John Snow, M.D. (1813-1858)

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John Snow, the eldest son of a farmer, was born at Heworth on the outskirts of York on 15 March 1813. He died in London in his forty-fifth year. *The Lancet* of 26 June 1858, announced his death in a notice that was short almost to the point of rudeness : 'Dr John Snow died at noon on the 16th instant at his house in Sackville Street from an attack of apoplexy. His researches on chloroform and other anæsthetics were appreciated by the profession'. That was all; a far from sufficient tribute to a man whose fame has steadily increased over the following hundred years, a man, in fact, whose memory now commends more respect than that of any of his professional contemporaries. We should observe, however, that at the time of his death, Snow's first masterpiece, that on cholera, had been so far ahead of its day that its full worth had not been appreciated and that his second magnum opus, 'On Chloroform and other Anæsthetics'[1], had yet to appear. In dramatic coincidence he was engaged in penning its final paragraph at the very moment of his seizure. This second great work was prepared for publication by Benjamin Ward Richardson, a young and ardent admirer of Snow's excellencies, and one who was himself later to achieve fame in the world of public health. A sad accident here befell the historians of future years: Richardson prefaced the work by a memoir of the author and that memoir suffered first by being written in a hurry and secondly by coming from the pen of an enthusiastic friend. Great haste and great affection are not the best aids to accuracy and we cannot but regret that the apparent authority of Richardson's memoir discouraged research for so long that it is now very difficult to find exact answers to the questions which inevitably arise when we begin to study Snow's history in detail.

At the very start, Richardson gives Snow's date of birth as 15 June 1813. The Dictionary of National Biography, the appropriate volume of which was published in 1898, gives the date as 15 March 1813, and confusion was further confounded by the gravestone at Brompton,

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which in 1939 gave the date as 1818. It seemed that the obvious thing was to look up the Parish Register–but there was no parish of Heworth until the latter half of the century. The registers of all the adjoining parishes of the City of York were unyielding. The Genealogical Society came to the rescue, not, as might have been expected, through its transcriptions of the Yorkshire Registers (for these only reach as far as 1812), but by means of a Census Return made at the end of March 1851. On this return Snow entered the details of his household at Sackville Street and gave his own age as thirty-eight. This implies that he was born before the end of March 1813 and that we can accept the date of 15 March. Richardson's 'June' must have been a slip of the pen and the '1818' of the gravestone probably replaced the original '1813' at one of the first two restorations. Incidentally, had the date of birth been 15 June, Richardson would hardly have failed to point out that Snow had celebrated his forty-fifth birthday on the day before he died, a day on which he was already lying mortally stricken.

Beyond a few somewhat obvious assumptions by Richardson we have no details of Snow's childhood. The first specific fact is that at the age of fourteen the boy was apprenticed to Mr William Hardcastle, a surgeon of Newcastle-on-Tyne. Snow's name later appeared in the original list of pupils of the newly-formed and then very small Newcastle School of Medicine. The most important incident in his apprenticeship occurred in its last year, when the young man was sent to be medical officer in charge at Killingworth Colliery. There he had to deal as best he might with the ravages of the cholera epidemic then raging. It seems to be reasonable to accept Richardson's assertion that it was his experiences on this occasion which turned Snow's mind to the question to which he later put forward so complete (and to many of his contemporaries so incredible) an answer. Richardson also tells us that it was during his years at Newcastle that Snow embraced the doctrines of vegetarianism and of alcoholic abstinence to which he was to cling so tenaciously.

In 1833 Snow, then aged twenty, was engaged as assistant to a Mr Watts who practised at Burnopfield, some eight miles from Newcastle. A year later he moved to Pateley Bridge in Yorkshire where his chief was a Mr Warburton. At the end of eighteen months in this practice he returned to York and after a few months at home he started out for London. This was in the summer of 1836. The remarkalbe thing to us about his journey is its indirectness. From York he came to Liverpool. Thence he proceeded on foot, passing through North and South Wales, staying for a time at Bath with an uncle, Mr Empson, and finally arriving in London for the beginning of the autumn academic session.

Snow enrolled as a student at what Richardson calls the 'Hunterian School in Windmill Street'. Here we could wish for a little more precision: the school which William Hunter founded and to which John Hunter came in 1748 was nearing the end of its days. In 1830 a number of students had been transferred to the new school at Hyde Park Corner; others had gone to the Middlesex Hospital in 1835, and in that year there had also been a damaging fire on the school premises. *The Lancet* of 26 September 1835, carries an advertisement for the 'Hunterian Theatre of Anatomy, Great Windmill Street, Haymarket'; but a year later on 24 September 1836, there are two advertisements, one for the 'Hunterian Theatre of Anatomy, 37 Little Windmill Street' and the other for the 'Hunterian School of Medicine; 16 Great Windmill Street.' One of these schools seems to bear the title and the other the address of the original institution which Richardson described in 1858 as 'long since closed and become almost a myth like the mill which gave a name to the locality'. After a year at this school or theatre Snow enrolled as a clinical student at the school attached to the Westminster Hospital. The hospital had but recently moved to its new building in the Broad Sanctuary across the road from the great west door of the Abbey. The building remained much the same until 1924 when many of us can remember its enlargement by the addition of an extra storey.

On 2 May 1838, John Snow had satisfied the examiners of the Royal College of Surgeons and was enrolled as a Member. He applied for the post of Apothecary to the Westminster Hospital but found that the regulations for the appointment required him also to have satisfied the Examiners of the Apothecaries' Hall. A rigid interpretation of the rules of that Institution prevented his sitting for the examination until the following autumn: by the time he had done so the post at the hospital was filled by someone else. Richardson's account of this matter suggests that Snow had some cause for resentment but at this late date we cannot hope to sort out the rights and wrongs of the matter. Following this setback, Snow pursued a course not uncommon before the days of compulsory pre-registration appointments. He exhibited his plate and began to build up a practice. The plate was put up at 54 Frith Street, Soho, not far from his student lodgings at 11 Bateman's Buildings. There are still old houses in Frith Street, but the present number 54 is a relatively modern warehouse.

At this time, too, Snow attended the clinical practice of the new Charing Cross Hospital. He continued with his studies and in 1843 took the MB of the also new University of London. In December of the following year he was in the first division of the MD examination. His diploma on that occasion is in the possession of Sir Robert Macintosh, the Nuffield Professor of Anæsthetics at Oxford. Thus

we have a young doctor building up a private practice, reading for the University examinations, and keeping in touch with hospital practice. From this point onwards there are two separate stories: they are that of Snow the anæsthetist and that of Snow the epidemiologist. These stories, of interest even to a layman, are fascinating to the professional man and a source of wonder and inspiration to those who have followed in either of the two specialties.

During the years 1838 to 1846 Snow, in addition to reading for his degrees, was turning his mind to the fundamentals underlying medicine, to what we today call the 'Scientific Bases'. He made contributions to the medical papers and spoke at meetings of the Westminster Medical Society, a body which originally met in the rooms of the Hunterian School and which was later to merge with the Medical Society of London. From a list of his papers and communications three stand out as showing the particular interests of the anæsthetist-to-be: the first, 'On Asphyxia and on the resuscitation of still-born children', was read to the Westminster Medical Society and was published in the London Medical Gazette of 5 November 1841[2]; a second was on 'Paracentesis of the thorax'[3] and the third 'On the Circulation in the capillary blood-vessels and on some of its connections with pathology and therapeutics'[4]. A man with interests of this nature was almost bound to become a student and pioneer in the art and science of anæsthetic administration when once that possibility had been brought to his notice.

And so it was. The details of Snow's first experiments and experience with ether do not seem to be recorded. It appears, however, that he was invited to use his methods upon the dental out-patients at St George's Hospital, which he did with success. There is a newspaper record of a very inadequate ether session in the main theatre of the hospital on 14 January 1847. The first of three cases lost its nerve and refused operation altogether: the second was more robust; too robust, in fact, for the attempted anæsthesia was a complete failure: the third case did manage to go under for a time, but recovered consciousness as his tibia was being sawn through. It is not therefore with surprise that we observe that Snow was giving anæsthetics upstairs by 28 January. The house surgeon for the year was a Mr Bumpstead, who, some fifty years later, recorded his memories as follows: 'I, myself, under the instruction of Dr Snow, gave the ether to some of the earliest cases. I well remember the first instrument, a large cumbersome flat glass bottle, measuring at the bottom nine or ten inches across, with a flexible tube and a mouthpiece at the end to cover both the mouth and nose. The next apparatus was a sort of metal bottle. invented by Dr Snow, which was held in the hand, the heat of which was sufficient to help the evaporation of the ether. This also had a

flexible tube and facepiece'. This would seem to have been the apparatus which Snow had 'deposited on the table' at a meeting of the Westminster Medical Society held on 23 January 1847. The patient's inspirations were drawn over the surface of ether whilst negotiating a long spiral track. One of the problems which Snow solved was that of the minimum necessary diameter of the flexible tube leading from the vaporiser to the patient. Some seventy-five years or so later Dr Magill came up against the same point when he removed the Boyle re-breathing bag from the facepiece to the machine. He also worked out an answer and was interested later to discover that his findings were in agreement with those of Snow. In a short time Snow's last model of his inhaler appeared; one half of an oblong metal box held the spiral vaporiser; the other part served as a warm-water bath when the machine was in use and as a convenient store for the inspiratory tube, facepiece and valve between whiles. A modern reproduction constructed according to Snow's detailed directions during the 1946 celebrations when tried in practice is said to have worked quite well.

By September 1847 Snow's first book was published by Messrs. Churchill. It is short but has a very long title: 'On the inhalation of the vapour of ether in surgical operations, containing a description of the various stages of etherisation and a statement of the result of nearly eighty operations in which ether has been employed in St George's and University College Hospitals[5].' The outstanding thing about this work is that although it appeared at so early a date and was based upon what today would be thought to be a small series of cases, it gave nevertheless an impeccable description of ether anæsthesia. Snow described the different phenomena to be observed as administration proceeds and as intoxication deepens; his five stages of anæsthesia and his description of their characteristics remained as a standard until well into this century. Many of us may remember giving a somewhat rueful welcome to Guedel's elaboration of 'third stage anæsthesia' into four planes.

Snow's book had not long appeared when the news came of Simpson's trial of chloroform. Snow tried the new drug and found that it had many advantages over ether, which he almost completely abandoned, although he well knew that chloroform was much the more potent and therefore much the more dangerous. He is reported to have replied to a question as to why he used chloroform instead of ether, 'For the same reason that I use a phosphorus match in place of the tinder box; an occasional risk never stands in the way of ready applicability.' He forthwith began to devise an inhaler for chloroform: the outer jacket of this device was filled with cold, not warm, water and the air drawn in by the patient first passed downwards round the outer surface of a cylinder of blotting-paper. Snow describes it as

'bibulous paper', a delightful phrase. The blotting-paper cylinder had a series of hanging strips at its lower edge; these strips dipped into a small quantity of chloroform liquid and between them the air passed inwards to travel upwards inside the paper sheath and to reach the patient by a flexible tube fitted with facepiece and expiratory valve. The illustration is a little disquieting to us now; the patient is sitting bolt upright and she displays a distinct suggestion of exophthalmos. Snow vigorously upheld the merits of his inhaler as against the open drop method favoured by Simpson but it is interesting to observe that when some few years later he was called upon to anæsthetise a very distinguished patient indeed he used a variant of the open method, giving rise to the phrase 'chloroform à reine'. It must have been another instance of 'ready adaptability'.

Snow soon earned the reputation and success that his care and assiduity deserved. Liston, we are told, expressed an admiration for his work and William Fergusson, Liston's successor as the leading London surgeon, made Snow his colleague both at King's College Hospital, then in the Aldwych, and also in his extensive private practice. This success and recognition must have pleased Snow: but when we look at his extensive experiments in investigating the mode of action of anæsthetic agents, his search for new and better drugs, his endeavours to provide greater safety for his patients, we can see that personal success can but have been of minor importance–and this without considering the thought and perseverance he devoted to his studies on cholera infections.

Chloroform, as we have said, rapidly and almost completely replaced ether in Snow's practice: after turning to it he is said to have used ether only on twelve subsequent occasions. He carried out many experiments to demonstrate the particular qualities of chloroform and to evaluate its dangers. At quite an early stage he made a series of animal experiments using varying strengths of the vapour and observing their effect upon guinea-pigs, white mice, cats and frogs. After twenty of these assessments he was able to postulate that the second of his degrees of narcotism would be produced in a human of average weight and conformation by the inhalation of twelve minims of chloroform. This estimate he confirmed by himself breathing from a bag in which that amount of the drug had been vaporised. To induce his third degree, that is 'surgical anæsthesia', would require eighteen minims; deep narcosis would take twenty-four and respiratory arrest would be produced by thirty-six minims. The descriptions of his various experiments are made lengthy by his recording of air volumes in cubic inches and of the amounts of chloroform used in minims or grains. One is tempted to wonder that he did not turn to the metric system–but even today we prescribe morphia in fractions of a grain.

The small but increasing list of deaths reported as taking place during or immediately after chloroform administration was of great concern to him and by April 1852 he was able to publish a long paper[6] on the subject and to incorporate into it an account of his investigations into how chloroform killed. This is how he recounts one of a number of experiments he made to establish the effect upon the heart's action of a relatively high concentration of the vapour: 'A young rabbit, more than half-grown, was made insensible by breathing air charged with four per cent of chloroform vapour in a large jar. The trachea was then opened and a large tube was introduced and tied. The lungs and heart were then exposed, by making an incision and removing the lower half of the sternum with the adjoining part of the cartilages of the ribs on each side. The front of the pericardium was also cut away, to expose the heart. Whilst these operations were performed artificial respiration was kept up by means of a bladder of air attached to a tube in the trachea. The heart contracted vigorously and quickly and the lungs were of a light red colour. The rabbit was beginning to show signs of returning sensibility when the bladder of air was changed for one containing ten per cent of chloroform vapour. The bladder contained one hundred and twenty-five cubic inches and twelve minims of chloroform were put in before it was filled with the bellows. Three of four inflations of the lung only had been made when I perceived that the heart was beginning to be affected and I changed the chloroform for a bladder containing only air. These three or four inflations of the lungs with the chloroform had the effect of causing the right cavities of the heart to become distended with blood and its pulsations to become much slower. In two or three minutes, however, the action of the heart was quite re-established by the artificial respiration, the pulsations being vigorous and frequent and the ventricles being apparently emptied at each contraction.' The account then goes on to describe further inflations of the lungs with ten per cent chloroform, to record the details of the death of the rabbit and to draw conclusions from the observations made. It may today appear to us to be an obvious piece of work; but as we assess these investigations we must take into consideration their originality, their essential soundness and their fundamental value.

Snow was constantly engaged in a search for an anæsthetic agent which would possess the good qualities of both ether and chloroform and show the disadvantages of neither. He tried a large number of compounds: Richardson's list of them contains 'Carbonic acid, carbonic oxide, cyanogen, hydrocyanic acid, Dutch liquid, ammonia, nitrogen, amylovinic ether, puff-ball smoke, cyanide of ethyle, chloride of amyle, a carbohydrogen from Rangoon tar, a carbohydrogen coming over with amylene, and various combinations of these.' The

greatest promise seemed to be held out by amylene and of this he made a clinical trial: two deaths, however, in a fairly short series of cases led him to abandon it as too uncertain in its action. Not merely did he investigate drugs for their anæsthetic properties but during the years 1848 to 1851 he carried out a series of general observations on the effects of substances when given by inhalation. This work was done at the Brompton Hospital and the compounds used were opium, morphia, stramonium, turpentine, camphor, benzoic acid, creosote, hydrocyanic acid, 'conia' and chlorine. The findings in these investigations were published in the *London Journal of Medicine* for January 1851[1].

A full and adequate realisation of Snow's work in the investigation of anæsthetics can easily and, in fact, can only be obtained by a perusal of his great work, 'On Chloroform and other Anæsthetics'. This magnificent volume is truly the work of a master: admirably lucid, it presents a comprehensive account of anæsthesia and anæsthetics as they presented themselves to a man who was at the same time a humane idealist, and a careful, sober and judicious physician. The book, published some months after Snow's death, opens with a short preface by Richardson followed by the biographical memoir which we have already discussed. Then comes the work proper starting with a historical introduction to the subject of narcosis, followed by a short note on inhalation. The main part of the work consists of three-hundred pages devoted to chloroform anæsthesia, considering it in extenso and from every angle. *The British Medical Journal* of 18 December 1858, criticised the devoting of forty-seven pages to the discussion of the use of chloroform for each and every type of operation that Snow had seen performed under its influence and we ourselves may tend to be bored by the eighty pages in which Snow gives as full accounts as possible of every fatality, the records of which had come to his notice. Many of the details he recounts now seem to be irrelevant but we must remember that this was the first comprehensive work on the subject and that Snow was not writing a text-book for medical students but was compiling an encyclopædia of anæsthesia as far as his knowledge of it went, and that nobody's knowledge then approached his own either in extent or in depth. What Snow did not know it may be assumed that nobody knew. Following the section on chloroform, there are twenty-six pages on ether, thirty-eight on amylene, and four on 'the mono-chloruretted chloride of ethyle'. It was while he was engaged on this last section that Snow suffered the cerebral catastrophe; by a strange chance he had just penned the word 'exit'.

So, it would seem a complete and satisfying story has come to its end. It started with the assiduous young apprentice; it showed his working for professional qualification; it continued with his obtaining

academic distinction and with his building up a personal practice from the most modest of beginnings; it told of his turning his eager and enquiring mind to the new conception of anæsthesia; of his carrying out of numerous vital and crucial experiments; of his invention of apparatus; of his devising of improved techniques and of the devotion of his spare time and energy to the multiple aspects of the growing specialty. In fact, it was he who turned into a scientific specialty what had started off as a mere mechanical trick, a menial task. The story ended with the completion of his magnum opus, the record of eleven and a half years' work. We are left with admiration for the crowding of so much into so brief a period.

But this is at the most only part of Snow's achievement, and possibly the lesser part. We have yet to consider the tremendous work he carried out in seeking and finding proof for his belief that cholera infection was water-borne and that the secret of its control lay in the improvement of sanitation. This idea, which he pursued over a number of years and which he propounded by every means within his power, was not well received. Although the idea of micro-organic life was not unforeshadowed, the science of bacteriology had yet to be born. Koch's formulation of his postulates and his description of the cholera vibrio were still in the future. Snow could only theorise as to what it was that was water-borne in the spread of cholera and his indictment of the sanitary arrangements was likely to endear him neither to the local authorities nor to the water companies. Other medical men had other competing theories and there must have been moments when Snow felt himself to be but a voice crying in the wilderness. The starting point of his proposition was his observation that the cholera victim first suffers from an intestinal upset and that the general effect of the infection follows later. The inroad of the disease then, he considered, must be via the alimentary tract. He deduced from case histories that the intestinal flux from one patient contaminated the hands and the food of those in attendance and so spread the disease. Medical practitioners and pathologists escaped, since they washed their hands thoroughly; but the local nurses whose laying-out operations were accompanied by feasting and drinking were particularly vulnerable. Snow even went so far as to say that in view of its powers of rapid reproduction the cholera-carrying body must have a structure and might even be a cell, though its existence could not be recognized under a microscope. He pointed out that the disease is spread more easily where there is crowding, where sleeping and eating take place in the same room, and particularly in mines, where the men stay below for long hours and relieve themselves on the spot. He had observed this for himself at Killingworth and he quotes from a mine-managing relative's letter to the effect that 'The pit is one huge privy and the men always take their victuals with unwashed hands'.

Snow went on to point out that if direct personal contamination was the only means of transference of the disease, then the outbreaks would largely confine themselves to the crowded dwellings of the poor, but if there was an admixture of the cholera evacuations with the supplies of water used for drinking and for culinary purposes, then the disease could and would spread generally, as it sometimes did. Choleraic material might reach the water-supplies either by permeating the ground and so reaching the wells or by draining into the rivers which in certain localities were used as water-supplies.

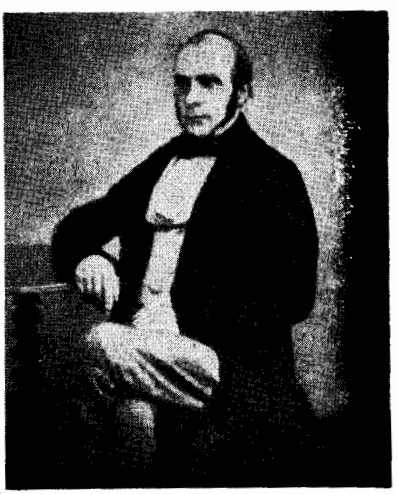
The conception of water-borne infection came to Snow in the year 1848 and from 1849 he set himself the task of investigating the particulars of every case of cholera in the metropolitan area which came to his notice, taking especial notice of the immediate arrangements of the water supply and of the drainage. He was able to demonstrate numerous instances of contamination. He made examination of the Thames river water at the various places from which it was taken into the water supply. He corresponded with those in other parts of the country who could provide details of the circumstances of past and present outbreaks. All this took a good deal of his time and much of his money. He published a small pamphlet[8] on the subject in 1849 and this formed the basis of his extended opus of 1855.

A grand climax came in 1854 when a sudden burst of cholera occurred in Soho almost within a stone's throw of Snow's house in Sackville Street, the famous Golden Square epidemic. This brings us face to face with the Broad Street pump, which engine stood at the corner of Broad Street and Cambridge Street, now Broadwick and Lexington Streets respectively. Snow demonstrated that without doubt the epidemic was centred round this pump. The outbreak became severe on the night between 31 August and 1 September and by the 3rd Snow was busy inspecting the water from the pump. In the following two days he found evidence of organic contamination. He had a list of the deaths from cholera registered in the locality during the week ending 2 September and found that they all took place within a short distance of the pump, that only ten of the cases lived nearer to another pump, that of those ten five preferred to draw their water from Broad Street, and that of the remaining five three had children who went to school in the indicted locality. As the epidemic grew the inhabitants of Soho fell into panic; in six days death and flight had reduced the population of some of its streets to as little as a quarter of the normal. On 7 September, the St James' Board of Guardians met to discuss the appalling situation. Richardson gives a very vivid and perhaps overdramatic description of the meeting: 'While the Vestry were in solemn deliberation, they were called to consider a new suggestion. A stranger had asked, in modest speech, for a brief hearing. Dr Snow, the stranger

in question, was admitted and in a few words explained his view of the "head and front of the offending". He had fixed his attention on the Broad Street pump as the source and centre of the calamity. He advised the removal of the pump-handle as the grand prescription. The Vestry was incredulous but had the good sense to carry out the advice. The pump-handle was removed and the plague was stayed.' That story is familiar to us all and like so many familiar stories it is not true; not true, that is, in its final implication. It is agreed now that the pump-handle was removed and that the plague came to an end but the second fact was not dependent upon the first. Sudden and acute outbreaks like the one round Golden Square are commonly self-determining and already at the time of the Vestry meeting the mortality figures had started on that downward fall which may be expected to balance the initial sudden rise. Snow was right in ascribing the outbreak to contamination of the pump water but Richardson was in the wrong when he said that the sudden cessation of cases was due to the removal of the pump-handle, admirable though that precaution was. His records of the immunity of the workhouse inmates since that institution had its own artesian well, of the safety of the brewery workers who scorned to drink anything weaker than beer, and of the death of the good lady who had retired to Hampstead but who had a daily supply of the Broad Street water sent out by carrier with unhappy results, all these are clinching in his indictment of the means of spreading the infection. The one thing he failed to discover was the original case by which the disease had come to Soho. In a recent issue of *Medical History* there was published an article[9] by S. P. W. Chave telling the story of the Reverend Henry Whitehead, a public-spirited man who was so upset by Snow's findings and theory that he set himself the task of checking all Snow's observations in the hope of refuting him. The outcome of this reinvestigation was not only the confirmation of Snow's contentions but also the bringing to light of the original case which had eluded Snow's searching.

Much more important and more convincing were Snow's researches into the incidence of cholera in South London. There, there was a situation which gave him a wonderful opportunity to demonstrate the validity of his theory. In the late eighteen-forties and early fifties there were rival water companies operating south of the river, one known as the Southwark and Vauxhall and the other as the Lambeth. These two companies often supplied different houses in the same street, their pipes running parallel. Now the Southwark and Vauxhall drew its water from the Thames at Battersea Fields about half a mile above Vauxhall Bridge. The Lambeth Company in 1852 transferred its intake upstream to Thames Ditton where the river water was comparatively unpolluted. Snow visited every house in the area from

which a case of cholera was reported and made direct enquiries as to which company supplied the household with water. His analysis of his findings is detailed and exhaustive but he clearly showed from his records that in the first four weeks of an epidemic outbreak in 1855 for every ten thousand houses supplied by the Southwark and Vauxhall Company with its comparatively dirty water there were seventy-one cases of cholera whilst at the same time there were only five cases in the houses supplied by the Lambeth Company–a discrepancy of fourteen to one. A later official enquiry by varying the conditions of the investigation reduced the figure of the ratio to 3.5 and in Snow's reply he raised it again to six even with the new limitations. These are merely the unhappy bickerings that always arise when expert witnesses are pontificating, especially when statistics are involved. The fact solidly remains that Snow by his untiring personal investigations and by his painstaking survey of local conditions proved for the first time and for all time that cholera is a water-borne disease. He was not alone in his thought that it might be so conveyed but no one else has any greater claim to the origination of the idea than he has and certainly he alone conducted the meticulous investigation which led to the overwhelming proof of his assertion. His work 'On the mode of communication of cholera'[10] appeared in 1855 and is now regarded as a classical example of field work in public health studies. It was reissued by the Commonwealth Fund of New York in 1936 and this re-issue was re-printed in 1949.



Miss Una Snow possesses a presentation portrait of her great-uncle. It cannot be said to be a masterpiece of the portrait- painter's art and is far from being so revealing as his photograph which must date from about the same time. This, at first glance, is almost intimidatingly grim; but we must allow for the fact that mid-Victorian photographic methods required long exposures. To 'look pleasant, please' even for a moment is an ordeal and to sit still for some seconds, probably with one's head fixed in a hidden metal clamp, would make scowlers of most of us. Further inspection of the photograph takes away the first impression of sternness and leaves us with the feeling that here was a man who would see things clearly, who would think about them clearly and who would express himself

clearly. In fact, this is the man whom we know from his writings, the man whose predominant characteristic was clear-headedness. Snow dealt neither in vague generalisations nor in philosophical hair-splittings, but told a plain unvarnished story. A letter written by Snow in 1852 shows the qualities that we might expect. It is straightforward; it is clear; it is polite without any undue fulsomeness. Without being childish or unduly plain, the hand-writing is small and completely void of those elaborate flourishes which were so much more common in the age of 'copperplate' than in our own day of typescript. The signature is unaffected and unadorned, there is none of that perverse illegibility, none of those exotic curlicues and none of the over-emphatic underlining which are so often indicative of the indirect mind. Such a letter and such a signature are suitably characteristic of the eminently sensible man we have so much cause to admire and respect. This letter was written from Snow's later home at 18 Sackville Street. The house now stands apparently as it was in Snow's day, although it has ceased to be a private residence. The London County Council has adorned it with a plaque commemorating its distinguished resident of one hundred years ago.

Our admiration for Snow's assiduity as a pioneer anæsthetist and as an epidemiologist is all the greater when we read that he was a chronically sick man. He suffered not only from 'chest trouble' but also from renal disorder. At autopsy there were found not only the expected cerebral lesion and the healed evidence of phthisis, but also multiple cysts of the kidneys. Snow was buried in the Brompton Cemetery and a memorial stone was put up by Richardson and other friends. This stone was not so solid as it appeared and it was very severely shattered in an air-raid in 1941. The Association is to be congratulated for providing for the replacement of the original by a facsimile in Portland Stone.

As anæsthetists we may claim that Snow's work is one of the particular glories of our specialty. He was among the first in London to take up the art of anæsthetic administration. He was the first in London or elsewhere to search for a factual basis on which to build a theory of its phenomena; or, in other words, to search for the science behind the mere empiricism with which anæsthesia had begun. He sought for new drugs and better ones. He made improvements in technique and apparatus. He recorded the phenomena to be observed during deepening narcosis and he was the first to tabulate and systematise those phenomena. He compiled notes on all kinds of patients undergoing all kinds of operation. He sought for explanation of all untoward incidents and fatalities. He conducted animal and personal experiments before exposing his patients to possible hazards. He presented his findings in papers both spoken and written, that all might benefit by his work.

In short and in fact, Snow anticipated in essence all that any enquiring anæsthetist has been able to do, all, indeed, that the most lavishly equipped Department of Anæsthetics can propose. In the short term of his active life as an anæsthetist, John Snow set out feet firmly upon the path of progress and clearly pointed out the way ahead. To the century of anæsthetics that has followed him he has been an increasing source of inspiration. To those who have yet to come he will be the same guide and friend. The scientists who study public health have as great, or even greater, cause for gratitude; whilst the public at large will probably never be able to appreciate the totality of its debt to him.

Sixth Form essays and Upper School debates are often devoted to the question of the great man and great age; which produced the other? Snow's qualities cut across all such arguments; for it is apparent that he would have found valuable work to do in any age or clime: there is something in him that is not of an age but of eternity.

If it be permitted for a moment to indulge in fancy, one would hope that John Snow may know that he who was accorded but a brief obituary by his contemporaries has been the subject of three special commemorations in this the centenary year of his death. First, he was the subject of papers at a meeting of the Section of Anæsthetics of the Royal Society of Medicine, successor to the Royal Medical and Chirurgical Society of which he was a member; second, he was the subject of a Memorial Lecture at the Medical Society of London. which during Snow's lifetime absorbed the Westminster Medical Society at which he made his first appearances as a speaker. Of the enlarged Society, Snow in due course became first Orator and later President. Finally this Association which is devoted to the furtherance of all that is for the good of anæsthesia and of the anæsthetist, and which makes the award of a Snow Medal to those whom it wishes to honour, has today inaugurated the John Snow Lecture as an earnest token of its appreciation of all that the specialty owes to the great man whose early and untimely death took place one hundred years ago.

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