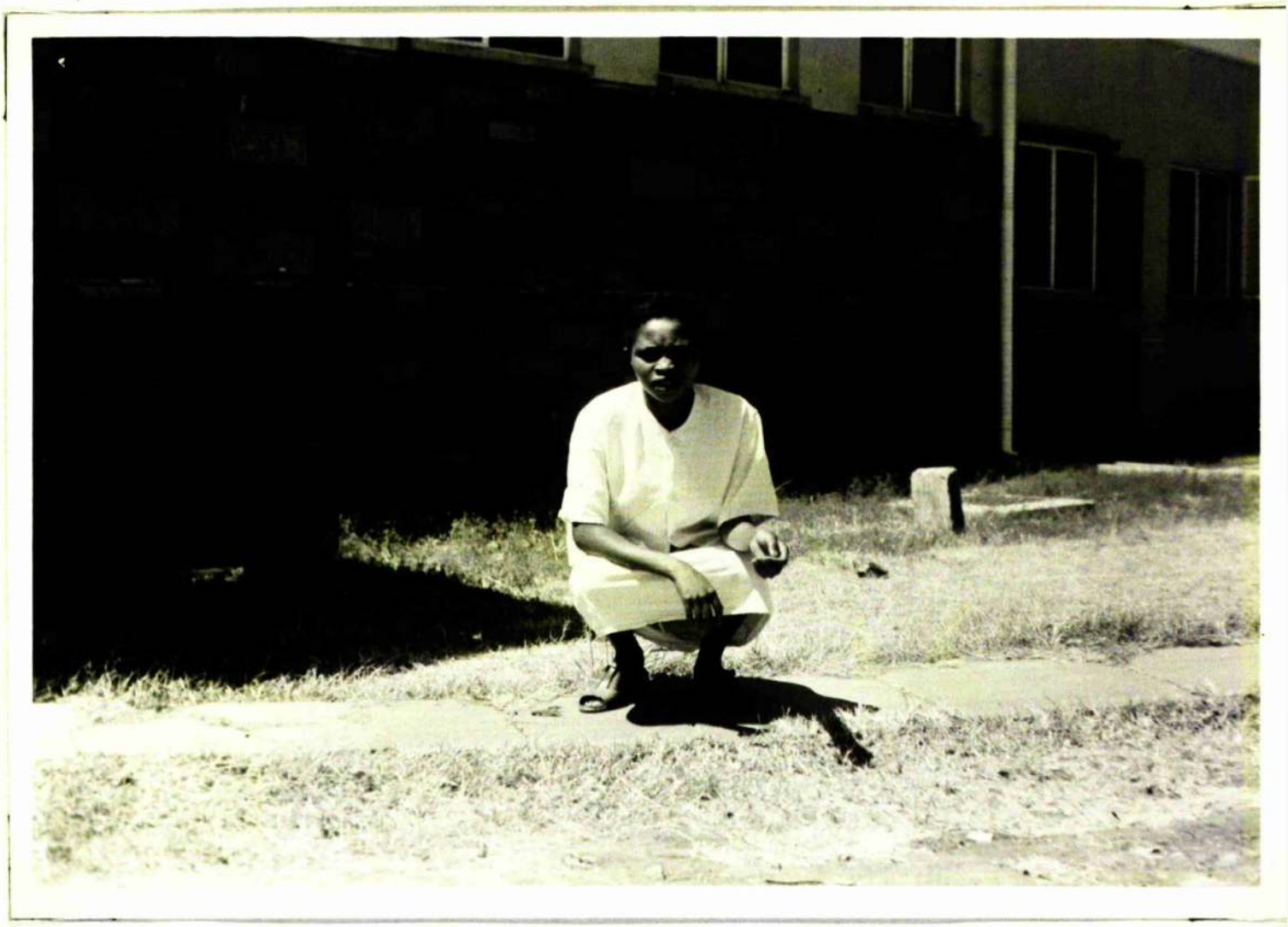


Plate 21/8

Plate 22/8

Plate 23/8

Some of the points outlined require elaboration.

The patient's legs are held and maintained at an angle of abduction of no greater than 90 degrees in order to avoid overstraining the sacro-iliac joints, the stability of which is essential for a secure pelvis in the future. For the same reason the pubic bones are prevented from separating more than one fingerbreadth (2 to 3 centimetres).

Catheterisation and the introduction of a finger between the fetal head and the pubic symphysis are necessary to avoid injury to the bladder neck and the urethra when the pubic symphysis is divided. Sometimes, when the fetal head is impacted in the pelvis, it may not be possible to introduce either the catheter or the finger unless the fetal head is disimpacted and displaced upwards.

No matter how lax the perineum may seem, an episiotomy is always necessary to avoid injury to the unprotected anterior vaginal wall when the head is delivered.

Continuous catheterisation for three days after delivery is also not strictly necessary. When there is haematuria more prolonged catheterisation is desirable and in order that no case of haematuria is overlooked in a busy maternity unit it has become policy to insist on such routine. Also if this practice is not undertaken, frequent bedpans are essential for those patients confined to bed. With a shortage of nursing staff this is not easy.

To permit patients to get out of bed on the 4th post operative day is earlier than most authors recommend. Experience has taught that if such early rising is not permitted the patients get up by themselves, unnoticed by the nursing staff. If this is

too early the patients may fall whilst taking their first few unaided steps and dislocate an only partially healed pubic symphysis. Such injury may result in much greater symphyseal separation than at the time of initial symphysiotomy and delay full ambulation by several days.

In smaller maternity units where there is more staff and individual attention is possible, many of these points may be relaxed. Many patients feel able to get out of bed on the day following delivery and provided that the nursing staff are readily available to help them, walking may be rapidly established.

CHAPTER 9

THE MECHANISM OF SYMPHYSIOTOMY

"The aversion of obstetricians toward symphysiotomy can find no justification; it is a rational, perfect and conclusive operation; rational in that it imitates nature. The infiltration of the symphysis during pregnancy tends to permit distention of the ligaments, increasing all the diameters of the inlet during delivery.

Symphysiotomy has the same effect, although of course in larger measure, permitting the object of delivery to pass freely and naturally. It is so rational that, with only a relative resting period in bed and without any accessory measures, nature can proceed to the 'reconstitutio ad integro' of the region".

J. DIRCEU DE ANDRADE

(1959)

THE MECHANISM OF SYMPHYSIOTOMY

"The pubic bones meet each other in the median plane, where they form a secondary cartilagenous joint which receives the special name of the pubic symphysis. The two bones are connected by a superior and an inferior pubic ligament, and by an inter-pubic disc of fibrocartilage".

This is Gray's Anatomy's description of the pubic symphysis. The two opposing surfaces of the pubic bones are covered by a thin layer of hyaline cartilage. Between them there is a band of fibrocartilage (the intrapubic disc) which often contains a cavity. This cavity does not contain fluid nor is it lined by synovial membrane. The stability of the pubic symphysis is dependent upon the superior and inferior ligaments, the intrapubic disc and the anterior capsule of the joint which is reinforced by the criss-crossing of the external obliqus aponeurosis and the medial tendons of the origins of the recti abdominis.

Although an intact symphysis pubis helps to maintain a stable pelvis, the major control of that stability is dependent upon the integrity of the sacro-iliac joints which also bear the maximum strain of weight bearing. If the ligaments surrounding the sacro-iliac joints, anteriorly the sacro-iliac ligaments, the sacro-spinous ligaments and the sacro-tuberous ligaments, posteriorly the long and short posterior sacro-iliac ligaments and internally the intraosseous sacro-iliac ligaments, retain their integrity, division of the pubic symphysis should have little effect on ambulation and weight bearing. Such difficulty as may be encountered is almost entirely due to pain within the joint and to a sense of loss of confidence by the patient.

After division of the joint, reunion will be by fibrous tissue, and if this is allowed to proceed unchecked by either infection or by movement there is no reason to believe that the final union will be any less stable than it was before.

During pregnancy the ligaments of the pelvis relax and there is a variable amount of play within the sacro-iliac and pubic joints. In the majority of women this is limited and is hardly perceptable. In the worst cases the separation is significant and quite marked subluxation may be encountered. This causes considerable pain, the pelvic osteoarthropathy described by James Young (1940) being the clinical manifestation. It is to be noted that in such extremes all three joints are effected and the considerable disability which may be present is not dependent upon the pubic symphysis alone. A similar type of pubic separation may occur spontaneously in labour. In such instances it is likely that there has been pre-existing weakness of the joints and considerable disability is the rule. The care, nursing attention and hospital time required to restore these latter patients to health is considerable and far greater than that required after surgical division of the symphysis pubis. Pubic separation of this type is uncontrolled, often un-noticed and labour may proceed for some considerable time thereafter.

It has already been shown how William Hunter (1778), when he so vociferously attacked symphysiotomy, took pelves from the cadavers of women dying after Caesarean section and demonstrated that sufficient pubic separation to permit free passage of the baby would cause serious damage to the maternal tissues around the vulver vestibule and tearing of the sacro-iliac joints and their ligaments. Apart from a single measurement (a diagonal conjugate of 3 inches (7.5 cm.)), no definite pelvic size was

given but it may be assumed that as no Caesarean section was ever undertaken in Britain in those days unless there was gross disproportion from a tiny pelvis, all of his pelves must have been extremely small. With enough force all pelves could theoretically be opened sufficiently to deliver all babies if the maternal tissues were ignored. Sigault probably did this in 1777 and it is likely that his successors did the same. Management of such gross disproportion by symphysiotomy resulted in such major maternal trauma that the operation had to be abandoned because of the professional and public outcry which followed.

Since the 19th century revival of the operation an attempt has been made to set the lower limit of pelvic size, below which symphysiotomy would be contraindicated. Morisani (1881) gave a lower limit of 7 cm. for the true conjugate, a figure agreed to by Farabeuf (1894). Pinard (1893) raised the lower limit to 7.5 cm., Zarate (1926) to 8 cm. and Spain (1949) to 9 cm. These figures are arbitrary and do not take into account the size of the baby which has its own part to play in the mechanism of cephalopelvic disproportion.

In 1893, Tellier undertook a symphysiotomy in Paris. The woman died of fulminating septicaemia and he obtained the pelvis at autopsy. The pelvic brim was measured and the symphysis pubis separated to distances of 6, 8 and 10 centimetres respectively to demonstrate the increases in pelvic measurements caused by such separations. His diagrams are reproduced in figures 1/9 and 2/9. The original true conjugate of the pelvic brim was 10 centimetres and the brim area was 98.6 square centimetres. A symphyseal separation of 6 centimetres increased the available true conjugate to 11.8 centimetres (18%) and the brim area to 135.9 square centimetres (37.8%). When the separation was 10 centimetres, the true conjugate diameter increased by 24% and the brim area by 62.4%.

Tellier's Symphysiotomy - 1893

Pelvic Brim

No Pubic Separation and Separation of 6 Centimetres

produite au niveau des diamètres transverses, comme l'enseigne M. Bochier. Nous y reviendrons.

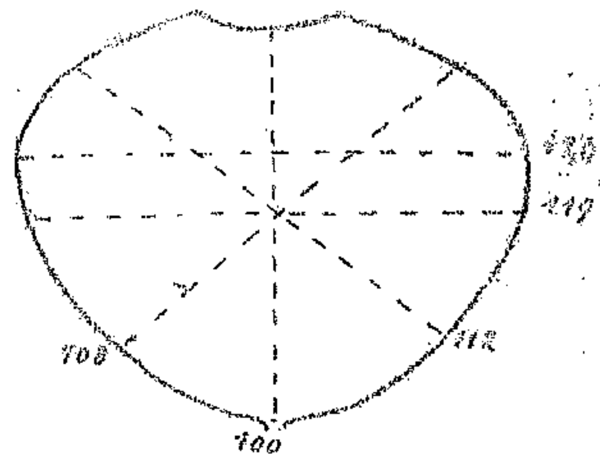


Fig. 2. — Bassin avant l'écartement de la symphyse pubienne.

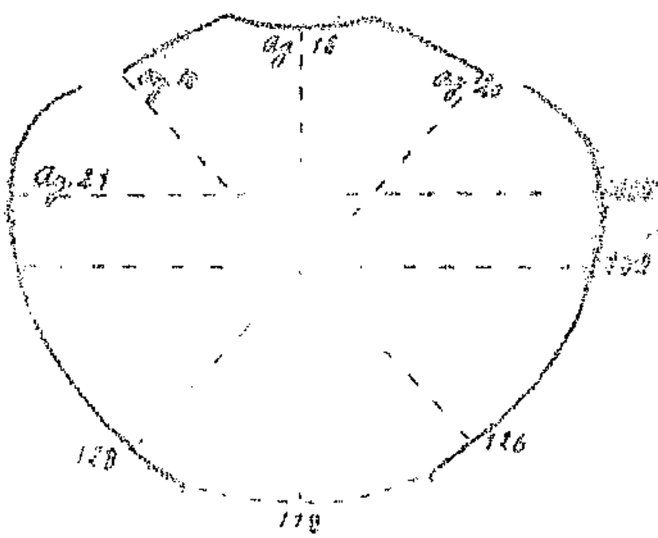


Fig. 3. — Écartement de 6 centimètres.

Fig. 1/9

Tellier's Symphysiotomy - 1893

Pelvic Brim

Pubic Separation of 8 and 10 Centimetres.

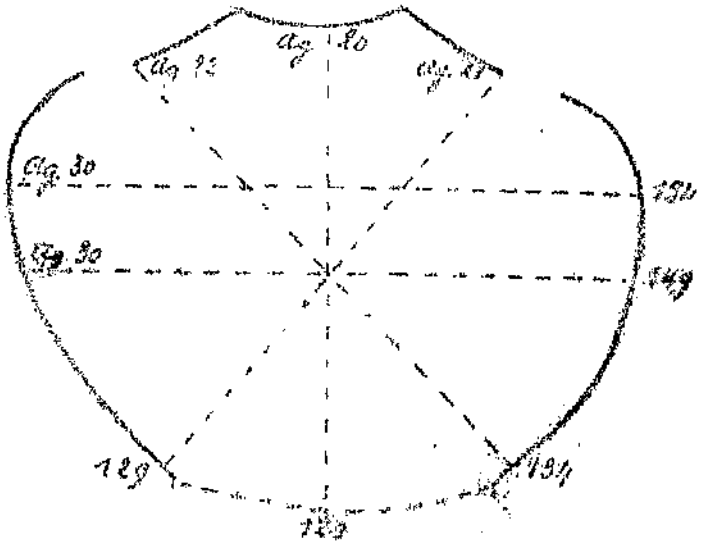


FIG. 4. — Écartement de 8 centimètres.

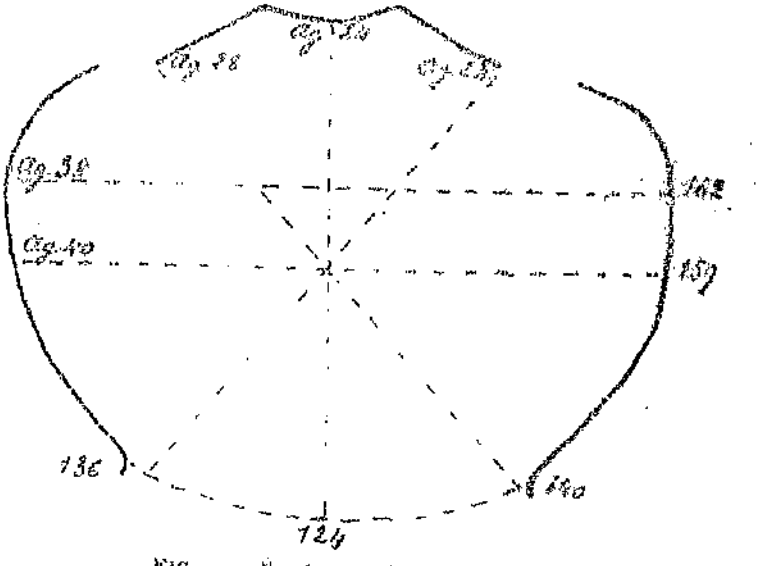


FIG. — Écartement de 10 centimètres

Fig. 2/9

Such separation is greater than would ever be attempted in practice today but it illustrates what may be achieved in pelvic brim enlargement by symphysiotomy. Pinard (1893), using a more theoretical approach (Fig. 3/9) indicated diagrammatically what would happen to circles of various diameters if opened at one point on their circumference to various distances.

A most complete and thorough investigation into the mechanism of symphysiotomy was undertaken in Edinburgh by the anatomist Sandstein in 1902. He collected 16 female pelves and divided the symphysis pubis in each to varying distances of symphyseal separation. Three distinct movements and rotations took place (Fig. 4/9).

1. Movement of the pubes outward by rotation of the innominate bones on a vertical axis passing through their respective sacro-iliac joints.
2. Rotation of the innominate bones on a horizontal axis passing through the sacrum and carrying the pubis downwards
3. Rotation of each innominate bone on its own long axis (an axis lying in a direction from the posterior superior iliac spine to the ileo-pectineal eminence) so as to cause the ileum to become more erect (or vertical). That is to say as the pubes pass downwards, the tubera ischii relative to the rest of the bone, are carried further apart while the iliac crests, relative to the rest of the bone approximate to one another. The innominate bone, as it were, revolves on its own axis, the upper part moving inwards towards the middle line, the lower part moving outwards.

The first movement is of little significance. It serves merely to point out that the shape of the pelvic brim is elliptical, and

Diagramatic Representation of Symphyseal Separation

Pinard (1893)

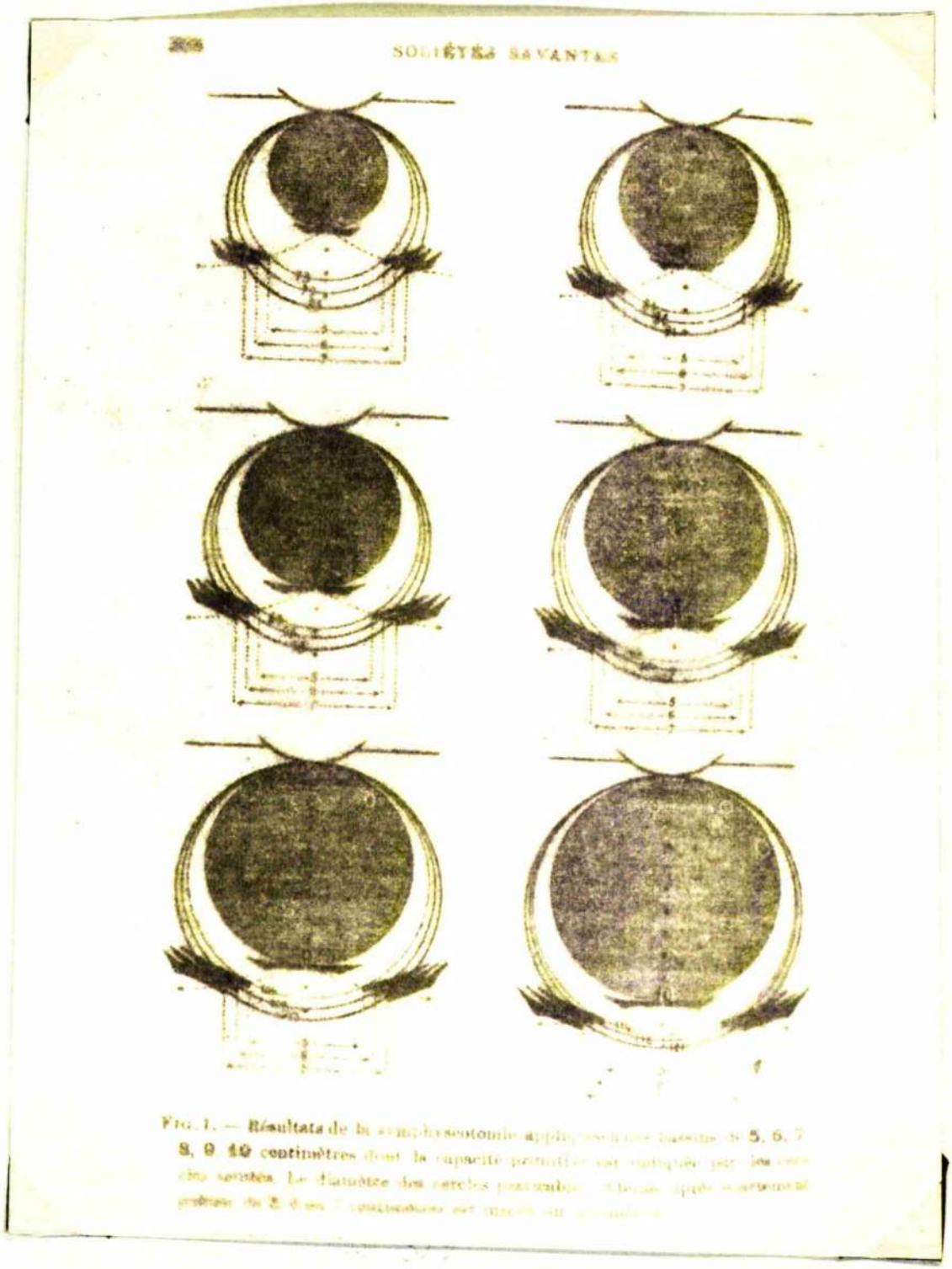


Fig. 3/9

The Three Pelvic Rotations after Symphysiotomy

Sandstein (1902)

becomes elevated above that of the os innominatum.

In cases where I excised the sacro-iliac joint *in toto*, after a pubic separation of 6 to 8 centimetres, I found that while outward separation of the surfaces had been limited, and was still very difficult, the

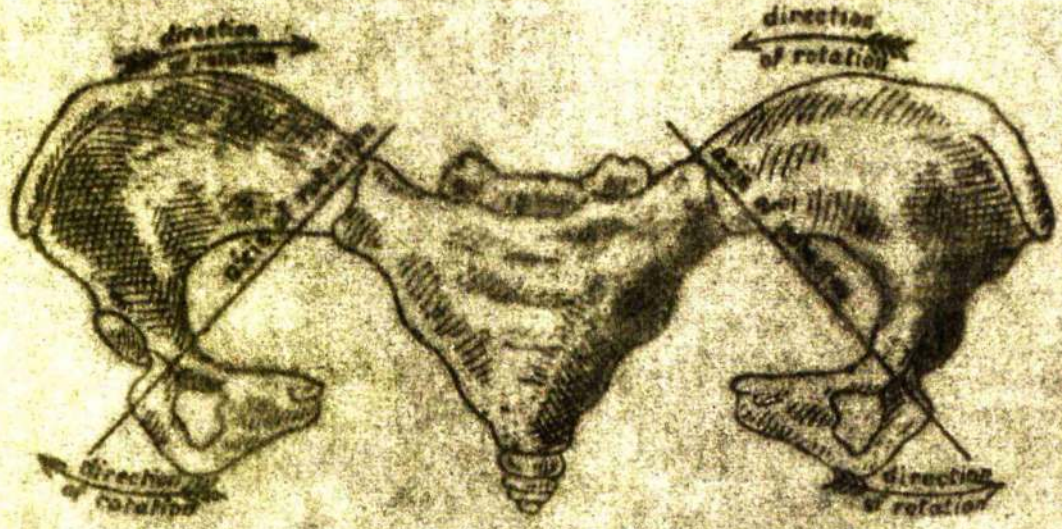


FIG. 1.

iliac part could be easily rotated on the sacral, giving the posterior ligament a slightly spiral twist downwards.

3. Besides these two movements of rotation of the os innominatum on vertical and transverse axes respectively, passing through the sacro-iliac joint, so as to carry the pubes both downwards as well as outwards, a third and hitherto undescribed movement occurs. This

Fig. 4/9

that the pubis, rotating transversely outwards on the sacro-iliac joints as centres for their movement, sweep on the circumference of a circle, on or near whose most anterior point (with relation to the sacral promontory) they are already situated. Consequently the outward rotation can only increase the sacropubic diameter to a limited amount; for although each pubis is carried farther from the sacral promontory than it was before, by every access of pubic separation, yet it is not so with the line joining the two pubes, which indeed in some shapes of pelves may even be carried nearer the sacral promontory.

Sandstein's reasoning is difficult to follow unless each step in the dissertation is taken one by one. However if the rachitic flat pelvis is visualised (where the sacrum has been forced forwards during development) the sacro-iliac joints will have moved closer together behind the sacral promontory and the nearer they approximate to the midline the less anterior displacement there will be when the pubic symphysis is divided. It is difficult to visualise any pelvis in which, when the symphysis is divided the line joining the ends of the pubis, would initially come closer to the sacral promontory. In all pelves however this is what happens eventually. For a given brim area this will happen at an earlier stage in a flat pelvis than in a round one. (Fig. 5/9). Practically this is of importance in that it demonstrates that the more circular the pelvic brim the more effective will be the symphysiotomy and the less likely will there be soft tissue damage. This might explain the relative ineffectiveness of symphysiotomy in Europe at the time when pelvic contraction was due to rickets.

Ninety-two patients in the present series had radiological pelvimetries undertaken before discharge from hospital. Figure 6/9 gives the percentage true conjugate distribution. It will be noted

Diagram to Illustrate the Arc of Pubic Separation in a Round and Flat Pelvis of Similar Brim Areas.

The flatter the pelvis, the sooner the line joining the ends of the symphyses pubes begins to approach the sacral promontary

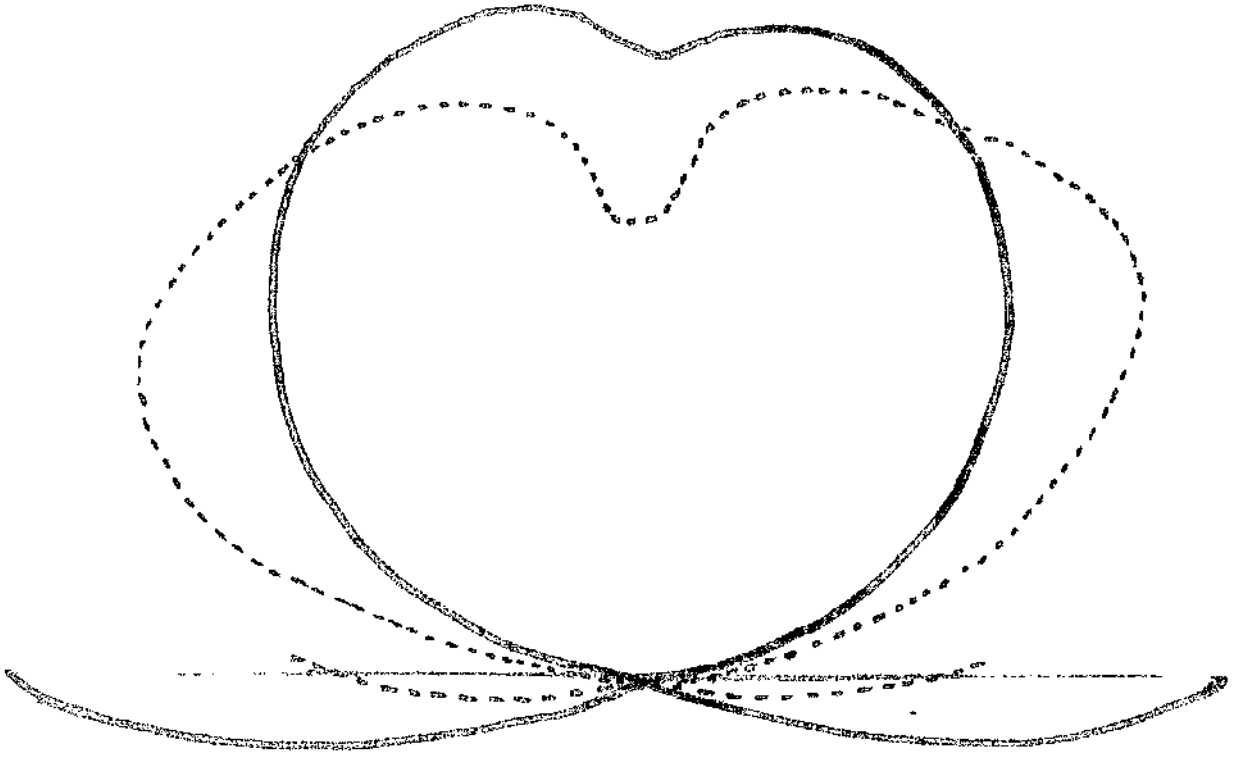


Fig 5/9

Percentage True Conjugate Distribution

Ninety-two Pelves after Symphysiotomy

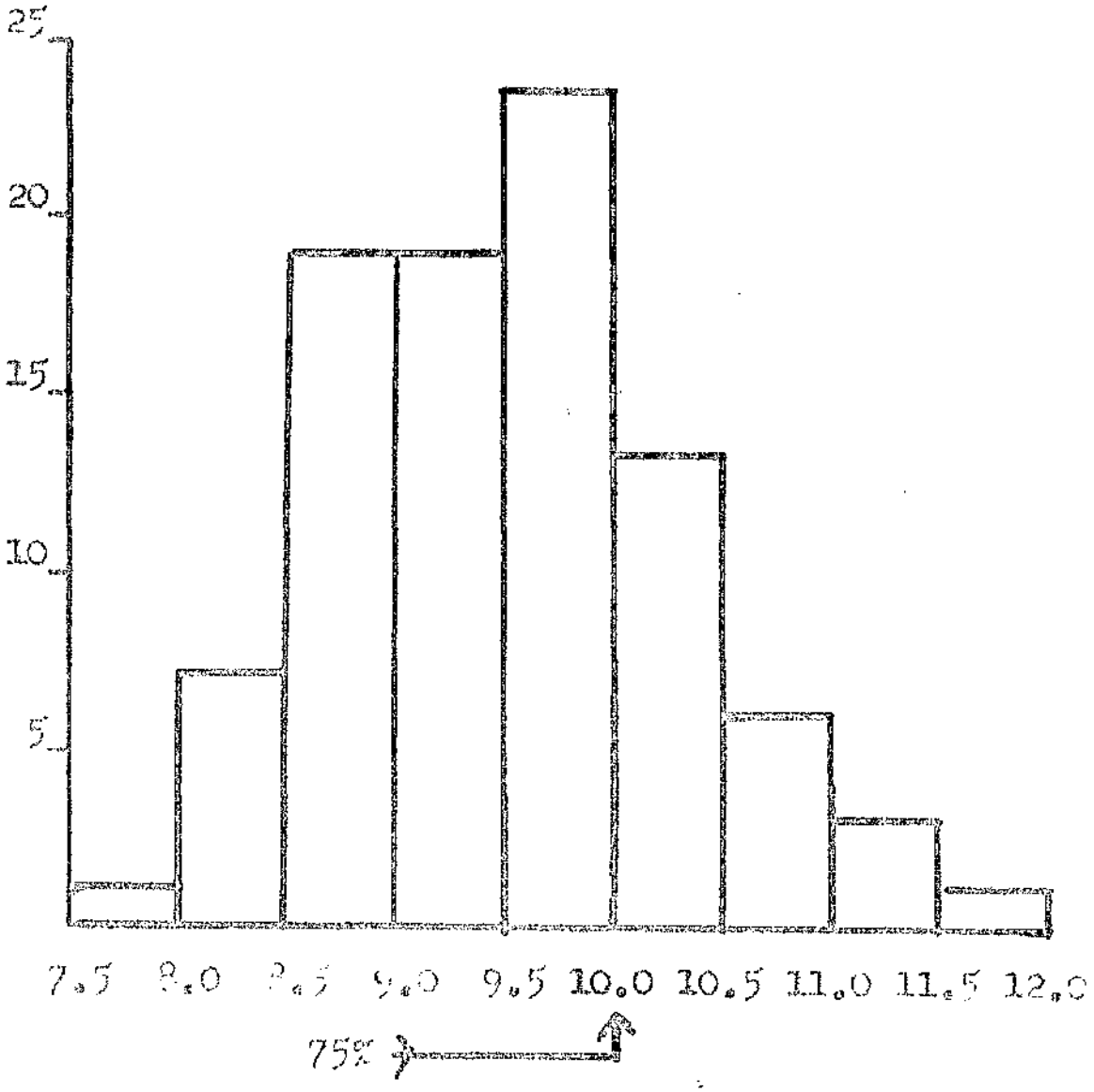


Fig 6/9

that most of the pelves were small, 69 of them (75%) having a true conjugate of less than 10 centimetres. The average true conjugate was 9.2 centimetres, with a range of 7.2 centimetres to 11.7 centimetres. When it is remembered that the pelvimetries were undertaken after symphysiotomy and that some increase of all measurements is to be expected, it will be appreciated that the operation was undertaken in the presence of fairly severe pelvic contraction. The wide range of true conjugate readings however, also demonstrates that the place for the operation is in clinically detectable cephalopelvic disproportion rather than on rigid measurements of the pelvis.

In two instances both pre-delivery and post delivery pelvimetries were undertaken. Plates 1/9, 2/9, 3/9 and 4/9 illustrate the before and after appearances of one case. The case history is as follows.

Mrs. N, a 16 year old Muganda primigravida attended the antenatal clinic regularly. Her height was 4 feet 10 inches (147 cm.). At 36 weeks gestation antenatal pelvimetry was carried out with the following measurements:-

Anteroposterior

True Conjugate	-	9.2 cm.	(Plate I/9)
A.P. midplane	-	9.8 cm.	
A.P. outlet	-	10.2 cm.	

Transverse

Maximum transverse diameter of pelvic brim - 11.0 cm. (Plate 3/9

Brim Area

80.2 sq. cm.

Brim Index

83.6%

The pregnancy continued normally until the patient was admitted at 39 weeks gestation in early labour. Trial of labour was carried out and after 23 hours the cervix became fully dilated. The

Erect Lateral Pelvimetry before Symphysiotomy

Plate 1/9

Erect Lateral Pelvimetry after Symphysiotomy

Plate 2/9

Antero-posterior Pelvimetry before Symphysiotom

Plate 3/9

Antero-posterior Pelvimetry after Symphysiotomy

Plate 4/9

fetal head was in the LOT position and the biparietal diameter had just passed through the pelvic brim. The fetal head showed considerable moulding and there was a large caput succedaneum present. A tentative effort to deliver with the vacuum extractor failed after 10 minutes traction. Accordingly, the pubic symphysis was divided under local anaesthesia and delivery was completed rapidly after reapplication of the suction cup. The baby weighed 7 lb. 3 oz.

Puerperal progress was satisfactory and a post natal radiological pelvimetry was undertaken on the tenth day just prior to discharge. The following measurements were recorded.

Symphyseal separation — 2 centimetres

Anteroposterior

True conjugate	9.5 cm.	(Plate 2/9)
A.P. midplane	10.0 cm.	
A.P. outlet	10.2 cm.	

Transverse

Maximum transverse of pelvic brim - 11.8 cm. (Plate 4/9)

Brim Area	89.1 sq. cm.
Brim Index	80.5%

An increase of 0.3 cm. (3.2%) in the true conjugate and an increase of 0.8 cm. (7.2%) in the maximum transverse diameter of the pelvic seem slight although the 8.9 sq. cm. (10.8%) increase in the brim area is much more substantial.

In the other case the increase in measured diameters was much less (True conjugate 0.2 cm. (2.0%), maximum transverse diameter 0.7 cm. (6.0%) and brim area 7.9 sq. cm. (8.1%).

There is probably a natural resilience in the pelvis to return to some extent to its original shape and form after the baby has been delivered. The increases found in the above cases therefore might not represent the increase at the time of operation. There is also an extra millimetre or two increase in the anteroposterior pelvic diameters when the head projects slightly between the two bones. This cannot be measured.

It is not possible, nor is it desirable to convert by symphysiotomy a tiny pelvis into one which will accommodate all sizes of fetal skulls in a future pregnancy, the aim should be to divide the symphysis to an extent sufficient to relieve the moderate disproportion which is present at the time and to leave behind a stable pelvis whose diameters are increased permanently to permit spontaneous delivery of a baby of equal size or slightly larger.

Perez (1938), Peiretti (1941) and Abad and Peiretti (1943) attempted to assess by radiological means the amount of permanent symphyseal separation which occurred after symphysiotomy. The X-Rays were undertaken some months after the operation. In every case it was possible to demonstrate that there was permanent separation. Over half of the cases showed a separation of over 2 centimetres. The remainder of the pelvis showed no disturbance in structure and in particular the sacro-iliac joints remained normal. There was no residual disability in any of the patients.

To relieve disproportion it is necessary to ensure that the symphysis is in fact divided. Plate 5/9 is a photograph of an X-Ray taken several days after delivery. The patient required forceps application and delivery following failure to deliver with the vacuum extractor shortly after the symphysis was presumed to be divided. No pubic separation is noted.

Division of the fibrocartilage is usually simple and there is little resistance to the knife. Sometimes, in older patients, there is calcification of the joint space and division is not easy. More often however, when difficulty is encountered it is due to failure to locate the joint space and therefore a pubiotomy is undertaken. This is clearly illustrated in Plates 6/9 and 7/9. In both instances the operation was described as 'difficult'. In the second

Pelvis after Attempted Symphysiotomy - No Symphyseal Separation
Followed by Difficult Vaginal Delivery

Plate 5/9

Pelvis after Symphysiotomy - Partial Division Through Right Pubic Bone

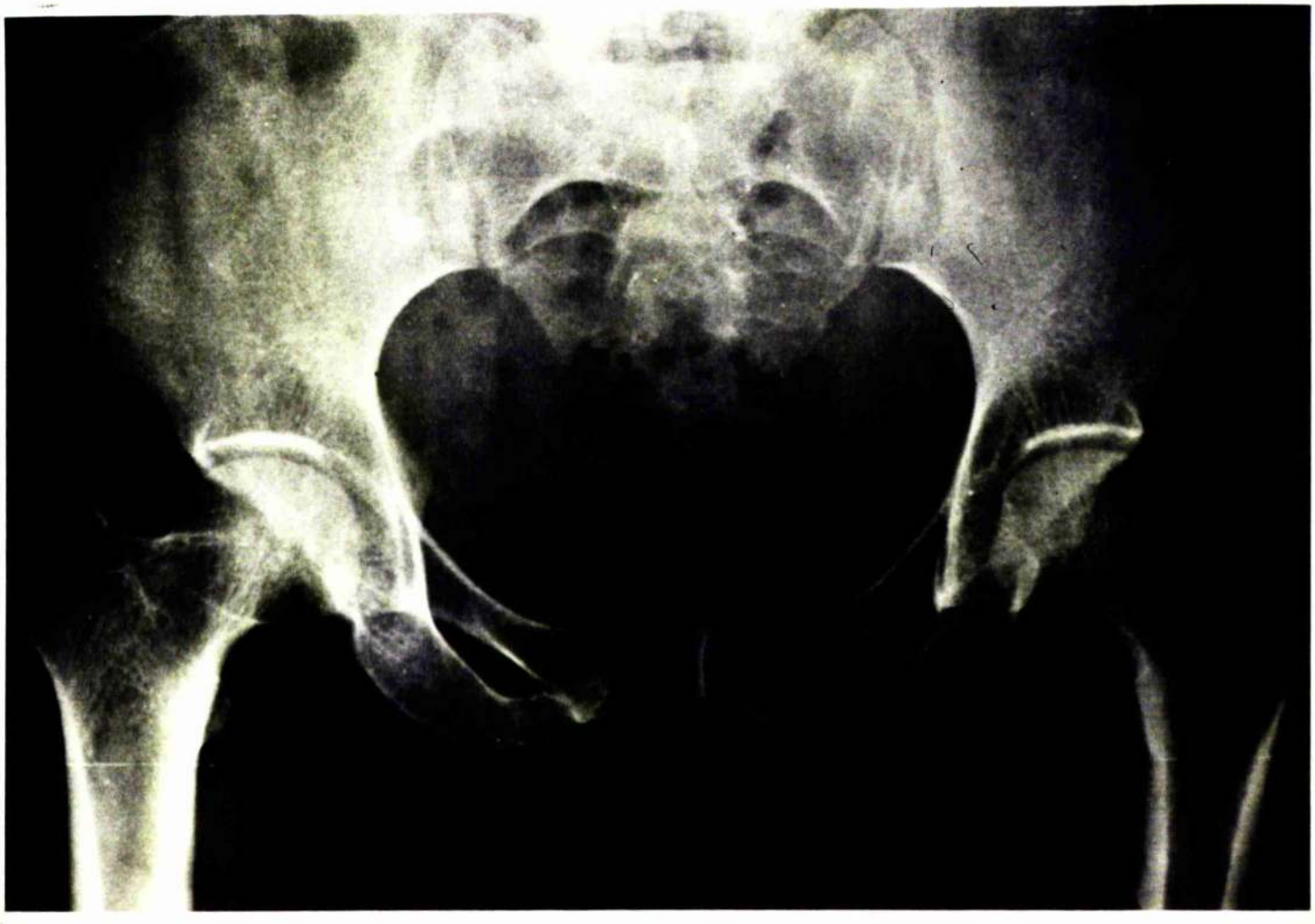


Plate 6/9

Pelvis after Partial Pubiotomy - Showing Bone Sequestration

Plate 7/9

case a bony sequestrum was expelled through the original incision on the 14th day. Neither patient showed any disability. There are no arterioles which cross the joint in the midline. Therefore such sequestration is inevitable when the division is not undertaken in the proper joint space. If resistance is encountered it is probable that the joint has not been properly localised. To avoid this Crichton and Seedat (1963) suggest that a needle be used to localise the joint before carrying out the operation. In practice this has not been found to be valuable.

C O N C L U S I O N

Nec jam Caesareum vulnus Lucinia requiret:
Symphyseos pubis dissectio rite peracta,
Damnatas telo partus simul atque parentes,
Protinus et certo, Dulcea servabit ad auras.
At mitemne adeo pubes divisa medelam
Matribus ac pueris ferat, ars ut mitius ullum,
Auxilium nequeat, vel convientius ullum,
Quod possit repeti quoties natura jubebit?

Schola Salernitana
Arnold of Villanova
12th Century A.D.

No longer needs Lucinia the dread rite,
That for great Caesar oped the way to life:
The skilful severance of the pubic arch
Will save the mother and the child from doom.
Shall not this means then bring deliverance
To babes and mothers - such an aid as art
Can find none gentler or more suitable,
That can be used again and yet again
As oft as Nature makes it necessary?

Free translation
British Medical Journal (1905) 1.890.

CONCLUSION

In the final Chapter of this thesis a detailed and personal approach to the management of cephalopelvic disproportion as it exists in Africa will be given. This is the greatest problem in obstetrics in Africa and it accounts for much of the mortality and morbidity associated with childbirth. Experience has been gained in Nigeria, Uganda and in Kenya. Each country presents many of its own specific variations but the overall pattern of cephalopelvic disproportion is similar.

DURING THE ANTENATAL PERIOD

Measurement of maternal height is essential in every patient who attends for antenatal care. This should be displayed prominently on the antenatal record. Each tribal or ethnic group will have a critical height below which disproportion should always be suspected. There will be variations in that critical height from people to people but, with a little effort, it may be determined.

A detailed obstetric history should always be taken. Operative deliveries, perinatal deaths and prolonged labours are highly suspicious of disproportion in the past. Accurate records are not always easy to obtain unless the patient has been delivered previously in the same hospital or she has been given a summary of previous deliveries and has brought this with her, but with patience and care a reliable history is nearly always possible. Many patients will often neglect to volunteer information regarding stillbirths and neonatal deaths. However, when pressed by leading questions in a confidential atmosphere, this information is usually forthcoming.

A careful pelvic assessment should always be undertaken at the 36th week of pregnancy, no matter the previous obstetric history.

Such assessment is not easy and can only be undertaken with accuracy after long experience. The findings should be written in the antenatal records. The place of X-Ray pelvimetry is limited. Only a few hospitals in Africa are equipped with facilities for this procedure. When it is available it may be useful to undertake an unselected study of a series of patients to obtain information regarding the size, shape and peculiarities of the pelves which exist among the community. X-Ray pelvimetry has its greatest use in the individual case when, for example, there has been a previous peri-natal death, a Caesarean section or when the patient suffers from some maternal disease complicating pregnancy. In such circumstances trial of labour in the presence of a small pelvis is unwarranted.

Attempts to demonstrate cephalopelvic overlap and abdominal manipulations to guide the fetal head into the pelvic brim in the antenatal period have in practice proved unreliable and are best abandoned, although similar tests are often useful during labour. There is no natural inclination of the fetal head to engage during the antenatal period and efforts to encourage it to do so are fruitless.

It is possible during the antenatal period to separate all patients into three categories:-

1. Those in whom disproportion is likely;
2. Those in whom disproportion is uncertain;
3. Those in whom disproportion is unlikely.

Maternal height, pelvic size and the obstetric history are the main features which determine into which category an individual patient is placed. Experience has shown that in the majority of communities more patients belong to the second group than to the other

two. In view of this it would be preferable if all patients were delivered under good medical supervision. At present the number of hospital beds available for obstetrics is seriously limited in most areas of Africa and if gross overcrowding is to be avoided this is not possible. The small woman with the small pelvis has thus greatest priority along with the woman with the bad obstetric history and previous operative delivery. The remainder are best looked after at a maternity centre, provided that the maternity centre is in constant communication with its parent hospital, that rigid rules are set and that an ambulance is readily available if and when the progress of labour is unsatisfactory.

ELECTIVE CAESAREAN SECTION

The extensive practice of this form of delivery is to be discouraged, particularly in young primigravidae. Absolute disproportion is not often encountered unless the pelvis has been deformed by tuberculosis or poliomyelitis when the distortion and contraction are obvious. There are however absolute indications for elective Caesarean section in multiparae and on occasion medical complications rule out trial of labour.

1. The presence of two or more Caesarean section scars.

Risk of uterine rupture in these cases is so great that to attempt to test the strength of the multiple scar is foolhardy. In spite of this such patients are still permitted to labour. The results may be disastrous. It is admitted that there have been patients who have had successful vaginal delivery after more than one Caesarean section but such delivery is only permissable when the patient arrives in hospital in advanced labour, or when the baby is extremely small.

2. The presence of a vesicovaginal fistula whether that fistula has been repaired or not.

One of the disappointments of obstetrics and gynaecology in Africa is to witness the breakdown of a successfully repaired vesicovaginal fistula during labour. Similarly, unrepaired fistulae are never made easier to repair by further trauma.

3. Two or more perinatal deaths, provided that there are no other surviving children and providing that those perinatal deaths are known to have been caused by disproportion.

It is often difficult to determine why previous perinatal deaths have taken place. A carefully taken obstetric history will often help. If the patient has a small pelvis then it is likely that the deaths have been due to disproportion.

4. One previous Caesarean section when the true conjugate measures 9.5 centimetres or less.

If accurate measurement by radiological pelvimetry is not possible a clinical estimation of the diagonal conjugate to be 11.0 centimetres or less is the alternative.

5. One stillbirth or neonatal death in the past, provided there are no other surviving children and providing that the death has been shown to have been attributable to disproportion if similar pelvic measurements are present.

6. Disproportion along with other complications of pregnancy.

These rules for elective Caesarean section are attributable only when the pregnancy is reasonably mature. When the baby is thought to be small the case has to be judged on its own merits and it may be permissable to allow vaginal delivery. In many instances it is preferable to await the onset of labour before embarking on the elective Caesarean section as the estimated pregnancy maturity is often inaccurate. Antenatal hospital beds

are often at a premium and wherever possible a waiting area should be constructed adjacent to the hospital. Alternatively, the patient may have a relative or friend who lives close to the hospital with whom she may stay whilst awaiting the onset of labour. All patients should be instructed to come to hospital on the slightest suspicion of the onset of labour.

In all other cases a trial of labour should be undertaken whenever disproportion is suspected.

TRIAL OF LABOUR

In the past, obstetric teaching has emphasised that trial of labour should have no defined time limit. This is a mistaken policy in Africa and, in the presence of disproportion, very few labours should be permitted beyond 36 hours in primigravidae and 20 hours in multipara. If labour is allowed in a patient with a previous Caesarean section a time limit of 10 hours should be imposed.

The progress in trial of labour is, of course, determined by descent of the head and dilatation of the cervix. Engagement of the head does not usually take place until late in the first stage of labour (or even at the beginning of the second stage) but the vertex will descend into the pelvis earlier and at this point it may be possible to determine whether there is overlap or not. Provided the bladder is empty this may be detected by laying the flat of the hand along the symphysis pubis, over the anterior parietal eminence and pushing the head in the direction of the pelvic brim. There is no need to undertake a vaginal examination whilst carrying out this test. From now onwards descent of the fetal head is to be judged by abdominal palpation alone. If there is any degree of disproportion present fetal head moulding and caput formation will give a false appraisal of the station of the head on vaginal examination. In the extreme the caput may show at the vulva with the head barely engaged.

When there is minimal or no disproportion labour will generally

proceed rapidly, the fetal head will pass through the pelvic brim and, having negotiated the plane of least resistance, spontaneous delivery will result after a very brief second stage of labour.

Disproportion is not always associated with prolonged labour, particularly if the cervix is closely applied to a well flexed head and especially if that head has been slow to negotiate the pelvic brim. One of the chief barriers to rapid progress in labour is the circumferential pressure on an incompletely dilated cervix between the fetal head and the pelvic brim. Such pressure causes stasis within the cervix which becomes progressively more oedematous and hangs as a curtain within the vagina or as a cyanotic anterior or posterior lip. Such findings are most usually encountered in multiparous patients, particularly if early bearing down has been encouraged or natural, but they are also present in primigravidae and are to be recognised as signs of cephalopelvic disproportion. Complete sloughing of the cervix, the extreme example of this, is not rare.

It has been shown earlier that a prolonged second stage is of greater danger to the baby than a prolonged first stage. Presumably this is due to excessive head moulding and intracranial injury. It is therefore important to be aware of the onset of the second stage so that early delivery can be undertaken when required. No primigravida should be permitted to have a second stage of labour longer than 45 minutes and no multiparous patient longer than 30 minutes. A patient with a previous Caesarean section scar should be delivered as soon as the second stage has been reached. Such intervention may seem unnecessary to those who practice in Britain, but in the absence of disproportion in Africa the second stage of labour is extremely short and early interference does not appreciably increase the rate of assisted vaginal delivery. If trial of labour is to be justified at all in circumstances in

which it would not be permitted in Europe the perinatal mortality rate must be kept to an absolute minimum. The prolonged forcing of a fetal head through a small pelvis by good uterine action contributes to this fetal mortality, therefore such prolongation should not be tolerated.

If the patient is a primigravida and has not delivered within 24 hours or, if she is multiparous and 12 hours have passed, a full assessment is necessary. Any descent of the fetal head should be noted and a vaginal examination carried out to determine the dilatation of the cervix, its consistency and if necessary a reappraisal of the size of the pelvis. Other points to be noted are the presence or absence of meconium, the position of the fetal head, the amount of moulding and the degree of caput formation. If the membranes are intact they should be ruptured. Unless significant fetal distress is present, or the second stage of labour reached, labour should be permitted to continue. Six hours later in primigravidae and rather less in multiparous patients, reassessment should again be made and at this stage a very good reason must be given if labour is to be permitted to proceed further. Incoordinate uterine action is relatively rare in Africa and prolonged labour is invariably due to cephalopelvic disproportion and there is nothing to be gained from persistence with trial of labour if delivery is not within sight at this stage. Certainly 36 hours should be the time limit set for primigravidae or 20 hours for multipara. In many instances, particularly if the doctor is inexperienced, Caesarean section is undertaken too late. Either fetal distress has been ignored or labour has been allowed to proceed for an over-long period. It is not uncommon for Caesarean section to be undertaken with the baby already dead in the interests of the mother. At this late stage the mother's life is in considerabl danger from sepsis. The avoidance of Caesarean section wherever

possible is a good policy for conditions pertaining to large areas of the developing world but it is a mistaken policy to delay the operation to the point of fetal death. A mother with a dead baby and a Caesarean section scar in her uterus is hardly likely to respond to a request to return for supervision in a subsequent pregnancy.

CAESAREAN SECTION IN TRIAL OF LABOUR

This operation is necessary at any time when circumstances dictate that delivery is essential and that vaginal delivery is impossible. The reasons are usually the presence of fetal distress or prolongation of labour before the cervix is adequately dilated to permit vaginal delivery.

At this stage it is necessary to define fetal distress. For many years to come it will not be possible to undertake biochemical sampling on specimens from the vertex on the fetal scalp and reliance has to be placed on fetal heart rate and regularity plus the presence or absence of meconium. A slow and irregular fetal heart plus meconium stained liquor are signs that cerebral anoxia is present and they should not be ignored. If the patient is in early labour or labour has not progressed sufficiently to permit vaginal delivery Caesarean section must be undertaken if perinatal mortality is considered to be important. Fetal distress and prolonged labour often accompany one another and it is in these circumstances that delay in delivery may mean the eventual Caesarean section when the baby is dead.

OPERATIVE VAGINAL DELIVERY

If the cervix has dilated 4 fingerbreadths or beyond in primigravidae or to 3 fingerbreadths or beyond in multipara it should be possible to achieve vaginal delivery in the majority of

patients. The 60 millimetre vacuum extractor cup will fit easily into the former and the 50 millimetre cup into the latter. If the cervix has dilated to this extent and the fetal head has entered the pelvic brim to at least one third without the anterior parietal eminence overlapping the anterior surface of the pubic symphysis vaginal delivery is permissable and very few failures will be encountered. To attempt vaginal delivery when the head is free or when there is second degree overlap is foolhardy and will only result in either failure or in severe maternal trauma.

THE VACUUM EXTRACTOR

When the fetal head is engaged within the pelvis and the cervix is dilated sufficiently to permit the introduction of the 60 millimetre cup in primigravidae or the 50 millimetre cup in multipara delivery by vacuum extraction is generally straightforward. The instrument is not without its own complications and no more than 10 minutes traction should be permitted if severe scalp injury, haemorrhage or intracranial injury are to be avoided. When the operator has achieved sufficient skill in the use of the instrument most delays in delivery will be due to cephalopelvic disproportion. It is sometimes stated that the presence of fetal distress is a contraindication to the use of the vacuum extractor. This view is not generally held by those experienced in its use and the author believes that, with experience, delivery may be just as rapid with the vacuum extractor as with forceps.

SYMPHYSIOTOMY

If at the end of 10 minutes traction the ventouse has failed to deliver the baby symphysiotomy is the operation of choice,

provided the rules have been adhered to strictly. If the fetal head is not engaged but one third of it has entered the brim and there is less than second degree overlap, symphysiotomy may be undertaken as a preliminary to vacuum extraction.

If symphysiotomy is accepted as a permissible operation there is no need for the use of the obstetric forceps.

The management of trial of labour is never easy. It is a daily problem in most obstetric units in Africa and often more than one patient is being supervised at the same time. Lawson (1965) does not favour the use of symphysiotomy in trial of labour, preferring the obstetric forceps and Caesarean section when there is difficulty. To this I cannot agree. Symphysiotomy is as safe an operation as Caesarean section for both mother and baby and is far safer for the child than an ill-judged prolonged and often traumatic forceps delivery. If the object of trial of labour is to aim at vaginal delivery whenever possible then every operation which may produce that end should be used, provided that the operation is reasonably safe and provided that skill, care and experience are used to their utmost.

THE UNBOOKED PATIENT

There has been no mention yet of the patient who is admitted in labour and who has received no antenatal care or antenatal care by those who are not responsible for her delivery. Such patients may be admitted at any time during the course of labour. If they are in early labour assessment may be made on admission and management continued according to the rules laid down for trial of labour. It is, however, in the patient who is admitted in obstructed labour that most difficulty is to be anticipated. Often these women live far from organised medical care and when they eventually come to hospital their general conditio

is poor. Sometimes the baby is dead; more often terminal existence is detectable by a slow fetal heart and infected, meconium stained, liquor. For the mother's sake and sometimes for the baby's sake as well, urgent delivery is necessary. If the uterus has ruptured immediate laparotomy is indicated without any preliminary attempt at vaginal delivery. If the uterus is intact and the baby dead, the fetal head should be perforated, the contents of the skull evacuated and the baby delivered by attaching stout clamps to the edges of the skull bones. When this is undertaken with care there is usually little difficulty and the maternal vagina may be protected if the procedure is carried out under direct vision after an episiotomy with a Sims' speculum in the vagina. No matter how poor the fetal condition is suspected to be, if the fetal heart is present, symphysiotomy is strongly recommended as sometimes a baby will survive no matter how adverse the situations seems to be. Vaginal delivery in such circumstances is always preferable to Caesarean section. Uterine infection is invariably present and if the uterine cavity is opened at all peritonitis is inevitable. Whatever type of delivery undertaken the fetal mortality and maternal morbidity is considerable. The patients will often have the percursors of vesicovaginal fistulae, puerperal sepsis and obstetric paresis. Symphysiotomy may worsen the extent of these conditions, although this has not been proved, but after symphysiotomy there should be little maternal mortality. This is particularly important in the more remote areas where blood is not readily available and the more expensive antibiotics unobtainable. Most workers in Africa now realise that symphysiotomy has its greatest place in such circumstances. The cold light of statistics of perinatal mortality and maternal morbidity following the operation done in neglected cases would condemn the operation, just as it did

150 years ago but the more enlightened approach in modern times should be able to appreciate that it is not entirely upon these statistics that the operation should be judged but against other operations undertaken in similar circumstances. Controlled clinical trials for such operations are not possible, but the figures and statistics quoted earlier in this thesis which showed a reduction in fetal mortality and a very low maternal mortality and morbidity rate for operative vaginal delivery are good enough to suggest that the combination of vacuum extraction and symphysiotomy when necessary is the method of choice in the management of difficult vaginal delivery in present day developing Africa.

In the long run symphysiotomy will disappear from obstetrics in Africa just as it has disappeared from obstetric practice in other more sophisticated parts of the world. The operation will in time no longer be needed. This will not happen until the last case of contracted pelvis has been delivered of her final baby. Infant malnutrition, so rife in Africa today, will of necessity disappear first. Even if sudden improvement were to take place within the next 10 years, which is unlikely, it would be 50 years hence before disproportion was eliminated. Until such time obstetrics in Africa will remain an art, and part of that art will be the operation of symphysiotomy, hand in hand with the vacuum extractor.

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