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THE MONROS OF EDINBURGH

AND THE ORIGINS OF AMERICAN MEDICAL SCHOOLS

Notes to accompany an exhibit at the
National Library of Medicine
December 1957 - January 1958

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Catalog Division

Washington, D. C.
1957-1958

In colonial times and in the early days of the American republic, men of medicine in great numbers went abroad for their formal training. Many of these students attended the University of Edinburgh, where the young and flourishing school of medicine enjoyed enormous prestige throughout the 18th century.

The men who were the founders of medical schools on these shores, William Shippen, John Morgan, and Samuel Bard, were men whose stature was heightened by the fact that they had been Edinburgh students.

Not a little of Edinburgh's prestige derived from the faculty, among them Alexander Monro primus and his son Alexander Monro secundus. These men in turn derived considerable prestige from their association with the brilliant faculty of the University of Leyden.

The purpose of this exhibit is to show how intimate were the connections between the Philadelphia Medical School and the medical school at King's College (Columbia University) and the universities of Leyden and Edinburgh, and also to make clear the role of the Monros of Edinburgh.

During an unbroken period of 126 years, three generations of Monros (Alexander Monro primus, 1697-1767, Alexander Monro secundus, 1733-1817, and Alexander Monro tertius, 1773-1859) held the chair of anatomy and surgery at the University of Edinburgh, transmitting to their students from the new world the teachings of Europe's great clinicians and anatomists.

Their influence transcended mere person-to-person contact. Monro primus, as virtual father of the Edinburgh school of medicine, established a pattern unique among British institutions, that of a complete medical faculty associated with a university. This plan, as opposed to the English system of private lectures and hospital schools, was carried over from Leyden, where Monro primus had been Hermann Boerhaave's pupil, on to the United States, where the first two medical schools were set up under Philadelphia College and King's College respectively.

It was no accident that Monro primus should have played his particular role. His father, John Monro, had been a student at Leyden and had long cherished the scheme of founding a medical school in his home city of Edinburgh, patterned on the Leyden model.

John Monro had often discussed the matter with his friend Archibald Pitcairne, who had lectured at Leyden during Monro's student days. They appear to have agreed that the best plan to follow was to prepare the ground in Edinburgh, as it were, at the same time seeing to it that a young and superbly trained potential professor would be at hand when the propitious moment arrived.

The task of establishing anatomical teaching as respectable and worthy of the dignity of association with the university was not a small one. Anatomy was a subject generally viewed with deep suspicion by a populace that thought in terms of grave-snatching. In Edinburgh, as early as 1505, the Guild of Surgeons and Barbers had been granted the privilege of dissecting once a year "ane condampnit man efter he be deid."

One yearly dissection had to suffice for the instruction of all the surgeons' apprentices of the city. James Borthwick and his colleague David Kennedy taught anatomy in this meager fashion in "three roomes of ane tenement of land in Dikson Close."

Later (1697) the Corporation of Surgeons constructed an anatomical theatre within its own hall. It was here that Robert Elliott performed as "public dissector." Elliott is sometimes mentioned as the first professor of anatomy in the University of Edinburgh. Actually he had no title and was paid for his demonstrations by the Town Council. Other public dissectors were John M'Gill and Adam Drummond. These were the immediate predecessors of Alexander Monro primus.

Monro primus was, as noted above, specifically groomed for his work by his ambitious father, who sent him to study at three great centers of learning, London, Paris, and especially Leyden.

In London Monro primus worked with the many-faceted Cheselden, in his own words, "assiduously dissecting human bodies, of which he was furnished with more than, with utmost application, he could make use of." (This was an unusual situation in a day when all anatomists were suspect, and special city ordinances were passed to stop the activities of grave-snatchers. Monro later in Edinburgh was obliged to get along with almost no cadavers.)

Under Cheselden, Monro made the first of his well known dissections, sending the preparations home, where his father made them the nucleus of the anatomical collection of Edinburgh, at the same time building up a reputation for his son.

The London period was fruitful in many ways. Monro's work on bones, which so greatly enhanced the reputation of the Edinburgh medical school, was an outgrowth of a series of "mutual improvement lectures" sponsored by Cheselden for his pupils.

Cheselden was impressed by Monro's work, and added his sketches of nerves and of the thoracic duct to his own Anatomy, which was a classic textbook for almost a century.

In Paris, Monro primus continued his anatomical studies under Bourquet, attended botanical lectures at the Jardin du Roy, and practiced surgery at l'Hôtel Dieu.

It was the University of Leyden, however, which played the greatest part in Monro primus' development, and consequently in the practices of the Edinburgh medical school, and subsequently in those of the first medical schools in this country. It was here that he came under the influence of Hermann Boerhaave and Frederic Ruysch.

Boerhaave, who was at the zenith of his fame, accepted Monro primus as a special protegé. Boerhaave was a man of extraordinary charm, with the ability to infect all his students with enthusiasm. His practice of bedside instruction was carried to many parts of the world. So great was Boerhaave's fame that an Arabic translation of his aphorisms, which begins with the customary praise of Allah the merciful and of Mohammed, king of the two worlds, continues on the same page with extravagant praise of Boerhaave himself.

Benjamin Rush was one day to write, "The system of Dr. Boerhaave governed the practice of every physician in Philadelphia." The fact is surely to be attributed to the intimate contact between Boerhaave and his pupil Monro primus.

Through Boerhaave, Monro primus came to know Frederic Ruysch the anatomist who, according to Monro's own account, "Shewed his preparations with more than ordinary Complaisance."

Ruysch had made a number of large anatomical collections, "the most magnificent that any private individual ever accumulated." A contemporary print of the Leyden anatomical theatre shows skeletons ranged about the enclosure bearing mortuary banners: such skeletons and inscriptions were characteristic of the Ruysch collections, one of which was sold to Peter the Great. Ruysch's macabre arrangement of specimens does not disguise the skill of the anatomist. He was one of the first to use injection techniques successfully.

When Monro primus returned to Edinburgh (1720) the stage was set. His lectures took place in Surgeons' Hall, but mob violence connected with unfounded rumors of grave-snatching made it evident to everyone concerned that the protection of the university was required. This was the actual beginning of the medical school, and was in line with the Monro plan to set up an institution similar to Leyden's.

In a short time (1726) Monro primus was joined by four able colleagues, all Boerhaave students. These men constituted a genuine medical faculty. Alexander Sinclair lectured on physiology, using as his text Boerhaave's Institutiones medicae. Andrew Plummer taught pharmacy. (His name is preserved in Plummer's pill, the ingredients of which are antimony and mercury). The third member of the new faculty was John Innes. The last was John Rutherford, who, together with Monro primus, was instrumental

in the establishment of the Royal Infirmary of Edinburgh. Rutherford was the first to deliver clinical lectures there, and Monro daily made the rounds of the wards, as he had seen Boerhaave do at Leyden.

Monro primus was an extraordinarily active man. He prepared a number of textbooks, among them, An anatomical treatise of the nerves, and An essay on comparative anatomy. He also wrote innumerable articles for the Medical essays and observations, which he edited, with the idea of preserving the clinical experience gleaned at the Infirmary. This journal also contains an "abstracting service" initiated by Monro in imitation of Leyden's.

Meanwhile the stream of students from the American colonies steadily increased in volume. There were no medical schools here, and most students received their training as assistants to practicing physicians. To round out this informal education, those who could afford it went abroad for a year or two. John Redman's notes of "a course of public lectures in anatomy taken from him (Monro primus) during the time of lecturing," 1746, shows how close was the web connecting American students with Edinburgh and Leyden. Redman was a Leyden M.D., and after his studies in Edinburgh he returned to Philadelphia, where he was the medical preceptor of Benjamin Rush and John Morgan before they themselves set off for Edinburgh.

The Monros were ambitious not only for their young medical school but also for themselves. Just as Monro primus had been trained for his role, his son Alexander Monro secundus was groomed carefully to succeed his father. The fact that he was given the best available education further enriches the American heritage.

Monro secundus received his basic instruction in Edinburgh, taking his M.D. degree there in 1755. Next he was sent to London, where he studied with his father's illustrious pupil, William Hunter.

From London he went to Berlin, working and living with Johann Friedrich Meckel the elder, learning from him the newest methods of anatomical research, particularly the use of the microscope. Monro secundus never failed to mention his debt to Meckel in his lectures.

While in Berlin, Monro published a thesis, De venis lymphaticis valoribus. Later he became involved in a controversy with Hunter, insisting that his thesis gave him priority in the description of the lymphatics. It is an unfortunate fact that most of Monro secundus' early papers center on controversies of this nature. One of his claims (against Hewson) seems to be substantiated: apparently he was first to propose paracentesis of the thorax.

From Berlin, secundus proceeded to Leyden, where his teacher and intimate friend was Boerhaave's pupil, Albinus. He also formed a lasting friendship in Leyden with still another great anatomist, Pieter Camper.

Returning to Edinburgh in 1758, Monro secundus resumed lecturing at the University. He had begun to assist his father during his student days at Edinburgh, and had been appointed assistant professor of anatomy and surgery when he was only 22 years old.

He was to give a full course of lectures from 1759 to 1800. Whereas his father seems primarily to have been a founder and organizer, secundus was a brilliant anatomist and an exciting lecturer. The staggering total of 14,000 students taught by father and son must largely be credited to the son.

A term familiar to all medical students is "the foramen of Monro." This was first described in the Observations on the structure and functions of the nervous system, 1783, and illustrated in his Treatise on the brain, the eye and the ear, 1797. Monro's other works include A description of all the bursae mucosae of the human body, 1788, and Observations of the muscles, 1794. Work of a peculiarly modern nature involving the effect of drugs is described in his Experiments on the nervous system with opium and metalline substances, 1793.

Like his father, secundus paid detailed attention to the problems of comparative anatomy. A work studied with care by his students was his The structure and physiology of fishes explained and compared with those of man and other animals, 1785.

The Monro influence in Edinburgh ended abruptly with the death of Monro secundus (1817). Alexander Monro tertius, the successor of secundus, was an unimaginative man whose work was almost entirely derivative. His doctoral dissertation, De dysphagia, is interesting only because it describes his father's invention, the stomach tube. (This invention is sometimes attributed to Philip Syng Physick, who was first to use the device in America.) Monro tertius inherited the chair of anatomy and surgery from his father and held it for thirty years, stubbornly reading his predecessors' notes, not even troubling himself to delete or edit such openings as "When I was a student in Leyden in 1719..." Bored students pelted him with dried beans, and Charles Darwin complained that Professor Monro was as dull as his lectures.

A grizzly side-light on the grave-snatching activities of the time is the fact that the infamous "sack-'em-up"man, Burke, was sentenced to be publicly dissected after his execution. The dissector was Monro tertius: Burke's skeleton is today part of the Edinburgh anatomical collection.

The Monro influence remained strong in America, where even the first independent teacher of anatomy, before the formal establishment of any medical school, was a student of Monro primus. This was William Hunter, 1720-1777, who delivered lectures on anatomy in Newport, Rhode Island in 1754.

The real beginning of medical schools in this country took place in Philadelphia, where William Shippen, returning from his studies abroad, gave private lectures on anatomy and midwifery in 1762, illustrating his instruction by means of gypsum casts and crayons which John Fothergill (who had been induced to study medicine by Monro primus, and who had assisted him with the 4th edition of his great work on bones) had given to Pennsylvania Hospital.

It appears that while Shippen and John Morgan were in Edinburgh they discussed the possibility of opening a school in Philadelphia. They seem to have talked over the project with Fothergill, whose letter presenting the collection of casts and crayons indicated that he was aware of such a scheme and wanted to take an active part in it.

John Morgan while in Europe had a plan for a medical school foremost in his thoughts, and to him must go the credit for the organization of the school at Philadelphia College. While in Paris in 1764 he wrote his Discourse upon the institution of medical schools in America, A brilliantly thought-out argument which he subsequently delivered as a commencement address at Philadelphia College in 1765. He had been appointed professor of theory and practice of physic just three weeks before the commencement ceremony. In his discourse, Morgan cited Edinburgh as an example of the "united efforts of men learned in their professions." Even today the thistle of Scotland is emblazoned over the entrance of the Philadelphia institution.

Shippen was appointed professor of anatomy in September 1765, and two more Monro students, Benjamin Rush and Adam Kuhn rounded out the first complete medical faculty in the colonies.

The immediate successors of this illustrious group had also been Monro pupils. Philip Syng Physick, the father of American surgery was an Edinburgh graduate. Caspar Wistar, who taught anatomy from 1791 to 1818, was also an Edinburgh graduate, although he reversed the trend by taking a medical doctorate first in Philadelphia (1782) and then in Edinburgh (1786).

The Philadelphia example was followed in New York in 1768, when the Monro student Samuel Bard started a similar faculty under King's College. This faculty was short-lived, but it was the immediate fore-

runner of the College of Physicians and Surgeons of the University of New York, and it had the distinction of awarding the first doctorate in medicine in America.

Bard's associates at King's College included two Edinburgh students, notably the military surgeon John Jones, whose Plain concise practical remarks on the treatment of wounds and fractures, 1776, written for the physicians of the Revolutionary army, was the first book of its kind to be published in this country.

Other members of the New York faculty included Samuel Clossy and Peter Middleton (Edinburgh student) who together with Dr. Bard made dissections for use in anatomical instruction. The injected preparations which they made were the first in this country. Presumably they learned the technique from the Monros, who in turn had learned the technique from Ruysch of Leyden.

Short-lived the King's College medical faculty may have been, but its existence helped to establish the pattern for today's medical schools in this country. American medical schools owe their structure to Leyden, to Edinburgh, to the Monros.