Discourses on the Function of the Pelvis in Childbearing from Ancient Times until the Present Day

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Abstract

This historical research traces evolving beliefs about the function of the pelvis in childbirth from ancient times until the present day. The female pelvis was considered facilitative of birth in ancient times, acquiring an increasingly negative image adjacent to developments in the study of anatomy and medicine.

The ancient doctrine of humours highlighted constitutional differences between the sexes, which sixteenth-century anatomists refined down to the level of the pelvis. The idea that the female pelvis was perfect for childbearing was exalted as a natural reason for women's domestic and childrearing roles in society. Paradoxically, men midwives (now obstetricians) contended pelvic pathology often meant women failed miserably in this role.

The pelvis was also harnessed by men midwives to demonstrate traditional midwives' ignorance of reproductive anatomy. The midwife authors discussed in this thesis were aware of this, and the need for all midwives to have a contemporary knowledge of the bony pelvis and female reproductive anatomy, in order to converse with doctors and maintain public confidence.

Whilst forceps could overcome mild degrees of obstructed labour caused by a narrow pelvis, surgical techniques were employed to explore ways of widening or bypassing it, such as symphysiotomy or caesarean section.

The foray into pelvic mensuration which began in the eighteenth century, continued unabated until the late twentieth century. Seemingly objective medical studies were also cultural markers which aimed to justify social differences between sex, race, and class.

As maternal mortality declined in the late twentieth century, and the safety and versatility of the caesarean operation increased alongside developments in fetal medicine, concerns about the size and shape of the pelvis became of less consequence.

Despite tremendous medical endeavour, the old adage, the fetal head is the best pelvimeter, continues to underpin practice to this day.

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Terminology

Use of terminology

History is context-bound, and the author acknowledges that some of the terms used in the past and referred to in this thesis might now be considered inaccurate, offensive or politically incorrect.

The term 'text'

This is used throughout this thesis to describe any form of written evidence, irrespective of format (includes stone and clay tablets, manuscripts, codices, printed materials).

Inclusion of forenames of authors

Forenames of authors of primary sources are referred to in the text on first occurrence in order to inform the reader of their sex, which may have a bearing on their approach to the subject, so assisting with historical interpretation.

Readers will find that some names were Latinised in the sources and so variants of these authors' names may be found in alternative historical sources.

Periods by chronology

The terms Before Christ (BC) and *Anno Domini*, in the year of our Lord (AD) have been used in this thesis.

Ancient up to 500 AD

Medieval - 500-1450 AD

Early Modern –1450-1700 AD
(There is some debate between historians as to whether to include the eighteenth century under this term).

Modern – 1700 AD onwards

Use of the term 'Caesarean'

A caesarean operation involves the delivery of a child by surgical intervention. The child is pulled out from the uterus through abdominal and uterine incisions. *Caesarean* has been used extensively in this thesis, although it is hereby acknowledged that the actual

term first appeared in the texts in the sixteenth century[1] and in subsequent centuries the term and techniques involved varied.[2]

Child and infant

In the past these terms were often used to refer to a fetus, newly born baby or young child.

Fetus vs. *foetus?*

The term *foetus* has been used in the medical treatises to describe an unborn child, from the first six weeks of conception. This spelling has been superseded by the term *fetus* in the late twentieth century which refers to a conception after the first six weeks before which it is described as an embryo.

Woman

Woman is often synonymous with *mother* in this thesis.

Womb

The term *vagina* (Latin for sheath] did not enter the English language until 1682. The female reproductive tract was formerly described as the womb (uterus), the mouth of the womb (cervix) and the neck of the womb or women's privitie, privie passage or womb passage, (vagina).[3]

Glossary

An asterisk* next to a word in the main text indicates that the word is explained in the glossary.

Active fetus theory

This term has been adopted by this author to describe the ancient perception of the process of birth, in which the fetus forced its way out through the pelvis and the pubic

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[1] See Graham 1950, pp. 64-5

[2] For an overview see Young 1944, pp. 1-71.

[3] See Fissell 1995, pp.433-56, p. 440.

bones separated slightly to accommodate its passage. Some authors suggested pelvic expansion also occurred in the region of the sacro-iliac joints of the pelvis.

Accoucheur

Equivalent to an English man midwife – see the term *Man Midwife* below

Asynclitism

The sideways rocking mechanism of the fetal head during descent through the pelvis in labour.[4]

Birth canal

Bony and soft tissue structures through which the fetus must pass.[5]

Cardiotocography

Graphical correlation between fetal heart rate and uterine contractions in labour.[6]

Cephalo-pelvic Disproportion

A misfit between the fetal head and the maternal pelvis.[7]

Conjugata vera, true conjugate or anatomical conjugate

A measurement of pelvic distance from the sacral promontory to the centre of the upper surface of the symphysis pubis. The actual space is physically difficult to measure and measures slightly more than the diagonal conjugate, however not all of this space is accessible to the fetus.[8]

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[4] Tiran 2000, p. 19.
[5] Tiran 2000, p. 27.
[6] Tiran 2000, p. 19.
[7] Tiran 2000, p. 56.
[8] Based on a definition in Tiran 2000, p. 203.

Contracted pelvis

'A pelvis in which any diameter of the brim, cavity or outlet is so shortened as to interfere with the progress of labour'[9]

Coprotherapy

The use of excrement in ancient medical remedies.

Craniotomy

Perforation, crushing and extraction of a fetal skull to facilitate vaginal delivery.[10]

Crochet

This was a sharp, hook-like instrument, used to remove a dead fetus from the uterus, which was also capable of causing trauma to maternal soft tissues.

Cuneiform writing

Established by the Sumerians, required a stylus in order to make wedge-shaped marks in wet clay tablets, which were then dried to become indelible.

Deep transverse arrest

The fetal head descends through the pelvis and is arrested above the region of the ischial spines, with the occipito-frontal diameter in the transverse diameter of the pelvis. The occiput reaches the pelvic floor but, due to a lack of flexion of the fetal head, it then arrests just above the level of the ischial spines. This may be caused by weak contractions, a strait sacrum, a narrowed pelvic outlet or combinations of such things.[11]. By far the most common cause of delay at this point is lack of effective uterine action.[12]

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[9] Tiran 2000, p. 56.
[10] Tiran 2000, p. 59.
[11] Fraser and Cooper 2003, p. 513.
[12] O'Driscoll, Meagher and Robinson 2003, p. 8

Diachronical

The *diachronical* historian is only interested in finding out how rational things were judged to be in their own time before events in later periods.[13]

Diagonal conjugate

'Internal pelvic measurement … taken from the promontory of the sacrum to the lower border of the symphysis pubis. Diameter measured from the apex of the pubic arch to the lower border of the symphysis pubis and should measure 12.5 cm. in a normal pelvis.'[14]

Distorted pelvis

Deformed and possibly contracted pelvis – see *contracted pelvis*.

Dogmatists, Empiricists and Methodists

There were several medical sects operating in Alexandria and the Greco-Roman empire. The Dogmatists believed causes of illness might be revealed by rational medicine, which involved experimentation and human dissection, whereas the Empiricists denied that nature was comprehensible and rejected the Dogmatists' ways of investigating diseases. Their discipline was guided by the individual and collective experiences of treating the symptoms of illness. A third sect, the Methodists, adopted the atomic theory of disease. In this the body was seen as an aggregate of moving atoms traversed by pores carrying body fluids. Health and disease depended on the size, shape and number of the particles and the condition of the pores. The three main causes of diseases were constriction, flux and a combination of both, called *status mixtus*. Treatments were aimed at relaxing constrictions, counteracting flux and, in status mixtus, treating the most prominent features of the illness first.[15]

Empiricists

See *Dogmatists* above

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[13] Kragh 1989.
[14] Tiran 2000, p. 203.
[15] Temkin 1991, pp. xxx-xxxviii.

Fortuitous deaths

Deaths from unrelated causes which happen to occur in pregnancy, labour or the puerperium.

Internal podalic version (IPV)

Internal correction of a fetal malposition by grasping a foot or both feet and extracting the fetus, feet first.

Man midwife / Men midwives

Male practitioners of midwifery desired to distance themselves from traditional midwives by title, several alternative names being proposed over the years.

Men midwives specialised in the use of instruments for difficult births, a role which was protected, although they sometimes attended normal births on request, for a fee. Their fees were higher than those charged by midwives and they tended to aim their services at the upper end of the medical market. Occasional reference is also made to the French equivalent to a man midwife, an 'accoucheur'.

Medical men

These include physicians, barber-surgeons, surgeons, men midwives, apothecaries, quacks. Medical certificates could sometimes be purchased by stealth or the letters 'MD' used by counterfeit physicians. Consequently, the competence of medical men was variable.[16]

Medical renaissance / Medical enlightenment

This period developed around the time of the scientific revolution and saw major changes in the understanding of human anatomy and physiology.

By the sixteenth century, significant numbers of hospitals had been built and many new discoveries had been made, assisted by developments in techniques of human dissection, artistic contributions to the display of human anatomy and the use of the printing press which enabled this information to be extensively disseminated. Famous renaissance medical men included, Vesalius, Paré, and Harvey.[17]

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[16] Fissell.1991.
[17] Park 2001, pp. 66-79; Cunningham 1997.

Medical science

This term is used in this thesis to describe the work of medical researchers using a scientific approach. See the following terms, ***Science, Medicine and Natural Philosophy*** (below).

Methodists

See the term, *Dogmatists (*above)

Metria

Now described as puerperal sepsis

Midwife

The contemporary term refers to a person who has undertaken a recognised education programme and is duly registered as a midwife in their country. The International Confederation of Midwives and the World Health Organization provide expanded definitions of a midwife, available on their websites.

Midwifery and Midwives

The terms *midwifery* and *midwives* are used unless otherwise stated in a broad sense to include pre- nineteenth century, male and female midwives.

Mollities ossium

This is the Latin term for literally softness of the bones, and refers to puerperal osteomalacia which occurs as a consequence of exhaustion of skeletal stores of calcium and phosphorus by repeated pregnancies and lactation.[18]

Moulding (of fetal skull)

'Over-riding of the cranial bones' of the fetal skull at the sutures and fontanelles, so that the skull can adapt its shape in order to pass more easily through the pelvis.[19]

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[18] Dorland 2003
[19] Tiran 2000, p. 175.

Natural philosophy

According to John Henry (2002), natural philosophy aimed to describe and explain the entire system of the world, before the period of the scientific revolution.* A number of mathematical traditions existed, such as astronomy, optics, mechanics, music, anatomy, physiology, the study of materia medica (pharmacology) and *practical arts* such as *navigation cartography, military arts, mining, metallurgy and surgery.* Interactions between specialist disciplines and natural philosophy gave rise to new developments.[20]

Obstetrician

This modern, Latinised term superseded the title, 'man midwife' in the nineteenth century.

Obstetric conjugate

From the inner upper border of the symphysis pubis to the sacral promontory – measures 11 cm.[21]

Osteomalacia

Osteomalacia is a condition marked by softening of the bones (due to impaired mineralisation and excess accumulation of osteoid), with pain, tenderness, muscular weakness, anorexia, and loss of weight, resulting from deficiency of vitamin D and calcium.[22]

Pelvic

In this thesis the term *pelvic* refers to the bony pelvis, rather than to the soft tissue contents of the pelvis.

Pubiotomy

Division of the pubic bones to facilitate a vaginal birth.

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[20] See Henry 2002. pp. 4-5
[21] Tiran 2000, p. 203
[22] Dorland 2003, p. 1335.

Puerperal

A period of six to eight weeks following childbirth during which the body returns to its pre-pregnant state.

Renaissance

The renaissance period was labelled as such in the nineteenth century. For a discussion about this term, and also about the difficulties of periodisation of history which may not transect national boundaries.[23]

Roentgenology

The study of X-rays in medicine, later differentiated into radiology and radiography

Science

This modern term is used in its general sense and reflects the shared theories, ideologies and orientation of scientists and medical doctors.

Scientist

The term was not invented until the nineteenth century. Scientists share basic knowledge, codes, principles, methodologies and areas of theoretical and practical interest.

Scientific enlightenment / revolution

The scientific and medical enlightenment periods are both complex and their chronology varies according to the sources consulted. The following definitions are therefore greatly abbreviated.

A general definition encompasses major developments in astronomy attributed to Copernicus in the late fifteenth century, to the physics of Isaac Newton, who died at the beginning of the eighteenth century. Other key figures involved included Bacon, Galileo, Descartes, Kepler, and Paracelsus.

It is described by historians as 'the period in European history when, arguably, the conceptual, methodological and institutional foundations of modern science were first

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[23] See Johnson 2002, pp. 3-5

established.'[24] This period of marked change was commensurate with the *age of reason* that rapidly ensued, which created a degree of religious scepticism.[25]

Sucussion

This ancient Greek form of treatment involved the violent shaking of a person. On some occasions the person was strapped to a ladder or tossed in a blanket.

Supervisor of midwives

A practising midwife appointed by the Local Supervising Authority who after appropriate education supervises a group of midwives.

Symphysiotomy

Division of the symphysis pubis to facilitate a vaginal birth.

Traditional midwife

Female midwife (sometimes known as a '*handy woman'* in England). In 1902 the Midwives Act instigated mandatory midwifery training and registration, from which bona fide midwives emerged.

Trial of labour

A limited period of time in labour to see if normal vaginal delivery is possible, followed up if necessary by medical intervention to deliver the fetus, usually by caesarean section.

Uterine obliquity

Uterine obliquity was a deviation in the position of the gravid (pregnant) uterus, which commonly caused it to protrude out as it grew larger, causing the appearance of a pendulous abdomen.

The uterus might also deviate backwards or to one side. Laxity of the abdominal muscles caused by a series of pregnancies might increase the problem.

Traditional midwives described the correction of uterine obliquity during early labour to avoid further complications and slow progress. This involved techniques of internal and

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[24] Henry 2002, p.1.

[25] See Gribbin 2003.

external manipulation and prolonged intimate contact, which was another reason why they believed midwifery was essentially women's business. Men midwives argued that this type of manual manipulation was not necessary; Thomas Denman suggested a change of maternal position would suffice.[26]

Western world

According to Michael Worboys there were three great systems of medicine in 1,000 AD, Chinese, Indian and western. In this sense, western meant Mediterranean and was based upon Greek, Roman, and Islamic ideas, and it co-existed alongside local folk beliefs. Today, western medicine is the predominant system which co-exists with traditional and alternative systems of medicine.[27]

Whig history

This explains the 'present in terms of the past … implying that the present was better'. [28]See Vincent 1996, p. 84. It also attempted to make history relevant to the present time and looked at the past from a presentist perspective.[29]

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[26] See Denman 1787, pp. 55-6.
[27] See Worboys 1997, p. 249.
[28] Vincent 1996, p. 204
[29] See Wear 2000, pp. 1-4.

Abbreviations

AD	Anno Domini
AJOG	*American Journal of Obstetrics and Gynecology*
AP	Anterior-posterior
BC	Before Christ
BJOG	*British Journal of Obstetrics and Gynaecology*
BMA	British Medical Association
BMJ	*British Medical Journal*
CHSTM	Centre for the History of Science, Technology, and Medicine
CO	Caesarean operation
C & M	Caldwell and Moloy
CP	Contracted Pelvis
CPD	Cephalo-pelvic Disproportion
CS	Caesarean section
CV	Conjugata vera
DC	Diagonal conjugate
ECBO	Eighteenth-Century Books Online
EEBO	Early English Books Online
JAMA	*Journal of the American Medical Association*
JRL	John Rylands Library (University of Manchester)
KWAK	*The Knowing of Woman's Kind in Childing*
MWGH	*Medieval Woman's Guide to Health*
RCM	Royal College of Midwives
RCOG	Royal College of Obstetricians
RCP	Royal College of Physicians
RCS	Royal College of Surgeons
UK	United Kingdom
USA	United States of America
XRP	X-Ray pelvimetry

1 Introduction

1.1 Aims of the thesis

This thesis aims to contribute to the body of knowledge on the history of midwifery and is primarily intended for the illumination of those, who like this author, are from a clinical background. Although much has been written about the professional history of midwifery, little has focused upon contemporary ideas about the process of birth. It came as a surprise to the author, as a practising midwife, to discover that years ago the pelvis was considered facilitative of childbirth. This led me to explore why it had acquired so much importance in the modern world of midwifery and obstetrics, where it was seen as a potentially hazardous obstruction during labour. This thesis explores changing perceptions of the function of the pelvis in childbearing as presented in contemporary texts from ancient times until the present day. Some revisionist readings of the texts by the author will provide new insights into the ostensibly mundane topic of the anatomical pelvis and its alleged roles in childbirth; which have evolved considerably over the past two thousand years or more. This thesis, written as it is with clinicians in mind, also offers a number of new interpretations of primary sources. It has a chiefly empirical focus; however, the literature revealed much about the nature of knowledge and the influence and limitations of literary discourses, and also demonstrates the power of dominant groups and predominant knowledge over the path of history.

1.2 An overview: what happened to the pelvis?

To set the scene, this exploration will examine and, in some cases, attempt to explain why ideas about the role of the pelvis evolved so drastically. The study begins in Chapter Three by examining ancient and medieval perceptions of the birth process, based upon cultural and religious beliefs. This focuses upon the Greek and Greco-Roman literature which had an influence on medieval midwifery practice in the Western world.* The history of the pelvis is examined from an English perspective, although pelvic theory was greatly influenced by foreign ideas. In ancient times, the function of the pelvis was an

assumed one and as an anatomical structure, the pelvis was relatively invisible. This was partly because anatomy played a less important role in medicine.[1] Nevertheless, this study argues that the theory of pelvic separation at birth may well have been underpinned by studies of comparative anatomy.[2]

When human dissection was permitted in Renaissance Italy, views on pelvic expansion began to be challenged, albeit slowly. Views of the nature of the pelvis gradually evolved in the texts, the pelvis first being described as flexible and facilitative, then going to the other extreme of being portrayed as inflexible and potentially hazardous to birth.

The medical texts of the early modern period described childbirth with increasing complexity. By the eighteenth century the hidden dangers within every woman of a potentially contracted (narrowed) pelvis capable of causing obstructed labour became a dominant feature of the medical literature in the West. Medical concern regarding women's abilities to give birth normally led to the development of a range of interventions to assist delivery, which also justified the need for a medical presence during childbirth. This was generally well received by affluent women, who believed they were getting the best type of care and attention. However, when it came to severely obstructed labour, instruments such as the famous forceps introduced via France would not suffice, and the only option available (apart from a destructive operation to remove the fetus piecemeal or symphysiotomy)* was a treacherous operation known as the caesarean, which was still in its experimental stages on the living and often proved fatal.

Relatively few early caesarean operations were carried out in England before the end of the nineteenth century because of concern over the likelihood of fatal consequences for mother and child. However, the alternative in such serious cases was a more protracted demise from exhaustion, haemorrhage or infection.

Beginning in the eighteenth century, medical men in Europe embarked upon the design of numerous complex measuring instruments to assess pelvic capacity before or during labour. Their aim was to detect problems or potential problems early in order to

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* See Glossary

[1] Foucault claimed it was not religion but the *incommensurability* of clinical medicine and anatomy which delayed developments in pathological anatomy; Smart 1985, pp. 26-31.

[2] Comparative anatomy is explained by Wear, in Conrad *et al.* 1995, pp. 281-282

maximise opportunities for medical intervention before women became moribund, thereby increasing the chances of successful delivery.

By the early twentieth century alliances between British and American obstetricians were continuing to develop,[3] and the desire to measure and identify potentially hazardous pelves led to large-scale radiological studies using X-ray pelvimetry, a technique which had been pioneered in America. As the general health of the British nation improved towards the mid-twentieth century, the hospitalisation and medicalisation of childbirth increased;[4] simultaneously the problem of obstructed labour caused by bony (pelvic) obstruction declined. This reduced the urgent need for antenatal knowledge of pelvic capacity, and was compounded by fears about the harmfulness of X-ray pelvimetry to unborn children. Such factors contributed to the eventual abandonment of pelvimetry in the late twentieth century, which coincided with an increasing reliance upon ultrasonography. This was first introduced in the 1960s, and put the spotlight directly upon the obstetrician's other patient, the fetus.[5]

By the mid-twentieth century, any concerns remaining about the management of contracted pelves had been allayed, as the pelvis could be bypassed relatively safely at the first sign of difficulty by the improved caesarean operation. Today, most women in England are rarely more than a short distance from a maternity unit with facilities to perform a caesarean at very short notice. The pelvis is now perceived as being of little threat during childbirth.

1.3 The pan-historical approach

The pan-historical approach to historiography, spanning many centuries, is considered liable to lead to a 'broad sweep' approach to history, resulting in superficial accounts, stripped of context. This thesis intends to demonstrate the value of this approach when exploring a relatively narrow topic over a long period of time. The resulting overview offers a comprehensive history of the evolution of ideas concerning the function of the

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[3] See Litoff 1978, p. 8-10
[4] Tew 1990.
[5] See Oakley 1984, pp. 155-186

pelvis in childbirth, exposing discourses which endured for centuries, and lesser-known ones which enjoyed brief reigns. John Pickstone claims that historians can be:

> ...prissy about keeping to their periods. They worry that in studying events across centuries they may lose sensitivity to the peculiarities of particular times and places, and thus misread them.[6]

He argues that, 'periods illuminate each other' and knowledge of events in different periods allow comparisons to be made and contrasts identified.[7]

What people saw in the past when they looked upon a pregnant or labouring woman depended to a large extent on how they actually did the looking. As Andrew Cunningham suggests, anatomy in general has been viewed using a number of different 'intellectual spectacles'[8] in different periods, making different bodies visible to different groups of investigators. An acknowledgement of this allows the reader to:

> [make] ...sense of what these people did see - and why they didn't, why they couldn't see what they didn't see.[9]

Each chapter presents contemporary opinions on the role of the pelvis in childbirth in a general semblance of chronological order. Some histories of obstetrics written by medical historians in the early twentieth century may inadvertently have given the impression that progress was linear, taking little account of any setbacks or difficulties along the way. These encyclopaedic histories, which contain considerable research, serve as useful introductions to topics and sources of basic information on a wide range of subjects, although they may have distorted the past. No attempt is made in this thesis to string the pelvic discourses together in a Romantic or Whiggish fashion: indeed, some events occurred in parallel.

The very nature of the discourses means that chapters may actually intersect or overlap recognised, historical periods. Consequently, like history in general, chapters fail to string together as one story. In the words of Porter:

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[6] Pickstone 2000, p. 5.
[7] Pickstone 2000, p. 5. See also Tosh 2002, p. 12.
[8] Cunningham 1997, p. 8.
[9] *ibid.*

> The historical record is like the night sky: we see a few stars and group them into mythic constellations...but what is chiefly visible is the darkness[10]

Consequently, each chapter of this thesis could potentially be expanded upon to form separate theses. The work may be useful in future as foundation for further research or writing, and as a basic resource for subsequent historians of midwifery.

1.4 The nature of discourses

The discourses examined in this thesis reflect the social climate from which they emerged: what happened to the pelvis was a microcosm of what happened to the practice of midwifery. Pelvic theory mirrored contemporary developments in medicine and also reflected approaches taken to pre-scientific and scientific thinking by specialist groups.

Discourses co-existed in various forms and changed in importance over time. They fell into several main types; dominant discourses, parallel or competing discourses, and subjugated discourses.

The theories of Ludwik Fleck;[11] Michel Foucault;[12] and Thomas Kuhn[13] on the nature of scientific thinking will be drawn upon to help interpret some of the empirical evidence, particularly in the final chapter.

1.5 Why the pelvis?

While much has been written about the history of midwifery from a professional perspective, very little has been written by midwives about the origins of clinical practice. This thesis was first envisaged following a pilot study completed as part fulfilment of the requirements for a Master of Arts degree in Midwifery Practice.[14] It required the origins of the ischial spine nomenclature used to describe the pattern of fetal descent through the

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[10] Porter 1997, p. 13.
[11] Fleck 1979.
[12] Foucault 1994, 2002.
[13] Kuhn 1996.
[14] Discussed in Allotey 1995.

pelvis during labour to be traced. Much to the surprise of midwifery and obstetric colleagues, the scheme was found to have originated in America in the 1920s. This academic exercise created a fascinating diversion for a midwife and provided the motivation to explore further exactly how the pelvis had apparently evolved, from ancient times when it was seen as facilitative of birth, to its present status, as potentially hazardous to birth.

1.6 What can practitioners learn from this study?

Today, few midwives and obstetricians know about the origins of pelvic theory and of the discourses on the function of the pelvis in childbirth from a historical perspective. This thesis explores these ideas and some of the contemporary social meanings linked to the discourses.

Remnants of past pelvic theory continue to appear in contemporary discourse found in midwifery and obstetric textbooks, devoid of context and perhaps of questionable value. Following this study, the professions may wish to consider revising certain ominous pelvic terminology which remains in contemporary professional literature and reflect upon the influences of the past upon contemporary practice.

In a period of rationalisation of resources in the NHS, the advantage of normalisation of the process of birth seems even more appropriate. However, as can be seen from a historical perspective in this thesis, knowledge is selective and some types of evidence are liable to be ignored if they do not fit in with the bigger picture and the predominant views of society.

1.7 Skills of reflection

Winston Churchill suggested:

The longer you look back the further you can look forward [15]

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[15] Sir Winston Churchill 1944, addressing the Royal College of Physicians, London, cited by Radcliffe 1967, p. v.

Historical research can offer a deeper understanding of how contemporary practice has been arrived at and help practitioners avoid making similar mistakes by taking advantage of the cues hindsight provides.

The nurse historian Anne Marie Rafferty believes the study of the past may assist with the understanding of contemporary problems, such as change management and the understanding of the 'process and politics of innovation', although the past is not necessarily a 'predictor of the future'.[16] Social contexts and ideologies are constantly evolving, and, whilst some general responses and parallels can be seen between events in different time periods, attempts to align the past with the present in order to predict or shape the future can be problematic. A number of historiographers have used the words of L.P. Hartley to explain this difficulty: 'the past is a foreign country: they do things differently there'[17]

Taken in the literal sense, situations never unerringly recur and new knowledge is not generated in a progressive manner. It may be influenced in a broader sense by contemporaneous changes in ways of thinking. Foucault's approach to the 'archaeology' of knowledge suggests the sources of power are greater than the individual or author who may be a channel of particular types of power. He examined the influence of developments in academia, science and society upon the development of medical knowledge.[18]

A detailed study of the history of ideas falls outside the parameters of this thesis, which has a clinical focus. However a brief examination may help raise the consciousness of modern-day practitioners to the way in which their practice has been engineered or constructed by events in the past. It also supports and encourages practitioners with new ways of thinking, by illustrating the way in which some previously unacceptable ideas have successfully challenged traditional boundaries to become new paradigms of knowledge.

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[16] Rafferty 2000. See also Jenkins 1991 and Tosh 2002, who consider some of the current debates on history and the value of historiography.
[17] Hartley, p. 7.
[18] McHoul and Grace 1993.

1.8 Reliance upon medical texts

Birth is a female act, traditionally attended by women. However, midwives have not left such a clear literary trail of their practice as their medical contemporaries. Once doctors became more involved in childbirth in Britain, they professed to be authorities on it and publicly outperformed midwives on many fronts.[19]

John Vincent suggests that history has always been written by dominant groups who have influenced the way in which it has been recorded and preserved:

> History is about evidence, and evidence flagrantly distorts. There is a bias in the creation of evidence, and a bias in the survival of evidence. There may be a bias in access to what survives too. There is a bias towards the important (and self-important), a political bias to winners against losers, a bias towards the stable against the unstable, and perhaps a deliberate censorship of the past by the past on top of that. Before we even get to modern historians, distortion is built into the very nature of history [20]

Authorial bias is also channelled by societal influences which permeate thinking on a far greater scale than most people realise. From the eighteenth century onwards, English male medical men emerged as an authoritative group, arguing their positions in a generally persuasive manner. This claim to authority was manifested in the medical literature, in which the medicalised pelvis was portrayed as a potentially hazardous, diseased or distorted structure.

Much has been learned from reading the obstetric literature which has allowed this author, as a midwife, to understand some aspects of practice which have gone before with greater clarity, and to observe the effects obstetricians have had upon midwifery education and the influence they continue to exert over society; in particular over women and midwives.

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[19] See, for example, Donnison 1988.
[20] Vincent 1996, p. 77.

1.9 Writing from a midwifery perspective

All historical researchers bring to their textual interpretations certain pre-formed opinions and expectations whilst aiming to be as objective as possible. They combine prior knowledge with new discoveries during the process of reading and analysis. A range of authors have written about the history of midwifery from various perspectives; very little has been written by midwives themselves. This author is not an academic historian but an 'insider' (a midwife), and so personal insight will colour the interpretation of the texts; this is hereby acknowledged. A safeguard against personal biases in the selection of evidence is to ensure that an exhaustive review of the sources is completed and that everything conceivably germane to an investigation is considered.[21]

The author has worked in the field of midwifery for twenty-seven years, and her personal experience of attending women in pregnancy and labour has informed the reading of the historical accounts of births and descriptions of clinical scenarios. Although the underlying physiological process of birth remains the same, each birth and its context are unique and birth theory has moved on considerably, altering the midwife's perceptions of what is happening to the mother and child during the birth process.

The historiographer cannot hope to uncover the 'truth', as many perspectives or truths exist. History may be subjective and interpretive rather than totally objective. Consequently historiographers can only offer their interpretation of the truth.

From a postmodern perspective, the textual discourses suggest that the respective beliefs and opinions of the midwives and medical men became increasingly polarised during the late seventeenth and early eighteenth centuries. Regardless, medical opinions tended to carry more 'clout' because doctors possessed greater cultural authority.[22]

1.10 About the author

The author qualified as a State Registered Nurse at the London Hospital, Whitechapel (now Royal London Hospital) in 1978 and as a midwife in Lincolnshire in

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[21] Elton 2002, pp. 60-61.
[22] See Foucault 1972, pp. 50-55.

1980 before gaining clinical experience at the North Staffordshire Maternity Hospital, Stoke on Trent, a busy unit with approximately 5,500- 6,000 births per year. Following experience as a ward and delivery suite sister, she was invited to accept a position providing clinical teaching in the ward areas for student midwives and student nurses. In 1990, after obtaining an Advanced Diploma in Midwifery followed by a Certificate in Adult Education, she began a career as a midwifery tutor and was also appointed as a Supervisor of Midwives* by the West Midlands Regional Health Authority, a position held for six years. She also completed a Masters in Midwifery Practice in 1995 at Thames Valley University before being appointed as Head of Midwifery Studies at the University of Keele in 1997. In order to complete this thesis, she took up an appointment in November 1999 at the University of Manchester, as Lecturer in Midwifery and Research Associate.

As well as personal observations, experience of childbirth has been gained over the years, which helps one to empathise. The author has a healthy daughter and son (Marcia and Leon) and perhaps more unusually today, has also experienced the heartbreaking side of childbirth, having lost two daughters, one who lived a short while after being born pre-term (Phillipa)

2 Historical Research Methods

...the same object of enquiry is capable of being read differently by different discourses whilst, internal to each, there are different readings over space and time[1]

2.1 Introduction

This chapter describes the approach taken to the literature and some of the benefits and limitations of historical research in general. There follows a discussion of certain practical and academic considerations when 'doing history'. The discussion will highlight the benefits and limitations of historiography (the writing of and study of history) and the impossibilities even with the greatest of insight of reconstructing the past, whilst avoiding an entirely solipsistic* (self is all that exists and can be known) perspective.

The longitudinal nature of this pan-historical study casts light upon the history and prehistory of ideas about the function of the pelvis in childbirth, which tends to reflect medical styles of thinking. The physical process of birth has changed little compared with contemporary explanations, which have evolved considerably. Birthing theory, like other fields of learning, was clearly affected by contemporary culture which moderated approaches to the rationalisation of physical phenomena. Towards the end, this chapter introduces the approach to the interpretation of the midwifery discourses which have emerged from the texts. This forms a significant part of the discussion in chapter eleven.

2.2 Practicalities of doing historical research

The limits of historical research are linked to the richness of available data. One of the advantages that qualitative researchers have over historical researchers is that the former are immersed within the same socio-cultural environment as informants and are able to communicate with them to verify their own interpretations. The main difficulties

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[1] Jenkins 1991, p.10.

encountered when writing chapters three and four of the thesis resulted from the patchy availability of relevant documentary evidence. As the study continued and the search became more contemporaneous, the amount of data increased to such an extent that it was necessary to perform a selective review.

2.3 Searching the literature

Initial orientation to the subject was achieved through the reading of secondary sources on the history of midwifery. Searches of card indexes at the John Rylands Library, University of Manchester and the Wellcome Library, London, led to further important primary sources. Modern technology has made the task of literature searching faster and more convenient since this study began. Electronic databases of e-books, namely Early English Books Online (EEBO) and the Eighteenth Century Collections Online (ECCO), have been available for the past eighteen months from the John Rylands Library (JRL) University of Manchester.

A COPAC search (http://copac.ac.uk/) was completed to locate rare book collections at twenty-four of the principal UK university libraries. Apart from online catalogues, for chapter six and seven, the *Annual Reports of the Registrar General of Births, Deaths, and Marriages in England* were consulted at the JRL and manual searches made of *Index Medicus* from 1879 onwards, and its successor, the *Index Catalogue of the Surgeon General's Office* (from 1880-1961). The *BMJ (British Medical Journal)* database (www.bmj.com) and the website of the United States National Library of Medicine (http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=nlmcatalog) provided useful obstetric references for the post-1966 part of the study.

Other specialist libraries were visited to read primary sources. These included The British Library, the Wellcome Library, and the libraries of the Royal Society of Medicine, the Royal College of Obstetricians and Gynaecologists (RCOG), the Royal College of Midwives (RCM), and the Royal College of Surgeons in London. Also, Chetham's Library, Manchester and the special collections department of the University of Birmingham. Most of the materials for this thesis were accessed from the Parkinson

Collection at the John Rylands Library (JRL), the University of Manchester. Texts and papers were also obtained from the British Library Document Supply Centre via JRL.

2.4 Accessing resources

Historical research requires considerable time investment and expenditure. This study required the use of early printed materials from scattered locations. Rare books are kept in specialist libraries under secure conditions and are for reference only. This required the author to make numerous trips to libraries to consult texts in library reading rooms. More recently many of these resources have become available electronically.

Despite the convenience of online resources and facsimile versions of primary sources, there are benefits to be gained from looking at the original printed materials. Apart from the privilege of seeing and handling these rare documents, the occasions offered opportunities to examine their general quality and condition, and in some cases, indicating who had previously owned them.

Occasionally, the rewards of extra effort were a serendipitous find, which had defeated systematic searching. For example, a midwifery pamphlet containing a small collection of dissertations on symphysiotomy was found bound with another text being consulted at the British Library. On another occasion, a librarian unwittingly suggested an alternative source to the one requested, which provided the original source of a particular practice.

2.5 Selection of sources

The study adopts an English as opposed to British perspective on the literature and focuses upon the most influential of the remaining sources, many of which were foreign. Some of the early discourses were traced back to ancient Greek and Greco-Roman sources. These have been accessed through modern translations and secondary sources on classical midwifery. Primary material was accessed from the early modern period onwards and complemented by secondary sources.

2.6 Practical aspects of data interpretation

Difficulties with the interpretation of primary (original) sources exist at various levels. The first difficulty may be a practical one; some rare books may be difficult to access. Manuscripts are too difficult for non-specialists to decipher in terms of palaeography and graphology. Some anatomical terms are no longer in use, and descriptions of types of illnesses and treatments have no modern-day equivalents, and required researching. As the author is not an historian, personal communications with specialist academic historians have provided invaluable assistance with the preparation of this thesis (see acknowledgements).

The next level of complexity when interpreting the midwifery literature is establishing who wrote the texts and who read them. This issue is alluded to throughout the thesis when questions are raised about the true identity of authors, the channels of dissemination of textual discourses and whether midwives were actually able to access and read the texts medical men dedicated to them.

2.7 Authenticity of knowledge

Difficulties with accurately dating ideas in texts has come about because of the widespread practice of 'borrowing' from ancient works that went on during the pre-medical enlightenment period, opening up the field to philologists to examine the style of the literature in order to assess its age and authority. Chapter three examines some of the ancient ideas about the process of birth and the role of the pelvis in labour. Some of these literary ideas existed for a considerable time and were replicated widely on an international scale, reaching England during the late medieval and the early modern period. These ideas were then transmitted into popular culture through the medium of print.

Common sources of ancient midwifery knowledge stem back chiefly to Hippocrates, Soranus and Galen. During the process of selective replication, contemporary knowledge was added to this material in small increments over time,

although the rise in independent observation was slow and respect for ancient wisdom enduring.

2.7.1 The influence of foreign texts upon traditional practice

The first book on midwifery to be translated and printed in English was the German text, *Der Swangern Frauwen und Hebammen Roszgarten* by Eucharius Rosslin, which was translated and published as *The Byrthe of Mankynd*.[2] This text reflected the ancient tenets of midwifery wisdom, including the work of Soranus of Ephesus. The extent to which this literature actually influenced English midwifery practice in the early modern period is uncertain. In some instances texts may have starkly contrasted with surviving impressions of existing contemporary practice.

Whilst medical men implied that the texts held a degree of innate authority, the extent to which midwives modelled their practice on the medical literature is uncertain, as they appeared to have their own strong oral tradition.

By the eighteenth century, translations were being replaced by English midwifery treatises written mainly by men-midwives. In the introduction to John Maubray's treatise he appeared to recognise the ambiguities of the past texts when he stated:

> What books of midwifery have we ever had in England but bare translations; which, at this time of day, will never bear the reading of any good judge? Nay, more than this, what book has ever been written upon midwifery, in any country, or in any language that may be call'd compleat? I think I have read all that ever have appear'd on this subject, and yet not seen one, but, what is either defective in many respects; confusedly prolix in others; or which is worse abounds with gros[s] errors [3]

2.8 Authenticity of texts

With the advent of the printing press and wider circulation of texts, the demand for medical self-help manuals increased. Much material was borrowed from medical

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[2] Various editions of *The Byrth of Mankinde* by Thomas Raynalde are available online; see http://eebo.chadwyck.com. A direct translation of the original German text was produced by Wendy Arons; see also Arons W. 1994.

[3] Maubray 1725, pp. xiii-xiv.

treatises to produce watered-down versions for public utilisation.[4] Table 2.1 (below) provides an example of the kind of 'borrowing' which went on and which makes the work of historiographers wishing to find the origins of ideas more difficult.

Table 2.1

Examples of similarities between texts:

1. The Midwives Book

Midwives call it the water, and when it runs forth then the birth is near; this is the truest sign that is, for when those skins are broken, the infant can no longer stay there than a naked man in a heap of snow.

Sharp J. 1671 [1999], *The Midwives Book, or, the Whole Art of Midwifry Discovered*, edited by Hobby E., Oxford: Oxford University Press. p. 160.

2. Aristotle's Master-piece

When those waters come away, then the midwife may be assured the birth is very near, this being the most certain sign that can be; for the Amnion and Allantois being broken (which contain those waters) by the pressing forward of the birth, the child is no more able to subsist long in the womb afterwards than a naked man in a heap of snow.

Aristotle [pseudonym] 1749, p. 65.

The authors of 'popular' midwifery manuals[5] advised on medical issues, much to the annoyance of physicians. The physician Thomas Gibson, writing in 1682, complained:

> For we see there is no man that publishes anything in the Latin tongue that is received with any applause, but presently some progging book-seller or other finds an indigent Hackney scribbler to render it English. But with

[4] See, for example, Tobyn 1997.

[5] Andrew Wear suggests that women were often taught to read, although only half the population were literate by 1750. See Wear 1992, p.18.

what disreputation and abuse to the worthy Authors, every learned person cannot but observe [6]

The popularity of self-medication handbooks means they are important sources for historiographers. They often contained similar types of information and advice to the type meted out by physicians, and had a wider general consumption.[7]

2.9 Use of extracts from the texts

Excerpts from the texts have been selected in order to offer readers further insight into the actual words used by writers and their writing styles. Mindful of the risks of presenting quotations stripped from their context, the author has attempted to use examples which enhance the narrative and provide a typical flavour of the texts. This gives readers a more powerful sense of the original sources and opportunity to sample their substance for themselves.

2.9.1 Illustrations

Artists' impressions of reproductive anatomy conveyed powerful additional visual messages to readers and illiterate onlookers. Illuminated manuscripts were usually personally commissioned and exclusive, being edited to reflect the purchaser's specific needs. The illustrations in early printed materials were made from intricate and expensive woodblock impressions or copper engravings. As with the 'borrowing' of texts, sometimes illustrations were sold on and copied or modified for use in other publications.[8]

Images could convey subliminal messages to onlookers and to the illiterate.[9] For historiographers, caution is required when interpreting pictures, which may contain a

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[6] Gibson 1682, in Eccles 1982, p. 15.
[7] See Martensen 1994, p. 113.
[8] See Roberts K. B. and Tomlinson J. D. W. 1992.
[9] Further work on the interpretation of midwifery illustrations has been carried out by: Newman K. 1996; Laqueur 1990; Jordanova 1989; Schiebinger 1987, in Gallagher and Laqueur (eds), pp .42-82; and McGrath 2002.

degree of artistic licence and could distort or misrepresent reality.[10] Images and frontispieces were sometimes included simply to enhance their appeal to purchasers; some were self-portraits of the authors. The texts of the aforementioned traditional midwives tended to be less elaborate than many of the medical texts.

Whilst most contemporary theses are devoid of visual images, selected illustrations are included in this thesis as they contribute to interpretation of meaning and reveal subliminal messages which complement or supplement the text.

2.10 Historiography

Historiography, that is, the writing of history, involves the interpretation and elucidation of past events. Critics of historical research suggest it may be a highly subjective method, lacking in rigour. However, historians have obligations to their sources, their readers, the past and the public at large.[11] Historical research carries with it an element of uncertainty with the encumbrance of having no control over the data, and limited ways of verifying its trustworthiness; also, with the exception of oral history, key informants are usually deceased. The responsibility for verification of interpretations therefore often rests entirely with the interpreter, who should strive to understand what the author's intentions were.

2.10.1 Textual interpretation

There is no 'correct' interpretation of a text. Twentieth-century academic historians have exposed the frailties of history as a human construct. The true motivations and intentions of authors and the inherent bias in the remaining traces of the past will never be fully revealed. The written word differs from the spoken word because the printed word is durable and not up for negotiation, although the words may be disputed.

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[10] Fleck (1979, pp.136-41) suggests illustrations could be mended to fit contemporary theories or *ideograms*.

[11] Jordanova 2000, p. 194.

It is also "pre-meditated, disembodied, monologist and planned".[12] Texts often lack personal warmth or emotion, are sometimes ambiguous and the writer cannot enter into a personal relationship with readers,[13] which may make it easier for some writers to convey exactly what they think. Alternatively writers may adapt their thoughts to incorporate the perceived needs or leanings of readers in order to gain their admiration.

Until recently, the surviving primary sources in midwifery have been predominantly medical and the opinions of midwives, women and the poor have been lost to a large extent.[14]

Readers of secondary sources are dependent upon the historiographer's ability to uncover as much reliable data as possible and interpret this in as impartial a manner as possible.[15] Whilst it may be assumed that primary sources, being closer to the topic or event are more reliable, these may also be biased.[16]

Causation of events may be difficult to relate to specific historical variables with absolute certainty.[17] This element of uncertainty has been advanced by relativists who question whether there are such things as historical facts and the extent to which these 'facts' were subjected to distortion during interpretation.[18] Truth comes to be seen merely as a perception, forged by social constructs and language. Recorded history was devised and contrived by man and is comprised of many 'truths' and dimensions of reality; some as yet unnoticed or undeveloped.[19] In multicultural Britain, reality is clearly an individual perception, based on personal constructs and influenced by socio-cultural concepts which affect the use of language and expression. Foucault argued that ideological power structures subconsciously influenced people's thinking, consequently ideas where not attributable to individuals alone but were the product of discursive and epistemic conditions.[20]

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[12] Words spoken by Professor Katherine Perera, University of Manchester, speaking at the Department of Nursing and Midwifery Staff Conference on communication, University of Manchester, 30/6/06.
[13] *ibid.*
[14] Bynum (1994, pp. 208-209) suggests that we tend to have only the doctors' side of the story.
[15] See Vincent 1995, pp. 77-82.
[16] Tosh 2002, pp. 57-87.
[17] Rafferty 1996, pp. 166-177.
[18] See Carr 2001, pp. 1-24; also Hallett 1997, pp. 67-68
[19] Foucault 1972.
[20] McHoul and Grace 1993.

Whilst everyone's personal interpretations of historical events are considered their own, they will have been moulded by ideological power structures, acting indirectly upon them. The interpreter will have been affected in a small way by all those they have communicated with during their personal, social and educational development. External influences are also in a state of flux and will affect people differently. Therefore, the historiographer's perceptions will be coloured by their knowledge and experience and their personal values and this will unavoidably affect how they report and interpret history.

2.10.2 Reading

Reading as part of the interpretative process is not a neutral activity; comprehension is achieved by a process of selection and organisation, affected by concentration and effort, personal judgements, prejudices and instinctive feelings.[21] As with personal relationships, misunderstandings on our part are to some extent inevitable.[22] Historical research, like current wisdom, may be subject to misinterpretation or blind acceptance, depending upon whether the author and reader share the same views of the world.

The historiographer tries to understand phenomena within their own contemporaneous context as much as possible which entails researching the background of an event. However prejudices and biases of past writers may easily pervade the judgement of readers or historiographers. Quacks who worked from outside the dominant culture were exposed to ridicule and then shown contempt by some of the previous generation of medical historiographers.[23] Goubert suggests prejudicial views may have prevented

> ...a number of doctors past and present, and also certain historians, from seeing that 'quackery' and 'superstitions' with regard to the body obey a system of values and representations that has its own authenticity[24]

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[21] De Leeuw and De Leeuw 1976.
[22] De Leeuw and De Leeuw 1976, p.156
[23] Goubert 1987, p. 40-56.
[24] Goubert 1987, p. 44.

A myth also grew up about midwives, suggesting they were generally ignorant, illiterate and poverty-stricken.[25] Historiographers need to be receptive to the silences of history, and also consider those who did not leave many literary traces of their lives behind. Many previous negative interpretations have now been redressed by revisionist histories.[26] It is easy when reading texts to take on the views of authors, which can happen subconsciously. A lack of analysis of the historical context and the principles that underpin the actions or events may engender the reinforcement of entrenched ideologies.

In this thesis it was important not to stigmatise pre-scientific medicine. Alien or seemingly bizarre or neglectful practices, such as tossing pregnant women in blankets (sucussion), fumigating procedures, or coprotherapy*, can be rationalised within their historical context. Without accompanying rationales, such scenarios might be wrongly judged. When examining ancient texts it is important to try and understand what is happening in relation to the cultural context and to avoid judging the past by modern day (presentist) values. This knowledge also assists with the identification of remaining threads of ancient discourses and enriches the understanding of contemporary birthing theory.

2.10.3 Secondary sources

Wherever possible, primary sources have been examined. However, secondary sources can provide useful background information and are a good source of primary (or original) references. Secondary sources written from primary sources require critical evaluation.

It may be argued that the past has a life independent of its writers. One must enquire why specific parts of the past were selected to be studied, whether a work was commissioned (and if so by whom), and what it may reveal about a particular author's perspective on an issue. Revisionist historians have attempted to moderate negative views towards traditional midwifery practice reported in the primary and outdated secondary sources.

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[25] Forbes 1966.
[26] See Ehrenreich and English 1974; also Harley 1993, p. 31.

2.11 Interpretative styles

It is difficult for an individual, even in real time, to obtain a well-rounded perspective of an event or an encounter that has not been biased in some way by its reporter(s). In reality, although we all live in one world, it is a world of multiple realities. Everyone tends to see the world through their own set of personal filters. An event in a newspaper will have been interpreted first by the reporter and then again by a reader who will interpret what is written for themselves. Coverage of the same event in a different newspaper may persuade readers to form different opinions. As previously alluded to, researchers may glean different views from the same text because they will have been affected by the way in which they have so far experienced the world. This serves to reinforce the stance that there is no one correct interpretation and each account should be valued for what it is, as an individual's personal interpretation.

In basic terms, historical research commonly incorporates a number of different ways of interpreting a text which can be likened to the research process in general. These methods are usually implicit rather than explicit in historiographical texts. Empirical (quantitative) approaches to the data can be used alongside relativist approaches (qualitative) and a hermeneutic approach can be employed to give consideration to the process by which the available data has been produced. Where appropriate, combining these methods helps to obtain the best overall impression of the phenomenon being studied.

2.11.1 The empiricist perspective

Events are perceived and interpreted differently within the contexts of time and conscious knowledge.[27] Relativists believe historical interpretations should not be considered as 'right' or 'wrong' whereas empiricists believe interpretations of meaning by modern-day historians could be wrong unless hard evidence is available.[28] They

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[27] See Foucault 1973.
[28] See Hallett 1997, p. 65.

recognise the potential for misinterpretation of past events when judged in a snapshot fashion, outside of their contexts of time and locality. One of the difficulties is the problem of detecting subtle or even subconscious codes of a society which may have been all-encompassing in the past but are now obscure or invisible to the modern-day reader.

2.11.2 Neutralising romanticism

Romanticism was particularly marked in the nineteenth-century medical literature, when authors tended to take a triumphalist approach to historiography in order to glorify the past and create individual heroes. Much history of medicine written by members of the profession was covert propaganda, hagiography, or ideology [29] in which medical science was successfully encoded and naturalised into the socio-political values of society. [30]

Science was portrayed from the Enlightenment until the early 1970s as continuist and progressivist, the assumption being that each theory was replaced by a better, more comprehensive one. This gave the impression that medicine was making progressive scientific advancement, something towards which contemporary society was sympathetic.[31]

Men's and women's roles have been tied in to the theory of natural design by medical philosophy, natural science and biology in a way that constrained the activities of women in society and highlighted their perceived inferior physical and mental strengths. This consequently elevated medical authority and the credibility of medical discourses on female weakness.[32]

In the 1970s, an increasing number of feminist researchers, sociologists and anthropologists, by employing a relativist, feminist perspective, began to explore the fertile grounds of the history of midwifery. They were able to counter the empiricist, reductionist, and romantic medical narratives, which often presented theories as hard

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[29] Porter and Wear 1987, p. 1.
[30] Porter and Wear 1987, p. 2.
[31] See Oakley 2000 and Porter 1995.
[32] See Martin 1989, also Davis-Floyd 2003. p. 181.

facts. These influences are particularly evident in the modern obstetric texts of the nineteenth and early twentieth centuries, discussed in the final three chapters of the thesis. Ideas that captured the spirit of the time were most readily assimilated into mainstream clinical practice.[33]

Figure 2.1

A Surgeon holding a naked female patient whilst trying to push away death, represented as a skeleton, by Ivo Salinger (1930s).

Source: The Wellcome Library. Reproduced with permission.

The image (Figure 2.1) of the tall, strong surgeon dressed in surgical garb, pushing death, represented by the skeleton, away from the vulnerable and naked woman, conveys the message that medicine could save lives and conquer death. Traditional midwifery knowledge was subjugated to medical theories which reinforced male superiority. Many examples of female oppression can be found in contemporary women's history projects which go beyond the scope of this thesis.

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[33] Dally 1991, p. 38.

2.12 Paradigm shifts in knowledge

Paradigm shifts occur when questions are asked which cannot be explained within existing paradigms. This knowledge is not simply more erudition, reinforcing the dominant discourse or existing paradigm, but a new authoritative knowledge. Years of accepted theory might suddenly be turned upside down by a new conceptualisation, often characterised by a leap outside of the current theoretical framework. These shifts create new paradigms of knowledge.[34]

Thomas Kuhn describes how paradigm shifts in knowledge occur when questions are asked which the laws, principles, values, and beliefs of existing paradigms cannot answer.[35] One of the first major paradigm shifts in this thesis occurs when Galenic theory was overthrown by a new approach to the study of human anatomy and dissection, which led to a revision of birthing theory.All ideas undergo continual evolution; some discourses may fail to thrive and disappear, others become dominant, whilst some run in parallel and compete with the predominant discourse. Some survive as subjugated knowledge, sometimes to reappear later, when the time is ripe and the ideas fit with the views of society, as a predominant discourse.

2.13 A theoretical framework: The nature of discourses

Within this thesis, the author has chosen to explore the nature of the discourses on the pelvis in terms of what was considered authoritative knowledge, which tended to be from a medical perspective. The discourses that tended to predominate were highly acceptable and influential and tended to become established in the midwifery texts, remaining in the public domain, even after their worth had been questioned. Other discourses were subjugated and sometimes, despite appearing to successfully undermine the dominant discourses, made little impact or took a long time to do so. Fleck's work in 1935, on the '*Genesis and Development of a Scientific Fact*', helps to explain this phenomenon.[36]

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[34] Marks-Maran 1999.
[35] Kuhn 1996.
[36] Fleck 1979.

A prevailing or predominant discourse is one largely accepted by a society and considered legitimate and altruistic. Once this is achieved, all its outworking and the power relations supporting it, appear quite natural and favourable and therefore, difficult to challenge. Formal schooling ensures the dominated classes learned to recognise legitimate knowledge by the devaluation of the knowledge and know-how they effectively commanded.[37] Bridget Jordan suggests this subliminal, socially-constructed rather than consensually-constructed ubiquitous effect served to provide a market for the desirable skills and products of the dominant classes. In this way authoritative knowledge is perceived not as relative and coercive, but as natural, legitimate and altruistic.[38] Ironically, the masses are usually actively involved in validating and reinforcing such knowledge.[39] This theory mirrors the effects of medical midwifery upon traditional practice in the eighteenth century.

2.13.1 Subjugated knowledge

Within the public domain, much midwifery knowledge was and remains subjugated and obscured by the dominant discourse of medicine. Following the period of the Enlightenment, traditional midwifery practices appeared to lack the degree of scientific rigour offered by medicine. Medical midwifery, later known as obstetrics, was enhanced by technical developments which polarised knowledge, leaving traditional midwifery to be regarded as lower-order or naïve knowledge:

> The idea is that technical specialists always work together to establish their field and its dominant ideas. These technical fields have had ever-increasing power over people, and these discourses have profoundly shaped the structure of our society' [40]

Bridget Jordan's description of authoritative knowledge suggests status may be more important to the adoption of knowledge than the validity of the knowledge:

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[37] Jordan 1997, pp. 56-61.
[38] Jordan 1997, p. 56-58.
[39] Jordan 1997, p. 57-9.
[40] Alix-Fillingham 1993, p. 101.

> ...for any particular domain, several knowledge systems exist, some of which by consensus, come to carry more weight than others, either because they explain the state of the world better for the purposes at hand (efficacy) or because they are associated with a strong power base ... and usually both.[41]

Looking back at the history of midwifery up until the late twentieth century, the ascent of the man midwife was disproportionate to the demise of the traditional midwife; midwives continued to deliver most women, although men midwives had far greater professional authority.

2.13.2 Midwives' knowledge as lower-order knowledge

Informal midwifery knowledge -- midwives' and women's lore, supported by experiential learning -- was marginalised by medicine and learned members of society. Such types of knowledge were considered tenuous and illusory, and were more difficult to locate than the all-pervading dominant discourse of male midwifery. Medical men were easily able to disqualify midwifery knowledge and to render midwives less visible within the social and also historical contexts. Indeed, the dominant ideology becomes so omnipotent that it slips into the unconsciousness of the population to become *a priori* knowledge or common sense. Writing a letter is a simple example of how people's lives are governed by pre-selected constraints; this personal and self-expressive act is not pure as it may seem:[42]

Discourse analysis attempts to expose such phenomena by identifying the '... forms of power which ... make us accept one version of events over another, or in the formation of common sense'.[43]

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[41] Jordan 1997, p. 56.
[42] Ritvo 2000, p. 38.
[43] Wilton 1999, p. 156.

2.14 Knowledge versus belief

Foucault described two different types of knowledge; physical and tacit (theoretical) knowledge; these are both dependent upon linguistic description and contrived by humankind. Tacit knowledge is a system of structure and representation used to facilitate interpretation of meaning and order.[44] Its three main constituents are knowledge, social relations, and social identity.

Ann Dally emphasised the difficulty of separating belief from knowledge, since belief determines knowledge that is sought or recognised, thus perpetuating certain beliefs.[45] Foucault believed that dominant discourses:

> ...work as instruments of 'normalisation', continually attempting to manoeuvre populations into 'correct' and 'functional' forms of thinking and acting [46]

The power of language to govern human lives should therefore not be underestimated.

2.15 Modern theories of scientific thinking

Ludwik Fleck (1896-1961) was a distinguished microbiologist and philosopher who studied the origin of scientific knowledge, using the disease syphilis as a case study. He discussed the genesis of scientific 'facts'. He argued that ... empirical observations that led to the construction and fixation of ideas were underpinned by special factors of deep psychological and traditional significance.[47] He also emphasised the role of anomaly and error in scientific discovery.[48]

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[44] Foucault 1970.
[45] Dally 1991, p. 37.
[46] McHoul and Grace 1993, p.17.
[47] Fleck 1979, p. 3.
[48] Summarised by Trenn T. J. in Fleck 1979, pp. 154-65.

The predominant discourses on childbirth have been heavily influenced by contemporary cultural and religious beliefs. Whilst some strong cultural beliefs were reconciled with new emergent theory, others evolved to forge new thought paradigms.

In ancient and medieval times pelvic theory appears to have been heavily influenced by spiritual beliefs about the process of birth and the purpose of life. With modernity, came a new type of thinking, rationality, which reconciled religion with a greater need to focus on the natural sciences in order to discover more about the workings of the human body. Nonetheless, ancient dogma influenced how people interpreted what they saw at human dissection for considerable time.

In Fleck's case study on syphilis, he described how two opinions had co-existed, an ethical-mystical disease entity and an empirical therapeutic disease entity. These contradictory perspectives finally combined in a manner which emphasised how empiricism might be compromised or displaced by an emotive apriority.[49] This explanation appears to explain why supposedly empirical facts, discussed in this thesis, such as the theory of pelvic bone separation, pelvic rigidity, or Caldwell and Moloy's four pelvic classifications, managed to survive in the literature long after their validity had been seriously contested and undermined by alternative discourses.

Fleck, and later, Foucault argued that ideas were not entirely attributable to individuals, but to collective thought, which allowed ideas to be developed from pre-existing ideas. Fleck also noted that ideas tended to be context-based; only existing as valid ideas within certain circumstances and reliant upon a network of supporting ideas produced by a thought collective. [50]

2.16 Maintenance of a dominant medical discourse

During the early modern period physicians worked to protect their own interests, and resisted the threats to their livelihood created by others, often designated as quacks or mountebanks. They managed to fend off rival groups including the homeopaths who

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[49] Fleck 1979, p. 5.

[50] A 'thought collective' as envisaged by Fleck is a group of like-minded individuals, steeped in the cognitive and social constructs of a particular thought paradigm see Fleck 1979, p. 39.

desired to be incorporated into orthodox medical practice.[51] Although disagreement was permitted, doctors risked their careers if they associated with quacks, who were considered subversive to science.[52] The proponents of 'proper' medical science had control of the medical schools and were entrusted to develop medical practice.

2.17 Postmodernist historical research

A postmodernist philosophy has encouraged the wider recognition of the existence of competing ideas, and the fragmentation of ideas has become more acceptable than in the past. Multiplicity has replaced progressivism, discontinuity has replaced continuity and superiority and inferiority are being replaced by difference.[53] This constructivist approach reduces tensions between competing ideas and negates previous beliefs about linear progression.[54]

Anne-Marie Rafferty suggests that the postmodern project, within academia challenges the possibility of whether history is possible at all. The emphasis on language, discourse and scepticism of authorial authority has led to the rejection of the possibility of historical truth or objectivity by some authors. [55]

Science and rationality were and remain superior discourses to narrative discourses in society. This notion has been widely criticised and deconstructed to demonstrate that they are no more credible than other types of discourse, although they are valued much more by society. Post- modernist philosophers have however been accused of sharing certain tendencies to adopt a philosophy.[56] They cannot get away from the notion of some form of theory of knowledge based upon the modernist notion of transcendental reason ... independent of history, location and the body. As Michael Traynor suggests, they appear to be sawing off the branch of the tree they are sitting on.[57]

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[51] See Weatherall 1996, p. 186.
[52] *ibid.*
[53] McHoul and Grace 1993, p. 10.
[54] *ibid.*
[55] Rafferty 1997.
[56] Traynor 1999, pp. 21-46
[57] *ibid.*

2.18 Authority of texts

Books became the most popular media for conveying information to the masses with a sense of authority. The long reign of the ancient literary discourses are attributable in part to the manner in which ancient knowledge was transferred to the West; described in Chapters Three and Four. It is interesting to note how ancient birthing wisdom was so readily assimilated by other cultures in different locations and in later time periods.[58] Subsequent translations of midwifery knowledge, assisted by advances in printing and the increased availability of books, led to a wide appreciation of the ancient tenets of midwifery wisdom in the West. Exactly how much of this was adopted or used by individuals in the manner intended by the authors is difficult to establish.

The English midwifery literature consisted of much foreign material until the eighteenth century, when men-midwives (and a minority of traditional midwives) began to produce more of their own texts. It was at this point in the post-Vesalian period, discussed in chapter five, that perceptions of the pelvis became an integral part of midwifery theory.

The early modern medical texts were comparatively stylish compared with some of the popular handbooks aimed at traditional midwives and women, which were produced on more modest budgets. The eighteenth-century anatomical atlases of William Smellie (1697-1763)[59] and William Hunter (1718-1783)[60] epitomized dramatic improvements to the quality of contemporary medical publications, simultaneously linking their status to high culture and art.[61] Similarly, the impressive medical terminology and theories[62] emphasised medical pre-eminence, whilst the midwife authors believed men-midwives had exaggerated their achievements. The literal manifestation of professionalisation took the form of a protective delineation between medical knowledge

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[58] A new book exploring *The Byrth of Mankynde* has just been published: Hobby E. 2007, *The Byrth of Mankynde: Literacy and Scientific Cultures of Early Modernity*, Aldershot: Ashgate.
[59] Smellie 1787.
[60] Hunter 1794.
[61] See Jordanova 1989, pp. 143, 183.
[62] Fielding Ould (1710-1789) of Dublin, followed by William Smellie, reduced the process of birth to mechanical principles. See Ould 1742 and Smellie 1752.

and other forms of wisdom. The complex jargon aimed to deter women and midwives from engaging with doctors on an equal footing.[63]

In comparison, the popular medical handbooks (chapbooks) on childbirth, addressed to midwives and women[64] contained a mix of watered-down versions of medical texts and ancient birthing theory, including the occasional poor-quality illustration.

The medical texts on birth displayed graphic illustrations of normal and abnormal pelves until the mid-twentieth century. These conveyed compelling evidence that the pelvis could be hazardous in childbirth and of the need for all to become familiar with its normal structure. In these subtle ways, pelvic theory re-affirmed the need for midwifery to become a recognised medical specialism.[65]

Despite the decline in pelvic bone disease and contraction after the 1930s, pelvic theory remained at the core of essential midwifery theory.

2.19 The literary world of obstetrics (1800-2000)

The main discussion focuses on the post-Vesalian texts. Print became a fashionable medium especially during the eighteenth century, when rising numbers of British medical men became authors. The eighteenth century saw the launch of newspapers, popular journals and journals of learned societies. By 1800 over thirty medical journals and journals of medical societies had been launched. Textbooks formed an integral part of medical education, providing basic knowledge for practice, whilst journals were used to disseminate expert knowledge, exchange professional opinions and discuss new work.[66] Whilst journals were at the cutting edge of nineteenth- and twentieth-century medicine, including obstetrics, textbooks began to reflect or dictate standards of practice, which only senior doctors might choose to ignore.

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[63] Midwives could purchase lectures from medical men, although these might be diluted versions of medical lectures, sometimes lacking in essential information.
[64] Medical authors seemed to address midwives along with women in general, undermining any authority midwives had with their client group.
[65] The 'British College of Obstetricians and Gynaecologists' was established in 1929 (later became the 'Royal' College).
[66]See Porter 1992b.

As can be seen in Chapter Nine from the insight given by Joseph De Lee in the early twentieth century, the role of a medical journal editor was a powerful one. Editors acted as gatekeepers of the public domain and chose which pieces of research entered through this portal into local, national or international circulation. They thereby had an opportunity to shape and regulate professional knowledge. They also had the personal authority to override opinions of particular authors, by editing their work, commenting on it or deferring or blocking certain pieces from appearing in their journal, especially contentious papers which challenged the status quo.

In contrast, until the late twentieth century, midwife-authored texts and journals were much slower to get off the ground and lacked distinctiveness. *Midwives Chronicle and Nursing Notes* was founded in 1887, and nursing journals such as *Nursing Record*, (later the *British Journal of Nursing)* and *Nursing Mirror and Midwives Journal* included sections on midwifery. It was therefore made easy for medicalisation, supported by advances in technology, to encroach year on year into what was previously considered normal childbirth, whilst midwives and women looked on.

3 The Invisible Pre-Vesalian Pelvis: Ancient Discourses on the Process of Birth

3.1 Introduction

The aim of this chapter is to identify some of the ancient ideas about the process of birth, which underpinned birthing theory. This account will begin a series of ventures, continued in subsequent chapters, into the changing importance and perceptions of the role of the pelvis in childbirth. Whilst the pelvis was believed to play a part in facilitating birth in ancient times, its role was chiefly assumed.

It is worthwhile at this point, to explore some of the underpinning philosophical ancient beliefs about the process of birth which had a bearing on the contemporary birthing theories of later generations. Many ancient ideas were later adopted by other cultures and incorporated into Western* birthing theory in the medieval and early modern periods.[1] The surviving ancient Greek medical tenets of knowledge were generally considered as definitive up until the time of Vesalius when the 'medical renaissance' began.[2]

The discussion will begin with an introduction to the context within which ancient birthing theory flourished, before specific discourses are examined. The discussion most notably reveals the minimal importance of the pelvis and indeed of anatomy and physiology to early birthing theory.

3.2 Problems of translation and interpretation

Although the number of extant ancient texts is limited, many ideas have lived on in later works. However, some of the original intentions of authors may have been obscured by careless replications, inaccurate translations, and selective editing. Despite significant gaps in the historical record, certain themes recur and particular authors' names or texts are cited in later works, providing an indication of the popularity and durability of certain ideas and the extent of their dissemination.

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[1] See Worboys 1997, p. 249.

[2] Anatomy began to influence medical knowledge to a greater extent; see Cunningham 1997.

A basic exploration of the cultural, spiritual, and medical contexts of ancient birthing theory assists with the understanding of their rationales. The further back one goes, the greater the difficulties with textual interpretation. Likewise, the context within which texts were written is also difficult to reconstruct.

Surviving ancient manuscripts require specialist interpretation, outside the remit and capability of this author. This chapter has therefore relied more upon secondary sources and personal communication with experts than other chapters.

3.3 Birthing theory in antiquity

In great contrast to contemporary Western medicine, the earliest available references to ancient Egyptian, Babylonian, and Mesopotamian childbirth emphasise a spiritual notion of birth in which evil forces, able to determine the outcome of pregnancy, were a constant threat to childbearing women. Explanations for long labours tended to be based upon spiritual, mystical, and astrological conditions and references to a narrow birth passage or a 'sealed womb' were symbolic rather than physiological.[3]

In Pharaonic Egypt and classical Greece, predictive prognoses were commonplace, and a way of establishing if a woman was able to give birth was to place an onion bulb near her vulva overnight, to see if the onion odour would pass through to her mouth the next day.[4] This test was based upon the belief that the reproductive tract was part of a long tube extending from the mouth and nose to the orifices of the external genitalia and rectum, thus the smell of onion reaching the woman's mouth would suggest that her birth passage was patent and she was capable of giving birth.

The Mesopotamian society believed certain devils were out to capture and kill newborn babies, and that sorcery and curses were powerful enough to cause misfortune in pregnancy. The medical exorcists devised measures to protect women and counteract any ill effects of this nature. They used prayers, talismans, and birthing rituals to appease the

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[3] Stol 2000, pp. 118-37.
[4] von Staden 1989, p. 21.

gods. Amulets such as the eagle stone, which was believed to hold magnetic properties, could be used to help retain or draw out a recalcitrant fetus.[5]

3.3.1 Difficult labour

Information discovered on clay tablets written in cuneiform* writing, shows the Mesopotamians (c.1894-1595 BC) were aware that difficult labour might be caused by a narrow birth passage. They referred to 'she who has been made [too] narrow'[6] and offered recitations to such women to assist them in giving birth. An Assyrian incantation envisaged the mother as facing defeat in battle and requested the bringing forth of 'the sealed up one'.[7] Herbal medicine was available from a type of physician called a *shîpu* (previously described as a sorcerer) when called upon by the midwife.[8] The modern concept of uterine contractions was generally perceived on a metaphysical level and not described in the texts, but wombs giving birth to children were.[9] The Mesopotamians believed the gods could bind a womb so as not to allow the infant through. They made analogies between obstructed birth and doors being locked or bolted. One explanation for obstructed birth was that the gods used it to counteract human over-population. Whilst the Mesopotamians recognised that if the fetus was truly stuck, the woman's life could be at an end, the *shîpu* focussed treatment upon the mother's psyche.[10] A form of visualisation therapy was used, in which delay was likened to a boat being held by mooring ropes which had to be cast free with permission of the gods in order for birth to proceed.[11] Physical assistance was offered in the form of herbal potions[12] and abdominal and loin massages, using the bare hands or a type of stick to produce downward pressure.

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[5] See Stol, p. 50. Also Scurlock 1991, pp. 137-85

[6] This may suggest that certain women were created narrow from birth or were made narrow by the gods or as a result of certain physical conditions; Scurlock 1991, also Scurlock, personal email communication, 3rd May 2001.

[7] Scurlock 1991, p. 144.

[8] Scurlock, personal communication 3/5/2001.

[9] *ibid.*

[10] Scurlock suggests that the *shîpu* aimed to convince the mother that she would survive the experience. Scurlock 1991, p. 158.

[11] Scurlock 1991, pp. 140-3.

[12] Evidence from Jerusalem in 4 AD suggests that cannabis was used to increase uterine contractions and reduce pain: Stol 2000, p. 136.

They also greased the woman's vulva to release obstructions.[13] Specific lotions were made for massaging, based upon folkloric recipes (for example, dust from a leaky drainpipe, fallen dust, hailstones). These materials were associated with analogies of things 'flowing' and, combined with visualisation, they aimed to suggest to the mother a freeing up of the birth canal, and a release of the bindings delaying birth.[14]

An old Babylonian text referred to a baby being 'pulled from the womb'.[15] So far, historians claim not to understand the meaning of this. Initially it was believed the caesarean operation or forceps were used, but these were unlikely to have been used at this time.

It may be argued that the pulling referred to the use of *internal podalic version** (IPV), which was a known early method of fetal extraction, involving manual manipulation of the fetus, locating and pulling down the legs first.[16]

3.3.2 Birth as a spiritual experience

Treatments of difficult labour, of course, reflected ancient understanding of the birth process, which involved the use of analogies and signatures from nature and the cosmos. Consequently terms such as 'being made too narrow or a sealed womb' suggest delays in labour may have been caused by problems of a supernatural nature, un-amenable to invasive manual intervention by attendants.

It is easy today for westerners to underestimate the power of mystical influences in deeply spiritual communities. The types of therapy administered to mothers in familiar surroundings, amongst people they knew, may have had positive or negative effects on women's abilities to cope with long and arduous labour. Potent mind-altering herbs were also available.

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[13] Scurlock 1991.
[14] *ibid.*
[15] See Stol 2000, p. 128.
[16] Soranus appears not have been the first to describe the procedure. See Temkin *et al.* 1956, Graham 1950, and Rhodes 1995.

In classical Greece, religious and secular medicine co-existed, and shrines and temples built in honour of various gods were viewed as places where the sick or needy could go to pray and rest, in the hope of being cured of their sufferings.[17] Women prayed to the goddess Artemis when in labour, who encouraged them to submit to their primal instincts and give birth. The clothes of women who died giving birth were offered to Artemis at Brauron.[18]

3.4 Classical Greek and Greco-Roman schools of medicine

Throughout antiquity, physicians were not a homogeneous group, and different epistemological schools of medicine, with distinct medical philosophies, flourished in certain time periods at particular locations.[19] The Hippocratic school of medicine is generally regarded as the earliest, marking the dawn of rational, empirical medicine, but still quite different from the medicine we know today. The Hippocratic physicians viewed the human condition as relative to the position of other creatures in the universe, humans being but one of many living species, while the Aristotelian perspective viewed 'man' as superior to other species and to women. The Greeks were known during the Greco-Roman period for their skills in medicine. Around 3 BC, Greek doctors travelled to Alexandria (a centre of medical learning) and to other parts of the Roman Empire to work as itinerant physicians.

The Hippocratic corpus was the most substantial collection of ancient medical manuscripts; it was produced by various unknown authors and compiled over several hundred years, mainly between 420-370 BC .The wide time span over which the corpus was compiled gives rise to contradictory evidence within it.[20]

The Hippocratic scholars wrote relatively little on childbirth, which was perceived as being governed mainly by external loci of control. These included the influences of culture and religion and beliefs about nature and astrology, combined with theory.

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[17] Nutton (1995) discusses Greek medicine.
[18] See Baring and Cashford 1993, pp.325-327.
[19] On medical doctrines, see Porter 1997a, pp. 50-54.
[20] King 2001, pp. 9-11.

Whereas the Mesopotamians blamed the gods entirely for ill-health, Hippocratic physicians were inclined to blame health problems on an imbalance of body humours (*dyskrasia*), altering the equilibrium of the body (*eukrasia*).[21]

3.4.1 Humoral theory

Although there are variations between Hippocratic, Galenic, and medieval humoral theory, the principles remain the same. It reflected the relationships between individuals and the macro-environment, and was based upon the precept that the body comprised four types of fluid (humours): *blood; yellow bile; black bile*; and *phlegm*. These corresponded to *hot, dry, cold* and *moist* humours. Too much of one or more humour would alter the body's moisture content and temperature, making a person prone to particular types of illness. Women appeared to have greater natural tendencies towards ill-health.[22]

Various other associations were linked into humoral theory during the Roman period, such as associations between the humours and the four annual seasons, four ages of man, and four tastes.[23] This knowledge could then be used to predict potential imbalances, which might be avoided by modifications to the diet in the first instance.

Treatments of illnesses focussed on restoring balances in the body humours. This was achieved by alterations in regimen, such as dietary changes, new regimens of rest or exercise, the use of aperients, emetics, and blood-letting to adjust and restore the body's equilibrium.[24] Medical preparations, sometimes combined with folkloric therapies, were held in reserve as second-line treatments. Surgical management was a last resort, generally limited to the treatment of trauma.[25]

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[21] Polarity and analogy were features of early Greek philosophy, and the theory of opposites extended to the human body. Males were associated with the right side of the body, and females with the left. See Lloyd 1966.

[22] See King 2001, pp.13 -14 and Porter 1997a, p. 58.

[23] See Nutton 1995, pp.23-25 for an explanation of the development of humoral theory in medieval England. Also see Rawcliffe 1999, pp. 33-57.

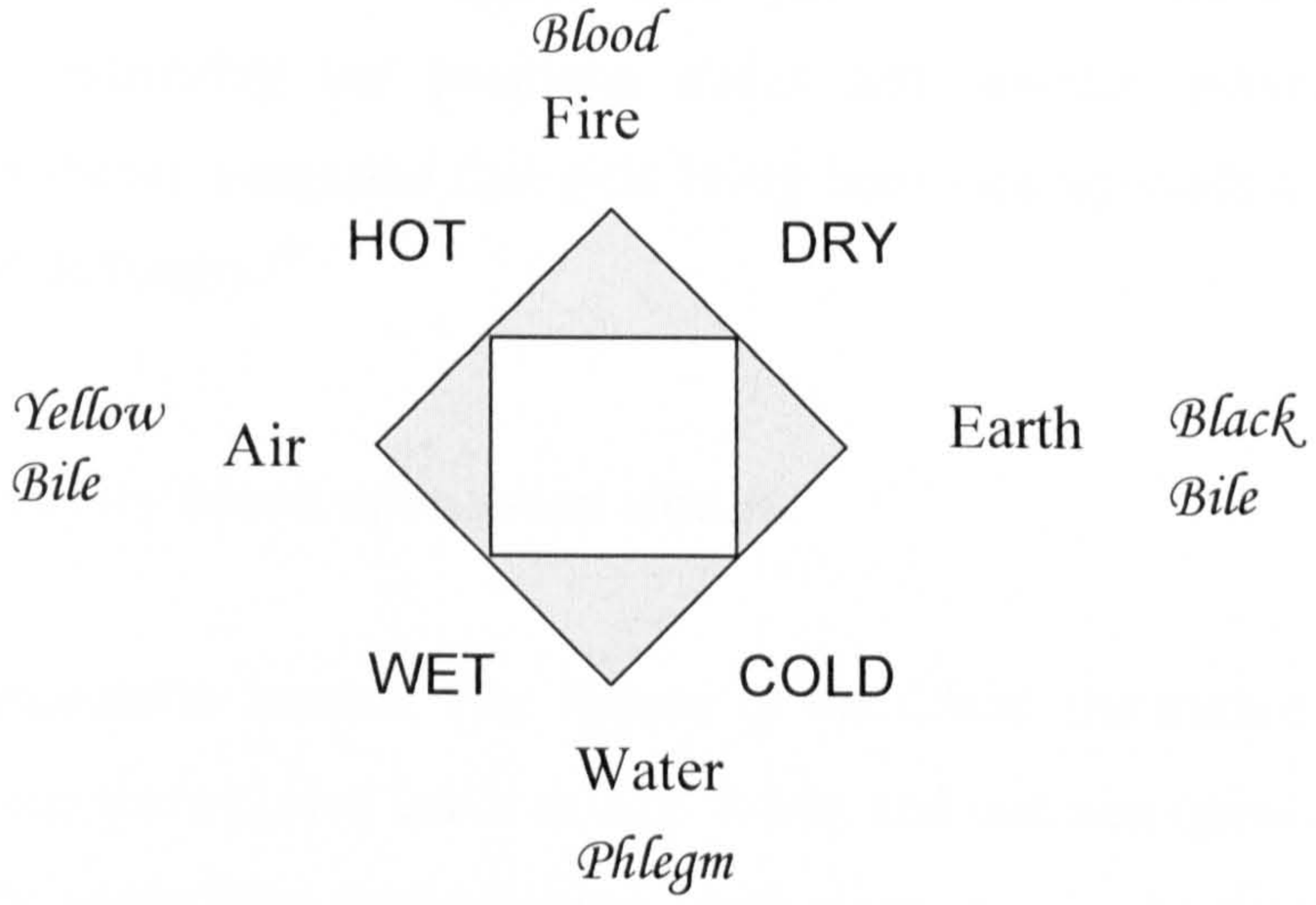
[24] See Lloyd 1978, pp. 21-37, 272-6

[25] Hooks and pulleys were sometimes used in cases of obstructed labour in an attempt to remove the fetus, see Temkin *et al.* 1991, pp. 71-2.

Figure 3.1

The Four Body Humours and their Correlations with the Four Elements and the Four Qualities [hot, cold, warm, dry].

(After Singer 1928, p. 34)



3.5 Female weakness and vulnerability

Although women and men shared the same basic anatomy, regulated in the same manner, their bodily constitutions differed in humoral terms. Men were physically hot and dry, making them strong and vivacious.[26] In contrast, women's flesh was porous and retained more fluid (wet and moist) which made them more prone to illness, although menstruation[27] and lactation helped counteract excesses.

In some texts, women were thought to produce seed [semen] like men, but of a weaker strain.[28] In the Hippocratic book, *On Generation*, female embryos and fetuses

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[26] King 2001, pp. 13-14.
[27] *ibid.*
[28] Commentary by Lonie 1981, pp.119-22.

were portrayed as weaker and slower to develop. Mothers were blamed for any problems arising, such as small or abnormal babies.[29]

The idea that female infants caused more problems may explain the lack of enthusiasm for identifying and managing prolonged labours, as female lives were not seen as being as precious as male lives. Indeed, Greek fathers could choose whether or not to welcome a daughter, and the cultural mind-set of female inferiority sanctioned female infanticide.[30] The Babylonian/Jewish Talmud[31] suggested that girls were born face upwards and boys face downwards, mirroring the positions males and females assumed for sexual intercourse.[32] The theory suggested that girls being born face upwards also caused more maternal pain and difficulty.[33]

3.6 Birthing theory based upon avian studies.

In the Hippocratic treatise, *The Nature of the Child,* the author advised that if twenty or more eggs were placed under several fowls, and one was opened and examined every day from the second day until hatching, 'with allowances', the similarities between the chick and the human fetus would be evident. The fact that both humans and hens had membranes and an umbilicus were given as evidence of this.[34]

The healthy fetus was perceived as proactive in the timing of its birth and its ability to fight its way out of the womb (hereon known as the active fetus theory):

> *Once the child is on its way, it forces a wide passage for itself through the womb, since the womb is resilient* [35]

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[29] Lonie 1981, pp. 10-13.
[30] The Egyptian Oxyrhynchus papyrus 1BC suggested female infants were either adopted or left to die of exposure, see Demand 1994, also www.house of Ptolemy.org/house002.htm#SCIMAT – accessed on 2/10/04.
[31] The Talmud is an ancient Jewish book of law and tradition. The redaction of the Babylonian Talmud is thought to have been completed around 500 AD.
[32] This presumption was denied by an Egyptian midwife who suggested most infants were born facing downwards, see Stol 2000, p. 128.
[33] Soranus does not mention fetal sexual differences as a cause of delay but suggested birth was easier if the fetus descended facing downwards (towards its mother's back), see Temkin *et al.*1991, p. 75.
[34] Lloyd 1978, pp. 324-46, p. 341.
[35] Lloyd 1978, p. 342.

A chicken's hatching behaviour was compared with attempts of the human fetus to rupture the membranes and break free. The chick was observed to initiate hatching when it had exhausted the nutrition available in the egg albumin. It then moved about violently, breaking the membranes and shell. The hen might respond and peck at the shell from the other side.[36]

The ancients believed prolonged labour might be caused by thick membranes, 'too tough' for the fetus to break. This was recorded in medical texts, as a cause of difficult childbirth, until the eighteenth century.[37]

3.7 Ancient Greek perception of the mighty fetus and expandable pelvis

The pelvis was viewed as facilitative of birth, and thought to separate at the symphysis pubis, to allow fetal egress. However, the ancients were not very interested in internal anatomy, and the womb and pelvis tended not to feature prominently in Greco-Roman birthing theory.[38] The womb was usually viewed as a passive container and uterine contractions were briefly mentioned.[39] The use of analogy was a common feature of Greek science despite the difficulties of over-stressing certain similarities or ignoring particular differences.[40] The womb was likened to the shell of the egg: an inert porous vessel containing the developing chick (child) within membranes and without an active role in the hatching (birth).

The phenomenon of pelvic bone separation at birth was first described in the Hippocratic corpus.[41] Soranus suggested that in rare cases stiffness of the separating ligaments associated with 'hardness of the body' caused delay in labour. Soranus

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[36] Lloyd 1978, pp. 341-45.

[37] If an egg was accidentally cracked and the chick did not immediately begin to hatch, the membranes would harden at the point where they came into contact with the air, and the chick would later find it impossible to break the membranes and hatch itself. This may have given rise to the ancient condition of 'tough membranes' which was described as a cause of long labour.

[38] Only brief references were made to uterine contractility and a rigid pelvis, see Temkin *et al* , p. 177..

[39] The womb is described as being unable to hold back the child once the membranes have ruptured. Uterine atony is referred to by Soranus, see Temkin *et al.* 1991, p. 177.

[40] See Lloyd 1966.

[41] See Lloyd 1978, p. 344, 'The Nature of the Child'.
In 1778, Alphonse Le Roy suggested Hippocrates claimed pains in the loins which women feel during labour, originated from the posterior articulation of the pelvis. He also claimed that elsewhere in the Hippocratic corpus there was an emphasis on the separation of the anterior portion of the pelvis (pubic separation) at birth. See Le Roy 1778, pp. 8-9.

specified the place of separation as being where the two bones of the os pubis met.[42] He claimed women's pubic bones:

> ...do not fuse into a solid joint as in men, but are bound to each other by a strong ligament [43]

These ligaments were thought to become rigid in later reproductive life and cause delays in labour in older women.

The possibility of a fetus being incarcerated within a narrow bony pelvis was not alluded to in the literature. If a fetus did not manage to get itself born it was assumed to be weak, destined not to survive, or badly positioned, having become lodged in the birth passage. This may have merited an attempt to pull the fetus out.

Judging by Soranus' text, midwives seemed to have been intended recipients of at least some medical instruction during the Greco-Roman period. Whether this was an aspiration or a reality is uncertain. Soranus desired midwives to be literate, although there is no evidence that they read medical treatises or incorporated medical instruction into their practice.

3.8 Care of women in labour in classical Greece

Male partners were often involved in gathering equipment for birth, which was usually attended by female birth attendants. They were sometimes asked to help physically support partners during sucussion,* when this process was used to hasten a birth.[44] Whilst women's modesty and their shyness were alluded to, there was a market for specialist midwifery care, open to various types of healers. Some traditional forms of practice involved male attendants administering therapies or manual assistance. Midwives utilised birthing stools[45] and may have assisted with the birth by forcibly

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[42] Soranus, see Temkin *et al.* 1991.
[43] Temkin *et al.* 1991, pp. 181-2.
[44] See Ellis 1994, p. 160.
[45] Squatting over birth stones was commonly practised in ancient Egypt, Mesopotamia and Babylonia; sitting on a birthing stool was most common within the Greco-Roman empire.

dilating the birth passage.[46] Analogies in the Hippocratic writings described the hen pecking the shell from the outside to assist the chick with hatching, which may be likened to the perceived role of the midwife forcibly dilating the cervix during difficult birth to assist delivery.

Apart from physical manipulations and sucussion*, charms, fumigations, and herbal remedies were used within the boundaries of humoral medicine. In a final endeavour to deliver a woman, hooks and crochets might be applied to remove the fetus (or fetuses), which were probably already dead. This may have saved the mother's life or simply delayed her eventual death from trauma, haemorrhage or infection. In ancient Greek culture, birth was an opportunity for women to 'prove themselves', and death in childbirth was an honourable state paralleled with death in battle.[47] In the classical Greek period, birth appeared to be a multidimensional phenomenon in which the physical explanations for long and difficult labour might not have been the only consideration. However, physiological explanations of the process of birth were becoming of greater interest to physicians.

Physicians were an elitist group who lacked clinical experience of 'gynaecology' (inclusive of midwifery) and it has been suggested some may never actually have seen a baby born.[48] In difficult cases they might have acted as consultants to midwives, supplying theoretical solutions based upon conjecture. Their working relationships with midwives may have been symbiotic: the midwives taking theoretical advice, applying it and feeding back on its efficacy to the male authorities.[49] In this way men could learn about clinical practice from midwives and of 'women's lore' on reproductive matters. In Hippocratic theory, the pain arising from the process of birth was attributed to 'distension of the loins and the hips', initiated by the fetus.[50] This was thought to be worse for women having a first child. Whilst pain was accepted as part of the process, in times of

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[46] Soranus – Temkin *et al.* 1991, pp. 72-3.
[47] King 1998, p. 124.
[48] Lonie 1981, pp. 244-52.
[49] Prostitutes also acted as sources of practical information on the treatment of abortion, difficult births and gynaecology, see Gazzaniga and Serarcangeli 2000, p. 39.
[50] Lloyd 1978, p. 344.

great need physicians could administer pain relief, although crude measurements of dosages meant their ministrations sometimes proved fatal.[51]

3.9 Fetal malposition

The fetus appeared to be responsible for its own birth, fighting its way out, although delay might occur if the fetus was misaligned:

> If the infant's momentum is in the direction of the head, the birth is easy for the mother. But if it comes sideways or feet first (this happens either because the size of the womb has given it space to move or the mother has not kept still at the beginning of her birth 'pangs') the birth is difficult and often fatal, either to the mother or child or both.[52]

A roomy uterus was identified as a cause of fetal misalignment. The mother was blamed for 'not keeping still' at the beginning of labour. The effects of a misshapen womb upon fetal egress are not discussed.[53] A constricted womb was described as being capable of affecting fetal growth and causing deformity at the level of constriction. The possibility of the size or shape of the pelvic bones affecting the size and shape of the birth passage was not considered.

3.9.1 Images of the fetus in the womb

Early symbolic representations of the fetus such as Figures 3.2 and 3.3 (overleaf) are found in many of the manuscripts and treatises on childbirth from 9 AD until the mid eighteenth century. The images were probably drawn by artists with little anatomical knowledge. They comprised sets of abnormal birth positions, usually with male homunculi (fetuses of adult bodily proportions) in a range of unusual postures, in thin-walled, roomy uteri.

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[51] King 1998.
[52] Lloyd 1978, p. 344.
[53] *ibid.*

In the pre-enlightenment era, anatomists had not described the curve of the birth canal, and many illustrations of the pre-enlightenment era depict the fetus in a fully outstretched position inside a large roomy uterus lying absolutely straight. The images may have been used to demonstrate types of difficult births, or they may simply have been included for their aesthetic value.

Fetuses were often described as normally lying 'in a straight line',[54] preferably as a cephalic (head first) presentation. It was believed that fetuses presenting by the head (sometimes by the feet, depending on author) and correctly 'aligned'[55] in the uterus, would deliver normally.

The representations appear to suggest a deep interest in the contents of the womb and, by its notable absence, less interest in the body of the woman as a whole.[56]

Figure 3.2 A 'Cats Head' Uterus From a Muscio manuscript
900 AD Brussels MS 3714, source: *Temkin O, trans. Soranus' Gynecology © 1991 The John Hopkins University Press. Reprinted with permission of The John Hopkins University Press.*

Figure 3.3

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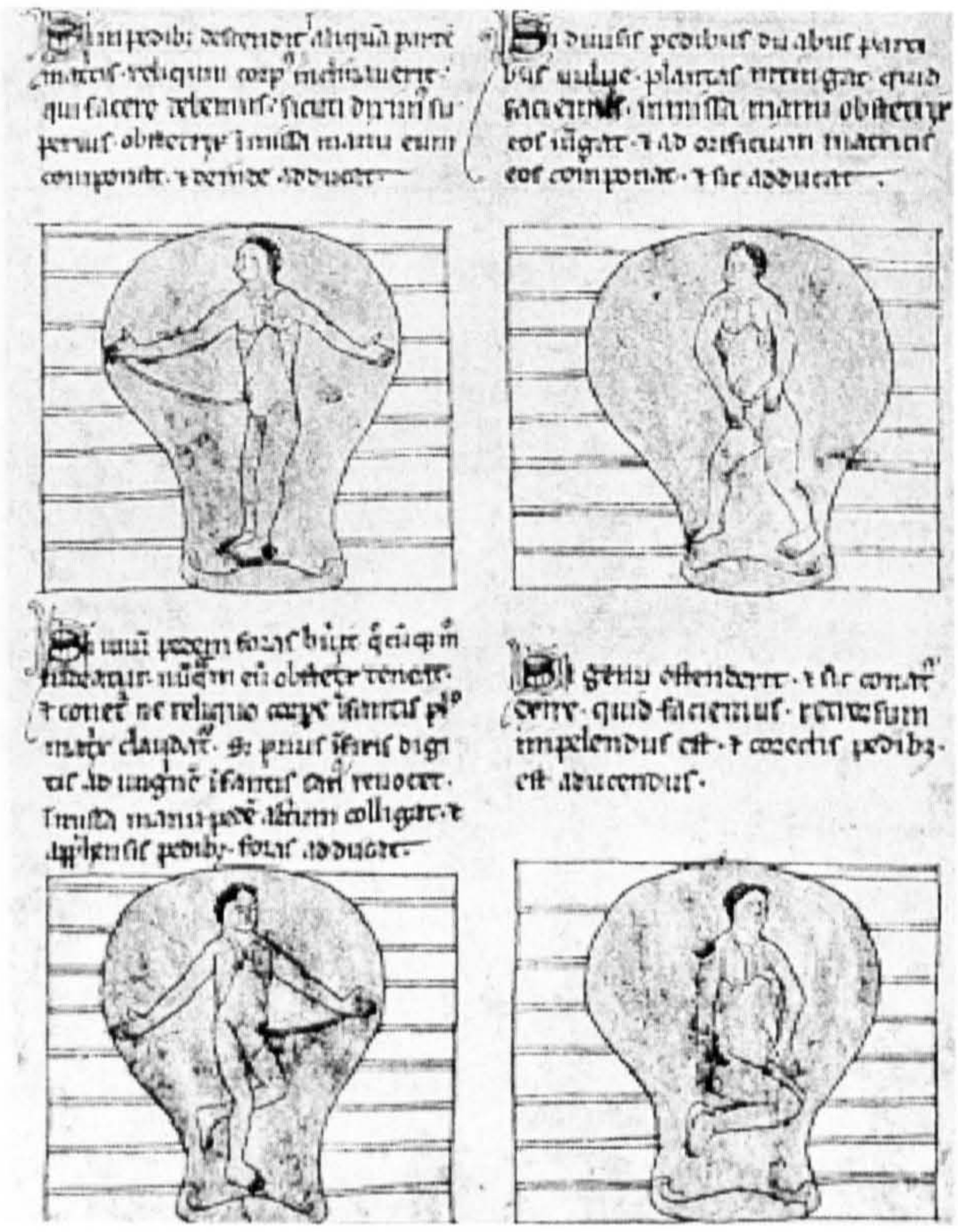
[54] Temkin *et al.*, p. 179.
[55] The term *fetal alignment* described a position in which the fetus lay in a *straight line* with hands by its sides.
[56] See Newman 1996.

Homunculi in 'wombs'
Reproduced with permission: Wellcome Library



3.10 Failure of the fetus to force its way out

When a fetus died in the womb it was assumed to have been too weak to get itself born. However, according to Walter Radcliffe, a Hippocratic text suggested,

> ...failure of the child to force its way out…could be helped if the feet could be drawn down or pulled upon (internal podalic version or IPV) [57]

If this is so, it pre-dates Soranus' work, which is generally considered as being the first to describe internal podalic version (IPV).[58] The technique would have required great skill, and might have been used before resorting to destructive procedures to try and

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[57] Radcliffe 1964, p. 2.
[58] Soranus corroborates this by suggesting the procedure was used by his predecessors. Soranus – Temkin *et al.* 1991,.

deliver the fetus. It is likely that in such situations the fetus would be dead, although delivery might have saved the mother's life.

The practice of post mortem caesarean was not discussed in the Hippocratic or Soranic works, although there is evidence that post mortem caesareans had been carried out as early as 715 BC.[59] Early Jewish references suggest that caesareans may have been successfully carried out on live women.[60] The *Lex Regia* was a Roman law which stipulated that mothers dying in childbirth should not be buried undelivered because of the remote possibility of saving the child if it were still alive.[61] The practice is also documented in Byzantine law. At this time, post mortem caesarean was the province of midwives or surgeons and not physicians. Consequently, they were not documented in medical treatises until the medieval period, when the feasibility of carrying out a caesarean on a living woman was seriously contemplated.[62] During the intervening period, post mortem caesareans may have allowed midwives to observe some of the mother's internal structures, but their significance to onlookers would have been limited.

3.11 Anatomical knowledge of the human female reproductive system.

Apart from the incidental study of dead and wounded bodies, human dissection was widely banned in antiquity. For a relatively short period of time between 3 BC and 1 AD, human dissection was permitted in Alexandria under the kingship of Ptolemy II.[63]

During this period medical practitioners were a heterogeneous group, with some sects relying very little on anatomical references. Herophilus was known to have carried out some important work on human birth, to which Soranus and others subsequently referred.

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[59] Referred to in India in 5 BC.
[60] Blumenfeld-Kosinski 1990.
[61] Blumenfeld-Kosinski (1990, pp. 1-47) also suggests that the *Lex Regia* (715 BC) was documented in Byzantine law. Similar practices were referred to in India in 5 BC and in early Jewish culture, where caesareans might have been successfully carried out on live women.
[62] Blumenfeld-Kosinski 1990.
[63] Edelstein 1935, pp. 235-249.

3.12 Herophilus' work on childbirth

The work of Herophilus underpinned much ancient midwifery practice, although his name is rarely mentioned in the historiography of ancient gynaecology. Herophilus is described as a Dogmatist* and is reported to have had many followers around 3BC to 1BC.[64] He wrote a text, *Herophilus' Midwifery or on Delivery,*[65] in which he discussed reproductive anatomy, physiology, and pathology. Only a fragment of this work remains, although he was widely quoted in subsequent texts written by Demetrius the Herophilean, Soranus of Ephesus and Paul the Aegian. Based on his dissections, Herophilus challenged the Hippocratic notion of the wandering womb[66] and described a number of causes of difficult birth. He divided the latter into three categories: 'internal conditions' which included maternal and fetal irregularities; 'external conditions' (conditions external to the uterus); and fetal causes. These are summarised and presented as tables, based upon the work of Heinrich von Staden[67] (see Table 3.1).

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[64] Temkin *et al.* 1991, pp. xxx-xxxviii.
[65] von Staden 1989, p. 296.
[66] Potter 1976.
[67] von Staden 1989, pp. 298, 369.

Table 3.1
A Summary of Causes of Difficult Birth

Summary of Causes of Difficult Birth from '*Herophilus: the art of medicine in early Alexandria* ... (after von Staden 1989, pp. 298, 369).
Internal conditions contributing towards difficult birth
• First labours • When the neck or its orifice (cervix) is not distended sufficiently • When the uterus or its orifice is slack (atonic) • When the membranes are too thick and not capable of being broken before birth • Multiple births; twins; triplets; and quintuplets
External conditions (external to the uterus): things that happen to one, things consumed, things done ...
• Diet • The nature of one's activities • Discharge of too much *blood - like moisture* • Excessive heat or cold • A tumour or abscess in the intestines • *'Concavity'* of the loin or spine • Excessive fat in the upper abdominal cavity or on the hips • Difficult labour also occurs if the uterus is 'squeezed' or distended by the fetus • Through pain of birth
Fetal causes
• Over-sized fetus • Small and light weight • Large-headed or monstrously malformed - for example two-headed • A weak or dead fetus, incapable of proceeding to the outside • Several fetuses (multiple pregnancy also considered a maternal cause of difficulty) • Oblique position of the fetus • The fetus is not arranged naturally and the shape of its shape of its body is *not at the right angle to the exit*

These causes are echoed by Demetrius the Herophilean (follower of Herophilus) who was cited by Soranus.[68] Many conditions were believed to be relieved by physical and psychological relaxation of the mother. Herophilus noted that emotional states could affect the progress of labour, and so things that happened to a person or were done to them could affect their bodily responses in childbirth. Apoplectic or lethargic women,

[68] See Temkin *et al,* 1991, p. 178

and those leading 'luxurious lives', were particularly vulnerable to problems. Women alarmed to be pregnant, or those that were ignorant about the nature of birth or who did not 'co-operate with pain in their labour' may have been at risk of difficulties emanating from the psychic faculty.[69] Soranus subsequently expanded upon these causes.

3.13 Soranus' *Gynaikeia* and the Management of Long and Difficult Labour

Soranus (AD 98-138) is credited with writing the most detailed of ancient manuscripts on childbirth, the *Gynaikeia*, in which he referred to the ideas of his forerunners. In the section on difficult birth, he referred to Herophilus, Diocles the Carystean,[70] and Demetrius the Herophilean. The first thing Soranus recommended was for the physician to question the midwife about the labour in order to establish a general cause. For a maternal cause, the first line of management was relaxation of the mother:

> *Whether it is caused by constriction and contraction of the region through which the fetus is to travel, or by coldness or heat of the atmosphere, or by hardness of the body or because of a concavity of the loins, or a naturally small uterus, or because of conceiving too early in life, or because of the burden of fat, or because of compressing tumours, or grief, or fear, or bending of the neck [of the womb] or inflammation or dryness, or whatever other cause, one should first promote ease and relaxation.*[71]

Many of the above causes had been described earlier by Herophilus. Soranus explained problems from the Methodist* (atomic) perspective, suggesting all difficulties were underpinned either by constriction or contraction. Loss of general tone was thought to occur when there was: 'much fleshiness and viscosity of body fluids causing narrowness of ducts and retention of fluids with loss of tone'.[72] There were other maternal causes of what would now be described as dystocia (the modern term for difficulty in labour) related to the maternal constitution. Certain conditions such as indigestion, anorexia, atrophy, dyspnoea, and hysterical (uterine) suffocation were attributed to the body being

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[69] The causes of difficult labour are described in *Soranus' Gynecology*, Temkin *et al.* 1991, pp. 175-207.
[70] Diocles' work on dystocia in labour is referred to through the writing of Soranus: see van der Eijk 2000.
[71] Soranus – see Temkin *et al.* 1991, p. 184.
[72] *ibid.*

too relaxed and unable to respond due to lack of tonus (muscle tone). Women with too much or too little *pneuma* (spirit) were also believed to be at risk of complications in labour.

3.13.1 Specific causes of difficulty

Soranus suggested that an inexperienced midwife or physician could also affect the progress of labour. Like the moderns, he believed there were certain groups of women who were more at risk of developing problems.

Luxurious lifestyles or regimen could affect the vital faculty[73] for example, women 'given to drink, late hours', or 'prone to dietary indiscretions' may well have birthing difficulties.

Old age and prolonged widowhood caused physical weakness and 'stiffness' of the pelvic ligaments, while youthfulness and small stature were linked to immaturity of the uterus and uterine orifice. It was thought a small body would constrain the growing uterus, which had nowhere to go as it expanded. In other cases the orifice of the womb was described as 'not straight, hardened, or closed', and of 'not giving away easily'. It was suggested that, occasionally, 'flesh may grow over' these parts of the uterus.[74]

Whilst the pelvis was not identified as a cause of uterine constriction, Soranus suggested women could experience difficulty if the uterine space were impeded by external compression from surrounding structures. There was perhaps a reference to pelvic bone contraction:

> *[when the] region of the loin is too concave and exerts a lateral pressure upon the uterus...*[75]

Curvature of the maternal spine and excessive maternal fat could potentially reduce womb capacity:

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[73] There were three types of vital spirits, emanating from three body faculties, see Traditional Medicine Network 2003.
[74] Temkin *et al.* 1991, p. 177.
[75] Temkin *et al.* 1991, pp. 181-2. Soranus indicated that childhood rickets was prevalent, see p. xxviii.

> *A hollowness of the loin or spine, also becomes a cause of difficult labour, moreover, difficult labour occurs if there is an accumulation of fat in the abdomen and the hips so that the womb is squeezed as it were...* [76]

Likewise, a full bladder or bowels were treatable reasons for dystocia, and bladder stones could also delay birth.[77] These conditions were described as having a 'squeezing' effect on the uterus. This squeezing may have caused the fetus to adopt an unfavourable position in the uterus or to obstruct its exit.

According to Soranus, Demetrius and Cleophantus, there was a particular type of physique which caused early rupture of the 'hydrops' (the membranes) and long labour:[78]

> *...those women who are broad in the region below the shoulders, but not very heavy below the hips have difficult labour. In them the hydrops<bursts> [symbols in text] before the pangs of childbirth spread over the body, and difficult labour occurs* [79]

This description resembles a modern condition known as a persistent posterior position of the occiput, in which the fetus lies in the uterus with its head lowermost and facing towards its mother's abdomen, with its back nearest to the maternal spine. This is classically linked with a high fetal head at term, pre-labour rupture of membranes, and a long and painful labour. Early rupture of the membranes was also known to lead to a long 'dry labour' which might necessitate the lubrication of the birth passage with oils.

3.14 Diseases of the uterus

The nature of the womb was discussed at length by Hippocratic physicians. It was once believed to be able to roam around the body, acting independently. During the Greco-Roman period the womb was considered the cause of many female ills, and this continued into the medieval period. Most womb afflictions were gynaecological and fall outside the remit of this thesis. Soranus argued that although some causes of difficult

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[76] See Temkin *et al.* 1991 p. 177.
[77] Similarly, *tumours or abscesses in the intestines* were described by Herophilus as able to *squeeze* the uterus. Similarly the fat of *very fleshy women* might do likewise; see von Staden 1989.
[78] See Temkin.*et al.* 1991, p. 176.
[79] *ibid.*

labour might be uterine in origin, 'external causes' (external to the uterus) were by far the most common:

> Simon the Magnesian ...[indicated that] 'atony of the uterus' or 'thick membranes not bursting' are difficulties 'inherent in the body'. Moreover, difficult labour takes place because of external influences, diet, activities, and because of an excessive amount of bloody fluid excreted from the body[80]

He described how the environment of birth and the atmosphere in the birthing room were important. A cold environment in the Methodist* sense was believed to 'narrow the ducts' and cause delay by causing rigidity and hardness of the birth passage, whereas too much heat caused too much maternal relaxation. Excessive heat or cold was thought to exacerbate certain innate difficulties:

> Sometimes external heat comes up around the internal organs and they are straightened in the act of giving birth. Sometimes the exit from the womb is too small, the woman is too fat or the fetus is dead, not helping nature by its own movements. This often happens to a woman giving birth in winter. If she has by nature a tight opening of the womb, the coldness of the season constricts the womb still more. Sometimes the heat all goes out of the woman herself and she is left without strength to help herself in childbearing[81]

3.14.1 Galen's understanding of the role of the uterus in labour

Galen (*circa* 130-201 AD) was the most influential of human anatomists, and went on to form the basis of medical education in the Middle Ages. His work was based upon animal dissections and experiments in vivisection, from which he constructed theories of human anatomy and physiology (comparative anatomy). His work also incorporated Hippocratic theory and the principles of humoral theory.[82]

It has been suggested that Galen gained credence from influential leaders of the Christian churches because he upheld the taboo against human dissection. Galen, who

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[80] Temkin *et al.* 1991, p. 177.
[81] Mason-Hohl 1940, pp. 2-23.
[82] Green 1985.

lived several hundred years after Soranus, approached anatomy from a teleological perspective, believing that all body structures served a purposeful function.[83] He proposed that the human fetus was passive in labour and the uterus was active. The idea of muscular ejection of the fetus also re-emerged in the Arabic writings on childbirth, which were heavily influenced by Galen's work. The Persian, Ali ibn -Abbas-al Majusi / Haly Abbas (AD 932) taught that birth was not linked with contraction of the abdominal muscles, as previously thought, but with uterine contraction.[84]

Despite the word, 'contraction' being alluded to by numerous ancient authors, including Galen, the power of the uterus in labour appears to have been neglected for some considerable time. Prior to Galen, it may have conflicted with existing ancient birthing theory. Nancy Demand describes how uterine contractions were briefly noted by Hippocratic observers and suggests their lack of acknowledgement was likely to have been because

> preconceived assumptions and theories dictated perceptions: the Hippocratic physician, in keeping with the Greek view of women as passive, saw the pain and contractions of the woman as responses to the violent efforts of the infant. [85]

Given the fetus was responsible for getting itself born, how might a stillbirth be explained? Although the fetus was not seen as an object to be expelled when alive, the uterus' expulsive faculty, which facilitated menstruation, might have been thought to expel it when dead. Moreover, this disregarded question may be indicative of the power of contemporary social frameworks to direct thinking.[86]

3.14.2 Galen's birthing theory

The work of Galen on anatomy was celebrated for centuries and heavily influenced medicine until the sixteenth century. The ban on human dissection led Galen

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[83] Whilst comparative anatomy has been lauded as being highly acceptable to the Christian church, Nutton suggests Galen was not entirely committed to the principles of Christianity: see Nutton 2001.
[84] Graham 1950.
[85] Demand 1994, p. 19.
[86] Birth after maternal death is discussed in chapter five, section 5.7.2.

to rely on information gained from comparative anatomy. This involved learning about human anatomy by inference from dissections of other creatures. Although many comparisons between humans and birds were made, Galen compared humans mostly with apes and quadruped mammals. However, the pelves of different species vary in their basic function. Large mammalian pelves would have created no resistance to the passage of offspring at birth.[87] However, the human bipedal pelvis is more sophisticated, due to its other important role in supporting and containing the pelvic contents against gravity, which also requires a particularly strong pelvic floor. The human pelvis is therefore deeper and more curved than many mammalian pelves, with three different planes of inclination, which make the process of human birth more complex.[88] The observations of large mammals during birth would have provided few reliable clues as to the intricate set of manoeuvres the human fetus makes to negotiate the pelvis, and of the relatively close fit between the internal walls of the pelvis and the fetus. Galen studied primates, which when born, have less subcutaneous fat deposits than humans and are relatively small in relation to the size of the maternal pelvis. These would have encountered relatively fewer difficulties giving birth, with little need for pelvic separation.

In the case of small mammals such as bats, gophers, and guinea pigs, pelvic separation has been found to occur.[89] Avian studies and the study of birth in small mammals appear to support the active fetus theory in which the pelvis is thought to separates to allow fetal egress.

3.15 Soranus' Views on Midwifery Practice

Soranus wrote detailed instructions on the management of normal labour.[90] In a general sense, he strongly supported the belief that the mother and fetus had to be 'ripe' to ensure a successful labour and birth, and there was a great emphasis, to be found

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[87] Most domestic quadrupeds, such as cows, sheep and dogs, have straight, shallow and tubular pelves. Many mammals have large litters of relatively small offspring, unlike the human fetus, which at term is relatively large.
[88] See also Dionis 1719, p. 168.
[89] See Stewart 1984a, 1984b.
[90] See Temkin *et al.* 1991, pp. 69-76.

throughout the history of midwifery, on the power of nature and in the importance of 'ripeness' (readiness) for spontaneous birth.

Soranus implored midwives not to intervene too early in labour, to allow nature to act:

> ...one should neither have immediate recourse to surgery or allow the midwife to dilate the womb forcibly.[91]

He did however condone interference around the time of delivery, advising that, whilst not staring at the genitals of the labouring woman 'in case being ashamed, her body became contracted', the midwife should:

> ... with a circular movement of her finger ...dilate the orifice of the uterus <and> labia[92]

He also described, with some caution, a technique for manually pulling the fetus forward at the time of dilation:

> ...to do this at a time of the contraction produces inflammation, or haemorrhage of the uterus, or drags it downwards.[93]

This quotation corroborates Demand's evidence that the ancients observed muscular contraction of the uterus during birth.[94]

3.16 Internal Podalic Version (IPV*)

Twentieth-century medical historians have suggested that Soranus was the first to introduce IPV.[95] Although he may have been first to write about it in detail, it had been advocated earlier by several other authors.[96] Its success in procuring live births remains uncertain. IPV was used before the caesarean, forceps, and symphysiotomy came into

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[91] Temkin *et al.* 1991, p. 184.
[92] Temkin *et al.* 1991, p. 75.
[93] The term '*contractions*' is used in the translation.
[94] See Demand 1994, p. 19.
[95] Rhodes 1995, p. 8.
[96] See Temkin *et al.*1991, p. xliii.

use, and appeared to be quite widely advocated. In the interests of women's modesty and with the limited availability of male helpers, Soranus provided instructions for midwives on how to carry out IPV. In more difficult cases where IPV had failed, the fetus would have been delivered piecemeal, with the aid of hook-type instruments. All these procedures may have caused an already compromised mother's eventual demise; however the ancients, unlike their medieval successors, appeared willing to offer help to all women, even those who were moribund and unlikely to survive.

Although traditional midwives did not appear to document their practice, they may well have passed on the use of techniques such as IPV to later generations of midwives. If we are to believe the secondary sources, the practice of IPV died out after Soranus' era until Ambroise Paré, the French surgeon and man-midwife, re-introduced it in the sixteenth century.

3.17 Conclusion

Although birth may have been essentially the same physical process in the past as it is today, it was interpreted according to contemporary understanding. Theories are normally linked to the cultural fabric of a society, and the ancients lived in a very spiritual era in which the gods controlled peoples' lives and determined their fate. In classical Greek literature, death in childbirth was paralleled with an onerous death, and was generally perceived as a fate determined by the gods.

Greco-Roman societies were also very patriarchal, so matters of a female nature such as childbirth may not have been so important for physicians to study. Women were seen as the weaker sex, and difficulties in labour were often seen as originating from the mother or from a probable female fetus, reinforcing a laissez-faire approach to difficult birth.

The role of the pelvis in labour was assumed to be facilitative. The uterus was sometimes seen as the root cause of many difficulties, some of which could jeopardise birth. Herophilus (3 BC) had the advantage of being permitted to perform human dissections, and, although rarely acknowledged by historians of midwifery, he appears to have

advanced midwifery theory significantly, whilst Soranus has been given most credit for this.

The Greco-Romans believed their gods ultimately controlled the outcome of birth and that the onus was put on the fetus to get itself born, which would depend upon its strength: a strong fetus would survive birth, a weak one would succumb. Avian studies and analogies with other processes in nature underpinned the study of human reproduction and supported the active fetus theory*. If a mother had difficulty giving birth, this was attributed to a malpositioned fetus or to a weak or dead fetus unable to get itself born.

The Christian church disapproved of human dissection, and later writers tended to revert to more theoretical explanations of the process of birth, or made assumptions about human anatomy and physiology from comparisons with nature. Foucault suggests:

> We must re-examine the original distribution of the visible and the invisible insofar as it is linked with the division between what is stated and what remains unsaid [97]

Whilst researching this topic it was found that the dissection of small mammals in late pregnancy might corroborate the dominant theory of pubic bone separation around the time of birth> As previously stated, the phenomenon of pelvic separation has been found to occur in selected breeds of small mammals, although references to comparative anatomy were not specifically discussed in the texts. The general lack of knowledge of human anatomy and the taboo against human dissection, plus a reverence towards Hippocratic theory, regardless of certain contradictions, may also have helped maintain the pelvic discourse of pubic bone separation at birth for so long.

Humoral theory influenced medicine from the time of Hippocrates until the early modern period in the West, and references to excessive heat and coldness pervade the literature of the ancients. Soranus was less concerned with anatomy and physiology and was guided by the Methodist principle of atomic theory, whilst also adopting quite an eclectic view of midwifery.

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[97] Foucault 1973, p. xi.

Galen the anatomist became widely revered, which is why it is a bit surprising that his work on childbirth was relatively neglected. Galen believed that the fetus was passive during birth and was delivered by *muscular contraction,* which is in direct opposition to the Hippocratic and Soranic birthing theories. This may be partly to do with the manner in which Galenic knowledge was redistributed in the West and partly because the female body was of less interest to contemporary anatomists.

In general, the earlier birthing theories continued to underpin midwifery theory for centuries, and factors of deep psychological, religious, and traditional significance may have played a role in the entrenchment of these ideas. Ludwik Fleck believed discourses evolve slowly because to be acceptable they need to conform to 'prevailing thought style'.[98] Competing theories were perhaps unacceptable because they were too far removed from mainstream ideas.

The workings of the body were perceived differently than they are today, and some common knowledge may not have been considered worth mentioning, because everyone was aware of it; although today lack of detail may obscure our understanding of the past.

To the ancients, the pelvis was basically facilitative of birth, and its physical workings were of little concern to most. The uterus was the cause of a range of gynaecological conditions but had only a minor role in ancient birthing theory. The overriding forces which drove the process of birth and affected outcomes were the gods and, here on earth, the fetus.

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[98] Fleck 1979, p. 2.

4 The Pre-Vesalian pelvis: Foreign Influences upon Medieval and Early Modern English Childbirth Literature (*Circa* 1000-1500 AD)

4.1 Introduction

This chapter explores medieval birthing theory in which the pelvis appeared to play an indiscernible role. The debate about the function of the pelvis in childbearing opened up during the sixteenth and seventeenth centuries and becomes a central theme in subsequent chapters. The manuscripts of the medieval period contained scant practical guidance for midwives and mothers on physical ways of dealing with difficult births. This was partly to do with the literary style of the texts and the manner in which ancient birthing theory was disseminated to the west and partly because the editors and translators lacked practical experience. A closer examination of several of the texts and their portrayal of the process of birth will reveal the nature of contemporary understanding and its associated management strategies for dealing with difficult births.

The transmission of childbirth knowledge to the west is not widely understood outside academic circles. Over the past two decades, Green has provided a revised theory about modes of transmission of ancient knowledge to the medieval west.[99] This work has helped explain the presence or absence of certain ideas on birth in the medieval and early modern English literature, which helps to make sense of the arrangement of knowledge, accounting for seemingly inconsistent ideas and pointing to their likely origins.

Ideas about the process of birth evolved relatively slowly from ancient times until the early modern period. In this chapter the focus begins to move towards the English birthing discourses. Until the eighteenth century, very little new birthing theory was produced in Britain, while a significant number of foreign manuscripts reached its shores. Major historical events occurring during the medieval period affecting Britain included Christianisation, the Norman Conquest and participation in the Hundred Years' War (and the Wars of the Roses) which helped to enrich England's childbirth literature. Much material entering England came via France.

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[99] Green 1985; Green 2002.

This chapter considers the contemporary and emerging childbirth discourses of this period, which comprised a surprisingly exotic mix of existing Anglo-Saxon ideas, plus material introduced via Rome and France, mostly derived from ancient Greek, Arabic, and European material. The pelvis continued to be relatively imperceptible in the literature during these transitional years, as the texts were grounded in translated and replicated ancient knowledge, re-emphasising the assumed facilitative role of the pelvis in labour.

Secondary sources written by medievalists have been heavily relied upon, as interpretation of medieval manuscripts requires collaboration between linguistic experts and falls outside the remit of this pan-historical thesis. References are made to published versions of translated gynaecological manuscripts, which include a recent re-translation of the *Trotula* manuscripts.[100] Their editors selected them for translation out of a number of such manuscripts, because they were typical of their genre, although the insights obtained from these published and edited manuscripts can offer only a 'snapshot' impression of medieval childbirth.

4.1.1 Impact of the texts upon practice

The impact on practice of texts discussed in this chapter is difficult to assess. The importance of midwives being literate has been noted since ancient times, and a good proportion of traditional midwives could read.[101] However, whether midwives had sufficient access to these texts, and, if they did, whether they actually incorporated any of these ideas into their practice, is uncertain.

Attitudes towards the role of medicine in society were changing, and medieval fatalism was gradually being outshone by a more scientific and less superstitious approach to health and illness. Midwifery licensure began in Europe in the sixteenth century, where its function was to regulate practice and to perform an educative role alongside a religious function. In England, diocesan licensing focussed on regulation purely from a religious

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[100] Green (2002) suggests there are over 175 extant medieval manuscripts on gynaecology, of which only 45 have been edited by scholars.

[101] Prayer books and some gynaecological texts were written in the vernacular ostensibly for the benefit of midwives and women; see Earler 2002. Monica Green (personal email 2001) contends that women's literacy rates in Europe were *infinitesimally low throughout the medieval period and that it is implausible to think they read (*midwifery) *texts*. See also Green 2000, pp. 5-74; Benedek 1977; Harley 1993; Willughby 1972, p. 2.

perspective, which also led to midwives being required to call for assistance from a physician, surgeon or a senior midwife should any difficulties arise during labour or birth.[102]

4.1.2 Midwives' ownership of medical books

Expensive, individually prepared medieval manuscripts were highly prized possessions. Some medieval leech books and written charms were believed to hold innate supernatural properties. They were the treasured possessions of the wealthy and of practitioners who may have based their practice on such words of wisdom, or the communal property of elite communities such as the church. These texts were handled with great respect. Female access and ownership of books in the medieval period was limited. Most texts were devotional in nature and owned by the clergy and the rich.[103] Upper-class women had access to family libraries which may have contained some medical texts and texts on childbirth. Green argues that women were probably not able to engage as well as men with the medical literature because most were not Latinate and would not have had the benefit of a university education to prepare them intellectually for engagement with the material.[104]

4.2 From Greek to Latin

From late antiquity until the beginning of the medieval period little new midwifery knowledge was produced (The Dark Ages), although much ancient wisdom had been amassed.[105] Green's thesis demonstrates how Salerno became a hub for the reception and

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[102] Benedek 1977.
[103] Pamphlets offering condensed versions of texts were available, but would have been more vulnerable to the ravages of time.
[104] Green 2000, pp. 5-76.
[105] Roger French (French 2003) argues that much academic activity of a discursive and analytical nature went on during this period.
[107] Green 1985.

dissemination of midwifery knowledge between the ninth and eleventh centuries.[107] Two distinct routes of transmission from ancient Greece converged at Salerno.[108]

The resulting transcribed Salernitan manuscripts were made available in the international medical language of Latin, and circulated to major northern European countries, reaching the British Isles by the fourteenth century. Multiple transcriptions were made of manuscripts, and knowledge was decanted and adapted to purchasers' or users' needs. Approximately 75 per cent of the Middle English corpus was derived from Latin works. Arabic writings were also being introduced into Britain, many of which reflected a Galenic approach and held greater significance for general medicine. Texts were translated from Latin or other languages into English, making them more accessible to English women. There is a suggestion that literate women passed on knowledge from the texts to illiterate women of the locality by word of mouth.[109]

Britain continued to receive a constant flow of foreign midwifery treatises, one which escalated during the sixteenth to seventeenth centuries, a period during which book ownership and reading increased particularly amongst the middle classes.

The anatomical works of Galen became a cornerstone of English university medical education,[110] begun in the thirteenth century.[111] Surgery and gynaecology were generally thought unsuitable subjects for the elite university-trained physicians. Midwifery cases were dealt with by midwives and if necessary, surgeons.[112]

4.3 Western medical tradition

The key authorities in midwifery and women's diseases up until late antiquity had been Hippocrates, Soranus, and Galen. Soranus had been the most influential and comprehensive authority on 'gynaecology' which included midwifery, before being briefly surpassed by Galen, who wrote in less detail on birth.[113] In terms of childbirth, Galen

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[108] Green 1985.
[109] See Green 2002, p. xiv.
[110] Galenic dogma was not challenged by the learned for fear of castigation by entrenched colleagues.
[111] Porter 1997b, pp. 29-30.
[112] Medical men normally attended women in childbirth only in dire circumstances. Their inability to cure the Black Death in the fourteenth century undermined public confidence in them. Most physicians were ordained priests and theoreticians: Siraisi 1990, pp. 17-47, pp. 26-27; Courtenay 2001, pp. 69-75.
[113] Green 1985,,pp. 134-138, p. 195; Ogden 1973..

became neglected in the Latin west, and Soranus' work was translated from Greek into Latin. The first translation of this was probably written by the monk, Muscio, in 6 AD with the intention of making the knowledge more accessible to women. There were at least two other less well-known translations of Soranus' Gynaikia, one by Augustine of Hippo (354-430) and one by Caelius Aurelianus, which arrived in the Latin west via north Africa. An anonymous treatise, the *Gynecia Cleopatrae,* also echoed Soranus' advice.[114]

Galen was re-introduced into Europe, firstly through Arabic sources and then through some of the original Greek work which had been recovered and heavily replicated during the period of the Italian Renaissance .[115]

4.4 Discourses from the Muslim east

The Arab scholars favoured Galen and his systematic approach, adopting the Byzantine literary style of an encyclopaedic format containing parts of various treatises under one subject heading, condensing and summarising knowledge, rather than reproducing monographic texts. Arabic texts contained traces of midwifery knowledge, preserved from the Hippocratic Aphorisms and Galen's work on diseases of women.[116] The Arabic literature echoed the Galenic texts and contained a limited amount of information on gynaecology and childbirth. According to Green,[117] Soranus' work was greatly censured by the Arabs and did not translate well into Arabic, consequently much of the practical facet of Soranus' work was lost. Moreover, Arabic doctors may have been uninterested in childbirth, which was more of a female concern.

4.5 Dealing with difficult birth

Christianity was brought to Britain by the Romans in AD 300 and became a major part of peoples' lives. Prayer was important as a source of support for women in labour. The bible reinforced the expectation of pain and suffering in childbirth as a collective debt

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[114] Green 1985, pp. 134-138, p. 195.
[115] Ogden 1973.
[116] Green 1985
[117] Green 1985.

for the sins of Eve.[118] Medieval childbirth was risky for mother and child,[119] and so divine assistance through prayer and the use of Christian magic to ward off evil was a rational and comforting way of maximising personal safety.[120] Certain traditional pagan practices involving spells, incantations or amulets were used despite the disapproval of the Christian church. This link between birth and pagan rituals meant that midwives became vulnerable to accusations of practising witchcraft. Midwives and gossips (local women) were invited to visit and support women during birth.[122] Medical men were rarely called in to attend, and women were more accepting than today of the perceived limitations of the flesh, adopting a fatalistic outlook and putting their faith in God, who was sometimes thought to work miracles. Public confidence in medical men was relatively low at this time, and, as they were only summoned in serious cases of emergency, usually when surgery was required, women dreaded their arrival.

4.5.1 Anglo Saxon mystic birth charms

The underlying premise of the use of charms was that illness was closely associated with supernatural forces and Christian magic was used to ward off evil.[123] *The Lacnunga* and the Anglo-Saxon Leech books are Old English compendia of medical manuscripts,[124] used by leeches, (professional healers or physicians) monks, priests, surgeons, lay healers, midwives, and folk healers.[125] Advice was sometimes dispensed on descriptions of symptoms, in the absence of the sufferer.

Birth culture was embedded in mystic traditions. The presence of metrical[126] charms for childbirth in the leech books was unusual, as women were not normally singled out to

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[118] Genesis 3.16, Rawcliffe 2003; Cressy 1997, p. 16.
[119] Many women died in their late thirties, the poor and malnourished were especially vulnerable to illness and difficult birth. There were floods and food shortages in the early fourteenth century and in the city of London the air was polluted and streets awash with raw sewage. The rich had more luxurious lives but were exposed to other risks, women often married and reproduced in their very early teens.
[120] Rawcliffe 2003; Cressy 1997
[122] Wilson 1983.
[123] Magical formulae invoked both Christ and Woden; Weston 1995,,pp. 279-80; Towler and Bramall. 1986, pp. 30-42; Lemay 1990.
[124] Some advice is Germanic or Greco-Roman in origin.
[125] Buck 2000.
[126] The term 'metrical' means the charm was written in a poetic fashion, allowing it also to be chanted.

be addressed.[127] The charms are believed to have originated from female lore and were for women to say or enact in labour.[128] They included a remedy for 'hateful slow birth ... heavy difficult birth ... hateful imperfect birth' and one for 'the woman who cannot bring a child to term, that is, who has had a stillbirth'.[129] These particular charms involved repeated recitations (the repetition being part of the magic) combined with symbolic enactments, such as stepping over the grave of a dead man.[130]

4.5.2 Devotional prayers

The Christian church attempted to eradicate traditional birth culture and encourage piety. At the dawn of the early modern period, in 1476, William Caxton set up the first printing shop in London and books became increasingly popular, including devotional works for women. One large text, *The Monument of Matrones*, written by Thomas Bentley and published in 1582, contained a section of 38 prayers for the assistance of women in childbirth. It included prayers to give thanks for conception, for recital during labour to ask for divine intervention, for a 'safe carrying' and later, for thanksgiving.[131] The following prayer for women experiencing a difficult birth suggested women sensed mortal danger in prolonged childbirth:

> Shall I be the grave of my child: shall I giue death the fruit of my bodie, for the sins of my soule; and my first (second or third) borne for the transgressions of my youth? Alas shall that perish in the wombe, which is conceiued by thee; or shall it die in the birth, and not be borne, which thou hast so mightilie fashioned? Hast thou shut vp the doores of my wombe in thy displeasure, and couered me with the shadowe of death that the birth may not come out? [132]

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[127] Weston 1995, p. 279.
[128] Weston 1995, pp. 282-3.
[129] Weston 1995.
[130] Weston 1995; Meaney 1989 pp. 9-30. Meaney suggests rituals allowed women to participate in their treatment and gave them more of a sense of control, which may have been another reason why the patriarchal church disapproved of such practices.
[131] Atkinson and Stoneman 1990. The ritual of churching was originally one of purification rather than simply thanksgiving. See Cressy 1997, pp. 16-21 for an account of the religious meanings of birth in which children were perceived as gifts from God.
[132] Thomas Bentley, cited by Atkinson and Stoneman1990,p.197. For history of churching of women see also: http://users.ox.ac.uk/~mikef/church.html

Like the Babylonians, the medieval English believed God ultimately decided whether or not to sustain or create new life, and negative outcomes were widely attributed to the sins of the mother rather than to the physical cause.[133]

4.6 Selected medieval gynaecological manuscripts

Three texts based upon medieval manuscripts will now be examined for ideas about the process and management of difficult birth. Diseases of the womb were a major feature of the medieval gynaecological literature although childbirth tended to be discussed relatively briefly. This may have been because of the Galenic influence, in which birth was perceived as women's business and something that did not normally require medical assistance. Often, when medical assistance was required, little could be readily done to assist and women were ultimately left in the hands of God.

4.6.1 The *Trotula* manuscripts

The *Trotula* manuscripts were originally a trilogy of manuscripts; *On the Conditions of Women, On Treatments for Women* and *On Women's Cosmetics*. These were based on Hippocratic and Galenic works which were edited and 'improved' over time and merged to become one text,[134] known as the *Trotula*.[135] Originally produced in the eleventh or twelfth century the manuscripts were widely copied and circulated in Latin and various vernacular languages throughout Western Europe, reaching England during the fourteenth and fifteenth centuries.

The wide circulation and influence of the *Trotula* compendium was enhanced by several factors. Firstly, it was incorporated into larger codices on gynaecology which tended to be stored in monastic libraries, assisting its preservation. Secondly, its selective replication was augmented by the invention of the printing press. After a period of time,

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[133] In the early modern period certain malicious forces were thought to hamper progress in labour. See Sermon .1671, pp. 111-3.
[134] Palaeographical evidence suggests the three books had different authors, see Benton 1985; Green 2002.
[135]The *Trotula* (a common female name in medieval Salerno) became the popular title for this compendium, also known as *De Passionibus Mulierum Curandarum*, or *De Curis Mulierum*.

other works on the sicknesses of women became wrongly associated with the name 'Trotula'.

Ironically this compendium may have passed through the hands of men,[136] and few women may have had access to it before the advent of the printing press. Benton suggests that a lack of male involvement with the intimate matters of childbirth would have created a 'need' for this type of information amongst medical men. It would at least have satisfied men's curiosity. [137]

4.6.2 'Conditions of women'

The first section of the Trotula manuscript, entitled *On Conditions of Women,* provided most information on childbirth in the trilogy. Many of the subsections are less than a page long. There is a notable contrast between the format of the *Gynaikia*[138], which was addressed to midwives, and the *Trotula*, which was less detailed and addressed to women as well as midwives. Galen is referred to in the *Trotula* by name, and most of the recommended treatments were based upon humoral theory with some additional, vague practical instructions on the management of malpresentations of the fetus. Galen's analogy of the fetus being 'attached to the womb like fruit to a tree' is used to explain the causes of early fetal loss and the onset of full term labour which is likened to a ripe fruit falling from a tree. A section entitled, *On Difficulty of Birth* suggests:

...there are some women who are so afflicted in the function of birth that hardly ever or never do they deliver themselves ...[139]

As the text was based upon a conflation of ancient ideas, the pelvis was not specifically mentioned. Causes of difficulty were attributed to a range of predisposing factors including humoral causes, such as excessive coldness or loss of body heat (see Table 4.1), which echo the ideas of Herophilus.

A dead fetus was thought to be one of the main causes of difficult birth. The pelvis was not directly considered as a possible obstacle to birth, although a small womb exit was.

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[136] See Green 2000 section I, e.g p. 72; Green 1985.
[137]Benton 1985; Barratt 2001.
[138] The Greek title is *Gynaikia*. This is Latinised as *Gynaecia*.
[139] Green 2002, p. 79.

The text refers to Galen on this point, who suggested that certain women, with narrowed vaginas and constricted wombs, ought not to have sexual relations with men, 'lest they conceive and die'.[140] Of course women with contracted pelves may also have narrow vaginas. It is not clear how these women would know if they were at risk.

Table 4.1

Causes of Difficulty in Labour according to the *Trotula*: (*circa* 11th-12th century) [142]

- Extraneous heat around the inner organs causing constriction of these at birth
- The exit of the womb being too small
- 'Fatness' (linked with the exit of the womb being too small)
- Dead fetus (cannot aid nature)
- Malpresentations
- Young women in particular may be affected by 'a tight orifice of the womb'. Common in winter, increased by coldness of the air, which also causes general constriction
- The evaporation of all the heat from the woman, leaving her without any strength with which to help herself [in giving birth]

The possibility of pelvic narrowness was not considered.

4.6.3 Causes originating in the child

The Greco-Romans recognised that if the infant was dead, extremely large or deformed, for example, if it had a large head or swollen (oedematous) body, an abnormal birth may be expected. Many problems were attributed to an abnormal position of the fetus in the uterus,[143] or a multiple pregnancy.

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[140] Green 2002, p. 78.

[142] Summary table based upon Green 2002, pp. 79-80.

[143] The normal position was with the head presenting first and in correct (longitudinal) alignment in the uterus, although some authors accepted feet first presentation as being normal as well.

4.6.4 Heat, coldness, and fatness

A 'loss of heat' might exacerbate or precipitate certain difficulties, as cold could create local constriction of the womb exit and general constriction of the body. In order to reduce constriction of the orifice during birth, women were advised about pre-labour diet and the use of anointing oils, baths, special potions, and herbals.

An evaporation of the woman's body heat was associated with a lack of strength to engage in labour and birth, although heat, cold or 'fatness' could also lead to constriction of the uterus or birth passage, producing delay. This may explain the need to keep the birth chamber warm in the medieval and early modern English literature. The *Medieval Woman's Guide to Health* (MWGH) adopted the ancient belief that fatness caused:

> ..blocking of the womb…because fatness stops the mouth of the womb, and holds back the blood that she should have been purged of before children were conceived. [144]

Similarly, a full bladder or bowels could be a hindrance to the 'womb' and similarly displace it.

4.6.5 *A Medieval Woman's Guide to Health*: Background to the text

The second text examined is an early fifteenth-century English *Trotula* manuscript described as the Sloan 2463, which has been translated into modern English by Beryl Rowland and published as, *Medieval Woman's Guide to Health* (MWGH).[145] This medieval gynaecological manuscript was selected for publication from over twenty, and chosen for the quality and representativeness of the collection. It contains references to Muscio's version of Soranus' *Gynaecia* and the work of the Arabic medical writer, Rhazes and reflected the ancient notion that the fetus was responsible for its own birth.

Suboptimal fetal positions were widely recognised as a cause of difficulty. The ideal fetal position for birth in the three texts examined[146] being head first. MWGH[147] suggested

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[144] Rowland 1981, p. 135.
[145] *ibid.*
[146] The three edited texts are:
Green 2002, (referred to here as 'the *Trotula*'), Rowland 1981 (MWGH), and Barratt 2001 (KWKC).

a child was born naturally in or within twenty pangs (contractions).[148] The normal 'order of the child' at birth was described as being:

> first the head, and afterward the neck, and with the arms, shoulders, and other members properly as it should. In the second way, the child comes out unnaturally, and that may be in sixteen ways [149]

The manuscript contained etchings representing sixteen abnormal birth positions. These images resembled those in Figures 3.1, 3.2 in chapter three based upon the Muscion tradition, which were simple representations of likely problems. They appeared, devoid of any references to maternal anatomy.

4.7 Focus on the management of abnormal presentations and malpositions

The instructions in the three identified texts directed practitioners to convert abnormal positions to a cephalic (head first) presentation. Texts emanating from the Galenic tradition suggest that cephalic presentation is the only acceptable fetal birth position.[150]

Many of the early illustrations imply that the uterus is roomy enough to easily admit the hand of a midwife in order to correct any fetal misalignment. Although it is sometimes possible to do this, it is not particularly easy. This idea may have been based on male conjecture.

Women adopted a range of birth positions and were encouraged to remain mobile in labour. There did not appear to be any underpinning rationales for this advice, apart from maternal preference and comfort.[151]

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[147] Rowland 1981.
[148] Rowland 1981, p. 123. The twenty or so *pangs* being described might refer to the very strong expulsive contractions which occur during birth, after full dilatation of the cervix.
[149] *ibid.*
[150] Soranus also suggested feet, breech (buttock) and certain oblique presentations may be drawn out, feet first.
[151] Birthing stools, chairs and beds have a long history see Banks 1999.

4.7.1 *The Knowing of Woman's Kind in Childing*

The third text, *The Knowing of Woman's Kind in Childing,*[152] (KWKC), was a late medieval version of Latin and French material, derived mainly from ancient sources and probably influenced by the *Trotula*. Barratt compared five similar extant manuscripts written in Middle English, and published the Cambridge version in 2001.[153]

In KWKC similar Soranic and Galenic influences appear. Manuscripts were often 'hand crafted' for a particular audience from a particular parent manuscript and suitably modified, especially on sensitive matters of a sexual nature.[154] Barratt suspects these manuscripts were written for pregnant women or new mothers themselves to read as well as for midwives, who are provided with instructions for the management of difficult births. Although curious males were warded off, Barratt believes males who practised gynaecology might have read them.[155]

KWKC suggested many women perished due to lack of good help, implying that interventions were either not always successful as techniques or not effectively performed.[156] Spiritual support was often drawn upon. Again, no references are made to the role of the pelvis in childbirth.

4.7.2 Medieval advice about difficult birth

All three texts advised that difficult births were to be managed conservatively, although there is insufficient detail to enable midwife historiographers to identify the degree of difficulty under consideration, and little specific instruction was given to midwives about what to do. In the *Trotula*, MWGH and KWKC, the management of severely obstructed labour was conservative and involved administering concoctions.[157] Some of the ingredients of ancient remedies may not have been indigenous and would need

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[152] Five extant versions of this manuscript are available in England. KWKC was translated and edited by Barratt 2001, from the Cambridge in Middle English text. The material was derived from Latin and French *Trotula* manuscripts, themselves previously derived from Greek manuscripts.
[153] Barratt 2001.
[154] Barratt 2001, p. 23.
[155] Barratt 2001, p. 2-5.
[156] Barratt 2001, p. 64, pp. 340-55.
[157] Rowland 1980, p. 135; Barratt 2001, p. 65, Green 2002, pp. 79-80. Concoctions included such ingredients as dittany, myrrh, fenugreek, wine and, if the child were dead, hyssop.

to have been imported into England, or local alternatives used. Although oral medication may not always have been sufficient to stimulate birth in cases of severely obstructed labour, the strength and potency of certain herbal remedies should not be underestimated.[158]

If these conservative treatments were unsuccessful, it is uncertain what midwives should do, as no further guidance was given. Most midwifery knowledge was presumed to have been passed on by oral tradition, and later references suggest that midwives did sometimes take further action upon themselves, such as the use of instruments to remove a fetus causing an obstruction, which perhaps came to the notice of medical men only when they were ineffective and cases went wrong.[159]

If the practice of Internal Podalic Version* (IPV) had been successful in ancient times, midwives who used the technique may have passed on the skill to other midwives. In a period when the drawing of blood was discouraged and instruments were rarely used by medical men to dismember fetuses, this manual technique may have been an option if faced with a mother dying of obstructed labour. Indeed Percival Willughby described his use of 'the handy operation' in the seventeenth century.[160]

While on most occasions simple measures or a matter of time may have resulted in a vaginal birth, in a few cases women may have died undelivered. If a fetal head was merely held back by a rigid perineum or by deflexion of the head, digital correction of this would have been sufficient to achieve a spontaneous birth. However, if the fetus was wedged in a more difficult position or was prevented from descending by a contracted pelvi,s these simple measures may not have sufficed.

4.7.3 Manual techniques for re-positioning the child

The texts contain a distinct lack of guidance on how a midwife would recognise an abnormal position of the fetus before birth, although there is the suggestion that it might be recognised on vaginal examination. Certain problems may of course only have become evident after considerable time in labour, when the fetus failed to appear. Initial management would have taken the form of gentle mobilisation, herbal baths, massage of

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[158] King 2001 p. 49
[159] For examples see Willughby 1972.
[160] *ibid.*

the woman's 'sides, belly and vagina' with oils, and the use of sneezing powder.[161] More hands-on management involved external pressure on the maternal abdomen, and there was an assumption that the midwife would know how to place her hands appropriately. Clear directions on how to perform a meaningful abdominal examination of the mother do not appear in the midwifery texts until later.

Much of the advice focussed upon internal manipulation to correct fetal malpresentations. The advice given was simplistic in nature, and in most cases practitioners were simply advised to push the fetus back up or 'return the fetus to the womb' and re-position it, so that its head was lowermost. If, for example, the fetus was 'exiting with legs or arms first' the midwife was instructed to:

> ...assist with a small and smooth hand moistened in a decoction of linseed and fenugreek, and [let her] replace the child in its place and [let her] put it in its correct position' [in a straight line, head presenting with arms by its side][162]

This information alone would probably not be sufficient to guide inexperienced operators on how to reposition the fetus,[163] which was no doubt a difficult task and painful for the mother to endure. A lack of attention to detail in the texts might simply have been because male instructors were theorists and lacked experience in performing the procedures they advocated. The illustrations found in some manuscripts give the impression that the uterus is roomy and lax and inserting a hand in it would be easy, whereas in reality it was not so simple.

4.7.4 Delivery of a child with a very large head

The term 'large head' may suggest an abnormally large sized head, which might be impossible to deliver vaginally, although in MWGH the problem appears amenable to manipulation:

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[161] See Green 2002, pp. 79-80.
[162] Green 2002, p. 80
[163] Difficult perhaps in primigravidae with strong abdominal and uterine muscle tone.

> ... if the child's head is so bulky and large that he cannot emerge ... the midwife should then push him back and anoint the orifice, that is, the mouth of the privy member, with fresh May butter or with common oil, and then the midwife's hand, oiled first and then put in and the orifice enlarged, brings the child forth by the head. [164]

In the past authors may be writing from personal experience, which may have been limited; the management technique suggests the head was not abnormally large, as in cases of hydrocephalus. An account in KWKC described the midwife oiling and possibly 'enlarging' the birth passage:

> ... yif so be his hed gret, than put to your hande; put hym in ayen and a-noynt the mouthe of the matrice with softe onymentis, as oyle of olyue or laury, and lete the mydwf wete here handis in wantir of senigreue that lyne-seede hath soden in, and than sese the hed and drawe hym forth.[Cambridge Version of KWKC] [165]

The midwife was similarly instructed to remove a large head by pushing it back and anointing the mouth of the 'matrice' (cervix) with soft oils and ointments before the head was ceased and drawn forth.[166] No mention is made of any manual rotation or flexion of the fetal head to assist the process, although this is not to suggest midwives did not do these things.

Although texts refer to the 'orifice' being enlarged, it is unclear precisely how this was achieved. Some advice implies that the perineum was stretched, or the walls of the vagina were stretched. Sometimes the matrice or matrix (cervix) was to be dilated by manual stretching. Such techniques may have been midwives' secrets or the 'tricks of their trade', and as such midwives might have been careful not to divulge their techniques to medical men or to other curious readers.

The texts would not be very helpful to those hoping to learn how to practice from a book, although they may have contained sufficient information to satisfy interested lay readers. Midwives had the benefit of observation of practice, although their amount of exposure to complicated births may have varied. Exactly how to purchase a grip on the

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[164] The third unnatural mode, see Rowland 1981, p. 125.
[165] Barratt 2001, p. 67.
[166] Barratt 2001, pp. 66-67, number 375.

head to 'bring it forth' as described in the medieval and some of the early modern texts, is left to the imagination. Experienced midwives will have recognised that the fetus normally emerged head first and most easily with its head in a certain position in relation to the mother's anatomy. They may have developed expertise in manipulating the fetal head into a suitable position to deliver it if delay occurred, and taught this to their apprentices. However, if the birth passage were too narrow, this would have been impossible. The forceps were not widely used until the eighteenth century, although types of metal instruments were contrived to hook the infant and pull it out or perform destructive operations. These instruments were unpopular because of the destruction they caused, and some mothers may have died undelivered.

4.8 Internal Podalic Version (IPV)

The ancients, such as Hippocrates and Soranus, advised on the use of IPV* to facilitate difficult birth. Whereas conversion to a cephalic presentation may have been sufficient to allow some births to precede normally, one imagines in other cases, especially when a large fetal head was presenting, the fetus would remain undeliverable.

4.8.1 Feet- or buttock first presentation

Converting a fetus to a feet first presentation to deliver it was not advised in the aforementioned selected texts, although it was sometimes acceptable, if the feet appeared spontaneously, to deliver them first. A later eighteenth century chapbook, *Aristotle's Works,* supported the view that removing a fetus by its head was more difficult than delivering it by the feet when they were presenting first:

> I know indeed in this case it is the advice of several authors to change the figure and place of the head so that it may present to the birth; and this counsel I should be very inclinable to follow, could they but also shoe how it may be done. But it will appear very difficult, if not impossible to be performed, if we would avoid the danger that by such violent agitations both the mother and the child must be put into; and therefore my opinion

> is, that it is better to draw forth by the feet, when it presents itself in that posture, than to venture a worse accident by turning it [167]

KWKC and Arnaldus de Villanova in MWGH stated that 'headling' and footling presentations were both normal. In KWKC, foot or buttock presentations could be delivered feet first:

> ...Yif so be the childe shewe first his hed and the remanent of the body cleue to the syde, than puttith to youre hand and dresse hym that both his handis ly jointly to his sydes, so that he may come right foorth. And yif he shewe bothe his leggis ioyntly, than put your hand and sese hym be the feet and drawe hym forth wysely, that he be not [dysioynted] in his armys, and pat he open not his handis and cleue to the matrice, but dresse wysely to his sides.[168]

MWGH disagreed:

> when the child comes out with his feet jointly together, only the midwife can never bring out the child when it comes down like this. But when the child begins to come out this way, the midwife with her hands anointed with oil must put them in and push him up again and so arrange him that he can come forth in the most natural manner, so that he does not flatten his hands in the sides of the uterus [169]

Footling or breech deliveries would necessitate more skill, and are today considered more risky for the fetus.[170] In another case the child appears to be held back by its shoulders or its large body, and the midwife is instructed to move it from the 'sides of the uterus':

> When the child's head appears, as it were, head first and the rest of the child remains in the uterus. The remedy for this is that the midwife, with her hand anointed with oils, that is, wild thyme oil, pure lily oil, or oil of musk, as is necessary, put her hand in and turn the child properly with her hands from the sides of the uterus. And [see that] the orifice of the womb is so well anointed that the child can come forth in the right order [171]

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[167] Anonymous c.1870, p. 258.
[168] Barratt 2001,p. 67.
[169] Rowland 1981, p. 125.
[170] With such a delivery, it is important to keep the back of the infant uppermost, otherwise when it comes to delivering the head of an average or large baby, it will be unable to negotiate the pelvis. See Fraser and Cooper 2003, pp.564-75.
[171]Rowland 1981, pp. 123-4.

This suggests the midwife internally rotated the shoulders to aid birth, a method which is being advocated today.

The condition of the fetus after delivery was rarely discussed, although it is assumed that many infants would be stillborn or seriously maimed and die soon after birth. Some mothers may also have perished despite heroic attempts to deliver them. The fetus continued to be considered as the primary cause of complicated labour. Narrow pelves do not appear as a major focus in the literature until the sixteenth and seventeenth centuries.

4.8.2 Continued use of internal podalic version?

Twentieth-century medical historians[172] suggest that the art of internal podalic version (IPV), advocated in ancient times, died out until it was revived by Ambroise Paré (1510-1590).[173] However, Paré claims to have learned about it from surgeons at the Hotel Dieu, Paris, which had accommodated maternity patients since the thirteenth century.

As the Trotula manuscripts are broadly allocated to the Galenic tradition, which came to Salerno via the Eastern route, the omission of IPV from the literature may not necessarily mean it was not practised in medieval times. The Arab writers omitted a lot of practical information from their translations of ancient texts. In addition Soranus' *Gynaecia* or its derivations were in circulation in the Latin west and information on IPV was available from these sources.

It also needs to be remembered that literary theory may not necessarily have driven contemporary practice. Contemporary medieval practice may have been more sophisticated, and, as midwifery was women's business, medical theorists may not necessarily have been privy to the intricacies of the skills of this mainly self-sufficient group of women.[174]

This thesis therefore argues that the practice of IPV, if useful, may not have been abandoned or lost during the intervening years at all, simply absent from the documentary record.

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[172] e.g. Graham 1950 and Rhodes 1995.
[173] The 1634 English translation of Paré's work by Johnson anglicised the spelling of the name to 'Parey': Paré 1634
[174] Echoing the sentiments of Biller 1986, pp. 42-9.

4.8.3 Prolapsed Limbs

In MWGH, if a hand, two arms, a single foot or both feet presented while 'the mouth of the privy member (cervix) may narrow or shut up', the midwife was to dilate the orifice and return the protruding part, rearranging the fetus and then taking the head of the child, 'slowly bring him forth'.[175] In the ninth example, the child presented as 'first one hand and one foot and cover[ing] his face with the other hand', in which case the midwife was advised:

> [placing] the fingers of one hand in the groin of the woman in labour and with the other hand put[s] the child in again, as we have demonstrated before, and so brings the child forth if possible.[176]

The midwife applied external pressure in the groin, presumably on the side occupied by the fetus, whilst the other hand was used to internally manipulate the fetus. In another case when the child presented with knees bent, the midwife was to 'push him back in again',[177] by putting her hands on both sides of the woman's groin, and then, with her own hand anointed with oil, internally correct the position of the knees. These instructions, although not very detailed, suggest that external as well as internal manipulation was used to return the fetus to the womb and achieve a cephalic version (conversion to head first position). The use of the midwife's hands externally is not well described, although, since midwives used external force to push the fetus back up, one assumes they knew how and where to apply external pressure to the fetus to help correct its position.[178]

The author uses the words 'if possible' in the latter case, which implies that the procedure may not always have worked, and there is a suggestion that complicated multiple births might be fatal.[179] In all cases the midwife was advised that a child, even with a breech presentation, must be brought out in the 'correct' order, which according to the texts, was head first.

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[175] Rowland 1981, pp. 124 -129.
[176] Rowland 1981, p. 131.
[177] Rowland 1981, p. 133.
[178] For complex compound presentations today, the woman would have an immediate caesarean section.
[179] Rowland 1981, pp. 134 -5.

4.9 The transmission of midwifery skills

It remains uncertain whether the burgeoning numbers of medical texts on birth were simply a 'literary development' or whether they were actually connected with practice.[180] Some of the medical texts suggest midwives were in need of training.[181]

There is a danger in assuming medieval English midwives were ignorant of manual techniques and medicines for the augmentation of labour, although they may have had alternative remedies. Medieval midwives also developed their own 'professional' language, including anatomical terms.[182] One presumes midwives and women healers,[183] having witnessed many births, had a good knowledge of the nature of the process. By the eighteenth century, some English midwives operated in partnerships and dealt with problems together; the more skilled amongst them acting in an advisory and supportive capacity to those less experienced.[184]

4.10 Caesarean operations and post mortem caesareans

In cases of obstructed labour, most infants died *in utero* or they were destroyed and removed piecemeal, to save the mother's life (destructive operation).

A letter to the Archbishop of York indicated that caesarean was employed in England around 1003-5 to deliver the infant of a dead mother, either to facilitate its survival or administer a quick baptism before it died.[185] The decision to perform this operation was commonly discussed with the family by the priest before being carried by a midwife or surgeon.[186] Midwives were also trained to carry out emergency baptism by the church. The role of the midwife in caesarean was a religious role, ensuring the salvation of the fetus,[187] and does not appear to be described in medical treatises until the fourteenth century.

John Mirk's, *Instructions for Parish Priests,* written in the fifteenth century, states:

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[180] Biller 1986,.

[181] In France and other European countries midwives were offered formal training prior to being licensed. In England licensing tended to focus upon midwives' ecclesiastical roles rather than offering them education.

[182] Biller 1986, pp. 42-9.

[183] In this sense, women healers were mature women, used to attending to the medical needs of relatives and friends in the local community.

[184] Biller 1986,. This was certainly true in seventeenth century London, see Evenden 2000..

[185] Biller 1986, p. 47 for early examples of caesarean and the *Lex Regia.*

[186]Rowland 1981, Blumenfeld-Kosinski 1990.

[187] The midwife was able to carry out emergency baptism, see Leyser 1996, pp.125-7.

And if the woman then should die
Teach the midwife that she hurry
For to undo her with a knife
In order to save the child's life
And hurry that it christened be
For that is a deed of charity. [188]

This reinforces the role of midwives and priests in caesarean operations and reflects the increasing control of the clergy over midwifery practice.[189]

Gelis[190] describes the resistance of some women and their families to post-mortem caesareans, which would need to be carried out very quickly after a mother had died to have any chance of saving the fetus. If the child was born alive from its mother's corpse, it tended to be considered either very special or unnatural.[191]

4.11 Evidence of male conjecture

Der Swangern Frawen und Hebammen Rosegarten (The Rosegarden for Pregnant Women and Midwives), first published in 1513, appears to be the most widely translated early midwifery handbook, with around one hundred editions over the following two hundred years. It was translated into English in 1540[192] as *The Birth of Mankynd.* The author, Eucharius Rösslin, was a city physician responsible for public health, which encompassed midwifery.[193] He had never attended a birth, although he suggested midwives were ignorant and responsible for much harm.[194] He dedicated his handbook to the

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[188] Leyser 1996, p. 127.
[189]Episcopal licensing began in the early modern period in England (1500s). In Europe it was superseded by municipal licensing. See Towler and Bramall 1986, p. 55.
[190] Gelis 1991, p. 236.
[191]In 1058, the Count of Lingsow was reported as being born by caesarean. He acquired the uncharitable nick-name of *ingenitus;* meaning *non-born* or *uncreated.* See Gelis 1991, p. 237.
[192] See Raynalde 1552.
[193] Rösslin's publication was compulsory reading for the midwives of Worms (Germany) and came to be widely disseminated throughout Europe and England. It is considered the first printed text on midwifery for midwives in England. It was later criticised by English men midwives of the seventeenth and eighteenth century for advocating archaic practices.
[194] Arons 1994, p. 1.

midwives of Worms[195] and wrote it in a chiding manner, scolding midwives for bad practice.[196]

Being denied information from contemporary midwives, Rösslin looked to the ancient, Arabic and medieval sources for inspiration for his text.[197] The resulting publication was a reworking of work by previous authors and took little account of contemporary practice.[198] For example;

> For Albertus Magnus writes that the baby should come out of the womb in the following manner
>
> …and as the baby comes out of the womb its face is turned upward toward the heavens or toward the mother's navel.[199]
>
> …the baby in the womb has its face and its breast against the mother's back before delivery and before it shoves itself / And at the time of delivery the child pushes and throws itself over against its mother's back …the baby comes out with its face towards its mother's face. [200]

Figure 4.1
The Infant in the Womb before Delivery[201]
Source: Arons W (1994) *When Midwifery Became The Male Physician's Province*, Jackson, North Carolina: McFarland.

[195] Arons 1994, translator's introduction, pp. 1-21.
[196] *ibid.*
[197] ibid. The text suggests many midwives practised to high standards and had good reputations.
[198] Arons 1994, p. 11.
[199] Arons 1994. p. 44.
[200] Arons 1994, note 105, p .44.
[201] Arons 1994, p. 45.

Many of his errors were repeated by others such as Jacob Rüff (1500-1558), author of *The Expert Midwife*.[202] Critics such as Scipione Mercurio (1540-1615) had questioned the authenticity of some of Rösslin's statements.[203] Although many had respect for the written word, midwives with practical experience would probably disagree with Rösslin and Rüff about the normal position of the fetal head at birth, which exposed the male authors' lack of practical experience.

4.12 Conclusion

Childbirth texts tended to reflect the cultural values of society. Christianity provided the grand scheme for understanding procreation, in which the physiological process was overshadowed by childbirth's powerful religious significance.[204] The English literature also emphasised the spiritual aspects of birth, and devotional books offered prayers for women in childbirth, while the old Anglo-Saxon leechbooks illustrated a great number of superstitions around birth which continued to co-exist in folk culture.

The content of the English medieval manuscripts was influenced by the way in which midwifery knowledge was transmitted to Britain. English manuscripts written in the vernacular and based upon foreign materials began to circulate more after the advent of printing in the fifteenth century.

The influx of foreign manuscripts from the fourteenth century onwards introduced texts that were more heavily influenced by Hippocratic, Soranic and Galenic wisdom, and may not have reflected existing practice in England.

The monastic libraries held most of the manuscripts and censored the nature of childbirth knowledge and controlled its dissemination. The degree to which written knowledge was assimilated into English midwifery practice remains uncertain but may have been negligible.

The three texts examined (*Trotula*, MWGH, and KWKC) contained evidence based upon conjecture and were vague and unhelpful to those seeking to know how to deal with birth complications. The brief manner in which anatomical knowledge was described in the

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[202] Rüff (1637) relies heavily on Rösslin's work in his own treatise. The form of the name varies: it appears most usually as *Rüff*, occasionally as *Reuff*.
[203] See Ingerslev, 1909b, p. 85.
[204] Cressy 1997.

medieval texts was linked to the contemporary value placed upon this knowledge and the manner of its transmission which resulted in two distinctive styles of text being circulated to Salerno and subsequently, to the West.

Translations emanating from the Greek and Latin West tended to resemble the Soranic works, whereas those travelling from Greece to the East and onwards through the Arabic world contained more references to the Hippocratic and Galenic doctrines. Compilations that arrived in England contained elements from one or both traditions. Those texts based upon Arabic translations of the ancient works offered less detailed information about birth.

The medieval texts contained explanations for delay in labour, reminiscent of ancient wisdom. Destructive operations were not discussed in the medieval medical literature and neither was caesarean which had more of a religious function (the desire to baptise and possibly save a living child after its mother's demise).

The *Trotula* manuscripts contain references to Galen and excerpts from *Diseases IV* of the Hippocratic corpus. The MWGH and KWCK appeared to contain few references to the works of Soranus, although they did contain series of birth plates, reminiscent of the Soranic tradition, subsequently replicated in style in at least twenty English manuscripts from 900 AD onwards.[205]

Discussion on the management of difficult births may have been intentionally brief either because the medical theorists lacked knowledge of practice or in order to restrict expert knowledge. The superficial discussion on dealing with difficult births in these books addressed to midwives and women may also have been to some extent intentional, keeping others from acting as midwives.

Traditional midwives, as the main attendants of childbirth had their own sources of knowledge absent from the documentary record. As Biller argues, it may be wrong however, to assume problems were dealt with in ignorance or 'passive resignation'.[206]

Whilst certain ancient discourses and foreign material contributed to the future direction of medical theory, the texts may well have been part of a large literary exercise. If

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[205] Biller 1986, p. 44.
[206] Biller 1986, p. 45.

the medieval material had been accessible to midwives, not all midwives could read or had access to texts, some of which remained untranslated.

The pelvis and the active fetus theory were not mentioned in these texts, although this theory of childbirth re-emerges in the early modern English treatises, after the rediscovered ancient texts had been circulated in the fifteenth century.

5 The Pelvis Became Visible

5.1 Introduction

This chapter investigates the beginning of the era in which the pelvis came to the fore as a topic for medical discussion. The discourse of the 'adequate pelvis' of suitable dimensions to permit birth emerged during the sixteenth century and ran in parallel to the earlier discourse of the active fetus and expanding pelvis, discussed in chapters three and four. As the scientific enlightenment* continued, more challenges to ancient wisdom began to emerge and superstition, absolutism and church censorship were relaxed. A new emphasis on the physical process of birth came to the fore during this formative period, presaging rapid changes and developments in eighteenth-century medical midwifery practice.

From the sixteenth century onwards, anatomists and medical men began to challenge the assumption that the pelvis separated to facilitate birth, and pondered whether a rigid female pelvis of adequate proportions might facilitate birth without need for this.

The Italian Renaissance* was an intellectual movement of the fourteenth century which fostered a revival of Greek and Latin literature and art, enhanced by the medical humanist movement and the discovery of some of the original Greek manuscripts.[1] The Renaissance sentiments were that 'the older the text was, the closer it was to true wisdom'.[2] This notion encouraged continued support for the 'active fetus theory'*, whilst new developments in the field of anatomy stemmed from another Italian-based rebirth in the approach to anatomical dissection which followed on from a lifting of the ban on human dissection. This prepared the ground for the first challenges to ancient dogma which had constrained advances in anatomy, eventually leading to the first challenge to the theory of pelvic separation at birth.

In twelfth-century Italy, human dissection was not practised because belief in bodily resurrection was wide spread and people were fearful of its implications[3] By

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[1] In 1525, the first European edition of Galen's text was translated into Latin from the Greek and the medical humanist movement began: Wear 1995, pp. 250-5.
[2] Henry 1991, p. 194.
[3] See O'Malley and Saunders 1982, pp. 13-16.

the thirteenth century, the occasional post mortem examination was carried out; although Arabic anatomy, influenced by the Galenic tradition, was taught from texts.

According to Siraisi, Renaissance anatomy was characterised by 'a notable enhancement of both practice and textual foundation'.[4] In 1516, the professor of practical medicine at Bologna, Mondino de Liuzzi (c1270-1326), was regarded as creative when he produced a text to be read whilst a human corpse was dissected.[5] More schools of anatomy, such as the ones in Padua and Montpellier in France subsequently permitted the dissection of criminals, whilst most texts on anatomy continued to be based upon a theoretical tradition. Andreas Vesalius (1514-1564) gained notoriety for the manner in which he challenged Galenic dogma, using a new approach to human dissection. His method involved direct observation whilst dissecting rather than reading instructions from a Galenic text, while an assistant performed the dissection. Vesalius produced his celebrated text, *De Humani Corporis Fabrica*, against a degree of resistance from Galenists such as his friend John Caius, a high-ranking academic from the medical school at the University of Cambridge.[6]

During the sixteenth century, Italy became the leading centre in Europe for anatomical teaching, closely followed by France[7] whilst England lagged behind.[8]

5.2 Involvement of artists in the dissemination of anatomical knowledge

> *Oh Writer, How Can You Depict In Words The Entire Figuration Of Man As Perfectly As A Drawing?*
> Leonardo Da Vinci [9]

The polymath Leonardo da Vinci (1452-1519), best known for his paintings and inventions, was generally perceived as being 'ahead of his time'. He was

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[4] Siraisi 1997, p. 95.
[5] De Liuzzi's teaching technique was followed for nearly 200 years: Cunningham 1997, pp. 37-56.
[6] See Cule 1997, p. 30, which suggests English medical theories were retarded.
[7] The hospitals and private training schools of France were seen as the best places to go for courses on anatomy, midwifery or surgery during the eighteenth century. French texts were often translated into English. By the mid- to late eighteenth century, some London men midwives, such as William Smellie and William Hunter, had set up similar midwifery schools in London.
[8] As early as 1540, Henry VIII granted the Companies of Barbers and Surgeons four bodies per year from the gallows for dissection (the dissection was part of the criminal's punishment). This did not satisfy the increasing demand for bodies to dissect. Dissection of criminal corpses was not legalised in the UK until 1752. The Anatomy Act of 1832 made more bodies available, which reduced serious problems of grave robbing. See Richardson 1988, pp.30-51; p. 31.
[9] Leonardo da Vinci, cited by Carlino 1999, p. 13.

probably one of the best anatomical artists of the Renaissance, and saw anatomy as separate from medicine. He believed illustrations could best convey the anatomical structures of the human body rather than textual description.

Encouraged by the spirit of the Renaissance, artists and sculptors emphasised the aesthetic beauty of the human form. This required a good knowledge of human musculature. Although simple representative or symbolic anatomical diagrams had been produced using a range of materials since antiquity, it was during the fifteenth century that artists and anatomists began to work together to produce truer human likenesses. Artists based some of their drawings upon observations of dissected bodies. Their work led to a wider dissemination of knowledge of the internal structures of the human body. Da Vinci was involved at an early stage in anatomical drawing and believed pictorial knowledge was the best medium with which to convey anatomical knowledge:

> If you want to show a human figure in all aspects of his parts by words, just forget it: since the more precisely you describe it, the more you confuse the readers mind and distance him from understanding the thing described [10]

His famous sketch of the fetus *in utero* appears to have been drawn from direct observation. It displayed the thick uterine musculature in cross-section and true proportions of the fetus in relation to the uterus. This now well-known sketch, which resides in the Royal Library, Windsor Castle, was unfortunately lost for two hundred years, and so had no contemporary impact on birth theory.[11]

5.2.1 The Christian church and human anatomy.

In the sixteenth and early seventeenth centuries, a wider public interest in the human form was encouraged and assisted by anatomical fugitive sheets.[12] These

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[10] *ibid.*

[11] Leonardo's image of the fetus *in utero* offered a better insight into intra-uterine life than most previous illustrations and some that followed: O'Malley and Saunders 1982, p. 475.

[12] Pairs of male and female anatomical fugitive sheets were in vogue between the sixteenth and the end of the seventeenth century. They facilitated dissemination of anatomical knowledge to a wider and diverse group throughout the cities of Europe: Carlino, 1999.

illustrations demonstrated anatomical parts layer by layer and appealed to the public. Their production was approved by the church, which viewed them as a way of emphasising the intricate work of God's creation. For the wealthy of the seventeenth and eighteenth centuries, miniature anatomical models were also available, made from precious materials (the female versions were described as 'anatomical Venuses').[13] Life-size wax models made from impressions of corpses became a public attraction in many European cities as well as valuable resources for medical students.[14]

Although primarily intended for a medical market, Vesalius' work, especially the epitome,[15] appeared to emulate the fugitive sheets.

5.3 *De Humani Corporis Fabrica*

Vesalius utilised the printing press and wood block printing to produce his lavish *magnum opus* in 1543, *De Humani Corporis Fabrica*, known in English as *On the Fabric of the Human Body* ('the *Fabrica*').[16] As numbers of dissections were restricted, his work, particularly the short epitome, enabled larger numbers of medical students conveniently to visualise the internal structures and learn about the Vesalian method of dissection. As he expected, his work became highly influential, and was widely disseminated and replicated throughout Europe.[17] Vesalius was not the only anatomist to produce illustrated texts; there is a resemblance between his work and that of Charles Estienne (1504-1564) of France.[18] Vesalius was allegedly famous[19] for publicly undermining the authority of Galen, which revolutionised the approach to the teaching of anatomy for future generations and cast the first glimmer of light upon the composition of the bony pelvis.

5.4 The rigid pelvis

Vesalius wrote relatively little about the female reproductive system, and based his observations upon a few illegally-obtained female corpses and body parts.

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[13] See Hansen and Porter 1999, pp. 26-71, 114-25.
[14] Some medical images were linked with eroticism: Newman 1996, McGrath 2002.
[15] Vesalius 1543, in Saunders and O'Malley 1950
[16] Vesalius 1543, in Saunders and O'Malley 1950, also Garrison and Hast 2003
[17] See Choulant 1945, pp. 73-87.
[18] Estienne 1545.
[19] Cunningham 1997 claims Vesalius' achievements have been overstated.

He described the male and female pelvis as sexually dimorphic; the female pelvis being far wider than the male with greater internal capacity in both the upper part, to allow for growth of the pregnant uterus, and below, to facilitate birth without need of pubic bone separation. He concluded that the female pelvis was sufficiently spacious to permit birth without the need for expansion, apart perhaps from movement of the coccyx at the sacro-coccygeal joint, seen most clearly in animals with tails.[20] In chapter eighteen of the *Fabrica*, he concluded that the pubic bones of the female pelvis were wider apart than in males but attached in the same way. He believed that they did not separate, 'attested by the touch during parturition'. [21]

Timely parallel developments in the arts and the advent of the printing press helped propel the argument about pelvic rigidity into a wider medical arena for discussion. The question of pelvic rigidity or separation was disputed for several hundred years by a number of respected men midwives, bringing the pelvis further into focus as a topic of medical debate.

5.5 Sustaining the opinion of pelvic rigidity

Giulio Cesare Aranzi (or Arantius) was one of Vesalius's students and an experienced practitioner who proposed a link between contracted pelvis and difficult labour. In his treatise, *De Humano Foetu Liber*[22] he suggested that when the pelvic bones were properly formed, even if the fetus assumed a bad position before birth, a 'wise master' could manually manipulate and deliver the fetus. When midwives contacted him with difficult cases, he would proceed to ask them the following questions (which interestingly suggest he had confidence in midwives' judgements):

> Were the pubic bones …prominent or compressed?
> Were the (fetal) parts accessible by hand?
> Which is the infant's position?[23]

Vaginal examination was used to assess the 'narrowness of the passages' and whether a vaginal delivery might be possible.[24] Arantius advised that when the bones were not

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[20] Garrison and Hast 2003, chapter 29, pp. 127-132, or enter 'childbirth' as a search term.
[21] Arantius 1587, cited by Eastman 1948: 'touching' synonymous with vaginal examination.
[22] *ibid.*
[23] Eastman 1948, p. 306, which suggests Italian midwives were relatively adept at vaginal examination and aware of the anatomy of the pelvis.
[24] Fetal destruction might be necessary in extreme circumstances to remove the fetus.

properly formed, 'too broad' or 'humped inside', they would be too narrow for the fetus to get past, even if it aligned itself in the optimal position for birth.[25]

Arantius described the need to perform a general examination of the woman first to assess her 'strength and vital force', before deciding upon whether to take further action.[26] As a Christian physician, he was aware that destructive surgery might mistakenly be performed upon a live fetus, resulting in its death; also that if the mother died during his interventions, he might be severely criticised. If the pelvis was very 'narrow' (contracted) and the mother was weak, Arantius was reluctant to take any action which might risk his reputation or compromise his accountability to God, and advised others to do likewise. By the sixteenth century discussions about surgical interventions such as the use of crochets to dismember fetuses became more commonplace in the texts, along with brief references to the caesarean operation.

5.6 Exploring the caesarean operation on live women

In the sixteenth century, post mortem caesarean operations continued to be practised, and the possibility of performing a caesarean on living women was tentatively investigated.[27] Scipione Mercurio, a student of Arantius, watched him perform a post mortem caesarean which resulted in a live birth. In his treatise, *La Commare o Ricoglittice*, published in 1596, Mercurio suggested caesarean could be performed on a living woman with a small pelvis to deliver a large baby.[28] The procedure had another proponent, Francois Rousset (b.1535) of France,[29] and an equally large number of early dissenters.

5.6.1 Views on caesarean operations in the early modern period

In 1696 John Pechey stated that caesarean was:

> ...a dextrous extraction of a living or dead child from the mother's womb, which cannot be otherwise excluded, and that without

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[25] Eastman 1948.
[26] Eastman 1948, p. 306.
[27] Young 1944.
[28] Graham 1950, p. 165.
[29] Rousset 1580

> endangering the life of both or of either and without spoiling the faculty of conceiving [30]

He believed, although the operation was dangerous, performing it was better than doing nothing, especially 'if some kingdom or principality is to be lost'.[31]

The caesarean debate continued in the midwifery texts until the late eighteenth century and the general opinion of men midwives in England was that the operation was barbarous. Robert Barratt, believed the operation was 'cruel' and not possible without killing the mother; although he had heard from 'country gossips' that it had been successfully performed.[32]

5.7 Persistence of mighty fetus and expanding pelvis theory in the early modern printed materials

Vesalius' suggestion of pelvic rigidity was slow to be acknowledged. One reason for this was perhaps because the active fetus theory of around 1500 years' standing was supported by some influential medical men in the sixteenth and seventeenth centuries such as Ambroise Paré and William Harvey.

The theory of the active fetus and expanding pelvis had a major limitation in that it could not easily reconcile the birth of a stillborn fetus,[33] although the notion of birth after maternal death was easier to accommodate.[34]

One reason for the continued support for the active fetus theory was the continued reliance by respected advocates such as Paré and Harvey upon avian studies to inform human birthing theory.

As previously mentioned, the advent of the printing press in the fifteenth century increased the ease of dissemination of medical knowledge. Just before the publication of the *Fabrica* by Vesalius, Eucharius Rösslin had published *Der Swangern Frawen und hebammen Rosegarten.*, This was followed by the publication of Jakob Rüff's *De conceptu et generatione hominis, in 1554,* translated into English in 1637 as *The Expert Midwife*. These treatises continued to underpin the 'active fetus

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[30] Pechey 1696, p. 150.
[31] *ibid.*
[32] Barret 1699, p. 35.
[33] Francois Mauriceau believed the mother had some role in parturition, accounting for the birth of macerated stillborn fetuses; Mauriceau 1710, p 169.
[34] See section 5.7.2

theory' and its dissemination to a public readership, which also included some midwives and medical men:

> ...he [the fetus] is moved with great force and violence in the womb; so that he breaketh asunder the ligaments or binders and small veins with the coats or caule in which he is wrapped and infolded [35]

> [Midwives and others] ...may marke and observe the true and proper paines, passions and throngs of childbirth; which indeed are no other thing, but the violence and strugglings of the infant being come to perfection...[36]

Rüff suggested the fetus ruptured the membranes and the whole process of birth was speedier with a male child. The feeble fetus was a cause of danger:

> yf the childe be so faynt weake and tender, that it cannot tourne it selfe or doth it very slowly, also if the child be dead in the mothers belly it is a very perellous thing for so much as it cannot be easily turned, nither can it welde or helpe it self to come forth, or if the chylde be sicke or weakned so that it cannot for feblenes help it self' [37]

The advice was to assist the fetus by forcibly dilating the cervix, repositioning the fetus, manually extracting it or all three combined. If midwives followed these directions, they may well have been responsible for the types of calamity that Percival Willughby and others witnessed on occasions.[38] While such texts encouraged manual interference, midwives who attempted to deliver fetuses by these methods no doubt risked running into grave difficulty.

5.7.1 Ambroise Paré's role in maintaining the ancient discourse of pelvic bone separation at birth

The works of the celebrated French surgeon and man midwife Ambroise Paré (1510–1590) were translated into English in 1634. In the chapter 'On the Generation

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[35] Ruff 1637, p. 76.
[36] *ibid.*
[37] Raynalde 1560, p. 68.
[38] Willughby frequently remarked on the cruelty of midwives and their gross incompetence. See for example, Willughby 1863, p. 43.

of Man',[39] unlike many ancient birth analogies in which the process of human birth was likened to seed pods opening up or fruit dropping from trees, Paré described the physical changes observed in women near to birth and the opening up of the pelvis that takes place. He was familiar with the work of Vesalius, having translated much of the *Fabrica* into French, although he clearly did not embrace the notion of a fused pubis.

He reinforced the Hippocratic opinion[40] that human conception could be learned about from the observation of a clutch of hen's eggs, taking one every day and breaking it open to observe developments.

Avian birthing theory continued to inform human birthing theory, while Paré focussed on the human process in some detail. He suggested that pelvic separation occurred during a visible culmination of maternal pain as it spread to the lower regions causing physical changes in the mother's condition which ended with birth:

> [Labour pain starts with]...great pain under the navel, and at the groins and spreading therehence toward the vertebrae of the loins and especially when they are drawn back from the Os Sacrum, the bones of the ilia and the coccyx are thrust outward, the genitals swell with pain, and a certain fever like shaking invades the body, the face waxeth red by reason of the endeavour of nature, armed until the expulsion of the infant. [41]

Paré again mentioned pelvic separation at birth:

> And then the child pursuing the air which he feeleth to enter in at the mouth of the wombe, which is then very wide and gaping, is carried with his head downewards, and so, cometh into the world, with great pain both unto itself, and also unto his mother, by reason of the tenderness of his body, and also by reason of the extension of the nervous neck of his mother's womb, and separation of the ones called os ilium from the bone called os sacrum. [42]

Paré argued that pelvic expansion must be essential:

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[39] Paré 1634.)
[40] In the Hippocratic text *The Nature of Man*, a series of daily observations of chick development emphasised certain similarities in pre-natal development between humans and avians, see Lloyd (ed.) 1978, p. 341.
[41] Paré 1634, p. 900.
[42] Paré 1634, p. 899.

> For unless these bones are drawn in sunder how could not only twins that cleave fast together, but also one child alone, come forth at so narrow a passage as the necke of the womb is? Not only reason, but also experience confirmeth it; for I have opened the bodies of women presently after they have died of travell of childe-birth, in whom I have found of Ilium to be drawne the breadth of ones finger from os sacrum[43]

He bolstered his support for pelvic expansion by referring to an incident in 1579 in which he had dissected a woman who had been hanged 15 days after giving birth. He noted that the 'os pubis' had separated at the middle by 'half a fingerbreadth' and the 'os ischion had separated from the sacrum'. He believed this gave credence to the theory of pelvic bone separation. The remainder of the discussion focussed on the notion of sacro-iliac joint expansion. Paré corroborated his evidence of separation of the sacro-iliac and sacro-coccygeal joints with testimonies from honest matrons:

> ...and moreover, in many unto whom I have been called being in great extremity of difficult and hard travell, I have not onely heard, but also felt the bones to crackle and make a noise, when I laid my hand upon the coccyix or rumpe, by the violence of the distention. Also honest matrons have declared unto me that they themselves, a few daies before the birth, have felt and heard the noise of those bones separating themselves one from another, with great paine. Also a long time after the birth, many do feele great pain and ache about the region of the coccix and Os sacrum, so that when nature is not able to repaire the dissolved continuity of the bones of Illium, they are constrained to halt all the dayes of their life after. But the bones of the share, called Ossa pubis, I have never seene to be separated, as many do also affirme. [44]

The process of separation was described as occurring by 'dissolution', which was not always reversible. Paré (above), Willughby and Thomas Denman[45] all remarked on the noise of separation.

5.7.2 Myths of preventative pelvic expansion

Vesalius tried to end 'myths' about the benefits of pelvic mutilation in young girls as a means of ensuring they would grow up to have easy births:

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[43] Paré 1634, pp. 899-900.
[44] Paré 1634, .p. 900.
[45] Pare 1634, Denman 1794. The sound is described on pp. 16 and.26.

> ...I believe it is a secret to no student of anatomy that in no race are the pubic bones either pressed together or separated in newborn girls for the sake of easier parturition, regardless of the stubbornness with which popular opinion makes this claim about one nation or another.[46]

Paré had also reported on a drastic prophylactic measure taken in Italy to ensure an easy birth:

> It is reported that in Italy, they break the coccyx of rump of all maidens, that when they come to bee married they may beare children with the lesser travaile in childe-birth....[47]

Vesalius had reasoned that bones would not stay parted and would heal by callus formation, perhaps making birth even more difficult.

Percival Willughby (1596-1685), the English man–midwife from Derby, was heavily influenced by Paré and reiterated a number of Paré's comments in his own manuscript. He referred to 'wild Irish women' who separated the pubic bones of female infants and prevented them knitting together again. Although sceptical, Willughby conceded that:

> ... wanderers of that nation have ... a waddling and lamish gesture in their going[48]

Willughby also described two cases in which women had difficulty walking and pain in the loins and hips after birth which he assumed was due to the continued disunion of the os pubis and os coccygis.[49]

5.7.3 William Harvey's interest in avian studies

The famous English physician William Harvey (1578-1657) admired the ancients. His landmark discovery of the circulation of blood described in *De Mortu Cordis* was based upon the ancient tradition of comparative anatomy.[50] In the image

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[46] See Vesalius 1543, in Saunders and O'Malley 1950, chapter 18, note 23.
[47] Pare 1684, p. 900.
[48] Willughby 1863, p. 16.
[49] Willughby 1863, pp. 16-17.
[50] Harvey 1628. Harvey had been inspired by his Paduan teacher, Hieronymus Fabricius da Aquapendente (1537-1619), who embraced Aristotle's work on natural philosophy and also claimed that most animals including men were born from eggs. Cunningham (1997) argues that Harvey's

that follows, from the frontispiece of, *Exercitationes de Generatione Animalium*,[51] Jove is depicted releasing an array of creatures including a human, a fish, lizard, bird, stag, grasshopper, snake, and butterfly from an egg, on which is inscribed *ex ovo omnia* (everything from an egg).[52]

Figure 5.1

Figure 5.1:

The frontispiece of the 1651 edition of *Excercitationes De Generatione* Animalium by William Harvey.

Source: John Rylands University Library of Manchester

Reproduced with permission

Figure 5.2

Figure 5.2

A close-up view of figure 5.1 of an open egg on which it is inscribed,

Ex ovo omnia, (everything from an egg), held by Jove.

Source: John Rylands University Library of Manchester.

Reproduced with permission.

Harvey suggested hens' eggs were cheap, easily obtained, and relatively observable, reflecting the Hippocratic, Aristotlean and Galenic traditions. Harvey

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ground-breaking work on the circulation was also more aligned with the ancient approach to dissection than the new approach.

[51] Harvey 1651 - The frontispiece illustrated above is different in different English and Latin editions.

[52] See Hagelin 1990.

published his treatise on reproduction in the last years of his life, when he was seventy-three. Despite his involvement with human dissections during his career, even dissecting his own father and sister,[53] he did not seem to draw upon this knowledge in this text. Harvey was reluctant to publish this work completed earlier in his career, as he was aware that comparative anatomy had become outdated. Nevertheless, he was influential and his words were quoted verbatim by Willughby in the manuscript of *Observations in Midwifery*.

5.8 Harvey's explanations of the birds and bees

The preface of Harvey's treatise dealt with science and knowledge and continued with a long discussion (continuing to page 566) based upon observations of avian reproduction (the study of hens' eggs and chickens), followed by a relatively small section about human birth. This was included near the end of the book and the theories of human reproduction are very closely likened to the hatching process of chickens.

Harvey located human reproduction within a wider context of nature, and by analogy suggested there was an optimum time for birth, which was when mother and fetus were 'ripe for the business':

> ...in a natural and genuine birth, two things are required, which are assistant the one to the other; that is to say, the woman travaile, and the foetus, which is to bee produced. Both which, except they bee ripe for the business, the birth is hardly successful.[54]

Harvey's belief was that nature knew best and should be interfered with as little as possible. Drawing parallels from nature, he sustained the view that the fetus was instrumental in its own birth:

> the assistance of the foetus is chiefly required in the birth, is evident in Birds onely, which Do by their own industry without help from their parent break up the shell; but also in other Animals; for all flies and

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[53] Richardson 1988, p. 31; Payne 2002.
[54] Harvey 1653, p. 487.

> butterflies doe perforate the little membranes (in which they did lurk when they were the Worme Aurelia). [55]

Like the Hippocratic writers, he claimed the fetus grew restless usually in the tenth month of pregnancy because this was when its food supply was reduced.

5.8.1 Harvey's concept of pelvic relaxation

Harvey made analogies between birth and the ripe fruit falling from a tree, reviving the Galenic tradition:

> And this kind of birth seemeth to bee the most natural wherin the fetus (like a mellow fruit which droppeth from the tree, without shaking out its seed before the time assigned by nature) is born with the secundines embracing it [56]

In order for this to happen he acknowledged that changes in the birth passage occurred and that, in advanced labour, the pelvis relaxed prior to expanding to allow fetal egress:

> ... also the articulation of the Holy bone [sacrum] and the Share-bone [Pubic bone] to the Hanch-bone [Iluim] (which Copulation, or Articulation is by Synchondrosis, or a gristly ligament) is so softened and loosened, that the fore said bones do easily give way to the parting infant; and by gaping open, do amplifie the whole region of the Hypogastrium or Lower belly. And when these things are in this condition, it is certain that the Birth is at hand. And that so the foetus (like a ripe fruit) may come forth into the World, Nature makes this provision of dilating the parts.[57]

He suggested the process of pelvic expansion began in the late stages of labour, pre-empted by a softening of the joints

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[55] Harvey 1653, p. 491.
[56] Harvey 1653, p. 487.
[57] Harvey 1653, p. 473.

> ...,for even the connection of the bones themselves, namely the synchondrosis of the Hanch Bone with the Share, and Holy bone, & the ...natural union or coalition of the Rump, or utmost end of the Os Sacrumis dissolved and mollified...[these bones]....should afterward [after birth] harden and draw themselves together...[58]

Afterwards they reunited and hardened. In preparation for the separation, massaging the pubic region with oils was traditionally practised.[59]

5.8.2 The active fetus...with a life independent of its mother's

The 'whole' maternal body was thought to be involved in ejection of the fetus, rather like sneezing. Harvey referred to a case in which the Queen's beautiful infundibulated mare gave birth to a foal while its introitus remained sealed up with iron rings. On inspection the foal had managed to exit through the region of the mare's croup [perinanal region] by creating a new passage. Harvey claimed this was another indication of the active role of the fetus in its own birth.[60]

In 1653, Harvey referred to several incidents in which babies were born after their mothers had died. Similar isolated incidents were reported in the early modern period in England and Europe. Some medical men pondered whether the fetus had an independent existence from its mother *in utero*.[61] Referring to several more cases, Isbrand de Diemerbroeck, a professor of 'physick' and anatomy from Utrecht, Holland, believed such reports were misleading. He argued the women presumed to have died may simply have been 'hysterical [and] motionless or fallen into a trance' and not dead.[62] Alternatively, the fetus may have made its own egress or the uterus played a part in expelling it after the mother had died. De Diemerbroeck, along with Andre Levret and Jean Louis Baudelocque of France, all considered involuntary maternal effort continuing after the mother had died.[63]

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[58] Harvey 1653, p. 498.
[59] Described in chapter eight.
[60] Harvey 1653, p. 491-6.
[61] *ibid.*
[62] de Diemerbroeck 1694, p. 193.
[63] Baudelocque 1790, p. 146; Laqueur 1990, p. 110.

This debate about whether a fetus could be born alive after its mother had died was re-opened in the *Lancet* in April 13th 1872.[64] Richard Aveling[65] responded to this by furnishing the *Lancet*'s editor with another six examples of birth after maternal death, although the last case appeared to be of a mother being buried alive and subsequently delivering the infant in her grave. In another case, a mother had been presumed dead for several days before the birth occurred. Such cases ceased to be reported by the end of the nineteenth century. Meanwhile, none of the authors questioned how a dead fetus was able to be born of a live mother if the fetus was responsible for its own egress.

5.9 Francois Mauriceau and the emerging discourse of pelvic bone inseparability

Francois Mauriceau (1637-1709) was an influential seventeenth-century French *accoucheur* who adopted the new paradigm approach to midwifery, grounded in observation and practice. His texts included a number of personal reflections on cases and observations from post-mortem dissections. In the introduction to his treatise *The Diseases of Women with Child and in Childbed* he criticised those authors, unlike himself, who wrote about things they had not personally witnessed;

> '...like geographers who give us the description of countries they never saw'[66]

Mauriceau was highly critical of the theories of pelvic bone separation or joint expansion at birth, and argued that the female pelvis could facilitate birth without the need for separation of the pubic bones.[67] Like Arantius, Mauriceau supported his argument by reference to the differences between the size and shape of male and female pelves. He described the female pelvis as more 'capacious and spacious' and 'turned outwards' than in the male.[68]

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[64] Anomymous 1872.
[65] Aveling 1872..
[66] Mauriceau 1710, p. ix.
[67] Mauriceau 1710, p. 123.
[68] Mauriceau 1710, p. 123.

While he acknowledged that 'many' were of the opinion that the os pubis, or the ilium and sacrum separated from each other at birth, like Vesalius, he concluded:

> ...having often seen and dissected women dead a few days after delivery, I found it very difficult to separate these bones with a strong sharp penknife, where I could never find the least appearance of any preceding separation...[69]

He reasoned that if the bones had separated it might take some time for them to reunite, meanwhile the woman would be rendered immobile. Moreover he claimed, providing the bladder and rectum were empty:

> ...the space in a woman's pelvis is 'sufficient for it, [fetus] without any necessity that these bones should be disjointed or separated; for if it should so happen, women could not keep themselves on their legs as many of them do, immediately after they are brought to bed.[70]

He believed Paré was 'mistaken' about pelvic bone separation being a normal process and reasoned that if the hanged woman[71] had such a wide pelvic bone separation a fortnight after birth, she would have required carrying to the gibbet for hanging and that the separation was as a result of some other violent force:

> ...we must rather believe, as most probable that such a disjunction and separation was caused either by the falling of this woman's corpse from the high gibbet to the ground after execution; or rather by some impetuous blow on that place, received from some hard or solid thing.[72]

Mauriceau suspected that mishandling of the cadaver and a blow to the pelvis had caused it to separate after the woman was hanged.

5.9.1 Challenging the physiological theory of joint separation

Using his anatomical knowledge and experience of human dissection, Mauriceau refuted the theory of joint mollification in which:

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[69] Mauriceau 1710, p. 124.
[70] Mauriceau 1710, pp. 123-124.
[71] Mauriceau 1710, p. 122.
[72] *ibid.*

> the slimy humours which flow forth from about the womb ... mollify[soften] the cartilage, which at other times join them firmly.[73]

He argued there were no anatomical structures to permit the 'flow of slimy humours' between the uterus and the joints and continued:

> I could never perceive this imagined disjunction, putting my hand on the pubis when the child was in the passage.[74]

Although he acknowledged that sometimes the coccyx bent outwards in labour.[75] The ancients had associated pain in childbirth with stiffness of the pelvic ligaments in older women. Mauriceau acknowledged that 'bad confirmation' of the pelvic bones could cause difficulty. He outlined the causes of difficult labour as follows:

> She may be too young, having the passages too straight, or too old of her first child; because her parts are too dry and hard, and cannot be so easily dilated, as happens also to them which are too lean; They who are either small, short, or mis-shapen, as crooked Women have not a breast strong enough to help their pains, and to bear them down; nor those that are weak, whether naturally or by accident; and crooked persons have sometimes the Bones of the Passage not well shape...[76]

5.92 Pelvic deformity as a cause of 'dystocia' (Difficult Birth)

Mauriceau was aware of links between small stature or skeletal deformities and reduced internal capacity of the pelvis. He advised that such women needed to be kept upright for as long as possible in labour and encouraged to mobilise:

> Small and misshapen women should not be put to bed, till at least their waters be broke; but rather kept upright and walking about the chamber, if they have strength, being supported under the arms; for in that manner they will breath more freely, and mend their pains better, than on the Bed, where they lie all in a Heap.[77]

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[73] *ibid.*
[74] Mauriceau 1710, p. 124
[75] *ibid.*
[76] Mauriceau 1710, p. 164.
[77] Mauriceau 1710. p. 166.

Mauriceau recommended the ancient practice of manual lubrication of the genital tract to ease the passage of the fetus:

> Let those that are very lean, also moisten these parts with oils and ointments, to make them more smooth and slippery, that the head of the infant and the womb be not so compressed and bruised by the hardness of the Mother's bones, which form the passage.[78]

He also believed the mother had a role in the ejection of the fetus.

5.9.3 Case study: fatally contracted pelvis

In *Observations sur la grossesse et l'accouchement des femmes,* Francois Mauriceau recorded a memorable case of a 'tiny' woman he was asked to see by a midwife.[79] Her pelvis was so narrow that he could not access the fetus on vaginal examination, precluding the use an embryotomy instrument. He refused to listen to the midwife who advised on a caesarean operation as he saw this as a death sentence for the mother. Hugh Chamberlen happened to be visiting France and Mauriceau challenged him to deliver the woman with his 'secret instrument' (the obstetric forceps). Unfortunately the mother's condition was too extreme and despite Chamberlen's dogged persistence, she died 24 hours later, still undelivered, with a ruptured uterus.

5.10 Movement of the coccyx and sacrum at birth

At the end of the sixteenth century, Peter Forestus, a Dutch physician from Delft, suggested the only part of the pelvis that moved at birth was the coccyx.[80] At the beginning of the eighteenth century, the notion of posterior pelvic movement involving the coccyx, or sacrum and coccyx, became a central focus of the work of his fellow countryman Hendrik van Deventer. Dutch midwives (van Deventer was married to a midwife) already subscribed to this notion, although it is not clear

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[78] *ibid.* Antenatal oiling and stretching of the vagina was advised in the *old* and the *young to* make the birth easier and cause less injury to the fetal head.
[79] Mauriceau 1640
[80] Despite communication with Dutch historians of medicine the works of Peter Forestus and Cornelius Solingen referred to by Ingerslev have not been traced. See Ingerslev 1909a, p. 6.

whether they advocated applying manual pressure to these bones during birth, to push them back, as van Deventer advised.[81]

5.11 Conclusion

> *Explanation can survive and develop within a given society only if this is stylised in conformity with the prevailing thought style*
> *Fleck (1979)* [82]

Foucault[83] suggested that expansion of the descriptive language of anatomy and a deeper 'gaze' enabled 'what had previously been below and beyond their domain' to be demonstrated. This changed the way people looked and described the body:

> The relationship between the visible and the invisible – which is necessary to all concrete knowledge – changed its structure, revealing through gaze and language what had previously been below and beyond their domain. A new alliance was forged between words and things enabling one to see and say.[84]

Once human dissection was authorised, a greater interest ensued in reproductive anatomy and theories of generation. The adoption of new terminology facilitated more complex anatomical discussion and enabled the ancient theory of pubic bone separation to be tested. This work undermined that of Galen in the West.

The general interest in the body created during the Renaissance was supported by the Christian church. Dissemination of anatomical knowledge was supported by the slightly earlier invention of the printing press and wood block printing, which enabled knowledge of anatomy to be conveyed in visual as well as verbal form to wider international audiences.

Anatomists employing the Vesalian method of dissection proposed the female pelvis was larger than the male 'prototype', which meant it could normally facilitate birth without need for expansion. The active fetus and expanding pelvis theory

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[81] van Deventer 1716.
[82] Fleck 1979, p. 2.
[83] Foucault 1973.
[84] Foucault 1973, p. xii

continued to exist in parallel, despite its inability to explain how the birth of a dead fetus might occur in the absence of maternal involvement.

The discourse of the expanding pelvis was maintained for some time by the highly regarded experts Ambroise Paré and William Harvey, whose work continued in circulation. This was bolstered by various editions of *The Byrth of Mankynde* and *The Expert Midwife,* which reinforced ancient birthing theory. As Fleck suggests;

> Whatever is known has always seemed systematic, proven, applicable, and evident to the knower. Every alien system of knowledge has likewise seemed contradictory, unproven, inapplicable, fanciful or mystical.[85]

However, the discourse of the rigid pelvis was championed by Julius Arantius, Francois Mauriceau and later, Hendrik van Deventer, who believed only the coccyx and possibly the sacrum were capable of moving back during birth. As these men observed pelves at post mortem dissections, they began to notice some were misshapen and contracted. Gradually the discourses of pelvic rigidity and contraction came to the fore; this is discussed in the next chapter).

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[85] Fleck 1979, p. 22.

6 The Blighted Pelvis

6.1 Introduction

In the previous chapter, we saw how anatomists and a number of medical men had concluded that the normal female pelvis was a rigid structure of suitable dimensions to allow the fetus to proceed through it without need for expansion. A narrowed pelvis, alluded to by Arantius in the sixteenth century, became associated with rickets in the seventeenth-century English and European midwifery literature.[1] Whereas the possibility of a fetus adopting a malposition (unfavourable birth position) in the womb was established in ancient times, the concept of fetal uterine entrapment, primarily caused by a narrowed pelvis took longer to become established. Gradually a narrow pelvis, later known as a contracted pelvis, became associated with protracted labour[2] and death in childbirth, and the theory of the active fetus and expanding pelvis* gradually lost authority.

The modern textual discourses on the nature of the pelvis emerged during the late seventeenth and eighteenth centuries. This era brought an increased negative emphasis to bear on the integrity of the pelvis, which was increasingly portrayed as a rigid bony basin susceptible to distortion and contraction; leading to the potential for obstructed labour. From the eighteenth century onwards, in line with contemporary scientific thinking, methods of pelvimetry, discussed in chapters nine and ten, were invented by men midwives to enable pelvic capacity to be objectively expressed in quantitative terms. Yet practical solutions to severe pelvic contraction remained limited.

At this point the pelvis was perceived by men midwives as a potentially dangerous structure lurking in women's bodies, with the capacity to cause both maternal and fetal demise. It became the mission of many of the eighteenth-century London men midwives to ensure that all midwives (male and female) were familiar with the internal and external terrain of the pelvis from theoretical and practical perspectives. According to male authors, knowledge of the internal structures of the bony pelvis obtainable from 'touching' (vaginal examination) was an essential feature of good practice.

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[1] See Drummond and Wilbraham 1958, pp. 147-168, 271-276. For an up-to-date explanation of the disease rickets see Lim (n.d.). See also John *et al.* 2006.

[2] The contemporary definition of the term 'protracted labour' was a labour that went on for three days or longer.

Despite growing tensions where midwives were concerned, traditional midwives were caught up in this project as the main providers of midwifery care. The primary and secondary sources suggest there was a medical aspiration to eventually oust midwives and expand their role to care for women in normal labour. There appeared to be no shortage of students wishing to take up midwifery, although there was a finite demand for medical services amongst the upper classes at the lucrative end of the market. Others saw midwifery as a way into family medicine.[3] In the interim period, while the relatively small numbers of men midwives precluded a complete takeover, the plan was to gain control over traditional practice by locating it within a medically-dominated midwifery infrastructure. This would compel midwives, acting as medical agents, to notify doctors of the detection of complicated cases,[4] such as abnormally small or deformed pelves. Meanwhile, in a medical market place, purchasers decided whom to hire.[5]

This chapter explores the growing literature on deformed and contracted pelves, the likely causes of this and the contemporary management of obstructed labour. These moves appeared to have made a significant contribution to medicalisation and later, the hospitalisation, of childbirth.

The association between rachitic pelves and contracted pelves,* linked with maternal mortality in the texts, were assumed. As early as the seventeenth century, extremely narrow or contracted pelves were commonly observed in women afflicted by rickets (figure 6.1 normal pelvis and figure 6.2 rachitic), mollities ossium* (figure 6.3) or other forms of congenital skeletal deformity.[6] These pelvic types could often be visibly detectable from outward signs such as 'crookedness' of the spine, dwarfism and mobility problems, although a proportion of sufferers were of apparently normal outward appearance.[7]

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[3] Men midwives came to the fore as specialists in the cities, but they often combined midwifery work with other types of work in rural areas. According to Loudon, the general practitioner first appeared in the second and third decades of the nineteenth century: Porter 1992a; Loudon 1984; Loudon 1983; Lane 1987; Pelling 1987.

[4] Men midwives made several failed attempts over the years to take control of midwifery, while the midwives aimed to do this for themselves; King 1993.

[5] Wilson 1995, pp. 185-195.

[6] Mollities ossium (Latin: soft bones) rendered the bones of adults soft and pliable, and had distorting and contracting effects on the pelvis; Kaufman 1993. Images of affected pelves can be seen in figures 6a, 6b, and 6c; see also Hernigou 1995.

[7] In the early nineteenth century Gustav Adolf Michaelis (1798-1848), Franz Carl Naegele (1777-1851) and in 1842, F. Robert of Germany, described types of congenitally deformed pelves – see Playfair 1886, pp. 86-92

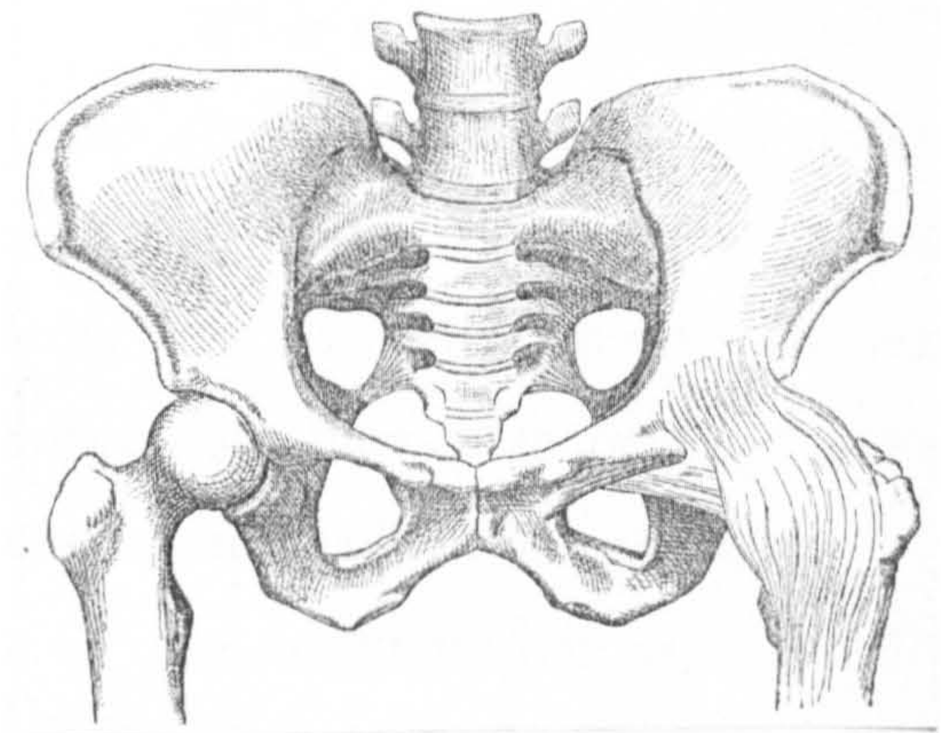

Figure 6.1 Normal Pelvis
Source: Burton J E (1884) *Handbook of Midwifery for Midwives*, J & A Churchill, London, p. 9

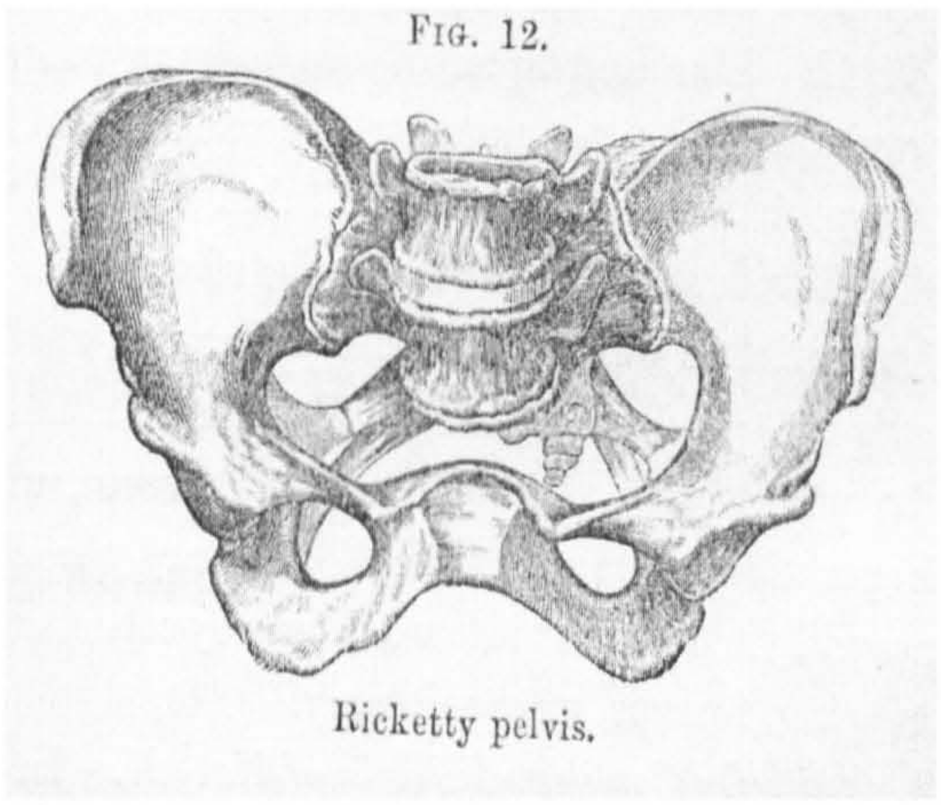

Figure 6.2. Rachitic Pelvis
Source: Reynolds J. J. (1886) *Notes on Midwifery*, J &A Churchill, p. 109

Figure 6.3: Deformed Pelvis with Typical Signs of Mollities Osium
Source: William Hunter (1778) in *Cases On Hydrophobia To Which Is Annexed An Account Of The Caesarean Section...by* Vaughan J. London: T Cadell .

When rachitic children began to sit and walk, direct pressure on the soft pelvic bones caused compression and compaction. This tended to result in various degrees of narrowed pelves. Rachitic pelves were characteristically wider from side to side and shorter from front to back.[8] On rare occasions contracted pelves were congenitally acquired in which case they often occurred alongside other skeletal deformities, first described by doctors in the nineteenth century.

In extremely rare cases of pelvic contraction, the pelvic bones would be so close together that the fetal exit route would be almost totally obliterated and access to the fetus via the vagina made impossible. Men midwives could then do very little to help, except destroy the fetus and remove it piecemeal through the tiny remaining pelvic aperture, or attempt a risky caesarean operation.[9] Another cause of cephalo-pelvic disproportion* was the occurrence of an abnormally large fetal head in conjunction with a normal-sized pelvis, which required similar management.

A popular book on family medicine written by 'eminent physicians' of the nineteenth century suggested that prolonged breast feeding in order to avoid pregnancy increased the tendency towards mollities ossium and was another cause of bony deformity.[10]

Whilst the boundaries between normal and abnormal labour were often blurred, midwives were sometimes harshly and undeservedly criticised in the texts for not being sufficiently educated and versed in female anatomy to recognise difficulties in labour. If this were so, it was not entirely their own fault, as most women were unable to obtain a rounded education and could only access midwifery lectures given by men midwives if they could afford the fees. Medical men readily dismissed midwives' alternative knowledge, skills and experience as inferior. Despite these differences, medical men were equally as culpable of causing harm to their patients. However, doctors, as learned men, were seen by affluent clients as superior to traditional midwives, and they became

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[8] See also Loudon 1992, pp. 130-132, for an additional explanation of rickets and its effects upon the pelvic bones.

[9] William Osborn sometimes allowed time for the fetus to putrefy so it could be removed more easily, although risks of infection and haemorrhage were likely to have increased.

[10] Contemporary ideas about rickets can be found in the self-help manual, *The Family Physician* by '*various authors*'; Anonymous 1884, pp. 31-36.

increasingly influential in society, with more powerful means of public persuasion at their disposal than traditional midwives. This is discussed further in chapter seven.

Historians such as Irvine Loudon and Adrian Wilson have questioned the incidence of severely contracted pelves. Its true incidence is difficult to establish, since the first maternal mortality statistics have limited value, being too esoteric to interpret. The early modern analysts approached data collection and analysis from a totally different perspective, making it impossible for present-day statisticians to interpret meaningfully, for example, the 'salad' of evaluative terms used by John Graunt in the London Bills of Mortality.[11] The modern use of statistics' emerged from the application of scientific logic to arguments and this was just beginning to take precedence over rhetorical approaches to arguments in the seventeenth and eighteenth centuries.[12] Graunt's widely-acknowledged work is referred to in this thesis simply to demonstrate the problems in attempting to use available contemporary data on rickets and maternal mortality.

6.1.1 The pathological pelvis

Medicalisation was multifactoral; over several hundred years, the detection and management of contracted pelves, which is of relevance to this thesis, was just one of a number of arguments put forward to support the need for childbirth to be medically managed. From the seventeenth century onwards the number of instructive texts on midwifery increased. In these, the pelvis was portrayed as potentially hazardous to mothers and unborn children, again accentuating the need for medical supervision of birth. By the mid-eighteenth century in England, the wider use and greater popularity of the forceps operation helped to advance the medical cause for control of childbirth. Medical birth for all was however impractical at the time, and the costs of medical attention were a major problem for some families,[13] although some had medical fees paid for them by patrons of

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[11] His selection and classification of data incorporated moral and political biases. Kreager 2002, p. 2.
[12] Kreager 2002, pp. 1-35.
[13] A minority of poor women were sponsored by patrons and admitted to one of the relatively few lying-in hospitals, and some acted as mannequins for students of men midwives. Maternity bed numbers were modest and did not significantly increase until 1921-1938; Marland 2004, pp. 36-40. The bodies of destitute women who died in childbirth in hospital provided opportunities for illicit post mortem dissections; Richardson 1988.

the lying-in charities. Fortunately the majority of women gave birth spontaneously and were attended by traditional midwives at home.

One of the arguments put forward by men midwives for more involvement with the care of pregnant or labouring women was the need for early identification of those likely to need medical interventions. They also desired greater access to patients on their own terms, in order to advance their skills, which were greatly facilitated by the hospital environment.

Although midwives were obliged to seek medical assistance in emergencies, some men accused traditional midwives of referring women to them too late, when all hope of a successful delivery had faded and the women were virtually moribund. However, the scope of medical intervention was relatively limited before techniques of caesarean operation improved. By way of counter-argument, traditional midwives claimed that male attendants may not have possessed the required competence to assist.[14] Elizabeth Nihell argued that some men midwives were reluctant to call for help from senior colleagues when they needed it, and would sometimes allow their patients to perish rather than have their own incompetence exposed.[15]

Regardless, men midwives proposed that earlier calls would allow more time to assess the situation and make medical decisions about treatment, thereby increasing women's chances of survival. In order to control midwifery activity and to develop birth theory, men midwives needed to establish professional boundaries. Traditional midwives needed to be persuaded to refer problem cases to doctors earlier than usual. Standard techniques for pelvic examination and definitions of reduced pelvic capacity began to filter through to enquiring midwives in instructive texts and private lectures.

6.1.2 The midwifery historiography

Before 1970, midwifery historiography was mainly produced by doctors, some of whom were or had been obstetricians. Much of this tended to be written in a progressivist style with little attention to the wider context. In this regard, accounts failed to acknowledge the levelling comments of senior men midwives available in the primary

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[14] Stephen 1795, pp. 73-4.
[15] Nihell 1760, pp. 72-3.

sources, and focussed instead on the treacherous side of childbirth.[16] The primary sources do in fact offer some assurances for readers that severely contracted pelves were relatively rare and the need for instruments or caesarean operations was negligible.[17] However, Smellie and others acknowledged that rickets and mollities ossium were not always easily recognisable from a woman's physique, as bouts of these diseases could affect young girls briefly in their youth, giving rise to mild pelvic contraction in women of otherwise normal height and appearance. Doctors therefore sought to define pelvic contraction objectively by assessment of the size of the internal pelvic aperture (discussed in chapters nine and ten on pelvimetry). This concern fuelled their growing desire to examine routinely all women in pregnancy, which was initially contained by logistical problems.

6.1.3 Management of difficult birth before the caesarean operation was considered 'safe'

Death in childbirth was a tragic end for women and devastating for remaining family members, who were sometimes left with a young baby to rear. For midwives and medical men it was also no doubt a difficult occurrence with which to come terms.[18] The case studies included in this section of the thesis include references to women in the throes of obstructed labour, which are particularly disconcerting to read today when female life expectancies in the UK are significantly longer and maternal mortality has been reduced to a fraction of a per cent.

Medical men drew attention to the plight of these women, sometimes pitying the 'poor wretches', and on a few occasions, allowing expressions of sincere empathy to percolate their texts. They wrote of personal regret that they were unable to do more than destroy and remove the fetus in order to give the mother a chance of survival. These case studies no doubt made disconcerting reading for novice men midwives, inexperienced traditional midwives and curious lay readers. There was a general consensus of opinion that

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[16] See Smellie section 6.2.1

[17] Smellie 1784. Sir Richard Manninghan believed there was little occasion for the frequent use of instruments: Manningham 1744, p. vii.

[18] Adrian Wilson tentatively estimated the national maternal mortality rate for the seventeenth century to be of the order of 30 per 1,000; Wilson 1983, p. 309; Dobbie 1982. For estimated rates of female life expectancy 1841-2000, see Appendix A. Courtesy of the Office for National Statistics Centre for Demography.

interventions needed to be carried out in a timely manner in order to be effective, although deciding precisely when was of course left in the hands of the person in charge of the case. There was a fine line between interfering too soon to increase the mother's chances of survival and intervening inappropriately, causing more harm than good. However, lectures on the use of instruments and destructive operations, combined with raised public expectations of men midwives in the wake of the introduction of the forceps, led to rising demands for medical birth attendants amongst the upper classes. This may have contributed to the apparent keenness of junior medical men to intervene in labour.

Forceps, introduced in the 1730s, gained popularity with women as a means of curtailing their suffering and potentially delivering their infant alive and complete.[19] However a severely contracted pelvis made this impossible, as the blades of the forceps could not be applied to an inaccessible fetus, trapped high up in a narrow pelvis.

In some circumstances, a small or premature baby would be able to negotiate a mildly contracted pelvis successfully.[20] Thomas Denman[21] (1733-1815) and others considered the possibility of emulating this natural phenomenon, by procuring labour before the eighth month in women with histories suggestive of a contracted pelvis. However, this proved unpopular in England and was probably difficult to carry out so early on in the pregnancy without today's pharmacological and technical adjuncts, and with less certainty of the gestational age of the fetus. Consequently, if the proceedings went awry, a practitioner could find himself responsible for triggering the death of a fetus or its mother.[22] In Roman Catholic France, priests appeared to have had more influence over the decision to operate, and women appeared to have been more positively encouraged to opt for a caesarean birth,[23] whereas English men midwives believed it was 'an immoral operation', offering a higher potential for rescuing a live and intact infant, but condemning the mother to death.[24]

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[19] Prior to this the appearance of a man midwife had been associated only with destructive operations and death. Forceps offered more hope, although they could still kill or maim infants and their mothers. See the medical mortality statistics provided by Churchill 1872, pp. 351-357.

[20] For an overview of the options available see Schauta 1909.

[21] Denman 1795, p. 395.

[22] See Churchill 1872, pp. 293 -295, on the use of early induction of labour.

[23] It was considered necessary for a child to have been born alive before it could be baptised, see Loudon 1992, p. 134.

[24] Thomas Radford compiled a report of 96 cases of caesarean in Great Britain, carried out between 1738 and 1867 which catalogued the outcomes of the operation for mother and fetus. Although some causes of difficulty

Internal podalic version* (IPV), which required no instruments, was still sometimes used for borderline pelvic contraction by midwives and medical men. Craniotomy* was strongly advocated for more severe cases and championed by William Osborn, who built up a reputation as a skilful advocate of 'lessening the head' or craniotomy. However, some viewed this operation as barbarous, as it would kill a fetus if it were still alive and many women died later from sepsis or soft tissue trauma, after a long painful delivery. The most abhorrent aspect of craniotomy, embryotomy and the use of the crochet had been the possibility that they might be used upon live fetuses. Whereas some believed a fetus did not feel pain, protestors, including Percival Willughby[25] and, later, Sir James Young Simpson, argued that there was little difference to the sensitivities of the fetus an hour before and an hour after birth, and nobody would permit the puncturing of a newborn's skull and the gouging out of its brains soon after birth.[26] Of course craniotomy or embryotomy could only be performed providing there was sufficient space to access the fetus and remove it piecemeal. In England, the caesarean remained the last hope for women with the most severely contracted pelves, although such women were invariably compromised before surgery.

In 1777 the French began to experiment with another alternative mode of delivery known as symphysiotomy, which involved an artificial widening of the pelvis by separation of the pubic symphysis (discussed in chapter eight).

6.2 Early modern observations on obstructed labour

An early description of rickets was provided by Francis Glisson in 1650, who suggested the disease had been prevalent in England for about twenty years.[27] Quite a lot of medical interest was expressed at Leiden and other centres of medical learning in Europe in this newly described disease. Glisson made no specific reference to its potential effects on the birthing capability of women; indeed he suggested it predominantly affected males.[28]

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were not recorded, 65 of the 96 were attributed to rickets or mollities ossium (17 to rickets and 48 to mollities ossium). Only 15 women and 55 babies survived; Radford 1865; Radford 1868; Young 1990, pp. 73-92.

[25] Willughby 1863, p. 104.

[26] Simpson 1868, pp. 401-2.

[27] Glisson 1651

[28] *ibid*

Percival Willughby (1596-1685) who practised in the counties of Derbyshire, Staffordshire and Cheshire was one of the first English men midwives to refer to links between rickets, mollities ossium and contracted pelves:

> Difficulty of birth may also bee caused through ill position of the bones, which hath been observed in such, as have been crooked in their bodies. As also in others, which have weake backs, and loynes, going waddling in their childhood. As also in others, which have had the infirmity, called the Rickets; and in such, as have been compelled to weare iron bodies, to keep them from being crooked .[29]

In *Observations in Midwifery*, Willughby wrote over 150 case histories based on his practice (late 1650s to early 1670s)[30] and made reference to a considerable number of cases of narrow pelvis. Like the traditional midwife-author, Sarah Stone, he associated difficulties with the wearing of very tight stays or corsets, although this was more likely to have affected the position of the uterus than pelvic capacity itself.[31] Willughby also revealed his awareness of the process of pelvic distortion and its negative effects on pelvic shape:

> Through these meanes, [causes in previous passage of the text] their tender bones, in their minorities, have so been alterede, and pressed together, and with time confirmed, that, losing, in part thus their circular roundness have become Ovall, through which the child will never be produced, but by violent force of hand, or by some instrument.[32]

The French accoucheur, Francois Mauriceau, whose work was widely acknowledged in Britain, also made passing references to links between a contracted pelvis and skeletal deformities, dwarfism and a weak constitution. The general assumption is of a relationship between certain physical features and pelvic deformity, detectable from the woman's physique and manifested by difficulty in childbirth.[33]

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[29] Willughby 1863, pp. 108, 114 -5.
[30] Willughby's manuscript was published posthumously and made no impact upon contemporary practice.
[31] By the nineteenth century, Shorter argues only the upper classes wore corsets: Shorter 1982, pp. 28-31.
[32] Willughby 1863, p. 108.
[33] Mauriceau 1710, e.g. p. 164.

6.2.1 Managing obstructed labour

Percival Willughby claimed that medicines were ineffective[34] in procuring birth in such instances. He relied on the use of his 'handy operation' [IPV] or failing that, the crochet. Several of the women he encountered had had no previous live children: all were delivered by the crochet.* Mrs Alestry was the only case in his 45-year career that died undelivered.[35] She had such a severely contracted pelvic inlet that Willughby was unable to do anything to help her. He was called to see her twenty-four hours after labour had begun on 30th January 1669. On examination he found:

> …shee [the woman] had undergone great strivings, and the lips of her body were swel'd, and the child far off, and the passages very narrow, ovally formed, and the bones not far distant the one from the other [36]

He prescribed a clyster (enema) and stayed overnight as he knew she was in danger. The next morning, the 'divines' prayed for her, and medicines were given to no avail. Mrs Alestry's pelvis was so narrow that he could not reach the infant at all, despite being implored by Mrs Alestry, her husband, friends and the local physicians to do something to save them. Willughby described his predicament:

> But through the narrow passage of her body, I could not get up my hand over any part of the head, to fix the instrument, nor, in any other part of it, to make a breach [37]

Even if Willughby had successfully delivered the fetus, he acknowledged that after a difficult birth, women sometimes still succumbed to death from haemorrhage, 'weaknes', 'thinnes of blood', 'putrefaction in the womb' or during manual removal of the placenta.

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[34] Willughby 1863, p. 108.
[35] Willughby 1863, p. 112.
[36] *ibid.*
[37] Willughby 1863, p. 113

Similar grim examples of obstructed labour can be found in many of the English and translated French midwifery treatises.

William Smellie balanced his work by providing some positive examples in which women with rachitic pelves delivered normally. Whilst he stated that contracted pelves could not always be detected from a woman's physical appearance alone, he gave assurances to novices that complicated cases could be detected upon touching (vaginal examination). This reassuring advice took up relatively little of his three-volume treatise, and may have easily been overlooked by readers, who were immersed predominantly in abnormal birthing theory aimed at men midwives.

6.2.2 William Perfect's case studies

William Perfect (1737-1809), a surgeon from West Malling, Kent, reported a number of successful vaginal births in women with severe rickets.[38] Perfect 'seldom' needed to use instruments, claiming that 'patience was a venerable maxim'.[39] He acknowledged that if a fetus was too large or abnormally positioned, or the pelvis too narrow, obstruction would ensue. However, he believed labour took time (2-6 days) before nature made its final effort to expel the infant, and advised cautious use of the crochet. He suggested this instrument might expose women to fatal uterine tears, and described several cases in which women, apparently severely affected by rickets, were able to give birth unassisted, highlighting the dangers of the use of instruments.

Volume two of Perfect's treatise presented a collection of case studies, which was typical of the genre of contemporary medical texts. These contained descriptions of women with skeletal deformities who delivered normally. Case 'XC' described a twenty-two year old woman 'of dwarf size and deformed'.[40] All six of her births were normal and several children were born before Perfect arrived. Similarly, case 'XCII' described a woman of 'ill health, low stature, and deformed' who had a speedy first and second birth. Similarly, case

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[38] Perfect 1789.
[39] Perfect 1789, volume.1, p. 76.
[40] Perfect 1789, volume 2, pp. 143-5.

'XCI' described a 'deformed' woman of small stature who had been sickly since infancy who gave birth successfully eight times (two children died later).[41]

The degree to which rickets or mollities ossium affected the pelvis would of course have varied from woman to woman, although there were some extreme examples in which the fetus could not be accessed at all on internal examination, because of the jutting-out of the sacral promontory towards the symphysis pubis. Devices to measure pelvic capacity are discussed in chapter nine.

6.2.3 Reports from France

Guillaume Mauquest de La Motte (1665-1737) a man midwife and author from the Valognes area of France, like many traditional midwives, attended large numbers of births (often 3-4 per day) and rarely used instruments (used crochet only twice in 30 years). He described the serious damage done to women by instruments, including a case in which a woman was so maimed that her intestines came out of her vagina. Amongst other mishaps he had witnessed, were infants left half born, of limbs being torn off, and heads left in the uterus. Such tales are reminiscent of Willughby's earlier reports, although he had attributed the blame for similar deeds to the ignorance of traditional English midwives. La Motte acknowledged the incompetence of many accoucheurs and surgeons and accepted the unpredictable nature of birth, which meant that after beginning well, things sometimes went very wrong. La Motte's text in case study format, provided examples of crooked women with suspected contracted pelves who gave birth normally.[42]

> An ...exceedingly crooked woman delivered briskly ... of a stout boy and placenta in less than half an hour.[43]

He noted in one case that the lower vertebrae and sacrum 'bunched outwards' to facilitate birth, suggesting that the woman suffered from mollities ossium*. Another case

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[41] Perfect 1789, p. 146.
[42] La Motte 1746.
[43] La Motte 1746, p. 223.

required a destructive operation. La Motte conceded that he would have had no option but to perform (reluctantly) a risky caesarean operation if the child had still been alive. [44]

In most of the severe cases of contracted pelvis a history of pelvic bone disease was common; however, the visible effects of these diseases on the woman's physique appeared to be an unreliable predictor of birth outcome. Sometimes women did surprisingly well, emphasising the uncertainty that practitioners faced when making clinical decisions. The importance of a good knowledge of anatomy was crucial to a correct assessment of the situation and selection of the most appropriate mode of delivery. Timing was crucial to maximising the effectiveness of medical interventions and to avoiding unnecessary risks. Intervening too early could create catastrophic iatrogenic effects. Similarly, significant delay before an intervention might incur undue maternal suffering and physical compromise, reducing the chances of successful interventions (that is assuming that the procedures were carried out by competent practitioners in the first place).

Within the wider context of maternal mortality, the medical interest in this most frightening but relatively rare complication of childbirth appeared to grow out of all proportion to the extent of the problem. The midwifery literature on rickets and its effects on childbirth multiplied throughout the nineteenth century. Other causes of obstructed labour were of fetal origin and were equally as life-threatening to mother and fetus. These were normally dealt with, if properly diagnosed, by manual manipulations of the fetus *in utero*, followed by extraction. Destructive operations were a last resort, although the life of an English fetus was deemed less important than its mother's.

6.3 Knowledge of the pelvis and the emergence of Deventerian birthing theory

A text by the Dutch man midwife, Hendrik van Deventer, translated into English in 1716, emphasised the importance of all midwives knowing the bones of the pelvis:

> ...without which they proceed uncertainly and make use of their hands like those that are blind.[45]

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[44]Early attempts at caesarean were very perilous, especially when the uterus was left un-sutured. See Young 1944, pp. 136-45.
[45] van Deventer 1716, p. 18.

Unlike Arantius in sixteenth-century Italy, van Deventer implied that Dutch midwives were ignorant of the anatomical situation of the reproductive organs.[46] He described the anatomy of the pelvic bones and a procedure for 'touching'. Like Arantius and Mauriceau before him, van Deventer discussed the key characteristics of male and female pelves and variations in pelvic shape. He also described variations in the female pelvic form:

> In some the pelvis is deeper, in some broader, in some larger, in some flatter, in some rounder, in some it is more oval, for which no reason can be given.[47]

He also emphasized the importance of detecting an '*ill*' or '*unnatural*' posture of the infant.

6.3.1 Van Deventer's work on the relief of outlet contraction

Van Deventer believed that most difficulties could be dealt with by manual manoeuvres. And that destructive instruments were rarely required. He also proposed that both spontaneous separation of the pubic symphysis and severe pelvic inlet contraction caused by rickets were rare. He argued that pelvic outlet contraction was a more common, resolvable problem[48] caused by rigid pelvic cartilaginous ligaments and a rigid sacrum and coccyx.[49] He advised using digital pressure applied through the vaginal wall during labour to press the sacrum and coccyx back.[50]

The two diagrams included in van Deventer's treatise represent anterior and cross–sectional views of the pelvis. Anatomical representations sometimes contained certain edifying aspects of artistic licence. Whether intentionally or not, these particular images of

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[46] Van Deventer's marriage to a midwife may have enabled him to gain a greater insight into aspects of traditional practice. The memoirs of the midwife Catharina Schrader (1693-1740), who practised in Friesland, suggested some midwives had exceptionally good skills and knowledge and were adept at managing difficult births, although not all midwives were quite so articulate or dexterous; Schrader 1987.

[47] van Deventer 1716, p. 21.

[48] La Motte 1746 and Smellie 1752 both disagreed with van Deventer's view, suggesting the occurrence of inlet contraction of the type caused by rickets was more common than outlet contraction. This could possibly reflect differences produced by geographical location; this requires further investigation, but seems unlikely.

[49] Well before van Deventer's time, Dutch midwives recognised movement of the sacrum and coccyx took place during birth. See the discussion in Ingerslev 1909a, p. 6.

[50] Fielding Ould (1710-1789) of Dublin described an alternative method for moving back the coccyx by rectal pressure applied with the thumb. See Ould 1742, pp. 42-43.

the pelvis show a heavy-boned, compact pelvis of typically male appearance, rather than a more spacious female type. This served to emphasise a need to create more space in the pelvic outlet for the fetal head to exit and for practitioners to intervene and work on the pelvis.

Guillaume Mauquest de La Motte (1665-1737) protested that the procedures which van Deventer described were unnecessary. He reasoned that, if there were resistance from the coccyx, children would be born with impressions of this bone on their head. He implied that van Deventer's procedure may simply have been used in an attempt to expedite birth.[51]

6.4 Bypassing the pelvis: Use of the caesarean operation

The caesarean operation was considered a death sentence for most women in Britain during the eighteenth and nineteenth century. However, by the end of the eighteenth century it was given further consideration for use in dire circumstances, where pelvic access was restricted to a space between the sacrum and symphysis pubis of less than 2-2.75 inches, which made craniotomy impossible. As the nineteenth century progressed, more caesarean sections were performed in Britain, and maternal survival rates gradually improved alongside advances in surgical techniques and improved measures to prevent cross-infection.

6.4.1 Maternal mortality and caesarean section

During the 1860s, Thomas Radford (1793-1881), an early pioneer of the caesarean in Manchester, published incremental sets of tables of recorded cases of caesarean section in Great Britain and Ireland.[52] Ninety-six cases were documented in total from 1738 to 1867. Only fifteen of the ninety-six women survived, and at least forty babies died. The women were described as severely compromised by disease, exhaustion or infection, and it was surprising that any managed to stay alive. One woman had been in labour for eighty hours prior to having a caesarean operation, and several had undergone a failed

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[51] La Motte 1746, p. 156.
[52] Radford 1865; Radford 1868.

instrumental delivery, no doubt causing severe soft tissue injuries, haemorrhage, and a greater susceptibility post-caesarean towards severe anaemia and secondary infection. Although the details of three cases were missing and some information was inconsistently recorded, almost two-thirds of women (66) were specifically described as having rickets or mollities ossium, while others had pelves distorted by bony or soft tissue tumours, and of course none of the operations were performed for fetal reasons. Manchester and the North West carried out the most operations (20) followed by London (16). There were eleven operations in Scotland, six in Ireland and one in Wales.[53]

Less severe forms of contracted pelvis may have been the root cause of protracted labour, difficult birth and infant mortality which will not have been captured in the statistics. The *Annual Reports of the Registrar General for Births, Deaths and Marriages,* from the early 1840s, to the 1860s and beyond, support the evidence that the north western region of England had the highest maternal mortality rates, almost double the maternal mortality of the metropolis and triple the rates found in the other nine regions of England and in Wales.[54]

Amand Routh[55] collected reports of 1,282 subsequent caesarean operations carried out in Great Britain and Ireland between 1867 and 1910, although the data is incomplete. Of these reported cases, 1,058 operations were performed for a contracted pelvis. Cases were mainly from industrial cities such as Manchester, Glasgow, London, Liverpool, Sheffield and Edinburgh. The success rates of the operation in terms of maternal mortality had improved tremendously since the period covered by Radford's investigation. Routh reported a much higher maternal survival rate of 1,137 out of 1,282 operations.[56] Routh's figures provided an opportunity to examine the types of cases most likely to end in a fatality. There was a suggestion that septic cases did not do well and that earlier intervention and operations might reduce the likelihood of death from infection (before sulphonamides and antibiotics were introduced). Routh also claimed that mortality rates were less for women who were operated on before labour commenced or with intact

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[53]Young 1990, pp. 108-59. For details of the pioneering of the caesarean operation in Glasgow, see Dow 1984.
[54] Registrar-General, *Fifth Annual Report* 1843, p. 61.
[55] Routh 1911.
[56] Routh 1911.

membranes. Arguments were again put forward for early assessment of the situation in pregnancy to provide the opportunity for elective surgery.

In 1898, William Playfair claimed that induction of labour was safer for the mother than a caesarean operation and that induction was common amongst English obstetricians, while being frowned upon in parts of Europe. Of course the pelvis required a certain degree of patency for this to be possible. Charts correlating sacro-pubic diameter with gestational age were drawn up to advise on the timing of the intervention, which may have been as early as thirty weeks' gestation in cases of severe pelvic contraction. Playfair claimed induction gave the fetus 'a chance' and 'spare[d] the mother the terrible dangers of the caesarean operation'.[57]

Early contact with obstetricians was hailed as a way of reducing maternal mortality. In the build-up to the call for the provision of antenatal care in the early twentieth century, Professor F Schauta, the German honorary president of the Glasgow Gynaecological and Obstetrical Society (1907-8), proposed looking forward to a time when operations which jeopardised the life of the child were made obsolete. He acknowledged that spontaneous birth was best[58] and claimed that it was 'more frequently possible than it appears from our statistics'; inferring that intervention rates were too high:

> By premature interference with its natural course, many cases of labour are directed into a wrong course and result in great injury to both mother and child.[59]

While Schauta was aware of the iatrogenic effects of medical interventions, few of his English contemporaries documented this dimension of practice. Schauta suggested that 'we gain nothing by the statement that the physician is usually called too late' and that general practitioners should refer problems to public or private hospitals in sufficient time for a caesarean operation, before the patient became infected. He also urged general

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[57] Playfair 1898, Volume 2, pp. 89-92.
[58] Schauta 1909.
[59] Schauta 1909, p. 313.

practitioners to make 'their influence felt upon midwives and the public' and called for 'improved education for midwives'.[60]

6.5 Rickets and maternal mortality in England

The highest rates of difficult birth were noted in industrial cities, although few appeared to recognise that these areas also happened to host the largest populations of men midwives/obstetricians.[61] Women in these cities, particularly in the industrial north and north-west of England, were compromised before embarking upon pregnancy by malnutrition, anaemia and a lack of fresh air and sunlight, which increased their vulnerability to communicable diseases and infections, and predisposed them to childhood rickets or to its adult manifestation, mollities ossium.[62]

Manchester and Lancashire had the highest concentration of cases of severe rickets and mollities ossium in the nineteenth and early twentieth centuries. Inhabitants of an area around Manchester, where the cotton industry was located, seemed to be more severely affected when compared to others in the neighbouring city of Liverpool. Manchester and its suburbs were severely affected by the 'cotton famine' (1861-1865).[63] Looking at the wider picture, contracted pelves made up a very small proportion of deaths in women of reproductive age.[64] Many more died of infectious diseases and general ill-health than as a result of childbirth and obstructed labour due to contracted pelvis.[65]

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[60] Schauta 1909. Also in the Registrar-General, *Fifth Annual Report* 1843, it was suggested that midwives were responsible for most maternal deaths. (As they delivered most women this would seem possible). The report also acknowledged the role of practitioners, particularly medical men, in the spread of puerperal infection through cross-contamination: Registrar-General, *Fifth Annual Report* 1843, pp. 185-6.

[61] In 1841, a total of 3,007 deaths were recorded in the ten regions of the UK and Wales. While these numbers were probably under-reported, most (20%) were from the north west region alone (610 deaths) whereas the metropolis reported 345 deaths and the eastern region had the lowest figures, with 119 deaths. See Registrar-General, *Fifth Annual Report* 1843.

[62] Common contemporary maladies included *scrofulous diseases*, haemorrhages and congestions, *depraved nutrition*, typhus, diarrhoeal illnesses, smallpox, scarlatina and erysipelas, which could exacerbate puerperal fever.

[63] Miller n.d.

[64] For life expectancy rates, see Appendix A.

[65] Infectious diseases such as phthisis, whooping cough, smallpox, scarlet fever, measles, typhoid and cholera, were far more of a threat to the health of women of reproductive age than childbirth.

6.5.1 Mortality rates, regional variations, and rickets

Royalty were not immune from obstetric tragedies, although the poor suffered the most.[66] The industrial revolution, which began around 1760, attracted country people into the towns. Factories were set up and the use of coal and steam resulted in smog and fog. Dust from the horse-drawn carts in summertime also contributed to the occlusion of sunshine.[67] Children were employed in the factories and mines and as chimney sweeps in the overcrowded and polluted towns and cities, restricting their exposure to sunlight. As previously suggested, living space for the poor was overcrowded, and many lived in dark basements and consumed poor-quality food, water and milk; indeed cows were sometimes kept in basements or cellars. Despite the increased prosperity of the period, and the increase in population, most people from the poorer classes of society benefited very little in terms of health and wealth.[68]

Whilst economic growth took its toll on the working classes, even the wealthier were not exempt from the most fatal of all diseases, phthisis (otherwise known as consumption or tuberculosis of the lungs). This killed more women than men, and significant losses occurred in women of childbearing age. In 1860, female deaths from phthisis between the ages of 15 and 45 years totalled 19,246, and deaths in childbirth amounted to 3,173 (46 deaths per 10,000 infants born alive).[69]

From a medical perspective, rickets and mollities ossium were seen as causes of contracted pelvis and obstructed labour. However, determining the causes of high maternal mortality is problematic. Looking back to the seventeenth century, when rickets was first recognised as a disease, the *Mortuary Table of the City of London* (1634) categorised rickets and 'livergrown' (a sequel) as causes of death, suggesting that severe rickets could be fatal. No links were made at the time between rickets and death in childbirth, and maternal deaths were allocated to a single category, 'deaths in childbed'.[70] As the seventeenth century progressed, general improvements in prosperity, with better nutrition

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[66] For example, Perkins 1996; Crainz 1977.
[67] Werner 1998, p. 86.
[68] According to Sir Dugald Baird, a number of successive generations paid the price for Britain's rapid industrialisation; Baird 1980.
[69] Registrar-General, *Twenty-third Annual Report* 1861
[70] Hernigou 1995.

(wider access to fresh meat and dairy products) and changes in agricultural methods, were linked with a general downward trend in the reported incidence of rickets and prevalent diseases such as plague and smallpox in England.[71]

The geographic variability of rickets, mollities ossium and contracted pelvis may have influenced perceptions of its prevalence amongst medical men, who tended to work in large cities and urban areas where they were more likely to encounter a greater number of poor multiparous and malnourished women. The clinical capability of medical men to recognise and deal appropriately with difficult births was also known to be variable. Poor general health status would also have meant that women were less fit to withstand a difficult labour. They were often left to labour for many hours before medical assistance was brought in, affecting their ability to tolerate subsequent interventions.

Life was much harsher before the mid twentieth century; many infants and children did not survive to adulthood and many women died in early adult life from a range of causes. Although death in childbirth was less likely than death from other causes, people were still likely to have known women who had died in childbed. When maternal mortality rates are compared with today's minute figures they seem very high, and deaths in childbirth were of course a serious matter, although Roger Schofield emphasises the need to look at these within context.[72] He suggests that before 1750, the maternal mortality rate in England was 10 per 1000 (1 per cent). Each time a woman became pregnant she ran this risk, and in a lifetime the risk was around 6-7 per thousand (6-7 pregnancies), depending on her age.[73] A great proportion of maternal deaths were caused by puerperal sepsis, which could affect women who had given birth spontaneously.

Women's risk of dying outside childbirth was also high, at 7-16 per thousand, depending on maternal age.[74] Schofield concludes that the prospect of dying in childbirth loomed lower on the horizon than the risks of dying from infectious diseases or other causes.[75] He argues that women's fear of death in childbed may have been taken out of context, and that the midwifery texts and medical historiography may have exploited

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[71] Drummond and Wilbraham 1958.

[72] Schofield (1986). Maternal death rates in England and Wales fell to an all–time low of less than 1.0 per thousand live births in 1948-9 (1900-1902 rate was 4.67 per thousand). See *Annual Abstract of Statistics* 1971, Table 34.

[73] See Schofield 1986, pp. 259-60.

[74] *ibid.*

[75] Schofield 1986, pp. 231-60.

conditions such as a contracted pelvis as a cause of mortality to support the need for medical assistance.[76]

Several nineteenth-century midwifery texts suggested that tuberculosis of the pelvic bones was another possible primary cause of contracted pelvis, although this was not captured in the mortality statistics and could only be confirmed by post mortem dissection.

A decline in communicable diseases, assisted by improved nutrition, better sanitation and a number of advances in medicine, such as introduction of the use of antibiotics, ergot (to control uterine haemorrhage) and blood transfusions, contributed to markedly lower trends in mortality in general and in maternal mortality in the post-1940 period. It was confirmed in the late twentieth century that the decline in maternal mortality was likely to have been linked with improved standards of public health, rather than particular advances in obstetric care, as previously assumed.[77]

6.5.2 Rachitic pelves and the link with difficult birth

Throughout the latter part of the eighteenth and the nineteenth centuries, rickets appeared to have a significant negative impact upon the health of children.[78] The increase in cases coincided with dramatic increases in population rates, urbanisation and industrialization, although deaths from rickets in London appeared to decline after the 1750s.[79] However, causes of death were under-reported or, when reported, were not always based upon accurate diagnoses.[80]

An archaeological study of eighteenth and nineteenth-century London bodies suggested that the average height of its inhabitants was shorter than modern-day inhabitants, with evidence of rickets found amongst skeletons in both rich and poor areas of the city. [81] Although much of the early data is both anecdotal and parochial, it tends to support the idea

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[76] Schofield (1986) believes intense fear of death in childbirth is perhaps assumed by historiographers, based upon personal accounts. He argues (pp.231-60) that not all women would have witnessed maternal deaths in their own families.
[77] Tew 1990.
[78] Roberts and Cox 2003.
[79] Roberts and Cox 2003, p. 309
[80] Magnello and Hardy 2002.
[81] Werner (1998) pp.84--5

that rickets reached epidemic proportions in London during the late eighteenth century. Recent archaeological evidence, based upon the examination of a limited number of exhumed human remains, confirms high incidences of rickets in certain areas of London. However, whilst women may well have been affected by rickets to some degree, this may not necessarily have been implicated in their death, if they happened to die in childbirth.

Loudon estimated that at the end of the eighteenth century and throughout the nineteenth century (1787-1899), the rate of contracted pelves was as low as 1%.[82] This estimate was based upon a collection of data from nine hospitals (in London, Dublin, Edinburgh, Glasgow, Paris and Vienna), two private practices and the *Report of the Registrar General of Births Deaths and Marriages for 1869.* Loudon was aware that hospital data could skew rates, as some hospitals, such as Queen Charlotte's Hospital, took an interest in cases of contracted pelvis and had a greater incidence (12.8 per 1,000).[83] Additional data were derived from craniotomy rates, although, as Loudon acknowledges, craniotomy was not exclusively linked with contracted pelvis, so this figure may have been an overestimate.

In addition, cases of fetal hydrocephalus, now almost totally eradicated, are referred to occasionally in the primary sources. Such congenital abnormalities would have raised rates of craniotomy in women with normal-sized pelves as opposed to contracted ones.[84]

The mundane was often subsumed in the texts by references to the rare and grossly abnormal. The excess exposure of men midwives to difficult cases, and their need to communicate impressively their experiences and triumphs to their peers and students, may account for the large numbers of unpleasant cases of contracted pelvis reported in the medical literature. Despite this, most made some attempts to put the nature of their midwifery work into perspective, so as not to put new recruits off their chosen career.

Before 1960, as Elmer suggests, medical historians were mainly physicians and surgeons with little formal training in historiography.[85] They extracted medical achievements from primary sources to produce Whiggish* histories. These impressions

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[82] Loudon 1992, p. 141.
[83] Loudon 1992, pp. 135-43.
[84] The reports of the Registrar General report a type of hydrocephalus caused by acute tuberculosis, although the type associated with neural tube defects would appear more likely to have affected unborn fetuses.
[85] Elmer 2004, p. xii-xii.

have been corrected by a new wave of late twentieth and twenty-first-century revisionist historians, who have revisited the primary sources and produced more balanced and contextualised interpretations of the past.

6.6 Contracted pelvis and nineteenth-century national statistics

Medical men carried out post mortems on their own patients,[86] and, while some pelves were dried and preserved, not every case of contracted pelvis was necessarily a confirmed case. Contracted pelvis had been the prime indication for caesarean section; however, as rickets and mollities ossium declined, caesarean section rates continued to increase for a variety of reasons. Firstly, being based upon clinical judgement, not all cases of pelvic contraction could be confirmed as having been due to true cephalo-pelvic disproportion, and secondly, as more obstetricians became familiar with the operative procedure, more operations were carried out and for a wider variety of reasons.

6.6.1 Collection of vital statistics

The health statisticians Thomas Rowe Edmunds and William Farr were concerned about the health and wellbeing of the working classes.[87] Edmunds devised a law of mortality and, with a general practitioner, William Farr, attempted to interest the medical profession in the use of vital statistics to highlight the plight and health needs of the poor. Articles were published in the Lancet[88] which highlighted how vital phenomena were regular and governed by rules,[89] and how mathematical laws could be applied to human health.

Vital registration began in July 1837 and publication of records began in 1838. William Farr was appointed as compiler of abstracts to the Registrar General. During his 40 years in office he produced annual reports which included a foreword, tables of vital statistics and commentaries on the main findings.

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[86] Perhaps supporting the adage; '*doctors buried their mistakes.*'
[87] Eyler 2002.
[88] Eyler 1976.
[89] Eyler 1976, p. 336.

From the historiographical viewpoint, one of the main problems with these figures is the absence of rates of stillbirth. A few Anglican parish registers provide details, but such figures were not formally collected by the Registrar General until 1927.[90] Some of these stillbirths would have occurred in association with obstructed labour, perhaps resulting in maternal fatality as well. However, these events may not be identifiable in the existing statistics, as the mother's death will not necessarily be associated with an unbaptised baby's death. Similarly, although gravestones may reveal a mother's fate, some women who died undelivered may not have had this fact documented in the parish records, so mortality rates for complicated births resulting in stillbirth or for the mother dying undelivered may be underestimated.[91] Midwifery data sets collected in 1850 by Fleetwood Churchill, ex-president of the King and Queen's College of Physicians in Ireland,[92] again demonstrated a lack of positive correlation between rising rates of rickets in the nineteenth century and rates of long and difficult labour.

In 1884, a surgeon to the East London Hospital for Children remarked that rickets:

> ...occurs widely, and under very different social conditions even amongst private patients from the upper classes [93]

Thomas Railton estimated in 1885 that 'about a quarter of all children less than five years of age brought to institutions such as the Manchester Clinical Hospital suffered from rickets'.[94] He suggested that readers could estimate its prevalence:

> ...from the number of people you meet in our streets who are stunted in their growth and either bow legged or knocked kneed, thus showing that they at one time have suffered from rickets ... although not all occurrences end in severe deformity[95]

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[90] Wrigley 1998 explores the estimation of stillbirth rates in some depth.
[91] *ibid.*
[92] Churchill 1850.
[93] Parker 1884, p. 4.
[94] Railton 1885, p.4.
[95] *ibid.*

He noted the condition was 'particularly abundant in the densely-populated quarters of our towns' [96] and that the disease more often affected infants of the poor.

While some believed rickets crossed all sections of society, and may have been perpetuated in the upper classes by the practice of wet nursing and through living a closeted lifestyle, a British Medical Association (BMA) survey discussed in the *British Medical Journal* in 1889[97] suggested that the wealthier residential areas of Mayfair and Belgravia were rickets-free.

6.6.2 British Medical Association rickets survey

By the late nineteenth century, doctors had established the benefits of vital statistics to medicine and public health and, as part of an international enquiry organised through the *Collective Investigation Committee of the British Medical Association,*[98] an investigation was launched into the incidence of common diseases in Britain. This included a survey on rickets. Every registered practitioner was sent a postal questionnaire. Large towns reported the highest incidence of rickets, with five great accumulations of the disease: in the Tyne and the Tees and the coast of Durham; the industrial areas of Lancashire, Yorkshire, Cheshire and Derbyshire and Nottingham; the Black Country; the mining regions of South Wales; London and the mining districts of Kent, Cornwall and north Essex.[99] In Scotland, rickets was most prevalent in the Clyde valley, North Ayrshire and Glasgow. In Ireland the disease was reported in Belfast and Dublin, although actual figures were not given. As expected, the most densely-populated industrial areas appeared to have the highest rates of rickets but also of other diseases, and although rickets may have contributed to maternal mortality, other problems such as anaemia and malnutrition may also have contributed to maternal deaths.

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[96] *ibid.*
[97] Owen 1889; Palm 1890.
[98] Owen 1889.
[99] Owen 1889, p. 114

6.6.3 Strength of the link between rickets and contracted pelvis

Although rickets was prevalent, its link with contracted pelves and obstructed labour appears arbitrary. In the early nineteenth century, the German obstetrician Gustav . Michaelis (1798-1848) conducted a large study in which he measured 1,000 consecutive pelves, defining a contracted pelvis as a pelvis with a 'true conjugate'* of 8.75cm or less.[100] In more than half the cases of contracted pelvis the women had not suffered from rickets. Michaelis found an incidence of contracted pelvis of 7.2% in his sample.[101] Approximately one-third of the cases of contracted pelvis originated from rickets (20 out the 72 cases of contracted pelvis). Four of the affected seventy-two cases had previous scrofula (a type of tuberculosis) and another four patients were reported as having a family history of difficult labour, which Michaelis believed was a hereditary factor. In the remaining forty-eight women, the cause of contraction could not be traced and their external physiques appeared normal. Further work by Irvine Loudon has highlighted a lack of correlation in New Zealand between high maternal mortality and rates of rickets.[102]

Much of the work on rickets and osteomalacia* carried out in the early twentieth century focussed upon dietary deficiency and lack of sunlight.[103] Female doctors working in colonial India and Africa acknowledged an association between lack of exposure to sunlight and distorted pelves, but also observed the effects of cultural habits, such as squatting, on the ease of childbearing and improved general shape of the female pelvis in adulthood.[104]

6.7 Examination of vital statistics

By modern standards, early vital statistics show a lack of consistency in reporting and significant under-reporting. The categories of death used were initially rather vague or ambiguous. Regardless, the Report of the Registrar General for the years 1847-1860 estimated that the incidence of all accidents of childbirth including abortion, 'metria'* and

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[100] Michaelis 1851, cited in English by Thoms 1935, pp. 204-208. Michaelis' text, *Das enge Becken,* appears to have been available in England, although it was not possible to locate an English translation.
[101] *ibid.*
[102] See Loudon 1992, p. 447.
[103] Drummond and Wilbraham 1958, pp. 147-60.
[104] Vaughan 1928; Vaughan 1931; Vaughan 1937.

various co-incidental fatalities over fourteen years, amounted to 44,325 deaths. This included 14,432 deaths from metria and 29,893 'accidents of childbirth'. This also included a proportion of deaths from diseases such as smallpox, plus a significant number of deaths from blood loss, rupture of the uterus and mechanical causes, some of which may have been attributed to the lack of skill and care of the persons in attendance.[105]

During the four years 1838 to 1841, the average maternal death rate per year, with annual variations, was estimated at around 3,000 out of the 500,000 births per year.[106] Farr provided a breakdown of the causes of maternal deaths received from a particular area of London in 1841 which illuminated the difficulties caused by ambiguous diagnoses. Although deaths from puerperal sepsis were clearly defined, other causes remained indistinct. Table 6.1 (overleaf) has been produced from data supplied in the Registrar-General, *Fifth Annual Report* 1843 to demonstrate the problem of trying to establish contracted pelvis as a primary cause of death from the available data.

The incidence of contracted pelvis is clearly impossible to establish. Although 'childbirth' and certain more specific diagnoses such as flooding, ruptured uterus, exhaustion and collapse, syncope, debility and difficult labour may be associated with cephalo-pelvic disproportion.

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[105] In a discussion on mortality rates attributed to childbirth for the year 1841, the Registrar General expressed concern about the ignorance of midwives, particularly in emergencies. This caused him to outline a plan for the provision of education for nurses and midwives who were predominantly the persons in attendance at most births. See the Registrar-General, *Fifth Annual Report* 1843, appendix, pp. 185-7.
[106] A rate of 1 death per 171 registered births; Registrar-General, *Fifth Annual Report* 1843, p. 185.

Table 6.1: Table based upon return of 196 cases occurring in one area of the metropolis demonstrating the *'nature of accidents that render childbirth dangerous'*

Source: Registrar-General, *Fifth Annual Report* 1843 p.185.

Cause of Death	Number
Childbirth	55
Miscarriage (and haemorrhage)	7
Flooding	27
Ruptured uterus	6
Puerperal fever/peritonitis/inflammation of the womb	63
Erysipelas (Haemolytic streptococcal infection of skin)	1
Inflammation of the brain	1
Inflammation of the heart	1
Inflammation of the lungs	4
Phlegnasia dolens (deep vein thrombosis)	3
Serous effusion after childbirth	1
Exhaustion, collapse, syncope, debility	14
Convulsions	2
Puerperal mania	5
Difficult labour	1
Exhaustion from a fibrous tumour in the uterus	1
Tubercles in the womb after childbirth	1
Ovarian dropsy after premature parturition	1
Dropsy and childbirth	1
Unaccounted for	1

6.7.1 Maternal mortality from contracted pelvis in England and Wales

The role of the Registrar General was simply to provide the figures and to present seasonal variations, regional variations, male and female comparisons and associated meteorological reports; data analysis was not part of his job. *The Thirtieth Annual Report of the Registrar General of Births, Deaths, and Marriages in England* reported 3,412 deaths in childbirth in 1867. 1,066 were due to metria* and 2,346 from various other accidents of childbirth.

A more detailed breakdown of the list of deaths of females aged 15-45 years, for the year 1867, suggests that fifty-six deaths were from causes that were likely to have been attributed to a severely contracted or deformed pelvis; see Table 6.2.

Table 6.2: Deaths Attributed to Contracted Pelvis.
Data extracted from the Registrar-General, *Thirtieth Annual Report* 1869 for the year 1867.[107]

Condition	**Number**
Craniotomy	1
Deformed pelvis	10
Ruptured uterus	41
Caesarean operation	4
Total deaths attributed to contracted pelvis	**56**

The rates are likely to have been under-estimated because of under-reporting and errors of categorisation. Table 6.3 (below) contains a series of data extracted from reports of the Registrar General for 1867 combined with results for the years 1910 and 1919. Criteria for data collection were revised after 1911, making comparisons ill-advised.

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[107] Registrar-General, *Thirtieth Annual Report* 1869, p. 129.

Table 6.3.
Deaths from Causes Attributable to Contracted Pelvis.
Source: the *Annual Report from the Register General for Births , Deaths and Marriages* for the years 1869[108], 1910,[109]and 1919[110]

	1867	**1910**	**1919**
Craniotomy	1	7	9
Deformed pelvis	10	-	-
Ruptured uterus	41	28	
Caesarean operation	4	15	20
Deformed pelves in 1869.Thereafter called Contracted pelvis		31	47
Hydrocephalic fetus (Cephalo-pelvic disproportion)	-	4	-
Version	-	-	2
Totals	**56**	**85**	**78**

Deaths directly attributable to an underlying borderline contracted pelvis are of course impossible to estimate, and may have contributed to deaths subsequently categorised under such causes as haemorrhage, infection and fetal malpresentation. For example a mother may have experienced a long protracted labour and a difficult destructive operation, dying later from a ruptured uterus and traumatic haemorrhage, or from puerperal fever. In such cases, the cause of death may have been registered under any one of these complications. Additionally, an underlying misfit between the fetal head and the pelvis could originate from a fetal abnormality rather than pelvic contraction. Alternatively, flat or contracted pelves could sometimes give rise to fetal malpositions and complications such as

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[108] *ibid.*
[109] Registrar-General, *Seventy-third Annual Report* 1910, p. xxiv.
[110] Registrar-General, *Eighty-second Annual Report* 1919, pp. xcii, xciii.

hand, foot or cord prolapse, which are more frequently referred to in the pre-twentieth-century midwifery literature.

Over the last hundred and fifty years, crude figures suggest a general downward trend in female mortality, whereas deaths in childbirth and infant deaths failed to follow the same rate of decline. This effect was similar in other economically developed countries, although it may have been partly accounted for by improved and increased reporting of deaths.[111] In the final decades of the nineteenth century, the government began to recognise the poor physical condition of British subjects recruited to the armed forces for the Boer War.[112] A new government drive to improve the health of expectant mothers and children was launched in the early twentieth century.[113]

6.7.2 An unfit and sickly nation

Following the years of Victorian prosperity (1850-1873) the population was set to double (from 18 to 36 million by 1911), even though the majority lived in poverty. During the early part of the twentieth century, the majority of infants were born to women in lower socio-economic classes. Although overall the nation was more prosperous, the poorest third of the population remained in impoverished surroundings and a polluted atmosphere, eating a poor diet.[114] This made their infants and children vulnerable to disease, poor growth and gross deformities such as rickets. The general downward trends in mortality at the end of the nineteenth century failed to influence overall trends in maternal and infant mortality, resulting in its investigation.[115] Medical experts were called upon and an investigation was organised by The Carnegie United Kingdom Trust. A four-volume report was produced under the auspices of Dame Janet Campbell, which investigated ways of improving the physical welfare of mothers and children in England and Wales. The study selected health

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[111] Tew 1990, pp. 5-6.
[112] Pelling *et al.* 1993, pp. 63-5.
[113] In 1928 the Minister for Health appointed the Departmental Committee on Maternal Mortality and Morbidity. The annual report of the Chief Medical Officer, *On the State of the Public Health*, also commented on maternal mortality. In 1918, the *Infant and Maternal Welfare Act* was passed, and in 1952, the triennial reports on Confidential Enquiries into Maternal Deaths in England and Wales began.
[114] Baird 1980. Donald Gebbie suggests other nutritional imbalances, such as protein deficiencies, may also have had an impact upon pelvic bone formation; Gebbie 1981, pp. 181-199.
[115] For most of the nineteenth century the maternal mortality rate was 5 per 1,000, rising to 5.5 per 1,000 from 1896 to 1900.

models from The Netherlands and Scandinavia. These countries demonstrated comparable or higher rates of maternal mortality than Britain during the nineteenth century, with improved trends in the early twentieth century.

Britain's lack of improvement was thought to be linked to the poor application of asepsis and antisepsis by midwives.[116] The interim and final reports of the Departmental Committee on Maternal Mortality and Morbidity for 1930 -1932, under the chairmanship of Dame Janet Campbell, suggested that if rates from 'highly industrialised manufacturing towns and sparsely populated rural areas' not found in Holland were removed from the statistics, rates of mortality compared more favourably with English figures.[117] The Committee concluded that the standard of living, diet and hygiene were better in Holland, where midwives were well-trained and difficulties were referred to specialist hospitals.[118]

Social causes of mortality, such as poverty and unsanitary environments, overcrowding and overwork, were also found to predispose to rickets in infancy and anaemia and malnutrition in adult life, resulting in poorer pregnancy outcomes. The report stressed the importance of women being strong and healthy, as 'weak' women were 'unfit ... to withstand the strain of pregnancy or childbirth...'[119]

The report recognised that mortality was not limited to the working class; 'well-to-do women' were potentially 'victims of too much, rather than too little, attention ...'[120]

This situation was unrivalled, especially in Holland and Scandinavia where from 1880 onwards, environmental conditions and stillbirth rates improved more quickly. Following the discovery of the causes of rickets in the 1920s, English children were given cod liver oil supplements in an attempt to eradicate rickets in the next generation of adults.[121]

Maternal deaths from 1905-1919 decreased gradually, and maternal deaths from causes unrelated to sepsis were stable at around 2.09-2.38 per 1000 births.[122] Caesarean section rates increased along with their technical success between 1890 and 1910. The

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[116] Loudon 1992, p. 449.
[117] Hope 1917. Professor Hope was Medical Officer for Health for the city and port of Liverpool and Professor of Public Health, University of Liverpool.
[118] *ibid.*
[119] Hope 1917, p. 11.
[120] *ibid.*
[121] Drummond and Wilbraham 1958.
[122] Loudon 1992, p. 135.

1940s saw the most marked decline in maternal mortality. By the 1980s it was reduced to a fraction of the rate fifty years previously, and obstetricians were given credit for their part in this.

In 1990, the medical statistician Marjorie Tew first published *Safer Childbirth*, which challenged misconceptions about the cause of the rapid reductions in maternal mortality in the 1940s. Tew presented extensive evidence, previously ignored, which demonstrated that 'obstetric intervention rarely improved upon the natural process'.[123] The lack of correlation between obstetric interventions and downward trends in maternal and infant mortality were brought to the attention of the public. and in particular to midwives, to pressure groups supporting normal birth and to the government. Moreover, environmental improvements and healthy lifestyles were most likely to be associated with the downward trends in mortality.

6.8 Links between maternal mortality and type of care received

Incompatibilities in data collection, such as differences in classification criteria, economic and geographical environments, different systems of health care provision, different patterns of education of health care providers and variations in cultural responses to childbirth made international comparisons difficult. However, Irvine Loudon's investigations suggested a degree of consistency between contracted pelvis rates in North America, Scandinavia, Holland, and England of around 2% during the inter-war period.[124]

In general, the Dutch and Scandinavians had significantly lower mortality rates than Britain and America, which Loudon believed was owing to the fact that the care they received in labour was less interventionist and resulted in fewer caesareans and craniotomy operations. If this were so, then it would support the idea that higher concentrations of men midwives in urban parts of England contributed to higher maternal mortality rates.[125]

The lower rates of intervention were generally believed to be due to the Dutch and Scandinavians living in a healthier environment and being generally healthier races. It was

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[123] Tew 1990, p. vii.
[124] Loudon 1992, p. 142, 446.
[125] Loudon 1992, pp. 445-459.

thought they were more 'culturally suited' to birth, with larger pelves and less susceptibility to rickets, borne out by lower rates of craniotomy and caesarean.[126] Loudon argued that the incidence of these operations may have reflected the practitioners' preparedness to wait rather than intervene too early.[127]

Loudon studied birth profiles of Scandinavian migrants who settled in and around Minnesota, North America during the inter-war period, and found that they began to mimic similar rates of birth complications as the natives, (including diagnoses linked with obstructed labour). It was concluded that rickets and a diagnosis of contracted pelvis were not the only contributory factors to maternal mortality, and that the culture around childbirth and patterns of medical intervention had a part to play in successful outcomes. Of course the diagnosis of obstructed labour might have been incorrect. Medical or midwifery mismanagement may therefore have played a more significant contribution to mortality rates than previously reported.

In 1926, following an exchange visit to America, an un-named Danish professor suggested from observation of American labour care that 'birth was interfered with too much'.[128] In Danish hospitals long and difficult labour was managed by midwives without recourse to anaesthesia. On a return visit to Denmark it was noted by an American observer that:

> Hurry has become part of our [American] national temperament...and has even affected the medical profession...When hurry in the confinement attendant meets fear in the mother; the combination ... militates against safe and sane obstetrics'[129]

Loudon's work makes a significant contribution to the argument disproving the common association between rickets, contracted pelvis and maternal mortality in the

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[126]Loudon suggests whilst the incidence of interventions such as craniotomy and caesarean may act as indicators of complication rates, they might equally act as signs of a *tendency to intervene;* Loudon 1992, p. 447.

[127] Loudon 1992, pp. 445-54, 447.

[128] *ibid.*

'Twilight sleep' had been introduced into the USA at the beginning of the twentieth century which facilitated *accouchement forcé* or routine forceps and episiotomy.

[129] Mendenhall, cited by Loudon, 1992, p. 446.

eighteenth and nineteenth centuries. He argued that types of care in labour could lead to drastic interventions, which could also be significant causes of maternal mortality.

The Scottish professor, John Young acknowledged in a lecture to the Medico-Chirurgical Society in 1875 the 'criminality of junior students attending midwifery cases': he was reported to have known of:

> ...35 cases in the last four years in which serious injury had been done to women through second-year students attending them[130]

Although the above quotation does not infer mortal wounding, examples of malpractice and botched deliveries resulting in serious morbidity and fatalities can be found in the midwifery literature. These deaths may have been categorised under a range of causes rather than medical negligence, which did not seem to be a category used by doctors, who were accountable to the authorities.

6.9 Matters of clinical judgement

After several hundred years of descriptions of distorted pelves in the medical press, the previously facilitative pelvis had been reconstructed as potentially hazardous, and a serious cause of maternal mortality. It is difficult to prove that the decision to intervene in labour and forcefully deliver a fetus was always based upon sound indications, as decisions relied upon the clinical judgment of the operators and upon accurate documentation, which was relatively brief.

On occasions some decisions were shown to be erroneous and the pelvis later found to have been of adequate proportions. Indeed, similar examples of misdiagnosis exist today at a time when caesarean rates have escalated significantly.[131] Nevertheless, concerns about combating this serious although rare problem were so compelling as to cast doubt upon the ability of all women to give birth unassisted, the problem being that doctors did not know which particular women would develop difficulties. The possibility that pelvic contraction

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[130] Dow 1984, p. 139.
[131] Churchill, Savage and Francome 2006, pp. 85-89

could be detected early by pelvic assessment provided the impetus for the development of a vast array of methods of pelvimetry and led to aspirations to monitor and screen the whole of the pregnant population. This ambition finally came to fruition in England by the mid-twentieth century.

6.10 Conclusion

The integrity of the maternal pelvis and its ability to expand in childbirth had been questioned in the sixteenth and seventeenth centuries, when medical authors began to report the plight of women suffering from obstructed labour due to pelvic contraction. This narrowness was predominantly associated with rachitic pelves. During the eighteenth century the anatomy of the pelvis moved to the fore in the medical texts as essential knowledge for practitioners and as a potential cause of serious difficulty in childbirth. Simultaneously, the theory of pelvic expansion at birth gave way to the notion of pelvic rigidity and possibly contraction.

Discussion about the problem of obstructed labour and contracted pelvis made interesting, albeit alarming, reading. On reflection, it appears that the case studies were selected and shared with readers because of their small number and atypical nature.

Apart from a few highly successful, well-paid London men midwives, most male practitioners were regarded by physicians and surgeons as inferior. As a group, men midwives needed to advance the standing of midwifery as a medical speciality and to demonstrate professional credibility.[132] Although men midwives advertised their services, they also relied upon traditional midwives, especially in rural communities, to refer patients in need of medical attention. They therefore wished to impress upon the public the inferior standing of traditional midwives, and upon midwives the need to detect narrow pelves and other abnormalities early on in labour by doing initial vaginal examinations. They could then refer cases of anticipated and actual difficulty on to medical men. It was desired that midwives would learn how to do certain basic tasks the medical way, and considered

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[132] Although it was obligatory for midwives to summon medical men to difficult births, some medical men wished to take control over the whole of midwifery practice.

essential that they all learned about the pelvis and how to perform vaginal examinations according to medical standards.

The diagnosis of a narrow or contracted pelvis relied upon the arbitrary clinical judgement of an operator. Some less severe cases were amenable to instrumental delivery with the forceps, although the texts indicate that forceps were often overused to the extent that they caused more harm than good.[133] Junior men midwives appeared keener to intervene than the more experienced men midwives. Reasons for over-use were linked to consumer pressure; the need to be seen to do something worthy of a fee or over-enthusiasm for trying out new skills, which sometimes led to disaster.

The rarest and most severe forms of pelvic obstruction were experienced by a relatively small proportion of women, and difficulties were assumed to be associated with a history of childhood rickets, mollities ossium, dwarfism and 'crookedness of the body'. Whilst rachitic disease affected the populations of England and north west Europe to varying degrees during the sixteenth to early twentieth century, it would appear that few developed severely deformed pelves. A small study by Michaelis in the nineteenth century suggested that rickets was certainly not the only cause of contracted pelvis and was only responsible for around a third of cases. Nevertheless, the assumed link between rickets and contracted pelvis played a part in the pathologisation of the pelvis, and there are some suggestions that rickets was more common and more severe in England than in parts of the continent of Europe.

Although the medical statistics of this period were crude, when deaths in England and Wales from contracted pelvis and cephalo-pelvic disproportion are examined within the wider context of female mortality, these deaths pale into insignificance when compared with numbers who died from puerperal fever.[134] Women of reproductive age also ran risks of dying of communicable diseases such as tuberculosis and smallpox, to which they were more vulnerable whilst pregnant from an immunological perspective.

Nevertheless, the idea of a 'blighted' or diseased pelvis was an important development in the process of the medicalisation of childbirth, contributing to a growing

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[133] William Hunter suggested that, on the whole, forceps did *more harm than good*; see Hunter 1778, p. 81.
[134] Many more women died of incurable puerperal sepsis; Loudon 2000; Hallett 2001.

professional and public impression of childbirth as a hazardous and complex phenomenon requiring medical supervision.

By the mid-nineteenth century vital statistics facilitated the national monitoring of public health and were relied upon increasingly by the medical profession to muster public and political cooperation. Despite problems with the reliability of the figures, particularly in the early years, it would appear that while increasing numbers of women were suspected of suffering from rickets in the nineteenth century, the incidence of maternal mortality from contracted pelvis was relatively low, again suggesting only a weak correlation with rickets.

Some cases of contracted pelvis appear to have been difficult to establish from physical appearance alone, and an accurate diagnosis would depend on the skills of the birth attendants. The diagnosis could only be truly defined at post mortem dissection when the pelvis could be directly observed and measured. Contracted pelvis was clearly liable to misdiagnosis or over-diagnosis, commensurate with the reliability of diagnostic methods.

All the early caesarean operations in which the cause of difficulty was documented, were performed for contracted pelvis and obstructed labour, not for any other reasons. The indications for the operation were based upon the opinion of the attending man midwife or surgeon, who relied upon their own clinical judgement, although second and third opinions were normally sought prior to this drastic action, which also required the agreement of the woman, her relatives and any attending clergy.

Questions have been raised over whether medical men actually won any significant battles over the management of contracted pelvis and borderline contracted pelvis by intervening more with forceps and doing more caesareans on an increasingly healthier population of women, with better physiques.[135] Loudon and Tew proposed that more harm occurred as a result of over-enthusiastic medical interventions during childbirth than perhaps doctors have been prepared to acknowledge.

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[135] See Churchill Savage and Francome 2006, pp. 41-58 on caesarean in the twenty-first century and pp. 59-84 on international trends. The proportion of large babies has not increased since 1958, when the caesarean rate was 2.8 per cent and around half the population was delivered at home.

6.10.1 Myth versus reality

Rickets was endemic in much of England, especially in industrial towns following the start of the industrial revolution. There were a number of genuinely severe cases of rachitic pelves in the past which seriously affected the capacity of a limited number of women to deliver normally. It also has to be emphasised that there were some highly-skilled and experienced men midwives who tended to work in industrial areas, where rickets was more common, who were able to deliver women with severely contracted pelvis by one means or another. Notwithstanding their technical successes, some of these women later succumbed to complications afterwards such as haemorrhage or puerperal fever.

Certain ambiguities have come to the fore which reinforce the fact that men midwives, like their traditional counterparts, were not a homogenous group, and whilst some were adept at dealing with complicated cases, others were inexperienced and at risk of misdiagnosing and wrongly treating problems. Inaccurate diagnoses undermined the usefulness of mortality statistics which were based upon clinical judgements.

As discussed in chapter two, the study of history often creates more questions than it answers; there being no single explanations. One has to accept certain ambiguities and embrace them. As the statistics cannot be drawn upon to produce invincible evidence, certain questions remain and a number of plausible explanations need to be considered.

Did doctors exaggerate the emerging problem of severe cephalo-pelvic disproportion, subsequently amplified by medical historians in the early twentieth century to justify their important role in childbirth? Was rickets more serious in certain English industrial locations where men midwives also happened to locate themselves, affecting their perspective on the degree of the problem? Recognising difficulties with accurate diagnoses, which further limited success at dealing with complications in labour, it seems possible that the condition of obstructed labour might have been genuinely misdiagnosed amongst the unhealthy poor, who were compromised at the outset of pregnancy by pre-existing conditions. Also, the condition of obstructed labour was misdiagnosed or used as an excuse for a poor outcome in cases of medical mismanagement. Everyone knew that obstructed labour could be fatal and doctors, armed with the latest knowledge and technology, could not be blamed for apparently doing their best.