

John Snow MD (1813–1858). Part II: Becoming a doctor – his medical training and early years of practice

Stephanie J Snow

Manchester, UK

Keywords: John Snow; apprenticeship; medical schools; medical societies

The medical careers of well established nineteenth-century London doctors have been given much attention by historians and biographers¹. Far less attention has been paid, however, to the means by which such individuals trained and gained a foothold in the competitive medical market. When individual histories are looked at in depth, particularly of those who came from working-class backgrounds, it is clear that such an achievement was not straightforward. Instead, becoming a doctor in the mid-nineteenth century was a matter of hard work, luck, and maximizing opportunities to the full.

John Snow MD (1813–1858) is an important historical figure in the specialties of both anaesthesia and epidemiology², and his childhood and family life in the city of York were the subject of another article³. This paper focuses on Snow's medical training and his early career as a general practitioner. His experience of apprenticeship and then lectures and clinical practice in London was shared by the majority of apothecaries and surgeons who practised medicine in the first half of the nineteenth century⁴.

Apprenticeship

In June 1827, at the age of 14, Snow was taken on as apprentice to William Hardcastle, a surgeon-apothecary in Newcastle upon Tyne. Hardcastle's home and practice were in Westgate Street, opposite St John's Church, and he held the position of surgeon and secretary to the lying-in hospital in Rosemary Lane, a few minutes' walk from his house⁵. Snow spent five years working with Hardcastle and was responsible, during the last year of his apprenticeship, for providing medical services to the colliery in Killingworth at the time of the first cholera epidemic in 1832.

Snow's reasons for choosing an apprenticeship in Newcastle remain unclear. No specific family

connections to the area can be traced, and although Charles Empson, Snow's uncle, established a business there during his apprenticeship, Empson did not arrive in Newcastle until Snow was well settled with Hardcastle. Hardcastle had served his own apprenticeship in York before moving to practise in Newcastle, and so there could have been a family connection⁵.

From the eighteenth century, medicine had been seen as an occupation which the lower classes could use to climb the social scale, as it required a comparatively small amount of money to pay for an apprenticeship. The cost varied enormously according to the status of the master and the location of the practice, and payments between 5s and £500 are recorded⁶. Snow's apprenticeship fee was 100 guineas and there was of course additional financial outlay for medical books, instruments, lecture courses and hospital practice.

Apprenticeship was vocational instruction, dependent on a one-to-one relationship between master and pupil, and had existed since the early medieval period⁷. It was a common means of entry into medicine for would-be surgeons and general practitioners, as there were no specific entry criteria other than a basic education and some knowledge of Latin and Greek. The apprentice acquired practical skills and knowledge through daily contact with his master and, after the training period, would establish himself in practice, either with or without a formal qualification. Formal training, through designated lecture courses and hospital practice, did not become a mandatory part of the apprenticeship until the requirements of the Society of Apothecaries and the Royal College of Surgeons established specific criteria for examination candidates⁸. By the time Snow was training, these included an oral examination in Latin, courses on anatomy, physiology, theory and practice of medicine, chemistry, botany and *materia medica*, in addition to a five-year apprenticeship and six months' hospital practice, or nine months' practice at a dispensary⁹.

The apprenticeship system was open to many faults and came under heavy criticism in the *Report of the Select Committee on Medical Education of*

Correspondence to: Stephanie J Snow MA PhD, Erway Hall, Pentre Coed, Ellesmere, Shropshire SY12 9ED, UK

1834¹⁰. There were no controls to guarantee standards and no safety net existed to prevent apprentices from training with a doctor who was without formal qualifications¹¹. Despite such weaknesses, many apprentices believed they had benefited from the system. Sir James Paget, Snow's contemporary, described the chief bonus as the opportunity to observe all the elements which made up the running of a medical practice. Despite having had to undertake many boring and useless tasks, Paget gave credit to the way in which he was encouraged to develop sound habits of study – "the knowledge was useless; the discipline of acquiring it was beyond all price". His cousin, Dr Moor of Chester, had advised:

Do not read medical books for the first three months at least. They will only confuse you. Look at and handle the various instruments – learn the quantity of the weights and measures... – examine the drugs – and if possible become familiar with the different bones of the skeleton... Do not let the number of instruments and drugs frighten you. You may carry all your rattletaps in your waistcoat pocket and all the articles of the *Materia Medica* really useful may be contained in a quart bottle.¹²

Sir Benjamin Ward Richardson, Snow's close friend and biographer, referred to the opportunities for learning social skills, which could not be found in any textbook:

The chief benefit was to the student himself, for he learned early in life all the practical branches he afterwards most needed; ... the style and manners of the medical man; ... the mode of entering the sick-room and of conversing with the sick; ... the true etiquette of physic; he became a good rider on horseback, and a good driver of a gig or phaeton; he was familiarised with the night bell; he gained ripe experience as a dispenser of drugs, and knew by sight, touch and odour every drug he was called on to dispense.¹³

The apprentice's daily routine involved dispensing and making up medicines, seeing the poorer patients, taking messages, making appointments, writing up the daily entries in Latin, and generally keeping the surgery clean and tidy. The majority could expect to see ulcerated legs which needed bandaging, coughs, colds and bleeding. In a busy practice with a well motivated trainer, there was no shortage of clinical work:

accidents were constantly occurring at which immediate aid from master as well as pupil was demanded and hosts of little operations were going on such as toothdrawing, venesection, the application of bandages, frictions and other acts. These acts though at the moment they might appear to be trifling, were in reality not so, for they gradually transformed the youth into the doctor and most successfully preceded if they did not supersede a hospital career.¹²

Snow assisted Hardcastle in both general practice and at the lying-in hospital where Hardcastle was a surgeon. This early exposure to clinical work stood him in good stead and he made many references in debate to obstetric procedures and cases with particular complications which he had treated during this time⁵. Hardcastle enjoyed

popularity within the local medical circle and held several medical appointments. Such professional success of a master was one of the criteria looked for by would-be apprentices.

Sometimes the relationship between master and apprentice was fraught and some masters refused to take apprentices on a five-year term, preferring instead to renew teaching annually. Snow experienced conflict with Hardcastle when Hardcastle complained that he had lost good patients because Snow had told them they were not ill and required no treatment¹⁴. Despite such intrinsic problems, the system did offer young males an entrée into the medical world and those lucky enough to train with a good master gained enough knowledge and skills to equip them for a medical career.

By the late 1820s, Newcastle's population was around 44,000 and was served by 10 physicians and 28 surgeons, most of the latter operating in general practice¹⁵. The majority of practitioners, even those who were newly qualified, took apprentices, mainly to ease themselves of the drudgery of the practice of medicine. In Newcastle, therefore, there would have been a minimum of 20 or so apprentices. As the local infirmary had only two posts for medical trainees who had completed apprenticeships, it becomes clear why the majority would depart to London to gain professional qualifications and hospital experience.

While working in Newcastle, Snow took the opportunity to study at the Newcastle School of Medicine, which developed during the 1830s. The beginnings of the School came about chiefly through the efforts of Dr T M Greenow, who subsequently became surgeon to the Newcastle Infirmary. Its progress mirrored that of other provincial medical schools which were emerging in Manchester, Birmingham, Sheffield, Leeds and Liverpool¹⁵. Snow's name appears in the list of the first regular students who attended sessions in 1832–3. These lectures would have served as preparation for the examinations of the Society of Apothecaries and the Royal College of Surgeons. Snow was among eight students and, in terms of identifying the comparative nature of his professional success with that of his contemporaries, it is useful to note that he was the only student out of this group to establish himself in practice in London¹⁵. The majority went into practice locally, a pattern which agrees with research done on Suffolk apprentices which found that although 90% undertook further training in London, only 9% remained and set up in practice there¹⁶.

During his apprenticeship, Snow was exposed to a disease which was to prove central to his later professional life – cholera. In the autumn of 1831, cholera appeared in Sunderland and spread over the north-east of England. By December 1831 it had reached Newcastle and over the following months reached epidemic proportions in the area. Hardcastle was one of two doctors appointed by the local vestry committee to attend the poor

suffering from cholera. One of the most violent outbreaks in the vicinity was at Killingworth Colliery, a few miles north-east of Newcastle. The village of Killingworth was the home of Robert Stephenson, the railway engineer, and he was also the engineer at Killingworth High Pit. Snow knew him previously, as he was a friend of Snow's uncle, Charles Empson, and Hardcastle was doctor to the Stephenson family⁵.

Snow later wrote of his experiences at Killingworth and noted that mining as an occupation was exceptional in the facilities it afforded the communication of cholera:

that the men are occasionally attacked whilst at work I know, from having seen them brought up from some of the coal-pits in Northumberland, in the winter of 1831-2, after having had profuse discharge from the stomach and bowels, and when fast approaching to a state of collapse.¹⁷

The epidemic lasted several months and cannot but have made a profound impression on the young apprentice who worked long and hard hours to treat the sick (Figure 1). Such early observations on the disease provided the foundation upon which Snow began to extend his concept of disease, from an individual case into its more general character as an epidemic.

General practice

On completion of his term with Hardcastle, Snow became assistant to Mr John Watson, general practitioner in Burnopfield, a village outside Newcastle. Snow's 12 months here were recorded as being "neither without their anxiety nor their reward", but his second assistantship, with Mr Joseph Warburton, general practitioner in Pateley Bridge, Yorkshire, was enjoyed more, with "many rough rides, a fair share of night work, and a good gleaning of experience". He spent 18 months with Warburton and in later years spoke of him with great affection and respect¹⁸. These two appointments were presumably undertaken to earn money to go towards further training in London, although it is unlikely Snow's salary would have been more than £30-50 a year⁴.



Figure 1. Etching of the first victim to die of cholera in Sunderland. Reproduced by kind permission of the Wellcome Institute Library, London.)

Temperance and vegetarianism

During these years, Snow became committed to two causes which were to remain with him all his life: vegetarianism and temperance. He formed views on vegetarianism after reading several scientific works, one of which was written by John Frank Newton¹⁹. Newton advocated the diet for its health-giving qualities and its potential for relieving certain types of disease. The most famous of Newton's converts to the regime was Percy Bysshe Shelley²⁰.

Snow initially included milk, eggs and butter in his vegetarian diet. However, after arguing the point with Joshua Parsons, a medical student he shared digs with in London, he converted to a vegan diet. Richardson later commented that:

I have heard him tell that so long as he continued to qualify his vegetables with milk and butter, the vegetarian plan supported him fairly. But on one unfortunate morning, when taking his milk breakfast, some quizzical friend, learned in botany, cross-examined him as to the vegetable on which he was then feeding. The joke went home; and the use of milk, as food for a pure vegetarian, became too absurd for consistency...although in after life he maintained that an approach to the vegetarian practice was commendable, in that it kept the body in better tone for the exercise of the mind, he admitted that in his own case his health paid the forfeit of his extreme adherence to an hypothesis.

In 1845 Snow suffered symptoms of renal disorder which were attributed to this diet and during a recuperation visit to his friend, Joshua Parsons, by then general practitioner at Beckington, Bath, Snow admitted that he had been obliged to return to eating animal products¹⁸.

The temperance movement began in 1828²¹. Temperance was deemed an appropriate partner for vegetarianism and Snow became teetotal in the early 1830s. His belief in the evil of alcohol was so strong that, while a medical apprentice, he refused to use brandy as a curative for cholera, despite medical acclaim for its powers²². In 1836 he and his brother Thomas joined the York Temperance Society and Snow's commitment to the principle of temperance continued throughout his life. However, for health reasons, he was forced to include a little wine in his diet from 1845 onwards. He paid an annual subscription to the York Temperance Society until his death, and became Honorary Secretary of the Medical Temperance Society in London in 1845²³.

London life

On arrival in London in October 1836, Snow enrolled as a pupil at the Hunterian School of Medicine in Great Windmill Street²⁴. The School had been established in 1746 in Covent Garden by Dr William Hunter, and in 1766 Hunter bought a house in Great Windmill Street and had it rebuilt to his own specifications²⁵. Snow was a pupil at the School during its final years, as it finally ceased teaching in the late 1830s (Figure 2).



Figure 2. Hunterian School of Anatomy (later Medicine). (Reproduced by kind permission of the President and Council of the Royal College of Surgeons of England.)

The choice of a medical school depended in great part, as in many instances in medical training, upon financial circumstances and any personal connections that an individual may have had. The Hunterian School of Medicine was recommended by the *London Medical and Surgical Journal* in September 1836, as it had better facilities than many other private or hospital schools, offering students the use of a library, a reading room and a museum²⁶. These were by no means common facilities for students, and it was only in 1836 that the Royal College of Surgeons announced for the first time that its library would be open to medical students if they wrote and obtained permission from the Court and the Council of the College. Its reading room was open only to members²⁷. The most obvious reason for Snow's choosing the Hunterian School, apart from its reputation, was that the charge of 34 guineas for attendance at all lectures and demonstrations was at the cheaper end of the scale²⁸.

It was important for students to organize their programme of lectures, demonstrations and hospital practice efficiently, so that they did not "incur a serious sacrifice of time and useful information". The *Lancet* warned that:

frequently has it happened that nearly one-third of the time of the student has been lost by his running, throughout the day, from theatre to theatre, and then from the hospital, back again, to a dissecting-room situated at a distance from it.²⁹

Snow's lodgings were situated less than a quarter of a mile away from the Hunterian Medical School and just over a mile away from Westminster Hospital. For most of his student days, he lived at 11 Bateman's Buildings, Soho Square, in lodgings with a fellow medical student

at the Hunterian School, Joshua Parsons. Parsons wrote that they had met in the dissecting room:

it happened that we usually overstayed our fellows, and often worked far on into the evening. The acquaintance thus grew into intimacy, which ended by our lodging and reading together. We were constant companions from that time till I left town in October 1837.¹⁸

Despite the existence of much propaganda on the idleness and dissoluteness of medical students, the majority were as hard-working as John Deakin Heaton, who studied at University College medical school in 1841. He spent all his time involved in medical work and wrote that:

I scarcely went to any entertainment or relaxed my constant round of attending lectures and hospitals and reading at home.³⁰

Paget described the timetable he had constructed for himself in 1834 as follows:

I did as much dissecting as I well could on most days, in the hours then usual – from 10 to 11 or 1.30 – reading Stanley's "Anatomy", and the "Dublin Dissector", which was then an advanced book; and, at home, the translation of Cloquet's "Anatomy", which very few then ventured on... I must have read hard in the other subjects: for I rarely went out in the evening and never went to bed early.¹²

Reading formed a major part of a student's life and had to be fitted into the beginning and the end of the day, as the remainder was taken up by lectures and dissection. There is no doubt that the life of a medical student was rigorous and potentially isolating.

Snow attended the full range of lectures that were available at the Hunterian School, including a chemistry course during the winter session which was the first one given at the School by Dr Hunter Lane³¹. The course on surgery was taken by Mr Wardrop, whose abilities were highly esteemed, and botany was also included³².

The year that Snow began his training in London was hailed by Professor Thomas of London University as the culmination of developments in medical science that had been "unexampled in any other profession". It was only a matter of a few decades since:

dissections were rarely attempted by the pupil; Natural History and Botany were neglected; Chemistry was indifferently acquired, and *Materia Medica* was known only as a catalogue of drugs; now, these in conjunction with Physiology, are the very foundation of medical science.³³

Hospital practice

In October 1837, Snow enrolled at the Westminster Hospital for six months of surgical practice. Westminster Hospital had been founded in 1719 for the care of the sick poor and, together with the other 10 general hospitals in London, it developed as a centre of medical teaching in the early 1800s³⁴. The hospital offered students a choice of medical or surgical practice, and surgical pupils had the option, at the end of 12 months, of extending

their experience by taking up the post of house-surgeon on payment of £105³⁵.

Snow trained with four surgeons who were very much at the forefront of surgical developments: Sir Anthony Carlisle, Mr Anthony White, Mr George Guthrie, and Mr William Lynn³⁶. Carlisle had studied at the Great Windmill Street School and was nearing the end of his professional life when Snow began at the Westminster. He was responsible for several surgical innovations, including the use of a thin, straight-bladed amputation knife instead of a curved blade, and introduced the use of the saw into operative techniques. White had been Carlisle's apprentice and was described as "the ablest practitioner in the hospital. His clinical comments are perspicuous, sound and enlightened"³⁷. He became notorious during the 1830s for excising the head of the femur for tuberculosis in a patient, against the advice of Carlisle and Lynn, who threatened to report him to the Royal College of Surgeons. Guthrie was an army surgeon and had been appointed to the Westminster in 1827. He developed a reputation in ophthalmic surgery and his clinics were valued highly for the information which they gave on the subject of fractures, gunshot wounds and other violent injuries. He advocated "hands-on" experience for his trainees, and commented that "to become a successful eye surgeon, a man must be prepared to ruin a whole hat full of eyes"³⁸.

At the time Snow entered the Westminster, hospital clinical teaching was still evolving, and although it was a source of great revenue for the hospital surgeons and physicians, it was not given priority in the organization of their day⁶. Teaching was carried out in the course of consultant ward rounds, operating sessions and postmortems, and was generally unstructured. As a teaching hospital, the Westminster was reputed to offer "solid opportunities" for witnessing practice and plenty of exposure to postmortems³⁹. Snow's consultants appear to have been comparatively well organized in their student teaching and gained commendation from the *Lancet*⁴⁰.

On completion of his hospital practice, Snow applied for the post of apothecary to the Westminster Hospital, which had become available in July 1838. He provided testimonials from Mr Hardcastle, Mr Warburton, James Allen of York, lecturers from the Hunterian School of Medicine, and surgeons he had worked for at the Westminster Hospital. Although Snow gained the support of the Westminster Hospital medical staff and "his canvass was very satisfactory", he was obstructed from obtaining the post by the bye-laws of the Hospital, which stated that the office of apothecary could be held only by a member of the Society of Apothecaries. He had not yet sat the Apothecaries' examination and so he petitioned the Society to let him sit it at the second court of the year, in July 1838, instead of October 1838. Although "the Worshipful Company were

sometimes lenient in admitting students to examinations", they refused to take into account the 12 months' hospital practice he had undertaken at the Newcastle Infirmary. He was therefore deemed ineligible to sit the examination until October 1838.

Snow sat the Apothecaries' examination on 4 October and although Richardson recorded that the Society "had not forgotten him and gave him good proof of their remembrances", he passed without problem¹⁸. Snow had successfully sat the examination of the Royal College of Surgeons in May 1838. His encounter with the Society of Apothecaries illustrates vividly the disorganization that surrounded the accreditation of provincial academic and clinical training, and the protectionist attitude towards London-based training¹⁰. A hospital appointment was considered an honour and provided a sound foundation for the establishment of a private practice⁵. For Snow to lose such an opportunity upon the basis of a mere technicality must have been a great blow indeed.

Once qualified as a surgeon and apothecary, Snow continued his progress up the hierarchy of medical qualifications by gaining his MD from the University of London in 1844 and becoming a licentiate of the Royal College of Physicians (LRCP) in 1850 – a corporation which contained the most elite of the profession as members and fellows⁴¹. (The LRCP is equivalent to today's MRCP.) Snow's ability to achieve this was determined solely by the apprenticeship system under which he trained. He had not the financial backing, nor the preliminary education, to have entered a university medical school directly, but his apprenticeship gave him the necessary footings. By training in the provinces, travelling to London to complete his education, gain professional qualifications and set up in practice, he was able to continue his studies, which eventually led to membership of the Royal College of Physicians.

Setting up in practice

Although the majority of newly qualified doctors returned to their home towns to start in practice¹⁶, Snow chose to remain in London and, at the beginning of September 1838, he moved from his student lodgings to a rented house in Frith Street, Soho, less than a quarter of a mile away. He "nailed up his colours" and lived an exceedingly frugal and quiet life until his practice became established several years later¹⁸. In this interim period, he had to work in the outpatient department at Charing Cross Hospital, and as a medical officer at several sick clubs, in order to gain a small income. He was apparently kept very busy with these appointments, although his private practice was limited in both amount and profitability.

Contract work such as the sick clubs and hospital dispensaries was some of the lowest-paid for

doctors. Apart from providing only a limited income, it also restricted the freedom of the doctor to concentrate on any private practice which might have come his way⁴². After seven years of living off contract work and a small amount of general practice, Snow gained an appointment as lecturer in forensic medicine at the Aldersgate School of Medicine. The School was a private one, established in 1825. It rivalled St Bartholomew's Medical School in the 1830s but eventually failed to attract enough students to continue, and closed in 1849²⁴. Snow's appointment lasted less than three years. It involved teaching only one course of forensic medicine during the summer session and he would have earned in the region of £40–60, out of which he would have had to pay for equipment and experiments⁴³. Although Snow was kept busy with his sick club and dispensary work, his private practice did not become established until the late 1840s, when he developed his anaesthetic work.

Building a reputation

Snow believed he owed his eventual successful practice in London to his early connection to the Westminster Medical Society, which merged with the Medical Society of London in 1851. The Society had been founded in 1809, with its objectives defined as "the advancement and diffusion of medical knowledge". Snow joined in 1837, when he had completed his clinical studies at the Hunterian School and was starting hospital practice. He was introduced to the Society by Dr John Epps, botany lecturer at the Hunterian School. For the first five years of his membership, Snow attended over 90% of meetings. He contributed to medical debates from the first, although he was not skilled in public speaking in the early years. He was also a member of the Medico-Chirurgical Society and held committee posts in both, becoming orator of the Medical Society of London in 1853 and its President in 1855⁵.

Medical societies provided a forum in which doctors could begin to develop a sense of professional identity and corporate strength. The content of papers at meetings centred on an individual case or a series of cases of disease. The emphasis was on diagnosis through physical examination and the findings of morbid pathology. From a practitioner's point of view, these were the most useful ways of extending knowledge, improving diagnostic techniques and collecting advice on therapeutics. The presentation of papers allowed doctors to display the range and depth of their clinical and scientific work, and the publishing of papers, cases and letters in medical journals was one of the most common ways of extending this opportunity. Networking helped to gain new patient referrals from fellow members or the opportunity to combine scientific research⁵.

A reading of the medical debates between 1837 and 1846 illustrates how willing and able Snow was to contribute to most medical discussions. An illustration of not simply his capabilities but also his ambition and hard work is given through a simple comparison of his entry in the 1845 *London Medical Directory* with those of other general practitioners within London. His entry lists five papers, published in various medical journals, and refers to his invention of an instrument for paracentesis of the thorax and of a pessary of sponge. Out of a total of 1480 general practitioners listed in the *Directory*, less than 8% list any publications at all⁴⁴. He was, therefore, very much in the minority in pursuing such work.

Despite the persistent elements of the hierarchical medical structure which were to be found in the public arena, societies did protect the intellectual freedom of their members. Such liberality encouraged those ambitious practitioners such as Snow to contribute to, or even challenge, the medical debate. As early as 1838, he challenged the views of Edward Lonsdale, anatomy demonstrator at the Middlesex Hospital, on the anatomy of the recti muscles⁵.

There is no doubt that for ambitious practitioners such as Snow, medical societies offered valuable forums in which to develop a reputation for clinical and scientific work.

Conclusions

Snow entered medicine during a window of opportunity. He undertook one of the cheapest training options that was available at the time and gained a broad-based training which included plenty of clinical work, with particular experience of obstetrics and cholera. It is hard to argue that what would have been judged a superior medical education, consisting of a more substantial schooling, a university arts degree and six months of clinical training, would have equipped him better as a doctor. Nonetheless, it may well have eased his way into establishing a successful medical practice and enabled him to qualify with the Royal College of Physicians 15 years earlier than he did.

The juxtaposition of the technical and scientific approach to the diagnosis and treatment of disease, developed during the first decades of the nineteenth century, against lingering patient expectations of Enlightenment medical values created new tensions in the doctor–patient relationship. High levels of remuneration may have been enjoyed by the popular London physician, yet for the vast majority of those in general practice, be it in London or the provinces, it remained a poorly paid and hard-won occupation. Those medical men who wished to put their medical school training into practice found themselves facing an unwelcome dilemma. They could decide to re-educate their patients with the new medical values which

applied to consultations and treatment, although this often resulted in little business if patients were not satisfied by the process. Or they could choose to compromise their own expectations of the practice of medicine in order to achieve a satisfactory income. It was for these reasons that many doctors were forced to undertake work as medical officers for sick societies or dispensaries, for minimum rates of pay. Building a successful and popular practice required more than simply implementing the new scientific approach to disease. It was a juggling act which many found impossible to achieve, without it being to the detriment of either their standards of living, or medical aspirations. It is no surprise that it was only when Snow started to specialize in anaesthesia, in the late 1840s, that his private practice developed significantly⁵. In an overcrowded marketplace, specialism was one means of achieving distinction in medical practice⁴⁵.

References

- 1 Cope Z. *Some Famous General Practitioners and Other Medical Historical Essays*. London: Pitman, 1961
- 2 Snow SJ. John Snow MD, 1813–1858. In: *New Dictionary of National Biography*. Oxford: Oxford University Press (forthcoming)
- 3 Snow SJ. John Snow MD (1813–1858). Part I. A Yorkshire childhood and family life. *J Med Biog* 2000;8:27–31
- 4 Loudon ISL. *Medical Care and the General Practitioner, 1750–1858*. Oxford: Clarendon Press, 1986
- 5 Snow SJ. *John Snow MD, 1813–1858 and the Emergence of the Medical Profession*. University of Keele, PhD thesis, 1995
- 6 Peterson MJ. *The Medical Profession in Mid-Victorian London*. Berkeley: University of California Press, 1978
- 7 Lane J. The role of apprenticeship in eighteenth-century medical education in England. In: Bynum WF, Porter R, eds. *William Hunter and the Eighteenth-Century Medical World*. Cambridge: Cambridge University Press, 1985
- 8 Cope Z. *The History of the Royal College of Surgeons of England*. London: Anthony Blond, 1959
- 9 *Lancet* 1827–8;i:11
- 10 *Report of the Select Committee on Medical Education, Parts I, II and III*. London: HMSO, 1834
- 11 *Lancet* 1827–8;i:149
- 12 Paget S. *The Memoirs and Letters of Sir James Paget* (3rd edn). London: Longman, Green & Co., 1903
- 13 Richardson BW. *Vitae Medicae*. London: Longman, Green & Co., 1897
- 14 Clover/Snow Collection. Section VIII.3.iii. Woodward Biomedical Library, University of British Columbia, Vancouver
- 15 Turner GG, Arnison WD. *The Newcastle upon Tyne School of Medicine, 1834–1934*. Newcastle upon Tyne: Reid, 1934
- 16 Van Zwanenberg D. The training and careers of those apprenticed to apothecaries in Suffolk, 1815–1858. *Med Hist* 1983;27:139–50
- 17 Snow J. *On the Mode of Communication of Cholera* (2nd edn). London: Churchill Press, 1855
- 18 Snow J. *On Chloroform and Other Anaesthetics, with a Memoir Written by BW Richardson*. London: Churchill Press, 1858
- 19 Newton JF. *The Return to Nature: A Defence of the Vegetable Regime*. London: T Cadell and W Davies, 1822
- 20 Morton T. *Shelley and the Revolution in Taste: The Body and the Natural World*. Cambridge: Cambridge University Press, 1994
- 21 Harrison B. *Drink and the Victorians: The Temperance Question in England, 1815–72* (2nd edn). Keele: Keele University Press, 1994
- 22 *British Temperance Advocate* 1887:131
- 23 Pam.G.60. The Livesey Collection, Archives of the University of Central Lancashire
- 24 *Lancet* 1838–9;i:264
- 25 Cope Z. The private medical schools of London, 1746–1914. In: Poynter FNL, ed. *The Evolution of Medical Education in Britain*. London: Pitman, 1966
- 26 *London Medical and Surgical Journal* 1836–7;10:129
- 27 *London Medical and Surgical Journal* 1836–7;10:776
- 28 *Lancet* 1836–7;i:6–17
- 29 *Lancet* 1836–7;i:16. *Lancet* 1846;ii:358
- 30 Reid TW, ed. *A Memoir of John Deakin Heaton MD of Leeds*. London: Longman, Green & Co., 1883
- 31 *Lancet* 1838–9;i:264
- 32 *London Medical and Surgical Journal* 1836–7;10:140–1
- 33 *Lancet* 1837–8;i:15
- 34 Woodward J. *To Do the Sick No Harm: A Study of the British Voluntary Hospital System to 1875*. London: Routledge and Kegan Paul, 1974
- 35 *Lancet* 1836–7;i:11
- 36 *Lancet* 1837–8;i:15
- 37 *Lancet* 1837–8;i:17,93
- 38 Humble JG, Hansell P. *Westminster Hospital, 1716–1974* (2nd edn). London: Pitman Medical, 1974
- 39 *Lancet* 1837–8;i:17
- 40 *Lancet* 1833–4;i:3–21
- 41 *St George's Hospital Pupils Register*, presented to the Royal College of Surgeons in the 1920s, Royal College of Surgeons' Archives, London
- 42 Digby A. *Making a Medical Living: Doctors and Patients in the English Market for Medicine, 1720–1911*. Cambridge: Cambridge University Press, 1994
- 43 *Lancet* 1846;ii:345
- 44 *London Medical Directory*. London: Churchill, 1845
- 45 Granshaw L. Fame and fortune by means of bricks and mortar; the medical profession and specialist hospitals in Britain, 1800–1948. In: Granshaw L, Porter R, eds. *The Hospital in History*. London: Wellcome Institute, 1989: 199–220