The midwife, the shepherd, the keeper and the butcher: knowledge and practice in Harvey's system of inquiry

Introduction

Among the sources that Harvey refers to in his writings are four artisans: the midwife, the shepherd, the keeper and the butcher. Alongside them stand citations from learned men: philosophers, physicians, poets and so forth. References to artisans appear in actual or implied conversations; citations of the learned in textual extracts. The artisans are his contemporaries; the learned for the most part are long departed.

We can suppose then that Harvey places artisans in a different class to learned men. This supposition is confirmed when we examine the references, which are full of respect, admiration and wonder. Such esteem should not surprise us, for scholars have long acknowledged the influential role that artisanal practices played in early modern science.[1] What might surprise us however is that Harvey should so praise a class that was held in low repute and considered to be of inferior learning. It is my contention that no such paradox exists, rather that Harvey with careful deliberation places craft at the centre of his system of inquiry, and it is this centring that I now examine.

Low born and drunken gossips

Wealth and class determined the artisan. Carpenters, smiths and so on were the sons of husbandmen, tenant farmers who supported their families on small plots of land. Mercers, grocers, drapers and such like, members of the great companies that dominated England's lucrative foreign trade, came out of the gentry and the nobility.[2] In part this reflects the substantial apprenticeship premium to be paid [3] and in part the entry capital for admission to the livery. But the bias towards boys from the wealthier strata of society was also a consequence of the 1563 Statue of Artificers which restricted apprenticeship in the great companies to boys of families with freehold property valued in excess of three pounds per annum.[4]

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[1] See for example, Dear, P., The meaning of experience in the Cambridge History of Science Volume III Early Modern Science, eds. Park, K. & Daston, L., Cambridge University Press, Cambridge, 2006; Eamonn, W., Science and the Secrets of Nature, Princeton University Press, Princeton, 1994; and Smith, P., Vital Spirits: Redemption, Artisanship, and the New Philosophy in Early Modern Europe, in Rethinking the Scientific Revolution, ed. Osler, Margaret J., Cambridge University Press, Cambridge, 2000.

[2] Rappaport, S., Reconsidering Apprenticeship in 16th century London in Renaissance Society and Culture, Italica Press, New York, 1991, p 242; Rappaport, S., Worlds within worlds: structures of life in 16th century London, Cambridge University Press, Cambridge, 1989, pp 285-376; and Jewell, Helen M., Education in early modern England, Macmillan, Basingstoke, 1998, p 108; Archer, Ian, The History of the Haberdasher's Company, Phillimore, Chichester, UK, 1991, p 49. The Apprentice register of the Haberdashers Company, one of the great companies, for 1641 shows that there were no apprentices in that year from poor, that is un-propertied, families

[3] As little as one pound for a shoemaker apprentice in Bristol up to one thousand pounds for an apprentice to one of the London mercantile companies, such as the Mercers, according to Ben-Amos, Ilana, K. in Adolescence and Youth in early modern England, Yale University Press, New Haven, 1994, pp 87, 90.

[4] Jewell, Helen M., op. cit, p 43. Jewell also points out, p 43, that the Poor Laws of 1597 and 1601 put out to apprenticeship children whose parents could not support them, most boys ending up as cheap husbandry labour and most girls as domestic servants.

The great companies also had their order. The twentieth ranked Butchers Company attracted the lowest proportion of sons from the nobility and gentry. Fewer than 2% of its apprentices during the period 1630-1660 were of gentle birth; for the first ranked Mercers the equivalent proportion was 37%.[5] But the nature of the company's business also played a part. Slaughter was an unsavoury trade; its by-products contaminated the streets of London and the flow of blood and the presence of offal in the three parishes where animals were killed was a constant problem for the city authorities.[6]

Of all Harvey's artisans it was the midwife that was most despised. She was, as Evenden notes, portrayed as 'ignorant, incompetent and poor;' [7] to Dangerfield she was 'a drunken gossip.' [8] 'This incompetent race' de la Touche called them, and ridiculed their experience. Women should interrogate their midwives he said, with questions such as 'What books have you read?' and 'Who taught you?'[9] Pamphlets told stories of midwife abortionists[10] and of midwives taking care of unwanted bastard children later to be murdered for payment.[11] There was much resentment too that midwives monopolized the birthing process.[12] Since the Henrician Reformation English midwives had been licensed by the church to deliver infants. Initially enacted to ensure that a dying child received the sacrament of baptism in the absence of a priest, the practice soon became regarded as a means to ensure competence. Not all midwives were licensed nor could the church enforce licensing, although by the middle of the 17th century licensing was the norm and its original purpose had disappeared.[13]

Licenses were granted to midwives who had been properly trained, were experienced and perceived as competent; character was rarely important. Competence was testified by other midwives and from 1636 probably by patients too.[14] Learned medicine played no part in the licensing of midwives nor did midwives receive training from physicians or surgeons. They acquired their skills from other midwives who themselves relied on knowledge passed down from their 'apprentice masters,' mothers, relations and friends.

This formal licensing by the Church, providing an objective validation of competence, was enhanced by an informal network of recommendations. Women with confidence in their midwives recommended them to friends and relations. In early 17th century London more than three of every five deliveries was 'repeat business.' There were trade networks too. Husbands of delivered wives would recommend the midwife to fellow freemen whose wives were soon to be delivered. Even the wives of surgeons used midwives in preference to other surgeons, who though licensed to deliver in certain circumstances typically lacked the experience of midwives.[15] Men were adjunct to the midwife and her helpers in the birthing room. If men were necessary, to handle difficult births for example, they were summoned by the mother or the midwife who invited them into the birthing room.[16]

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[5] Grassby, R. The business community of 17th century England, Cambridge University Press, Cambridge, 1995, p 145.
[6] Sabine, Ernest L., Butchering in medieval London in Speculum 1933, pp 335-353; Jones, Philip E. The Butchers of London, Secker & Warburg, London, 1976, pp 1-12.
[7] Evenden, D. The Midwives of Seventeenth Century London, Cambridge University Press, Cambridge, 2000, p 1.
[8] Dangerfield, T. Thomas Dangerfield's Answer to 'Malice Defeated,' London ,1680 pp 17, 18, cited in King, H. The politick midwife: models of midwifery in the work of Elizabeth Cellier in The Art of Midwifery, Routledge, London, 1993, p 118.
[9] Broomhall, S. Women's medical work in early modern France, University Press, Manchester, 2004, pp 31-39.
[10] The Murderous Midwife, London, 1673.
[11] The Cruel Midwife, London, 1693.
[12] Mendelson, S. & Crawford, P., Women in early modern England, Oxford University Press, Oxford, 1998, p 435, point out that women's continuing control of the birthing process hindered the rise of men-midwives.
[13] Evenden, D. Mothers and their midwives in 17th century London in The Art of Midwifery, Routledge, London, 1993, pp 9-26; Evenden D. The Midwives of Seventeenth Century London, op. cit., pp 25, 26; and Guy, John R. The Episcopal licensing of physicians, surgeons and midwives in Bulletin of the History of Medicine 1982 56 pp 528-542.
[14] Evenden D. The Midwives of Seventeenth Century London, op. cit., pp 36, 37.
[15] Evenden, D. Mothers and their midwives in 17th century London, op. cit., p 16.
[16] 70% of the cases of Percival Willughby, a man-midwife in 17th century London and Derby cases were difficult births. In most cases his task was to save the mother not deliver the child. See Wilson, A. The making of man-midwifery:

Nonetheless midwives were of low status and were conscious of it. The author of The Compleat Midwives Practice thought that women used midwives as 'mere hirelings'[17] and that though '…a Midwife worthy of that name doth deliver a Woman from death…yet in the place of much praise she incurs many times much blame…'[18] Elizabeth Cellier's pamphlet 'To Dr.----An Answer to his Queries' sought to instil pride in London midwives; she argued that gentlewomen practiced midwifery in ancient Greece, that '…before the Romans came hither were Colledges of Women practising Physick…'[19] and cited Scripture to support the high standing and legitimacy of midwifery 'And it came to pass, because the Midwives feared God, that he made them Houses.'[20] Louise Bourgeois, a midwife in the service of the French queen in late 16th France, offered support to her daughter:

> *'Now let me tel thee Daughter, that thou oughtest not to take it ill to see the condition of Midwives despised, neither let this hinder thy studies in the perfection of this Art which are not to be comprehended by those that despise it: neither be dismayed if thou seest people in this condition, that do not deserve to be…'*[21]

Learning (as they call'd it)

The authors who wrote about craft praised its honour, its integrity and its grounding in practice. They saw in it a rejection of debate, of guile and of loquaciousness, an honesty that was not present in the learning of scholars who '…who did not know them (things) at all, but only prated about them.'[22] But to the Latined men practice was not learning at all. The author of The English Midwife Enlarged catechises Mrs Eutrapelia a midwife as to her capabilities and emphasises the inferiority of practice when set against the learning of the physician.[23] In an account of his brother's apprenticeship dated 1631 when he was an undergraduate at Cambridge, Wallis, later Savilian Professor of Geometry at Oxford, denigrates the teaching of the 'Mathematicks' his brother was being taught, for he says that

> *'…Mathematicks, (at that time, with us) were scarce looked upon as Academical Studies, but rather Mechanical; as the business of Traders, Merchants…or the like…I do not know of any Two…who had more of Mathematicks than I…and but very few in that whole University.'* [24]

Wallis had very little respect for such a topic. '…(this) Brother of mine (in order to a Trade) had for about 3 months, been learning (as they call'd it)…to Write and Cipher, or Cast Account.'[25] Arithmetic, for such it was, was not fit for proper study, was not learning at all but mechanical, fit only for tradesmen.

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childbirth in England 1660-1770, Harvard University Press, Cambridge, Mass., 1995, pp 47, 48 and Evenden, D. The Midwives of Seventeenth Century London, op. cit. p 87.

[17] The Compleat Midwives Practice II, London, 1656, p125.

[18] Ibid., p105

[19] Cellier, E., To Dr—An Answer to his Queries, concerning the Colledg of Midwives, London 1671 (check date, EEBO) p5

[20] Ibid. p1. The reference is to Exodus, I, 21.The title page of The Compeat Midwives Practice, London, 1656 also cites Exodus, I, 17, 20 and Jane Sharp in the Midwives Book (London 1671) p 12 claimed that Exodus accords women the perpetual honour of midwifery.

[21] The Compleat Midwives Practice Section II, London, 1656, p122

[22] Thomas Shepherd's Memoir of His Own Life, in Chronicles of the First Planters of The Colony of Massachusetts Bay from 1623 to 1636, Young, Alexander, Boston, 1846, pp 503, 504.

[23] The English Midwife Enlarged, London 1682. The author was probably a physician.

[24] Dr Wallis' Account of some Passages of his own Life in Langtoft, Peter, Peter Longtaft's Chronicle, Oxford 1725, CXLVII, CLXVIII.

[25] Dr Wallis' Account of some Passages of his own Life in Langtoft, Peter, Peter Longtaft's Chronicle, Oxford 1725, CXLVI.

Yet it was this craftsmanship, this emphasis on skill, practice and experience that so engaged Harvey that he placed it squarely and deliberately at the heart of his system of inquiry into physiology and embryology.

Apprenticeship

Artisans, whether apprenticed to a guild Master or to a craftsman outside the guild system, learnt by way of apprenticeship. With the passage of the Statute of Artificers in 1536 apprenticeship in the guilds became regulated. Eligibility as to entry and acceptance, term and the rights and duties of apprentice and Master were set according to a national standard.[26] Apprentices were typically trained in a single trade although examples exist in early 17th century New England of farmers acquiring several trades in order to maintain their equipment and clothe and shoe their families, and of small town manufacturing craftsmen becoming skilled in several trades.[27] Most apprentices were trained in guilds or in the London Livery Companies but some crafts lay outside the guilds such as agriculture, seamanship, hunting and midwifery though the pattern of instruction was equivalent.[28] Indenture agreements stressed the secrecy of the guild '…the said apprentice his said master well and truly shall serve, his secrets keep close…,'[29] a secrecy that was again stressed when apprentices entered the guild as freemen and masters.[30] There was secrecy in midwifery too. Elizabeth Cellier wanted it '…to be kept as a Secret amongst Women as much as is possible…' [31] This secrecy caused much offence to physicians who held that young women training to become midwives learnt by trial and error, to the risk of mother and infant.[32]

Midwives in London trained under the supervision of a senior midwife for periods ranging from two years to decades, though Willughby and Tollner put the norm at seven years, which was the period for the regulated trades. As with the guilds responsibility for training lay with the apprentice master who told the apprentice how to perform tasks and often carried out these tasks with him (or her).[33]

Instruction was by watching and doing, from sweeping the floor to preparing bills to actual craft production.[34] Craft knowledge could only be known by practice; written or oral instruction could only introduce. Few craftsmen could articulate what they did and few apprentices could afterwards explain what they had learnt.[35] 'The eys of the servants look to the hands of their master' wrote Burton,[36] where servants meant

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[26] Davies, Margaret Gay The Enforcement of English Apprenticeship 1563-1642, Harvard University Press, Cambridge, Mass., 1956, pp 1ff.
[27] Goodman, Little, William J. Education of New England Apprentices during the Colonial period 1600-1789 in Selections from the Chronicle, eds. Pollak, E. & Pollak, M., Astrogal Press, Mendham, NJ, 1991, pp 307-318.
[28] Evenden, D. The Midwives of Seventeenth Century London, op. cit., p 77; Jewell, Helen M. op. cit. p 50; Fury, Cheryl A. Training and education in the Elizabethan Maritime Community 1585-1603 in The Mariner's Mirror 85 2 1999 pp 147-161; Manning, Roger B. Hunters and Poachers, Clarendon Press, Oxford,1993, pp 170 ff; Cummins, J. The hound and the hawk The Art of medieval hunting, Weidenfeld and Nicholson, London, 1988, pp 172-186, which gives an account of the gradation of the roles and responsibilities of huntsmen from the page of hounds upwards to Master in medieval France.
[29] Little, William J. Education of New England Apprentices during the Colonial period 1600-1789 in Selections from the Chronicle, op. cit.., pp 307-318. The agreement is dated 1716 so was almost certainly based on an equivalent English agreement.
[30] Saguto, DA The mysterie of a Cordwainer in Selections from the Chronicle, op. cit., pp 117-129 cites the Freeman's Oath of the London Cordwainers Guild '…all the lawful secrets of the said Fellowship you shall keep secret and not disclose the same to any not of the Fellowship…' The date is put at c 16th C.
[31] Cellier, E., op. cit., p 3.
[32] Broomhall, S., op. cit., pp 31-39.
[33] Evenden, D. Mothers and their midwives in 17th century London op. cit., pp 9-26; Evenden D. The Midwives of Seventeenth Century London, op. cit., pp 16, 55, 65, 77; Smith, S. Apprentices as 17th century adolescents in Past and Present 1973 61 pp 149-161.
[34] Ibid. pp 149-161.
[35] Long, Pamela D. Openness, secrecy, authorship Johns Hopkins University Press, Baltimore, 2001, pp 72-101; Smith, Pamela H. The body of the Artisan, University of Chicago Press, Chicago, 2004, pp 59-93.
[36] Burton, Richard, The Apprentices Companion, London, 1631, p 36. The citation is Psalm 123, verse 2.

apprentices; Petty recommended that apprentices attend to their masters: 'Now whereas there be divers Wayes and Methodes of working most Manufactures, he should in each thing stick close to the way of some one Mr. but note al the diversities he Knoweth…'[37]

Watching and doing became a skill in itself, a skill of learning, though an unacknowledged one.[38] Learning was independent of craft and some apprentices learnt more than one craft. Practice too, the repetition and perfection of skill, was independent of craft. It produced intuition, the facility to recognize based on experience, and with this intuition the apprentice gained a growing confidence in judgment and in putting his skill to good craft effect.[39]

Learning took in the whole world of the trade and not just its technical aspects. Apothecary apprentices learnt how to judge the urgency of cases, to keep records, to order herbs and medications and so on.[40] Observation of the world of the trade was as much a part of apprenticeship as mastery of the technical skills. Edward Coxere refers to the poisonous Dutch pillestart (an eagle ray) and how a Moor dealt with a sting from a ray and Edward Barlow describes how his vessel put out to see from Woolwich, taking on provisions, staying for fair winds, going on short rations and getting drunk on Spanish sack.[41]

There were few pedagogical texts that described the general pattern of apprenticeship or its daily instruction. The fashion was for books that extolled the craft and some of its eminent members; there were works on accounting, compendia on foreign customs for traders, how to choose a trade for your children and works which extolled the virtue, piety and diligence of apprentices, and their service to God and Master but few texts actually instructed.[42] They were probably regarded as unnecessary, not only because tradesmen learnt by practice but largely because the lower and middling classes communicated by word of mouth. Maxims and rules were the preferred way of articulating method and nurturing skills. People remembered proverbs, exchanged stories and quoted aphorisms which though unrecorded were nonetheless popular. Some tips were figurative. A list for communicating in a noisy blacksmith's shop in New England suggests, among other things, the following: ' (W)hen the blacksmith gives the anvil quick light blows, it is a signal to the helper to use the sledge, or to strike quicker' and 'If the blacksmith delivers a heavy blow upon the work and an immediate light blow on the anvil, it denotes that heavy sledge blows are required.'[43]

Learning was the responsibility of the apprentice. 'I did my endeavour to the utmost to please him', wrote Edward Coxere of his days at sea though '…he (the Master)…did not strive much to show me…'[44] Instruction seems to have been very slight; the single example cited by Barlow is of a senior officer offering a tip on how to turn the capstan

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[37] Petty, W. The Advice of W.P. to Mr. Samuel Hartlib for The Advancement of some particular Parts of Learning, London, 1647, p 19. Diversities means varieties or differences (as in species) rather than opposites.
[38] Ben-Amos, op. cit., p 115.
[39] Edward Coxere quotes an occasion when he disputed a course set by his Master, claiming he had experience which he knew to be good. See Coxere, Edward, Adventures by Sea of Edward Coxere, ed. Meyerstein, EHW, Clarendon Press, Oxford, 1945, p 29. Jewell, Little,
[40] Lane, Joan Provincial medical apprentices and masters in early modern England in Eighteenth Century Life 1988 12 pp 14-27.
[41] Coxere, op. cit., p 11, Barlow, Edward, Barlow's Journal, transcribed by Lubbock, Basil, Hurst & Blackett, London, 1934, pp 50ff
[42] See for example Bolton, Edmund, The Cities Advocate, London, 1629; Deloney, T (TD) The Gentle Craft. A discourse…Shewing what famous men have beene Shoomakers in time past London 1637; Powell, Thomas, Tom of All Trades, or The Plaine Path-way to Preferment, London, 1631; Jackson, Abraham The Pious Prentice, or, the Prentice's Piety, London 1640; Burrowes, Samuel, Good Instructions for all Youngmen and Maids, London 1642; Burton, Richard, op. cit.
[43] Perch, David G. Blacksmiths' Hammer Signals in Selections from the Chronicle, op. cit. The list was printed in an edition of Scientific American April 1880, but its origin is unstated.
[44] Coxere, Edward, op. cit., p 7

to raise the anchor, his account suggesting little more than a casual encounter '…one of the officers of the ship, calling me away, bid me come near to the bar's end and there I should do more good.'[45]

Yet Barlow's subsequent command of seamanship seems to have developed without specific instruction; it developed rather by absorption in the everyday world of the seaman, his tasks, skills and responsibilities and the wider world of the vessel and the sea. Barlow describes the departure for Brasil:

> *'…we directed our course southerly, having a fair wind…for after you come as far southerly as the North Tropick…you seldom miss a fair wind….and then you meet with continual rains…and many times strong gusts of wind, waving you about all points of the compass… And being come into (the Equator) we had many cross winds…and sometimes we did catch…dolphins…sharks…'*[46]

This detailed understanding of current, wind, water condition and marine life accrued if not without formal training then with training that at the time may have seemed so casual or to be of so little consequence that Barlow did not record how he learnt and may not even have been aware of it.

Much of what happens in an apprenticeship (and by inference, in all subsequent craft practice) seems to consist of merely being present in the craft, of living in the process of production or activity. The transmission of skill or practice is only later known and only then by inference,[47] as though by a causal connection evident only through time. Barlow has learnt to do something but does not seem to be aware of his progress nor does he see fit to explain it.

Skills and practices in this early modern craft world were neither formulated nor consciously adopted. As a consequence no ideal pattern of early modern apprenticeship exists. We lack emblematic texts with evidence of the life of an archetypical artisan. The logic of the ideal was well understood, as Rappaport points out, but in practice fewer than half of all apprentices experienced the ideal form.[48] We know that drop out rates were high, perhaps 50-60%,[49] and there are numerous examples of apprentices suing masters for inadequate instruction and of masters suing apprentices for dereliction of duty.[50] We know that the life of many apprentices was hard and that masters used to play tricks on boys to prepare them for their future work. 'Little better than a dog's life and base' wrote Sydnam Poyntz.[51] He would '…run after me with a rope…to scare me rather than to hurt me…' wrote Edward Coxere.[52] We know too that some apprentices wasted much of their apprenticeship years: 'I spent all that time to very little purpose' wrote Phineas Pett, later a senior naval administrator under James I and Charles I [53]. Yet apprentices did complete their terms, enter into the livery or the guild and many prospered. But what they acquired during their apprenticeship by way of skill and experience accrued by absorption rather than explicit instruction and was personal to them.

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[45] Barlow, Edward, op. cit., p 49
[46] Barlow, Edward, op. cit., pp 81, 82.
[47] Turner, Stephen, The Social Theory of Practice, Polity Press, Cambridge, 1994, p 47.
[48] Rappaport, S., Reconsidering Apprenticeship op. cit. p 241. Rappaport 's period was mid 16th century London however.
[49] Jewell, Helen M., op. cit., p 109.
[50] Rappaport, S., Worlds within worlds: structures of life in 16th century London, Cambridge University Press, Cambridge, 1989, pp 215-284; Lane, Joan op. cit pp 14-27.
[51] Goodrick, Rev. ATS, The Relation of Sydnam Poyntz, Camden Society, London, 1908, p 45.
[52] Coxere, Edward Adventures by Sea of Edward Coxere ed. Meyerstein, EHW, Clarendon Press, Oxford, 1945 pp 2, 3.
[53] Pett, Phineas, ed. Perrin, WG., The Autobiography of Phineas Pett, Navy Records Society, 1918, p 3.

The perfection of skill

The craftsman took the skills he learnt in apprenticeship and perfected them by way of constant practice. Much of our knowledge of this perfecting comes from midwifery texts and the improvement texts of the husbandry movement of the period. Midwifery texts were written in ordinary language and aimed at the literate but uneducated woman. Why these works were published is unclear. Contemporary opinion held that they were widely read and used by midwives but there is no evidence that this is so.[54] In any event few midwives were literate[55] and instruction was by way of apprenticeship and its tradition of learning by watching and doing.

Some of these works assumed an advanced level of understanding. The anatomical descriptions in The Compleat Midwives Practice, published in 1656, could only have been written by a physician or a surgeon or copied from extant material. The descriptions are dense and technical; they comprise material that came from the dissection and examination of human and foetal cadavers.[56] It does not seem credible that they could have been written by a midwife. Perhaps they were written to improve the civil status of midwives, to encourage women to respect the calling, to give confidence to midwives themselves or to elevate the midwife against the physician, craft against learning. There was undoubtedly a market for them for they were well produced, comprehensive and no doubt profitable.

The motivation for improvement texts is clearer. There was a keen interest in land improvement that first took form in early Tudor England with the publication of Fitzherbert's Boke of Husbandry in 1523 and reached its peak with the work of Gervase Markham. Markham published 30 books on husbandry, horse breeding and household management over a 36 year period. Such was the popularity of his work that several of his books went into third, fourth and fifth editions. His works were '…literally read to pieces…' notes Poynter in his bibliography.[57] There was a popular interest in improving the profitability of land, as well as the care of stock and the yield of domestic animals, particularly horses, cattle and sheep, one that challenged the traditional order. Markham exploited this interest and aimed his work at the husbandman, yeoman and their wives.

Both classes of text aimed to instruct and though they provide extensive descriptive material they do so primarily by way of rules, tips and stories; learning and knowledge is conveyed by formula and proverb. In midwifery texts tips were sometimes diagnostic. Sharp has fourteen 'common rules' for determining the date of conception which cover things such as '…She hath a preternatural desire to something not fit to eat nor drink…' and '…the veins about the eyes will be more apparent.' She adds some of her own invention such as 'keep her water three dayes close stopt in a glass and then strain it through a fine linnen cloth, you will find live worms in the cloth.' [58] She has rules for predicting things such as gender, miscarriage and due date, but the author of The English Midwife Enlarged admits that '…tis hard to know whether a woman hath conceived yea or no…' [59] and Sharp regrets that '…not one of twenty (women) almost keeps a just account (of their menstrual cycle).'[60] Markham offers rules for the age of a

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[54] Evenden D. The Midwives of Seventeenth Century London, op. cit., pp 7, 12.
[55] Ibid, p 6. Evenden cites a 1980 study by Cressy, D. that puts female literacy at 22%.
[56] The Compleat Midwives Practice Section I London 1656 pp 8ff.
[57] Poynter, FNL, A Bibliography of Gervase Markham (1568? – 1637), The Oxford Bibliographical Society, Oxford, 1962, p 2.
[58] Sharp, Jane The Midwives Book or the Whole Art of Midwifry Discovered, London 1671, ed. Hobby, E. Oxford University Press, Oxford, 1999, pp 82, 83. According to Hobby, preternatural should be read as abnormal.
[59] The English Midwife Enlarged London 1682 p 11
[60] Sharp, Jane, op cit. p81.

horse, '…by their teeth…is of all wayes the most certaines…'[61], for the best time to mate a mare with a horse, '…and if you see her wrie her taile, & show willinges to receive him, then it is most certaine she is ready…'[62] and for the soundness of eggs '…you may know (new and sound eggs) by their heaviness, fulnesse, and cleanesse, if you hold them up betwixt the sunne and your eye-sight…'[63]

The emphasis was on rules for practice. Chapter II of The Compleat Midwives Practice has much instruction on the birth '(W)hen she (the mother) findes her pains growing, it will be necessary for her to walke leisurely up and down the chamber…'[64] and '(W)hen the head comes forth of the womb, the Midwife must take it gently between her two hands….'[65] Guilleaume offers a tip to deal with the umbilical cord '(T)he midwife shall first tye, and then cut the childs Navel-string, to seperat him from the after burden: Which must be done in this manner…' following which there is a detailed set of instructions. [66] Markham knows the best age for a horse to mate with a mare '…when he is betwixt foure and five years olde…'[67] and he has a chapter how to help a mare that '…is in danger of foaling, and other secrets.'[68]

Some authors value stories for they too simplify experience and make it palpable. Guilleaume recounts the case of a falsely diagnosed pregnancy:

> *'Being come to Paris, her Colique was somewhat mitigated, and a little while after she voided two or three gallons of water, without any paine, thinking verily then, that she was not with child: yet five days after she delivered very happily, and with little paine, of a faire daughter, there following very little water, or none at all.'* [69]

But rules and stories are not universal; they may apply in some circumstances but not in others. Markham explains

> *'In which practice of hers, what particular rules are to be observed, I leave her to learne of them who are professed Divines and have purposely written of this argument; onely this much will I say, which each ones experience will teach him to be true… '* [70]

Notwithstanding the advice of the 'Divines' then who have written of this argument, it is the housewife herself who will discover by her own experience which rules are true and which not. Rules, like tips, maxims and stories are specific to context; they apply in defined circumstances and the appropriateness of the rule to these circumstances cannot be subject to determination for there is no formula of aptness. It is the practitioner who must decide when a given rule applies, for the context is a particular which can only be recognized by experience. Stories and rules are not experience; they are only guides to the acquisition of experience. Sharp summarizes well '… it is in vain for any one to make use of what is written if they have no Judgment in the things they use, in such cases it will be best for them to ask counsel…till they may attain to some farther insight themselves...'[71]

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[61] Markham, G., Cavalarice, London, 1617, p27.
[62] Ibid. p 39
[63] Markham, G., Cheape and Good Husbandry, London, 1614, p113.
[64] The Compleat Midwives Practice, op. cit., p 77.
[65] Ibid. p 83
[66] Guilleaume, J, The Happy Delivery of Women London 1612 p 98
[67] Markham, G., Cavalarice op. cit. p 25
[68] Ibid. p 50ff
[69] Guilleaume, J. op. cit. p 97
[70] Markham, G. The English Housewife London 1632 p 2
[71] Sharp, J. op. cit. p 194.

Skill domains

In 1633 Elizabeth Whipp and Hester Shaw petitioned Parliament against the attempt of Peter Chamberlen to incorporate a college of midwives under his direction. Chamberlen was a man-midwife who intended to make midwifery a male profession and the proposed college was the first step. Most of Chamberlen's work lay in the handling of difficult births, a point Whipp and Shaw made much of in their petition,[72] thus distinguishing between the skills of ordinary and difficult deliveries. The two domains were different despite the connotations of the nomenclature; skill in difficult births did not imply skill in ordinary ones. The following year a bishops' enquiry found in their favour, [73] thus establishing the notion that the skill domain for midwives was ordinary births and not all births.

Midwives knew well that their experience lay in normal births for 98% of all recorded cases were straightforward.[74] Surgeons, physicians and most men-midwives encountered only difficult births, for example a breached foetus which necessitated the crotchet, a tool to extract the infant from the uterus. But the determination of the skill domain was not wholly objective. What was or was not a normal birth within the compass of the midwife was a matter for her. She was expected to know her own domain and the applicability of her skill in it. Pare notes that, in regard to attendance '…for the doing thereof, if they be not sufficient, let them crave the assistance and helpe of some expert Chirurgian…'[75] Midwives acknowledged this limitation of their skills for they were cautioned '…to decline as much as in her lies, all the impediments that may be avoided…'[76] and take note of the consequences of the acts of the unskilful '…which is often times brought also to a worse condition, when the unskilful women force her to remedies, for bringing down the secundines…'[77]

What did skill mean to these artisans? Most could probably not have answered the question; skill was acquired subtly and imperceptibly by a process of unconscious absorption until the artisan could reliably and consistently work his materials or processes into the required form. Smith says only that 'The carpenter needs to know carpentry'[78] and in his study of luxury glass making in Renaissance Venice McCray writes that the '…production of cristallo glass melt was a complicated and lengthy process involving a great amount of judgment and tacit knowledge.'[79] Yet it is arguable whether these attempts to reduce the concept of skill to simple propositions improve our understanding of what craft is.

Certain things however are necessary for the acquisition of skill. Midwives would point to long years of practice. Jane Sharp, author of The Midwives Manual, had 30 years experience as a midwife; her knowledge was prodigious as midwifery texts show. Practice required exposure to a wide variety of birthing circumstances. Evenden records from testimonial certificates that London midwives delivered births outside their own parish in order to build experience in a variety of contexts; one midwife, a Mistress X, practiced from Leytonstone in London's east to Southwark in the south.[80] Markham too points out that a large quantity of observations over a wide field of occasions is a necessary element of experience for the horse breeder.

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[72] Evenden, D., The Midwives of Seventeenth Century London, op. cit., p 106.
[73] Ibid. p 106.
[74] Wilson, A. op. cit. pp 28-45.
[75] Parey, Ambrose The Workes of that famous Chirurgion Ambrose Parey, tr. Johnson, Th., London 1634 p 902.
[76] The Compleat Midwives Practice, op. cit. p 105
[77] Ibid. p 140-141
[78] Smith, P, The Body of the Artisan University of Chicago Press, Chicago, 2004, p 86.
[79] McCray, W. Patrick Glassmaking in Renaissance Venice, Ashgate, Aldershot, 1999, p 98.
[80] Evenden, D., Mothers and their midwives in 17th century London, op. cit., pp 9-26.

For the artisan practice is superior to theory. ‘My practice is not a language’ wrote Louise Bourgeois ‘…these are true effects;’[81] a sentiment endorsed by Jane Sharp ‘…only practice (can) equip a midwife…not all the theory that an ingenious man (can) master…’[82] Elizabeth Cellier was more sardonic:

> *‘I hope, doctor, these considerations will deter any of you from pretending to teach us Midwifery, especially such as confess they have never delivered Woman in their Lives, and being asked What they would do in such a Case? Reply they have not yet studied it, but will when the occasion serves…’*[83]

Practice had more to recommend it than argument for it could be measured objectively and shown to be reliable. The author of The Compleat Midwives Practice relates how the errors of an incompetent surgeon were corrected by the actions of two competent midwives and later has a more harrowing story:

> *‘…her husband desired me again, that since the Chirurgeon failed of his skill, I would use my skil; but it was too late, forthe Chirurgeon left them, and the Woman dyed. See here how ill a thing it is to be opinionated, for I could easily have delivered here if she had been delivered by me.’*[84]

Midwives were genuine and skilled experts whose skill derived from practice. As Jane Sharp points out ‘I have seen an ovary – one more than any man.’[85] Artisans practiced their skill everyday and their practice authenticated them.

This contempt for theory had for its source the rejection of the universal. Artisans saw the world as a world of particulars. For the midwife, the birthing mother was an individual woman; for the shepherd the sheep, for the keeper the deer and for the butcher the animal for slaughter. They spoke of individuals and not of classes. The writings of the midwifery authors, of Markham and the other writers of improvement texts are clear in their attachment to particulars. ‘It is certain that all women are not delivered alike…’ wrote the author of The Compleat Midwifes Practice and ‘…and therefore women in Childbed are to be governed by their several conditions.’[86] Jane Sharp claimed that ‘There is a great difference in women’s constitutions…you may kill one with that which will preserve another.’ The author of The English Midwife Enlarged has more a more lyrical style:

> *‘…and do we not know not only in the same Country and Field but also on the same Vine, grapes sometimes six weeks ripe before their ordinary Season; and others not till a month after?....So do we see Women brought to bed six weeks and 2 months before, and sometimes as long after their ordinary term….there have been women as Hippocrates acknowledgeth who have gone 10 or 11 whole Months with Child, which is so much the rarer, by how much it exceeds its limits.’*[87]

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[81] Broomhall, S. op. cit. p 133
[82] Harley, D., Provincial midwives in England: Lancashire and Cheshire 1660-1760 in The Art of Midwifery, Routledge, London, 1993, p 30.
[83] Cellier, E. op. cit. p 6.
[84] The Compleat Midwives Practice op. cit. p 112
[85] Keller, E. Mrs. Jane Sharp: midwifery and the critique of medical knowledge in seventeenth England in Women’s Writing 1995 2 pp 101-111.
[86] The Compleat Midwives Practice op. cit. p 77
[87] The English Midwife Enlarged op. cit. p 22

Markham and other improvement authors apply the same rule. It is the particular thing that determines the craftsman's practice, not the class.

The craftsman worked in fields of variant particulars. For the midwife the mother, foetus, birth were all variable; for the breeder the horse, the foal and so on. Though maxims and rules had the appearance of universality they were applied in a context which was a particular context and called for a rule or rules which was apt to the circumstance. This aptness was judged by the artisan himself, which judgment was grounded in experience derived from his practice.

Harvey the craftsman

Harvey admires craftsmen. There is a passage in his work on generation that discusses the recognition of good and bad eggs; in it he dismisses the skill involved as trivial when compared to the skill of intuitive recognition possessed by keepers. It is a simple task to pick out a good egg. '…even I myself could achieve it…and others (could) achieve it …' yet to recognize which discarded antlers belong to which buck takes great skill and '...is far more worthy of our admiration.'[88] There is no suggestion that he invites us to admire this skill as a performance, put on to amuse. The keeper's skill is part of his craft which we (presumably he means physicians and philosophers) experience everyday. Philosophers merely categorize and select but keepers possess an intuition which succeeds because of their experience and not only because of the outward evidence.

In his only reference to shepherds, Harvey relates how a shepherd can pick out a single sheep from his flock, even though he could not count:

> *'There was a simple, ignorant shepherd who had the care of a great flock of sheep and he grew so well acquainted with them that of any one were missing from the flock although he did not know how to count, yet he could straightway tell which one it was, from whom it was bought or whence it came. Once for a trial he singled out from among forty lambs penned together in the same fold one his master chose…'* [89]

Both these passages suggest that Harvey either lacks an intuitive skill of recognition or possesses it to a lesser degree than the artisans he so admires. Shepherd and keeper had developed their skills through long practice and acquaintance with the objects of their craft. They possessed a skill superior to Harvey the physician.

Harvey acknowledges inquiry as a craft. It calls for skill: 'It is no mere simplicity to conclude from an observation but a great test of skill…'[90] In writing of the similarity of eggs he comments: 'Although I have found some differences in the eggs laid by one hen, yet they are so very small that no-one will notice them unless he be highly experienced…'[91]

This noticing of a natural thing or effect precedes the act of observing and calls for experience rather than the skill of description. Harvey's comments in the Preface to De Generatione make this same point at greater length. He describes how a painter sometimes sketches a face prior to producing the portrait and observes that each

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[88] Harvey, W., Exercitationes De Generatione Animalium, London, 1653, tr. & ed., Whitteridge, G., Blackwell Scientific Publications, Oxford, 1981 (hereinafter referred to as De Generatione), pp76-77.
[89]
[90] Ibid.
[91] Ibid. p 76.

sketch the painter makes differs from all his other sketches and from the 'archetype' itself.[92] The differences are small, for the painter is skilled and has produced a thousand sketches. But how does he detect differences? He has no textbook that explains how to 'notice' differences. Harvey suggests that the painter has the same skill of recognition, grounded in experience, that is required to notice the differences between eggs.

The perfection of inquiry takes time. Time is a central and active component in Harvey's practice, as it is for the artisan. Observation does not consist of one single act of observing, or of the repetition of several acts, or of the rehearsing of an observation described or performed by another. Observation, to Harvey, consists of frequent observations of phenomena over many years: '…my many times repeated inspection…' he writes of his search for the male seed in the uterus of the hind and doe. [93] Contextual variation, the observation of effects and things in different environments, is important too: The Rule of Socrates he calls it, a reference to a passage in Book Two of The Republic.[94] Experience to Harvey is an outcome of practice which is an outcome of time; time is a necessary condition of practice and thus of experience and judgment.

Like the artisan Harvey collects tips, stories and aphorisms to assist his practice. Most are his own invention, for example '…we scarcely perceive what is useful or most serviceable in (all things) unless some are lacking in these features, or have a faulty disposition.'[95] and in relation to parturition in quadrupeds '…if you grasp the tail and press it down you will prevent the exit of faeces…'[96] In the Preface to De Generatione he emphasizes Nature's consistency ('Nature is always consistent with herself in the same things') and proposes an elevated status for analogy in Nature, not as a rhetorical aid but as an active mechanism of inquiry:

> *'…just as her works either agree or differ, that is in genus or species or some proportion, so her working, namely generation or fabrication, is in all of them either the same or different.'*[97]

There are many of these aphorisms scattered throughout his work; for example '…nothing is done to no purpose or rashly in the works of nature…'[98] and '…nature always does that which is more profitable…'[99] But these aphorisms stand alongside contradictory ones, such as '…in the works of Nature, there is neither prudence, nor skill, nor understanding…'[100] or in a comment on Aristotle's belief in the perfection of Nature writes '…But sometimes she acts otherwise, as it were under constraint and beside her purpose…' [101] thus denying their universal applicability. Sometimes Harvey borrows stories and maxims. In De Generatione he recounts the story of a woman who became pregnant after having voided part of an aborted child, the remains laying in her uterus with the later foetus yet this same story appears in The Happy Delivery of Women which was published in England in 1612.[102] His rules are quoted in and apply

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[92] Ibid.. p 11.
[93] De Generatione, op. cit., p 350.
[94] Socrates suggests that if we find it hard to read an inscription written in small letters and are told that the same inscription can be found elsewhere written in large letters it makes sense for us to read the latter and then return to the former (Jowett, Benjamin. The Republic, 368d). Harvey's reference is from the Lumleian lectures, Prelectiones.
[95] Harvey, W., The Eight Letter To The Distinguished and Experienced Physician, Jan Vlackveld, of Haarlem, London 1657 in De Circulatione Sanguinis tr. & ed. Franklin, Kenneth J. Blackwell Scientific Publications Oxford 1958 (hereinafter called De Circulatione Sanguinis) p 97.
[96] De Generatione, op. cit., p 303.
[97] Ibid., p 19.
[98] Ibid., p 179
[99] Ibid., p 61
[100] Ibid., p 236.
[101] Ibid., p 280.
[102] Ibid., p 399; Guilleaume, J. op. cit. p 184.

to a particular context that they are apt for. For the context is a particular too, as is the thing or the effect, and its aptness for the rule that is cited can only be judged by the practitioner based on experience.

Harvey makes much of the randomness of nature and its discovery, that 'pleasure' he calls it, as he admits to Ent in the Epistle Dedicatory to De Generatione. Ent recalls that

> *' I well remember that you yourself once used to say that you had never dissected any animal and you dissected very often, but that you found in it something unlooked for and which you had never even thought of before.'*[103]

In such a philosophy the value of large scale experiments, the single 'experimentum crucis' is questionable and may explain the lack of formal experiments in Harvey's investigations. Only the ligature experiment in De Motu Cordis [104] can be regarded as a formal substantial experiment. It is not that he does not experiment, rather that he conducts simple trials that can be frequently repeated in different contexts. In De Generatione he pricks the cicatricula of the egg to provoke a sensory reaction (thus proving that it has the animal qualities of sensation and movement);[105] he hard-boils an egg to ascertain the site of the foetal chick;[106] and floats an egg in a bowl of warm water to ascertain its fertility.[107] To Harvey experiment is a trial, a way of inquiry, neither privileged nor subordinated to observation [108]. His empiricism is not divided, with priority given to one or other mode of investigation. His craft does not rely on formal experimentation since, like the artisan, all his acts are experimental; they all provide instant feedback on the attributes of the particular thing and its behaviour under the actions of his hands and his tools.

Nor is there the 'observatio crucis' in his work. Harvey certainly requires frequent observations of the part or the effect: 'Having often observed these things with much caution and circumspection in a great number of eggs…' he writes of his first discovery of the blood point in the four day old egg[109], but he also augments his field in order to increase the number of natural contexts he is exposed to. He talks to shepherds and learns of the ability of an artisan to ignore the class so as to better understand the particular[110]; he inquires of good-wives on the fertility of eggs[111] and visits Bass Island off the west coast of Scotland to examine the composition of gull faeces. [112]

Nonetheless he is taken by a desire to conclude. In De Motu Cordis he considers the motion of the heart and the circulation of the blood 'in Animalibus' and in De Generatione asserts that epigenesis is the order of generation in all animals. Yet he has no basis for such certainty. His object of inquiry in De Generatione was the chick for oviparous animals (widely available, cheap and a proxy for all animals[113]) and deer for viviparous animals (deer from the royal forests were provided by Charles I) so such a claim is not credible[114]. The expense in time and money of dissecting these large

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[103] De Generatione, op. cit. p 3.
[104] Exercitatio Anatomica De Motu Cordis et Sanguinis in Animalibus, Frankfurt, 1628, tr. & ed. Whitteridge, G. Blackwell Scientific Publications, Oxford, 1976 (hereinafter referred to as De Motu Cordis) pp 88-94.
[105] De Generatione, op. cit. pp 99-100
[106] Ibid., pp 126-127
[107] Ibid., p 125
[108] The Latin word experimentum used by Harvey (Latin was his first language) meant experience, or sometimes trial. Often these trials were casual tinkerings with the objects of inquiry, such as in Harvey's case hens, eggs, foetuses etc. There was no consensus amongst scientists that experiments had to be performed in formal and controlled way with notes, results and so on.
[109] De Generatione, op. cit. p 110.
[110] Ibid., p 77.
[111] Ibid., p 125.
[112] Ibid., pp 66-68.
[113] Ibid., pp 21, 22.
[114] Ibid. Chapters 64-70. Harvey also includes some sheep in his investigations of viviparous animals.

animals at necessary and frequent intervals during gestation and repeating these dissection programs over several years in order to accumulate the necessary data would have been prohibitive and the addition of other animals would have added to this effort. Nor was there was any possibility of dissecting pregnant human females to ensure the complete integrity of his findings. His respect for particulars and his acknowledgment of variation in nature problematize his desire to universalize. 'The circulation is not always and everywhere the same...' [115] he writes in an essay to Riolian and '…these things…mostly come to pass on the forth day…I say "mostly" because it is not always so by reason of the great diversity there is in the maturity of eggs…' [116] Does his insistence on the universality of his ideas betray him? It seems that in this dogmatism there lies an underlying uncertainty or anxiety, a recognition that his approach to investigation is grounded in personal experience of a nature that he admits is random and contradictory. Perhaps his desire to rebut the Galenic notion of circulation and the longstanding preference for pre-formationism led him to unjustified conclusions, a point made incidentally by Riolan, one of his fiercest critics.

Experience and knowledge is personal because inquiry is personal. '(I am) taught by my own experience' Harvey writes[117] and 'I have proved this by frequent experience and anyone who likes may try it…'[118] He goes on to offer instructions on how to perform the trial and '…then he will see…'[119] He, the reader, will have no need to trust me, nor should he, Harvey means, for he will see for himself. In the Preface to De Generatione he writes of the exactness and priority of personal experience;

> *'…what thing soever I discuss in these my disputations touching the generation of animals, you weigh them in the exact scale of experience, and no further give them credit than you perceive them to be most securely bottomed by the most faithful testimony of your own eyes.'*[120]

His Lumleian lectures on anatomy first given to the London College of Physicians 35 years before the publication of De Generatione contain this same notion of the privity of experience and knowledge. 'Per me' he writes on the title page of these lectures; this is my knowledge which I offer to you. He conducts his lectures as master to apprentice, pointing and showing, inviting his charges to touch and handle the cadaver. In his General Rules for an Anatomy he requires the lecturer to '…supply only by touch what cannot be shown…(and) cut up as much as may be in the view of all, that practical skill may be learned together with theoretical knowledge.'[121] Language is an inadequate means of conveying experience and knowledge; knowledge can only be properly acquired by personal experience.

The world of the artisan

Harvey's world was the world of early modern London, the city and its immediate surrounds, Westminster, Covent Garden, Southwark and so on. It was here that he settled when he returned from Padua in 1602. He married Elizabeth Browne, daughter of Lancelot Browne, Physician in Ordinary to James I and Elect of the London College of Physicians. He quickly climbed the professional and social ladder: Fellow of the College in 1604, resident physician at St Bartholomew's in 1609 and Physician Extraordinary to James I in 1618. It was only in later life that Harvey moved out of London to Oxford and Surrey but by then he had written De Motu Cordis, De Motu

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[115] Harvey, W. A Second Essay to Jean Riolan, De Circulatione Sanguinis, op. cit., p 46.
[116] De Generatione, op. cit., p 100.
[117] De Generatione, op. cit., p 303.
[118] De Generatione, op. cit., p 174.
[119] De Generatione, op. cit., p 174.
[120] De Generatione, op. cit., pp 16, 17.
[121] Prelectiones Anatomie Universalis, tr. & ed., Whitteridge, G., E&S Livingstone, Edinburgh, 1964, Title Page, p 17.

Locali Animalium and had completed most of his work on generation. The lecture notes were first drafted in 1615 and although subsequently annotated saw few substantial amendments. His scientific work was substantially completed during these London years, from 1602 to the early 1630s.

London in this period was a trading town made up of tradesmen. In the mid 16th century three quarters of all men over the age of 25 were freemen of the City; more than two thirds of all men had served apprenticeships a figure which increases if the number of men who had served informal apprenticeships under the City's vocational schemes is included. For these men, apprenticeship accounted for more one quarter of their lives and nine out of every ten learnt their skill through apprenticeship. Apprentices accounted for between one tenth and one sixth of London's population;[122] they were identifiable as a class, often because of their riotous assemblies[123] but also because they thought of themselves and promoted themselves as a class. They petitioned Parliament and took action against 'foreigners,' traders from outside London attempting to do business in the city.[124] The idea of apprenticeship pervaded London; even boy actors in Shakespeare's Players undertook an apprenticeship, though informal without benefit of guild.[125]

Apprenticeship was part of the imagination of upper class England. Prominent people began their careers as apprentices: Robert Hooke was apprenticed to Sir Peter Lily, the court portrait artist; Antony a Wood, the biographer, was proposed to an apprenticeship by his mother in some sort of mechanical craft (his mother thought he had a 'Mechanical head') though he managed to escape the fate;[126] Phineas Pett, courtier and administrator, was apprenticed as a shipwright;[127] and George Fox, the Quaker preacher, was an apprentice as a boy and as a preacher promoted it as an honest calling.[128]

Harvey himself grew up among tradesmen. Folkestone was a trading port and his father was what we would now call a haulage or transport contractor. All but one of his brothers had probably been apprentices; Daniel certainly (he was admitted freeman of the Grocers' Company in 1610) and so too were (probably) Thomas, Eliab and his twin brothers Matthew and Michael.[129] Lewes Roberts, Thomas' probable apprentice and later a freeman in the Grocers' Company, subscriber to the Merchant Adventurer's Company and stockholder in the East India Company, dedicated a textbook on trade to Harvey (as first dedicatee) and his brothers, writing of them in glowing terms.[130] Roberts had been taken under the patronage of Harvey and his other brothers on the death of his apprentice master Thomas. Though of the court and the learned Harvey was also a part of London's artisanal society; cultures and sub-cultures in early modern

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[122] Rappaport, S., Reconsidering Apprenticeship op. cit. p 239, fn 1, p 240; Burke, P., Popular Culture in seventeenth century England, Croan Helm, London, 1985, pp 31-58; James R., Artisans in Europe: 1300-1914, Cambridge University Press, Cambridge, 2000. Ben-Amos, op. cit., pp 88, 89, points out that outside London most cities and large commercial centres were even more dominated by small craftsmen and manufacturers than London.
[123] Burnett, MT, Masters and Servants in English Renaissance Drama and Culture, Macmillan, Basingstoke, 1997, pp 14, 15, points out that apprentices destroyed the Drury Lane theatre in 1617.
[124] Lang, Jennifer, Pride without Prejudice, Perpetuum Press, London, 1975, p 34; Archer, Ian, The Pursuit of Stability: Social Relations in Elizabethan London, Cambridge University Press, Cambridge, 1991, p 1.
[125] Belsey, C., Shakespeare's Little Boys: Theatrical Apprenticeship and the Construction of Childhood, in Rematerializing Shakespeare, Reynolds, B. & West, William, Palgrave Macmillan, Basingstoke, 2005, pp 53-72
[126] A Wood, Anthony, The Life of Anthony a Wood From the Year 1632 to 1672. Clarendon Press, Oxford, 1772, pp 42, 43.
[127] Pett, Phineas, ed. Perrin, WG., The Autobiography of Phineas Pett, Navy Records Society, 1918, p 3.
[128] Fox, George, Journal of George Fox, London 1852, pp 76, 77; Fox, George, Journal of George Fox, ed. Nickalls, John L., Religious Society of Friends, London, 1975, p 12.
[129] Grocer's Company Admissions Register, 1345-1670, MS 11592A, Guildhall, London, shows a Danyell Harvye admitted freeman in 1610. Neither Thomas, Eliab, Matthew nor Michael appear in this register but some genealogies have them as possible freemen.
[130] Roberts, L. ,The Merchants Map of Commerce, London, 1671. Roberts refers to the brothers as 'The Thrice worthy and Worshipful Bretheren.'

England were not 'hermetically sealed' from one another and there was no exclusivity of admission.[131]

I whose Philosophie is mine owne experience

One feature of this society was its trust in skill and experience. There was an acknowledgment that skill could not be read but only acquired by practice. 'No man becomes a workeman by booke…I must needs liken them to Pilots by book onely; to whose care, I thinke, none of us would commit his safety at sea…' wrote Pare.[132] Markham too endorsed experience when he wrote of the age at which a mare foal was fully grown (five years): '…and to that experience I must needs condiscend for I finde it in dayly experience…'[133] Knowledge was conditional on experience '…for all men of experience know…'[134] and it was only the experienced man who could be trusted in their judgment '…Divers Horesemen heere in England (but not any expert breeders)…holde strong argument against this opinion of mine…but they are deceived in their judgments…' To Harvey the judgment of craftsman in his or her own domain outranked that of philosophers and physicians:

> *'Nor are these watery humours in the secundines of much use in Facilitating or lubricating the delivery, as experienced midwives know well, although Fabricius would have it otherwise.'*[135]

Experience was recognised by the State and its agents as carrying authority. Midwives were called by the courts to testify in cases of bastardry, sexual misdemeanours such as incest and the identification of fathers of illegitimate children. Their experience gave them credibility and their integrity was beyond reproach.[136] Some juries were composed entirely of midwives.[137] The notion of a skill domain was acknowledged by James I in his repudiation of the entreaty by the Grocers Company in 1616 to reject the plea by the Apothecaries, then part of the Grocers, to form their own company:

> *'…The mystery of these Apothecaries was belonging to the Apothecaries, wherein the Grocers are unskilful; and therefore I think it fitting that they should be a Corporation of themselves…and I think no man must control them because they are not Apothecaries.'*[138]

Experience in this world was more than a rhetorical flourish to be written of in improvement texts or to elevate the art of the midwife over the learning of the physician. It was both an unarticulated philosophy and deeply held belief. There was a tacit acceptance that experience defined the artisan; that judgment based on experience is true, and that based on argument deceives:

> *'The braine of a man being a busie and laborsome workemaister… brings to our knowledge … false shapes and experiments...'*[139]

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[131] Burke, P. op. cit. pp 31-58.
[132] Pare, A. op. cit. To The Reader.
[133] Markham, G., Cavalarice op. cit. p 60
[134] Markham, G., Cavalarice op. cit. p 32
[135] De Generatione, op. cit., pp 302, 303.
[136] Hess, Ann G. Midwifery Practice among the Quakers in southern rural England in the late 17th century in The Art of Midwifery Routledge London 1993 pp 49-76; Broomhall, S. op. cit. p 171
[137] Capp, B., When gossips meet: Women, family and neighbourhood in early modern England, Oxford University Press, Oxford, 2003, p 303.
[138] James I to The Grocers, 1616, cited by Rees, J Aubrey, The Worshipful Company of Grocers, Chapman & Dodd, London, 1923, p 148.
[139] Markham, G., Cavalarice, p 79

Experience to Pare is ‘wonderful great’[140] and according to Markham surpasses Scripture ‘However these opinions are maintained by the Scriptures…for mine owne part I holde neither trust nor truth in them…’[141] or as he says in Cavalarice ‘…I whose Philosophie is mine owne experience…’[142]

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February 2008

[140] Pare, A. op. cit. To The Reader
[141] Markham, G., Cavalarice op. cit. p 43
[142] Markham, G., Cavalarice op. cit. p 29