JOHN SNOW, PIONEER SPECIALIST-ANÆSTHETIST
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The history of the development of anæsthesia is a complicated subject, and despite the fact that recently much has been written on various aspects of its progress during the past hundred years, the early period remains shrouded in mystery. The rival claims of the early workers in the field each have their respective supporters, and fresh evidence, while contributing to our knowledge, has occasionally clouded rather than clarified the picture. The contributions by Barbara M. Duncan1 and by Thomas E. Keys2 present complete histories of the subject, with numerous figures claming for priority in various phases of the development of anæsthesia. The fact remains that there is honour enough for all, and that each was making his contribution, however small, to the progress of the most important discovery in the history of medicine. Certain persons desired to exploit the discovery for personal gain; others applied the knowledge rashly; but at least one realising the value of anæsthesia in surgery, but appreciating its dangers and shortcomings, decided to investigate in a scientific manner its possibilities. That man was John Snow, whose contributions during the early days of anæsthesia have been recognised as those of a pioneer, upright in character, a staunch scientist, and a man whose name is unsullied by the doubts and distrust caused by vain controversy over questions of priority.

John Snow was born at York on 15th June, 1813, the son of a farmer, and at the age of fourteen was apprenticed to William Hardcastle, a surgeon of Newcastle-on-Tyne. During the cholera epidemic of 1831–32 Snow was sent by his master to attend sufferers at Killingworth Colliery, and it was here that he gained first-hand knowledge of the disease, to the eradication of which he was later to contribute. John Snow came to London in 1836, and in October of that year was studying at the Great Windmill Street School of Medicine, which had acquired fame from its connection with the Hunters. The following year Snow attended Westminster Hospital, and in May, 1838, was qualified as a member of the Royal College of Surgeons of England. It is of interest to record that his additional medical qualifications included the licentiate of the Society of Apothecaries (October, 1838), M.B., London (1843), M.D., London (December, 1844), and licentiate of the Royal College of Physicians (1850).

Soon after qualification John Snow set up in private practice, but he attracted few patients. He had been threatened with tuberculosi of the lungs, and in 1845 suffered from renal disease. In 1841 he had read his first medical paper to the Westminster Medical Society, entitled "On Asphyxia, and on the resuscitation of still-born infants." Snow's tombstone4 and Sir D'ArCY Power5 give the month as March, but Richard- son6 consistently gives June. An extensive search has so far failed to settle the question beyond doubt. 120
children" (Lond. Med. Gaz., 1841–2, pp. 222–227). This indicated his scientific trend of mind, which was obviously intended for research rather than the application of ideas formulated by others. In 1846 anaesthesia was first used in the United States to produce insensibility to pain during surgical operations, and it was quickly introduced into England. The methods of administration left much to be desired, as might be expected during the early stages of development.

Fig. 1.—Portrait of John Snow

taken in 1856.

One morning John Snow met a druggist with whom he was ac-
quainted, carrying a large ether apparatus under his arm. Pleading
great hurry, the man explained that he was "getting quite into an
ether practice." Snow thought it rather peculiar that a man with
no knowledge of physiology and chemistry should be able to make a
living administering anaesthetics, and decided to specialise in that
subject. He conducted numerous experiments on animals and upon
himself, inventing an improved inhaler. With this he first ad-
ministered ether for dental operations at St George's Hospital,
and then at University College, where he attracted the attention of
Robert Liston, then the foremost surgeon in London. Liston was
much gratified by the difference between the result of anaesthesia as
administered by Snow, and that of less cautious anaesthetists, and
with Liston's patronage Snow was soon recognised as the premier
anaesthetist in London.
John Snow published the results of his experience with ether as
On the inhalation of the vapour of ether in surgical operations: con-
taining a description of the various stages of etherisation and a statement
of the result of nearly eighty operations in which ether has been em-
ployed in St. George's and University College Hospitals, London,
1847. Before it reached a wide public, Simpson introduced
chloroform as a new anaesthetic. Snow, always ready to try new
materials in his search for a perfect anaesthetic, turned to chloroform,
although he crossed swords with Sir James Young Simpson over his
method of administration, which consisted of sprinkling the material
upon a cloth.

Snow's Ether Inhaler as used at St. George's Hospital was designed
so that "ether vapour was inhaled by the patient through a mouth-
tube fitted with cedarwood ball valves. Air was admitted to the
vapour at one side of the apparatus and drawn over and round the
spiral chamber depicted." He now adapted this as a Chloroform
Inhaler, which consisted of an outer metal cylinder for cold water
surrounding an inner cylinder pitted with numerous air-holes and
containing two coils of ribulous paper. Air-slots were cut in the
paper and sufficient chloroform only to permit clear passage were
poured in. The facepiece was of leather or sheet-lead, with inspira-
tory and expiratory valves."
Snow stressed that the administrator should have control over the concentration of the anaesthetic in the mixture administered to the patient, and his new inhaler was regulated to deliver a maximum of \( \frac{1}{2} \) chloroform vapour in the inhaled air. There were many deaths due to chloroform, and Snow wrote several articles investigating the cause of these. On 7th April, 1853, he administered chloroform to Queen Victoria at the birth of Prince Leopold, but according to Richardson, Snow did not use his inhaler on this occasion, but employed a handkerchief. Four years later, on 14th April, 1857, he officiated in a similar capacity at the birth of Princess Beatrice.

John Snow has been hailed as an epidemiologist for his work in connection with cholera, in which he had first interested himself during the epidemic of 1831-32. In 1849 he advanced the theory that cholera is water-borne, in a slender booklet entitled On the mode of communication of cholera. A second, greatly enlarged edition appeared in 1855, following a severe epidemic of cholera in London during the previous year, a German translation by A. P. W. Ausmann being published in 1856. Snow investigated the London outbreak, paying particular attention to the mortality figures and the water supply of the infected area. He advocated the removal of the pump-handle in Broad Street, and the cholera epidemic subsided. Snow wrote numerous papers on public health, including On continuous molecular changes, more particularly in their relation to epidemic diseases [etc.], 1853, which, with the second edition of his other book on the subject, has been reprinted in the United States by the Commonwealth Fund as Snow on Cholera... With an introduction by Wade Hampton Fox, New York, London, 1936. His other important work on cholera was Cholera and the water supply in the south district of London, reprinted from the Journal of Public Health for 1856.

In 1855, John Snow was President of the Medical Society of London, and he also was a member of the Royal Medical and Chirurgical Society, the Pathological Society, the Epidemiological Society, and of the British Medical Association. Until 1839 he had lectured on forensic medicine at the Aldersgate School of Medicine, and was always ready to discuss problems with those interested. Despite an extensive practice, he never made more than £1,000 a year, and spent much of his income on conducting experiments, and furthering his ideas.

Snow was never satisfied with the anaesthetics employed, but was constantly experimenting with new agents and with various methods of administration. In 1856 he heard of amylene which had been discovered by Ballard two years previously, and Snow tested it on himself before using it in his practice. He employed it with success until his 144th case which succumbed in April, 1857, and another fatality (his 23rd case) occurred in the following July.
Although anylene was used widely on the Continent, and these two deaths appear to be the only recorded fatalities, the use of this agent was largely discontinued because the deaths had occurred in patients to whom John Snow had administered the anaesthetic.

Snow first described the phenomenon of intercostal paralysis in 1858,12 and in the same year employed endotracheal anaesthesia in an animal: "John Snow . . . apparently was the first to produce endotracheal anaesthesia in an animal. He performed trachectomy on a rabbit and into the resultant opening he inserted a wide-bore tube. The animal was made to breathe through this tube and into and out of a bag filled with the vapor of chloroform."

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Soon after qualification John Snow had suffered from ill-health, possibly contributed to by the peculiar ideas on diet that he put into practice, and it is obvious that his frequent experiments upon himself had an adverse effect upon his constitution. He was the first to carry out experiments on the physiology of anaesthesia, and did not spare himself in investigating every possible substance that might be employed as an anaesthetic. While nearing the completion of his greater contribution to the literature of anaesthesia, John Snow suffered a slight stroke, and a few days later, on 16th June, 1858, his full life was brought to an untimely end, as he was completing the final paragraph.13 His mother survived him, and was
still living at York, his birthplace. Snow was buried at Brompton Cemetery, and over his earthly remains, friends erected a suitable monument, which is now in need of renovation. 1

Snow's great friend Sir Benjamin Ward Richardson prepared a memoir of the pioneer anaesthetist, which he appended to the book on chloroform. This appeared in 1858 as On chloroform and other anaesthetics: their action and administration [etc.], and represents Snow's summary of the development of anaesthesia, and of the state of knowledge of the subject at that time. The book is now rare, but it is a fitting memorial to the achievements of John Snow, and represents an important landmark in the history of anaesthesia. Richardson's memoir was later reproduced in The Asclepiad, 11 and later biographies are largely dependent upon this material. 1 2 3 4 5 6 7 8 9 10 11 12

REFERENCES

Duncan, R. M. (1947), The development of intubation anaesthesia, with special reference to the years 1866-1900, London, etc.

John Snow's grave (1855), Anesthesia, T. 48 (Chromolith. 48).


Kemp, T. E. (1845), op. cit., 66.


Piper, Sir D.'s Ave. (1898), In Dictionary of National Biography, 33, 207.


Snow, J. (1858), On chloroform and other anaesthetics [etc.], 42.


SELECT LIST OF JOHN SNOW'S WRITINGS ON ANAESTHESIA

1847 A lecture on the inhalation of vapour of ether in surgical operations. Delivered at the United Service Institution, and addressed to the medical members of the Institution, on May 12th, 1847. Lancet, 1847, I, pp. 551-554.


On the inhalation of the vapour is surgical operations: containing a description of the various stages of anesthesia and a statement of the result of nearly eighty operations in which ether has been employed in St. George's and University College Hospitals, London, 1847.


Remarks on the fatal case of inhalation of chloroform, including additional explanations from Dr. Maginn. London Med. Gaz., 41, 1848, pp. 277-278.


A series of papers from May 18th, 1848, to April 11th, 1851, which were issued at reprints in two parts; Parts 1-7, London, 1848; Parts 8-16, London, 1851.

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On chloroform and other anaesthetics; their written and administration. *Lancet*, 1858, pp. 60-62, 82-84.

1858


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