

John Snow



*On chloroform and
other anæsthetics:
their action and
administration*

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PREFACE.

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The book here presented to the reader is the legacy to science of Dr. John Snow. The completion of the work was his last act and deed. In editing the book, therefore, all that remained to be done consisted in the construction of the index, and in this a plan suggested by the author himself has been followed.

In contributing the memoir, I have performed a painful and unexpected duty: the fulfilment of a promise given at a moment when two friends who often enjoyed close companionship met at one of their happiest meetings. The promise was given with the idea of fulfilment far distant, or improbable altogether, and, as connected with a more extended biographical survey, reserved for the work of years long in the future; it is called for now hastily and in deep sorrow.

Writing with the fact of my late friend's death not as yet fully realized; with the sensation still on me at intervals (like one who has lost a part of his own body, and yet at times conceives the lost present), that he cannot possibly be so far away; I may, perchance be pardoned for any deficiencies in style or matter. I have done my best, and leave it so.

B. W. RICHARDSON.

12, Hinde Street, Manchester Square.

August 6th, 1858.

THE LIFE OF JOHN SNOW, M.D.

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There is not much credit in the mere acts of living and dying; in being driven by unavoidable fate through the common journey, with shoulders uncovered and the whip over them; in doing nothing save the drudgery of existence; in enjoying, in an approach to the recognition of enjoyment, the brief dreams of childhood; in struggling into manhood; in battling through the after-strife obedient to the castigator behind; and in dying at last, as though life had never been; dead to-day, wept for tomorrow, and forgotten by the morrow's succeeding sun. There is not much credit in this surely, for credit must be earned by something done beyond that which all must perforce do. But, in the face of all the struggles incidental to the existence, so to have managed as to have stolen out of time hours which other men knew not in their calendar—so to have defied the inexorable taskmaster as to perform more than is included in his demands; so to have willed and acted as to live on when death has done his worst; to assist all coming wayfarers in their conflict wherever they may meet it; to prove that there is something more in life than labour lost, and nothing more in death than an idea—*Hoc opus hic labor est*—in this there is achieved the grand attainment; the perpetual life.

He whom I, with poor biographer's pencil, put forward now in brief sketch, is one amongst the few who have thus realized the ideality of death. It were but little matter, therefore, though no biography should appear at all; it is of

but little count that such biography, as the recollections of friends and intimates shall call forth, be scanty in its details; it is of but little count that the life of him who is to be shadowed forth is destitute of incident fitted for the taste of wonder-loving, passion-courting, romance-devouring, readers. Biographies for these are common. Good men are scarce.

John Snow, the subject of the present memoir, was born at York, on the fifteenth day of June, 1813. He was the eldest son of his parents. His father was a farmer. His mother, who is living, resides still at York. As a child, he showed his love of industry; and increasing years added only to the intensity with which he applied himself to any work that was before him. He occasionally assisted his father in agricultural pursuits, and often in later life spoke with great *naïveté* of the recollections of those early winter mornings when his boy's fingers were too intimately to be pleasantly acquainted with the effects of benumbing cold. He was first sent to a private school at York, where he learned all that he could learn there. He was fond of the study of mathematics, and in arithmetic became very proficient. At the age of fourteen, he went to Newcastle-on-Tyne, as an apprentice to Mr. William Hardcastle, surgeon, of that place. He had also the opportunities of studying at the Newcastle Infirmary. During the third year of his apprenticeship, viz., when he was seventeen years old, he formed an idea that the vegetarian body-feeding faith was the true and the old; and with that consistency which throughout life attended him, tried the system rigidly for more than eight years. He was a noted swimmer at this time, and could make head against

the tide longer than any of his omnivorous friends. 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. The milk, therefore, must be put aside, and the butter and the eggs. The experiment did not answer; the health of our pure vegetarian gave way under the ordeal, and 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. Amongst his earlier scientific readings was a book in defence of the vegetable regimen by John Frank Newton. This book is annotated by himself, 1833. It is an useful book, full of curious arguments, facts and suggestions, many of which, as his own after writings indicate, he had carefully studied and applied.

At or about the same time that he adopted his vegetarian views, he also took the extremity of view and of action, in reference to the temperance cause. He not only joined the ranks of the total abstinence reformers, but became a powerful advocate of their principles for many succeeding years. In the latter part of his life, he occasionally and by necessity took a little wine, but his views on the subject remained to the end unchanged; he had strong faith in the

temperance cause, and a belief that it must ultimately become an universal system.

In 1831-32, cholera visited Newcastle and its neighbourhood, and proved terribly fatal. In the emergency, Mr. Snow was sent by Mr. Hardcastle to the Killingworth Colliery, to attend the sufferers from the disease there. In this labour he was indefatigable, and his exertions were crowned with great success. He made also on this occasion many observations relating to this disease, which proved to him of immense account in after years.

He left Newcastle in 1833, and engaged himself as assistant to Mr. Watson of Burnop Field, near Newcastle. Here he resided for twelve months, fulfilling the assistant duties; regarding which it can only be said, and that from analogy, that they were neither without their anxiety nor their reward. Leaving Burnop Field in 1834-5, he revisited his native place, York; made a short stay, and thence, to a certain half-inaccessible village called Pately Bridge, in Yorkshire, to assist it with Mr. Warburton, surgeon there. Some few years ago a friend of mine went to the same village, by the recommendation of Dr. Snow, as assistant to the present Mr. Warburton of that place, a son of Dr. Snow's "old master". The circumstance of this recommendation often led Dr. Snow to refer to his life at Pately Bridge in our conversations. He invariably, on such occasions, spoke of Mr. Warburton, his "old master", in terms of sincere respect, and depicted his own life there with great liveliness. He was a vegetarian then, and his habits puzzled the housewives, shocked the cooks, and astonished the children. His culinary peculiarities were, however, attended to with great

kindliness. Eighteen months at Pately Bridge, with many rough rides, a fair share of night work, a good gleanings of experience, and this sojourn was over. Now back again went our student to York, to stay this time a few months, and—not to be idle—to take an active share in the formation of temperance societies. In leisure days during this period it was his grand amusement to make long walking explorations into the country. In these peregrinations he collected all kinds of information, geological, social, sanitary, and architectural.

At last York must be again left; the London student life was in view. In the summer of the year at which we have arrived, 1836, he set off from York to Liverpool, and, trudging it afoot from Liverpool through the whole of North and South Wales, turned London-ward, calling at Bath by the way, on a visit to his uncle, Mr. Empson, to whom, to the end of his life, he was devotedly attached. October 1836—eventful October—brought him to the “great city”, and placed him on the benches of the Hunterian School of Medicine in Windmill-street: a school long since closed, and now almost a myth; like the mill which gave the name to the locality.

I am indebted to the courtesy of Mr. Joshua Parsons of Beckington, near Bath, for an insight into the life and manners of my beloved friend during his student career. Mr. Parsons had the happiness to be the special fellow-student of Snow. Their friendship, cemented early in life, never declined, but had added to it, “on my part,” says Mr. Parsons, “respect and admiration for the solid talents and

industry of my old colleague.” Speaking of their common labours, Mr. Parsons writes as follows:

“Our acquaintance commenced in 1836, at the Hunterian School of Medicine in Windmill-street, where we were both dissecting at that time. 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. During that period Dr. Snow was, as a student, characterized by the same mental qualities which have marked him ever since. Not particularly quick of apprehension, or ready in invention, he yet always kept in the foreground by his indomitable perseverance and determination in following up whatever line of investigation was open to him. The object of this steady pursuit with him was always *truth*: the naked truth, for its own sake, was what he sought and loved. No consideration of honour or profit seemed to have power to bias his opinions on any subject. At the period of our co-residence he was a strict vegetarian, and many and great were the controversies held between us on the subject. These led to trials of our comparative strength and endurance, in one of which, on Easter Monday 1837, we walked to St. Alban’s, and back to town through Harrow,—a distance, I believe, of rather more than fifty miles. On reaching the Edgware Road, my companion was fairly beaten, and obliged to reach home in an omnibus. But though this, you will say, shows a fair amount of strength, yet it was my impression that my friend’s constitutional powers were impaired by his mode of

living, for I observed that he suffered from an amount of physical excitability not to be looked for in a man of his bodily powers and placid mental organization. I remember, on two or three occasions, so slight an injury as a cut of the finger with a dinner knife, or a graze of the skin, producing such an amount of fever, attended by so rapid a pulse, and so intense a flush upon the cheeks, that I once asked the opinion of an experienced medical friend about him, and was by that opinion alone restrained from summoning his uncle to his bedside. He also was subject to great drowsiness, so that he was obliged often to close his books, and retire to bed long before his inclination would have led him to do so."

In October 1837, Mr. Snow took out his hospital practice at the Westminster Hospital. On May 2nd, 1838, he passed his examination, and was entered duly as a member of the Royal College of Surgeons of England. He lived at this time at 11, Bateman's Buildings, Soho-square.

In July 1838, Mr. Thurnham having resigned his post of apothecary to the Westminster Hospital, Mr. Snow, with much promise of support from the medical staff, competed for the vacant post. He presented excellent testimonials from Mr. Hardcastle, Mr. James Allen of York, Dr. Conquest, Mr. W. B. Lynn, Surgeon to the Westminster Hospital, Mr. Anthony White, Sir Anthony Carlisle, Mr. Warburton, and Dr. Hunter Lane. His canvass was very satisfactory; but he was compelled to resign his claims from a cause which he did not expect. By the laws of the hospital, the office of apothecary could only be held by a member of the Apothecaries' Company. In those days the worshipful

Company were sometimes lenient in admitting students to examination. The leniency, however, clearly extended to those only who had friends at court. To render himself eligible, Mr. Snow addressed a very simple, earnest, and gentlemanly request to the Court of Examiners of the Apothecaries' Company, begging to be allowed to go up to his examination at the second court in July instead of the first in October, at which he was legally admissible. The request, under the circumstances, was not very great; but for some reason it met with refusal. After the refusal he addressed a second note to the Court, equal in tone with the first. In this note he urged the simple character of the request; he reminded the sapient body that they had allowed a similar extension of privilege to that asked by himself to others, and even for less important reasons. He explained that he had attended the practice of the Newcastle Infirmary; and promised that if he could be admitted, he would fulfil the required term of hospital curriculum rigidly. Lastly, he stated the expenses into which the canvass had led him, and once more prayed for leniency of the examiners, from "confidence in their kindness". The confidence was misplaced. The Blackfriars Shylocks demanded the pound of flesh; and our disappointed student, on the very eve of success, was compelled to relate his discomfiture in the following address:

"To the Governors of Westminster Hospital.

"My Lords, Ladies, and Gentlemen,

"I became a candidate for the vacant office of Apothecary to the Hospital a little before my term of study was completed, expecting that the Court of Examiners of the Apothecaries' Company would admit me for

examination in time for the election, knowing that they had granted a similar boon to my fellow-students on less important occasions. I have asked the favour of that Court with all due respect and ceremony, showing them that my course of study had already been twice as long as they require; and they have refused to examine me till my last item of study was completed according to their own peculiar curriculum, without stating any reason for their refusal. I must therefore necessarily resign, which I beg most respectfully to do, and to offer my sincere thanks to all those who have taken trouble in my behalf,"

On the first Court of October 1838, held on October 4th of that year, Mr. Snow met the Blackfriars Shylocks by legal right. They had not forgotten him, and gave him good proof of their remembrances. He passed, however, safe and sound; and, having the double qualification, laid himself out for the duties of a general practitioner in medicine in the great city.

At this time there existed in London a society (now sunken into the "Medical Society of London") called the "Westminster Medical Society." It was a society which had long given encouragement to those junior members of the medical profession who might wish for a hearing at its meetings and debates. Mr. Snow was not the man to lose an opportunity such as this. I have often heard him say, both privately and publicly, that, upon this early connexion with the "Westminster Medical," his continuance in London depended, and all his succeeding scientific success. When he first attended the meetings of the "Westminster Medical," he was very timid; and although he always spoke

to the point, found it difficult to obtain a favourable notice. At first, as he told me, nobody ever replied to what he said. After a long time some grave counsellor condescended to refer to him as the "last speaker". "In reference to an observation made by the last speaker, Mr. President, I could bring forward many practical objections; but I prefer to observe on the admirable, and, I have no hesitation in saying profound, remarks which Dr. Goldstick" (a very great gun, of course) "has done us the favour to lay before the society." A little later and somebody ventured to name the "last speaker" even by his name. Then some one, bolder still, concurred with Mr. Snow; and ultimately Mr. Snow became recognized more and more, until, as we shall see in the sequel, the presidential honours were his own.

Frith-street, Soho-square, No. 54, was the house at which Mr. Snow, to use his own words, first "nailed up his colours". He removed from Bateman's Buildings in the beginning of September 1838, and became, in Frith-street, the tenant of Mrs. Williamson, widow of Captain Williamson, known as the author of several works on India. He bought no practice, nor exhibited any pretence. Like mighty Columbus, his caravel was very insignificant when compared with the voyage on which he embarked, and through which he sailed so successfully. He did not find the voyage very smooth either at first. How could he? A man cast at large in the modern Babylon, with few introductions, no plethora of purse, and great purposes in hand, need never ignore the necessities from the idea of rising to the crest of the wave by three cheers and a long pull. Snow was too foreseeing to be ignorant of this, and he prepared accordingly. A more

thoroughly girded man for the world's encounter could hardly be conceived than he at this time. He took no wine nor strong drink; he lived simply of the simple, on anchorite's fare, with more than anchorite resolution, with the temptations of the world always before him; he clothed plainly, and made the best of everything; he kept no company, and found every amusement in his science books, his experiments, in his business, and in simple exercise.

To fill up time till the money patients should come, he became one of the visitors of the out-patients of Charing Cross Hospital; and to many a poor representative of the great half-starved, extended a skill which would have been a blessing to a duke. The Librarian of the College of Surgeons' Library knew him as a quiet man, who read closely, and was not too proud to ask for a translation when an original bothered him. All who knew him said he was a quiet man, very reserved and peculiar—a clever man at bottom perchance, but not easy to be understood and very peculiar.

The connection with the "Westminster Medical" led to Mr. Snow's first attempts at authorship. On October the 16th, 1841, he read at the Society a paper on "Asphyxia and on the Resuscitation of new-born Children." The paper in full will be found in the *London Medical Gazette* for November the 5th of the same year. The paper is remarkable for the soundness of its reasonings, and the advanced knowledge which it displays. The object of the paper was to introduce to the Society a double air-pump, for supporting artificial respiration, invented by a Mr. Read, of Regent Circus. The instrument was so devised that by one action of the piston, the air in the lungs could be drawn into one of the cylinders,

and by the reverse action, the said air could be driven away, and the lungs supplied with a stream of pure air from the second cylinder. There was also advanced, in the concluding part of the communication, a sentence or two on the cause of the first inspiration, which is well worthy of note. The cause of the first inspiration, he explained, is probably the same as the second or the last, viz., a sensation or impression arising from a want of oxygen in the system. So long as the placenta performs its functions, the foetus is perfectly at ease, and feels no need of respiration; but whenever this communication between the child and its mother is interrupted, at least in the later months of pregnancy, the child makes convulsive efforts at respiration similar to those made by a drowning animal.

On December the 18th, 1841, Mr. Snow was again before the "Westminster Medical" with a very ingenious instrument which he had invented for performing the operation of paracentesis of the thorax. The description of the instrument will be found in the *Medical Gazette* of January 28th, 1842.

In the *Medical Gazette* for November 11th, 1842, Mr. Snow published a note on a new mode for securing the removal of the placenta in cases of retention with hæmorrhage; and in the same journal for March 3rd, 1843, he communicated an essay on the circulation in the capillary vessels. The essay was selected and rearranged from papers read before the "Westminster Medical" on January 21 and February the 4th. We have in this essay an admirable sketch of the capillary circulation. He advanced, on this occasion, the idea that the force of the heart is not

alone sufficient to carry on the circulation, but that there is a force generated in the capillary system which assists the motion. He explained also the great importance of the cutaneous exhalation, and reasoned that in febrile states, accompanied with hot skin, the transpiration from the skin is in reality greater than is normal, and that the good effect of poultices and similar applications to inflamed skin is due to their influence in checking the transpiration from the affected part.

But what of practice during all this work at the purer science of medicine? The story to be told is an old one. Practice did not come, at least not from the wealthy. He had plenty of practice in so far as seeing patients was concerned certainly, for he was encumbered with four sick clubs; and his club practice, together with the out-patient work at the Charing Cross Hospital, kept the bell ringing all day, and not unfrequently enlivened the night with the clamorous music. But the patients with the fees in their hands kept at a respectful distance. Why? The answer gives another old story—because the practitioner at 54, Frith Street, Soho, was an earnest man, with not the least element of quackery in all his composition, with a retiring manner and a solid scepticism in relation to that routine malpractice which the people love. I have heard many reasons alleged for the want of success which attended Mr. Snow's first labours as a claimant on the public confidence. These reasons have all had one reading, in that they refer to every cause but the true one. The true cause was, that a young man having no personal introduction to the bedsides of dowagers of the pillmania dynasty, sought to establish his fame on the basis

of a sound and rational medicine—because impressed with the knowledge of the external origin of disease, he went in for the removal of external causes, and studied nature in preference to the Pharmacopœia.

Pushing on in the higher branches of his profession, and aiming always at the best, the degree of the University of London became a temptation, and *Mr.* became *Dr.* Snow on the 23rd of November, 1843, by passing the M.B. examination. He was enrolled in the second division on this occasion. On the 20th of December in the following year, he passed the M.D. examination, and came out in the first division of candidates.

The harass of London life by this time commenced to tell on Dr. Snow. He had suffered a few years previously from threatened symptoms of phthisis pulmonalis, but took plenty of fresh air, and recovered. He again became slowly unhinged for work, and in the summer of 1845, was attacked with acute and alarming symptoms of renal disorder. His friend and neighbour, Mr. Peter Marshall, then of Greek Street, now of Bedford Square, gave him his able assistance, and the advice of Dr. Prout, and, I believe, of Dr. Bright, was obtained. He was induced by their general opinion to change his mode of living, and even to take wine in small quantities. In the autumn of 1845, he paid a visit to his friend and old colleague, Mr. Joshua Parsons, at Beckington, with whom he stayed a fortnight, enjoying himself very much. The friends resumed their old controversies, and the Doctor admitted that he had been obliged to relinquish his vegetable diet in favour of a mixed regimen. He improved greatly, says Mr. Parsons, during his

stay; but it was obvious that London life and hard study had hold of him. From Beckington he went to the Isle of Wight, but soon returned to London and to his work. A little after this, he was elected Lecturer on Forensic Medicine at the Aldersgate School of Medicine, and held the appointment till the establishment dissolved in 1849. I have often heard from him, in his quiet droll way, many laughable stories in relation to his duties in the forensic chair. When he left off teaching, he found that, in addition to the labour implied and the cost of experiments, he had to pay, with the rest of his colleagues, a ransom for his release.

There is no night without its morning. The eventful medical year of 1846 proved the turn of tide season with our struggling Esculapian. In this year, the news came over from America that operations could be performed without pain under the influence of sulphuric ether.

The fact was just such an one as would at once attract the earnest attention of Dr. Snow. It was a physiological, as well as a practical fact. It was rational in its meaning, and marvellously humane in its application. The question once before him, was in a scientific sense his own. His previous experimental studies on respiration and asphyxia had prepared him for this new inquiry. He lost no time, therefore, in investigating the new fact; he took it up for its own sake, however, not from any thought, at the time, of a harvest of gold.

The first inhalations of ether in this country were not so successful as to astonish all the surgeons, or to recommend etherization as a common practice. The distrust arose from the manner in which the agent was administered. Dr. Snow

at once detected this circumstance; and, as he explains in the pages of the work now in the hands of the reader, remedied the mistake by making an improved inhaler. He next carried out many experiments on animals and on himself, and brought the administration to great perfection. One day, on coming out of one of the hospitals (I am giving the narrative as he gave it to me), he met Mr. — (a druggist whom he knew) bustling along with a large ether apparatus under his arm. “Good morning!” said Dr. Snow. “Good morning to you, doctor!” said the friend; “but, don’t detain me, I am giving ether here and there and everywhere, and am getting quite into an ether practice. Good morning, doctor!” “Good morning to you!” Rather peculiar! said the doctor to himself; rather peculiar, certainly! for the man has not the remotest chemical or physiological idea on the subject. An “ether practice! If he can get an ether practice, perchance some scraps of the same thing might fall to a scientific unfortunate.” Consequently, with his improved inhaler, Dr. Snow lost no time in asking to be allowed to give ether at St. George’s Hospital. He got permission to give it there to the out-patients, in cases of tooth-drawing. Dr. Fuller, of Manchester-square, standing by, was surprised to see with what happy effects ether was administered when administered properly. A day or two afterwards, an operation having to be performed, and the surgeon (I believe, Mr. Cutler) not approving of the ether in the way in which it had previously acted, Dr. Fuller remarked on the superiority of Dr. Snow’s mode of administering it; and the result was, that he was asked to give it on operating days.

He did so with great success. He administered it at University College with the same success. Liston, then the leading operator, struck with the new man who came before him in such an able and unaffected way, took him by the hand; and from that time the ether practice in London came almost exclusively to him. Science for once put assumption in its right place.

The new field once open, it were impossible but that he should cultivate it diligently. The Westminster Medical Society was often favoured with his communications and experiments on etherization; and in the September of 1847, he embodied, in his first work, the whole of his experience up to that time. The work was remarkable for the care with which it was written, the science which it displayed, and the complete mastery of the subject which it everywhere conveyed.

What had been a mere accidental discovery, I had almost said a lucky adventure, was turned by the touch of the master into a veritable science. The book was readily appreciated by the profession, and was just beginning to sell, when the discovery of the application of chloroform threw ether into the shade and the book with it.

Dr. Snow, though a man of great firmness when once his mind was made up, was always ready for new inquiry. Chloroform, therefore, was no sooner brought before the profession by Dr. Simpson, than he began to institute a series of independent researches, and having satisfied himself personally as to the effects and greater practicability of chloroform, he at once commenced its use, and forgot sooner almost than others all predilections for

ether. In 1848, he commenced a series of experimental papers on narcotic vapours in the *Medical Gazette*, and continued them until 1851, when the *Medical Gazette* virtually ceased to exist. The papers on narcotics, in accordance with his other and earlier productions, were stamped with the evidences of profound and careful research, and still more careful deduction. I infer that they have been more talked about than read, for few people seem to be aware of the enlarged and positive physiological arguments which they contain. Chloroform and ether are not alone discussed, but all narcotics. Narcotics are not alone considered, but various of the great functions of life. The records of a vast number and variety of experiments are here related, and an amount of information, original in kind, collected, which will always remain as a memorable record in the history of medical literature. But the great points in these papers are those in which the author enters on the physiological action of narcotics. Here appear the generalizations and insights into the relations of allied phenomena which mark the man of true power. His greatest deduction on these matters, and the proofs on which it is based, are to be found in his observations, where he explains that the action of the volatile narcotics is that of arresting or limiting those combinations between the oxygen of the arterial blood and the tissues of the body, which are essential to sensation, volition, and all the animal functions. He demonstrated that these substances modify and, in large quantities, arrest the animal functions in the same way, and by the same power as that by which they modify and arrest combustion, the slow oxidation of

phosphorus and other kinds of oxidation unconnected with the living body when they (the narcotics) are mixed with the atmospheric air.

In his modest way, he often spoke to me, with honest pride, on this observation. He himself thought it the best observation he had ever made, and believed that it would not be lost as an historical truth. Placing a taper, during one of our experiments, in a bottle through which chloroform vapour was diffused, and watching the declining flame, he once said, "There, now, is all that occurs in narcotism; but to submit the candle to the action of the narcotic without extinguishing it altogether, you must neither expose it to much vapour at once, nor subject it to the vapour too long; and this is all you can provide against in subjecting a man to the same influence. I could illustrate all the meaning of this great practical discovery of narcotism on a farthing candle, but I fear the experiment would be thought rather too commonplace."

The year of the world's fair in London, 1851, may be considered a fortunate one for Dr. Snow. His affairs had taken a new turn, and the tide was fairly in his favour. He had a positive holiday, physical and mental. The harass of the professional struggle was over, the world was opening its eyes to his intrinsic merits; old friends flocked around him, brought to the grand show in town, and all was well. He did but little this year, except to write a characteristic letter to Lord Campbell, who was pushing on a bill in the House of Lords, called the "Prevention of Offences Bill," in which a clause was introduced to prevent, by severe punishment, any attempt that might be made by any person to

administer chloroform or other stupifying drug for unlawful purposes. Dr. Snow, believing that Lord Campbell was actuated in introducing this clause by the fact of certain trials having recently occurred for the offence of using chloroform unlawfully, and being himself convinced that, in two of the cases (the one the case of a robbery in Thrale-street; the other, of a robbery attempted on London Bridge), the evidence against the prisoners, of attempting to produce insensibility by chloroform, was without any reason or possibility, he opposed the afore named clause in the bill on the ground that if it became law numerous frivolous and false charges would be constantly brought up against innocent people, or against guilty persons, but persons not guilty of the special charge laid against them, that, namely, of administering a volatile narcotic by inhalation. Knowing that weakness of human nature which leads a man, in the presence of all evidence, never to admit intoxication as possible in his own proper person, Dr. Snow felt that, in any case where an intoxicated person had been robbed, such person might allege that he had been made insensible by narcotic vapour. The two cases specially noticed in his letter admitted readily of such interpretation, and were clearly not cases in which chloroform had been administered. Lord Campbell, on the receipt of Dr. Snow's letter, referred to it in very complimentary terms in the Lords', but intimated that the reasoning of the letter did not alter his determination. The editor of the *Medical Gazette*, Dr. Alfred Taylor, opened fire on Dr. Snow; and for two or three weeks a sharp contest occurred between the two doctors; but the matter soon

rested, each author retaining his own opinions, and both agreeing to differ.

Dr. Snow's amiable but firm nature led him often to this ultimatum. Freedom of expression was a right he always claimed; but for this reason he extended the same privilege to others. He was never stirred into provocation by any difference of opinion. It was enough for him to form carefully his own opinions, and then to hold to what he had said, so long as he felt, from his internal convictions, that he was right.

In the year 1848, Dr. Snow, in the midst of his other occupations, turned his thoughts to the questions of the cause and propagation of cholera. He argued in his own mind that the poison of cholera must be a poison acting on the alimentary canal by being brought into direct contact with the alimentary mucous surface, and not by the inhalation of any effluvium. In all known diseases, so he reasoned, in which the blood is poisoned in the first instance, there are developed certain general symptoms, such as rigors, headache, and quickened pulse; and these symptoms all precede any local demonstration of disease. But in cholera this rule is broken; the symptoms are primarily seated in the alimentary canal, and all the after symptoms of a general kind are the results of the flux from the canal. His inference from this was, that the poison of cholera is taken direct into the canal by the mouth. This view led him to consider the mediums through which the poison is conveyed, and the nature of the poison itself. Several circumstances lent their aid in referring him to water as the chief, though not the only, medium, and to the

excreted matters from the patient already stricken with cholera, as the poison. He first broached these ideas to Drs. Garrod and Parkes, early in 1848; but feeling that his data were not sufficiently clear, he waited for several months, and having in 1849 obtained more reliable data, he published his views *in extenso* in a pamphlet entitled "The Mode of Communication of Cholera". During subsequent years, but specially during the great epidemic outbreak of the disease in London in 1854, intent to follow out his grand idea, he went systematically to his work. He laboured personally with untiring zeal. No one but those who knew him intimately can conceive how he laboured, at what cost, and at what risk. Wherever cholera was visitant, there was he in the midst. For the time, he laid aside as much as possible the emoluments of practice; and when even, by early rising and late taking rest, he found that all that might be learned was not, from the physical labour implied, within the grasp of one man, he paid for qualified labour. The result of his endeavours, in so far as scientific satisfaction is a realization, was truly realized, in the discovery of the statistical fact, that of 286 fatal attacks of cholera, in 1854, occurring in the south districts of the metropolis, where one water company, the Southwark and Vauxhall, supplied water charged with the London fæcal impurities, and another company, the Lambeth, supplied a pure water, the proportion of fatal cases to each 10,000 houses supplied by these waters, was to the Southwark and Vauxhall Company's water 71, to the Lambeth 5.

There was, however, another fact during this epidemic, which more than the rest drew attention to Dr. Snow's

labours and deductions. In the latter part of August 1854, a terrific outbreak of cholera commenced in and about the neighbourhood of Broad-street, Golden-square. Within two hundred and fifty yards of the spot where Cambridge-street joins Broad-street, there were upwards of five hundred fatal attacks of cholera in ten days. To investigate this fearful epidemic was at once the selfimposed task of Dr. Snow. On the evening of Thursday, the 7th of September, the vestrymen of St. James's were sitting in solemn consultation on the causes of the visitation. They might well be solemn, for such a panic possibly never existed in London since the days of the great plague. People fled from their homes as from instant death, leaving behind them, in their haste, all the mere matter which before they valued most. While, then, the vestrymen 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 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. There arose hereupon much discussion amongst the learned, much sneering and jeering even; for the pump-handle removal was a fact too great for the abstruse science men who wanted to discover the cause of a great natural phenomenon in some overwhelming scientific problem. But it matters little. Men with great thoughts in their heads,

think of little things which little men cover with their wide-spread feet. It matters little, for the plague was stayed; and whoever will now read dispassionately the report of a committee, afterwards published by the vestry, and the demonstrative evidence of the Rev. Mr. Whitehead, will find that the labours and suggestion of Dr. Snow, in reference to the Broad-street epidemic of cholera, must become each day better and better appreciated, as time, which never yet told a lie, tells the tale and points the moral of the event which is here so imperfectly described. Some who, at first, were amongst those who held up the labours of our friend to ridicule, or passed them over in contemptuous silence, have, indeed, since modified their opinions, and have either tacitly accepted his facts, or have done far worse by attempting to put them forward as though they were the work of no single man, or of some one unknown, or as though their connection with a theory destroyed the originality of the facts themselves. It was my privilege, during the life of Dr. Snow, to stand on his side. It is now my duty, in his death, as a biographer who feels that his work will not be lost, to claim for him not only the entire originality of the theory of the communication of cholera by the direct introduction of the excreted cholera poison into the alimentary system; but, independently of that theory, the entire originality of the discovery of a connection between impure water supply and choleraic disease. The whole of his inquiries in regard to cholera were published in 1855, in the second edition of his work on the "Mode of Communication of Cholera"—a work in the preparation and