

SOME PERSPECTIVES OF THE CULTURAL IMPACT OF EUROPEAN
MEDICAL SCIENCES ON THE DEVELOPMENT OF SCIENTIFIC
MEDICINE IN INDIA

ASHISH K. BASU*

Psychiatry Unit, N.R.S. Medical College Hospitals, Calcutta 700 014

The status of European Medical sciences in the 18th-19th century was imbued with the spirit of Enlightenment where we find Reason wins with philosophical logic, a search for renewed happiness; spirited scientificism, love of mankind by the people in power. This mental framework preceded the onset of the French Revolution and liberalism in the eighteenth century France. After Fontenelle, Voltaire urged for an active participation of the people by denouncing traditional beliefs and diffusion of the new knowledge acquired of the world. The important scientific publication was the Encyclopedia which was published in 22 volumes between 1751 and 1777 under the editorship of Diderot. The political revolution came in 1789 where a physician Marat played an important part and Dr. Louis and Dr. Guillotin gave posterity his notorious blade of 'mercy'. Lamarck (1744-1829) according to the French tradition evolved zoological philosophy and so also Laplace about his views of the Solar System. The development of progressive ideas in England paralleled that of France putting forth the ideas of Erasmus Darwin (1731-1802) on the theory of organic evolution, David Hartely, a physician had then great influence on the Birmingham Lunar Society, influencing Priestly on his monographs *Observations on Man* and *The first principles of Government* published in 1771. Erasmus Darwin published his *Zoonomia* in 1794. In Scotland the Philosophical Society of Edinburgh was established in 1732. In it were Hume (1711-76), Adam Smith (1723-90), Joseph Black (1728-97) Professor of Medicine, and James Hutton (1726-97) the geologist.

Scientific progress seems to have been slow in the first half of the 18th Century. It probably reflects the national preoccupations of that period. England was then under the spur of the Industrial Revolution while France was in its way of socio-political revolution. Probably this made the scientists of the former country more of experimentalists and the latter theoreticians. The overseas trading companies and merchants of England then helped much for progress of science in the early period. We must not forget the founding of the Gresham College by the East India Company at London in 1600; for it was an important centre of scientific activity in the 17th-18th Century. In the later period we find the name of Robert Boyle who had been a Director of the East India Company. Switzerland was an important centre of science in the

*Address for correspondence : 22 Mandeville Gardens, Suite No. W-1, Calcutta 700 019

18th century due to the aggregation of Protestant scientists and so also Sweden for its novel iron production in this century.

One of the famous medical systems current during the period was the school of Animism of Hoffmann and George Stahl. The other system in vogue was of vitalism propounded by Borden, Barthez, Pinnel, Cullen of Scotland which was opposed by John Brown, his countryman, by the principle of *contrari contraiis*. Herman Boerhaave the "Batavian Hippocrates" was a great physician who taught almost half of the physicians of Europe. Then came the *anatomia animata* of Morgagni in five volumes, wherein the author showed that every disease had its location in a particular organ. Freidrich Wolf showed that organs were not performed but progressively became differentiated. The heritage of Leiden went to the old Vienna School founded by Swieten and then Haen. It then settled to the Edinburgh and English Schools. Paediatrics advanced after the writings of Rousseau and public health under Frank. In psychiatry Pinnel freed mental patients from their fetters at Paris and also expoused the Linnean type of classification of diseases. During this period phlebotomy came to a degeneracy, and surgery became the art of surgeons rather than barbers. During this period Anton Mesmer, inventor of Mesmerism, held his sway over his hysterics by his 'magnetic fluid of the universe'. The German Hahneman during this period invents homeopathy. Quacks and charlatans also flourished during this period as the famous Casanova, Comte de St. Germain and James Graham who invented the electrical 'celestial bed' for the love-torn couples.

Severe epidemics scourged Europe during this period—small pox killing almost sixty million people. But soon came the village doctor Edward Jenner, with his successful vaccination as a preventive measure. In the United States life was settling down and physicians went for their medical training to Holland or England. The Enlightenment Encyclopedism was now on its wane, and the German Romanticism was to usher in the naturalism, in the first half of the 19th Century.

The 19th Century is remarkable by its more radical changes than had been in the previous hundred years. It lacked homogeneity, there was revolution of thought, social mores, political values and technological innovations. In medicine there was a wide gulf between the enormous blood letting of the early decades to the application of anaesthesia and asepsis in this period. This era is remarkable by the advent of social philosophers like Hegel and later on Marx-Engels and Prudhon. France's Comte and England's Spencer brought in the school of positivism. But the most revolutionary thinker of the century was Charles Darwin (1809-1882) by his theory, on the origin of species. England's Faraday discovered electromagnetic induction and the first incandescent electric lamp brought out by America's Edison. The current of thought in the second half of the 19th century is of optimism and progress. People saw that they were becoming more economically stable, science was progressing, technology expanding and alongwith it, they were approaching to more stable political and social forms. In medicine it was Bichat of France (1771-1802) who found that

the body was not only an association of organs but of membranes and tissues. The tissue was the morphological and physiological unit. This has led to Virchow's cellular theory some decades later, exploding the 2000 year old humoral theory. Cajal (1852-1934) and Golgi (1843-1926) shared the Nobel Prize for histological study of the nervous system. The giant of this era was Claude Bernard of France (1813-1878) who laid the foundation of modern physiology. His teacher Magendie (1783-1855) regarded medicine as a science on the making (*une science a faire*). In Germany his counterpart was Muller (1801-1858). He contributed greatly to the understanding of nerve structure and energy. Another giant of this era is Ivan P. Pavlov (1849-1936) of Russia who propounded the immortal theory of conditioned reflex. Another great, in physiology to be mentioned is the versatile, Helmholtz (1821-1894) a pupil of Muller. In 1781-1826 Laenec improvised his first stethoscope the symbol of physicians. Rokitansky during this period became famous in Vienna in pathological anatomy. England and Dublin during this period became famous by their nosological acumen by Parkinson (1755-1824), Richard Bright (1789-1858), Queen Victoria's physician, Addison (1793-1860) and Hodgkin (1798-1866). Ireland then had its good physicians in Stokes (1804-1878), Robert Groves (1796-1853), Corrigan (1802-1880) and Colles (1773-1843) father of the law of fracture bearing his name. Another important clinician of this era was Skoda (1805-1881) who stressed on the importance of observable physical phenomenon for diagnosis. The weakness of this phase in clinical medicine is the contentment of the clinicians after diagnosis followed by 'therapeutic nihilism.' Obstetrics and Gynaecology made advances. Samuelweis (1818-1865) reduced maternal mortality by his calcium chloride washes. Simpson applied chloroform to Queen Victoria, as an anaesthetic during delivery. The Scotsman Joseph Lister applied antiseptics in surgery with carbolic acid which made surgery more physiological and less heroic. Britain outstripped France in clinical acumen but France gave its great bacteriologist in the chemist Louis Pasteur. Linked with him are the names Koch the discoverer of tubercle bacilli, Von Behring master of toxins and anti toxins, Ferrain and his vaccines.

Drug treatment in this period was enriched by the advent of chemo-therapeutic agents, Paul Ehrlich of Germany introducing his anti-syphilitic arsenical "magic bullets", the predecessors of which were Paracelsus' non-galenic heavy metals. Medicine thus became more physiopathological and physiochemical in its form and content. In America too we see the advent of notable physicians as Rush, Drake, Beaumont, Oliver Wendel Homes, Mitchell and the great humanist—Physician in Sir William Osler.

In the latter half of the 19th century medicine ceased to be European but became more national, assuring, vernacular, unlike the 18th which was European in nature.

In contrast to the social and scientific achievements in Europe as portrayed above, a bird's eye view of the socio-political situation and scientific achievements, of the 18th-19th Century India needs evaluation. India in the 18th century had a feudal

economy in a multistructural society, where different forms of economic organisation of crafts were found besides agriculture. Many towns and settlements grew up with capitalist relations and domestic industry. There were ore mining—iron and steel production in Mysore and Bihar, saltpetre, indigo, sugar manufacturers in Bengal so also cotton and silk manufacturers in different parts of India. Vis-a-vis was the colonial structure in the trading station economies of the European trading companies. Marx had called this peculiar economic situation of this century, as the “national mode of production” which distinguishes India from Russia and many West European countries. The gradual colonial quest caused the destruction of local production, pumping out of the national wealth, the repressive colonial legislations of the different Governor-Generals and the restrictive activity of the local capital. But it should not be denied that despite the above constrictive influences, progressive means of transportation as the railways, scientific education, creation of the first industrial enterprises were done by the British. This led to qualitative changes in the multistructural society, in the latter half of the 19th century by the development of ‘national industrial capitalism’.

Vasco Da Gama first came to Calicut, in 1498 and in 1510 Albuquerque captured Goa to control the spice trade which extended up to the East Indies and China and to control the pilgrim traffic to Mecca. The Portugese were not for large scale conquests, but they brought with them the culture of the Renaissance Europe, which had little cultural impact on India. In this connection, it should be mentioned that Garcia, the Portugese physician studied local drugs and herbs at Goa for their medicinal value. In 1565 he published a book, entitled *Colloquies des simples* in which he mentioned about the eastern drugs, that the Arabs sent to the West and gave information on local fruits and narcotics.

The Dutch in Malabar (1667-1750) took much interest in Botany. Van Rheeде was a keen botanist who was as well, Governor of the Dutch possessions in 1667. In 1768 John Koenig, a missionary surgeon made serious study of the flora of Madras. It was he who first introduced the Linnean system of classification of plants in India. He also formed the ‘United Brotherhood’ for the promotion of botanical studies in India. In this connection, it should be mentioned that the contribution of the Jesuit missionaries were no less, in the political and scientific fields. Of the three East India Companies, formation of two, one in Britain (1600) and the other Dutch (1602) was in the 17th century. The former was granted a charter by Queen Elizabeth I, on the last day of 1600. The French East India Co. came into being in 1664. The European physicians, engineers, naturalists who came along with these companies contributed a good deal of western scientific methods.

Modern Medicine appears to have been firstly introduced in India by the Portugese and later on by the French but it was properly shaped and consolidated by the physicians of the British East India Company. Fort St. George was made by the British in Madras in 1640, and the Madras General Hospital was started as a Military Hospital

in 1679. Until 1640 the surgeon-barbers employed by the East India Company were ordinary servants of the Company. Medicine was then regarded as a secondary occupation. Local inhabitants were hired as their assistants, with some elementary training. With the progress of the East India Company the health of its employees became of concern. In 1740 the medical department of the Company was opened. In 1792-97 Charles Grant a Director of the East India Company wrote his 'Observations' and in 1813 the East India Company's Charter, granted one lakh of rupees a year for the promotion of knowledge of science, in the Indians. Now the British medical unit, consisted of military surgeons and their local assistants who had some experience of local stations. From 1787 one 'native' doctor of the rank of Havildar, was employed for a battalion of sepoys, and one or more to each civil station. The 'native' doctors commenced their careers, as compounders or dressers and had to appear in subsequent examinations, before they became eligible for higher rank and pay. The demand for such medical men increased and the necessity for a central teaching institution was found necessary. A general order to this effect was issued by the then Government in June 1822. The students permitted to be recruited were twenty, under the European Superintending Surgeons but they imparted medical instruction in vernacular and they were entrusted to translate western medical books. The students were given 8 Sonat Rupees a month during their education.

In October 1824 a regular medical school was opened in Calcutta, with Surgeon James Jamieson as the first Superintendent. On his death Surgeon Bretton assumed charge in June, 1825. In April 1824, Government sanctioned the printing of a medical dictionary of scientific terms prepared in the Roman, Persian and Nagri characters and Pandit Madhusudan Gupta was appointed to assist the Superintendent in this work. The London Pharmacopia was translated in 1825. The Sanskrit medical classes were held at the Calcutta Sanskrit College and Urdu classes in the Calcutta Madrasah. The latter was opened by the then Governor General Warren Hastings in 1781. The period of training was of 3 years. Dissection of human body was not performed but post-mortem were done and allowed to be witnessed. The students of the Native Medical Institution were also asked to study Caraka, Suśruta in the medical classes, while in the Madrasah, the works of Avicenna and other physicians of the Arabic school, were studied in Urdu treatises. In 1833 Lord Bentinck abolished the Native Medical Institution and ordered the revision of medical education. The medical school in Calcutta was started in 1824 and it is the first teaching institution of its kind, in British India. On January 20th 1835 the school was upgraded to Medical College, Calcutta, with Dr. M. J. Bramley as the Superintendent. The College became affiliated to Calcutta University in 1857 and the first batch of medical graduates came out in 1861. The first medical school in Madras was opened in 7th February 1835 which was also known as the Madras Military Medical School. It was opened for civilian students in 1838 but as suspicion and doubt on Western medicine was pretty high, it was not until 8 years later when the first batch of civilian students were enrolled.

In 3rd November, 1845 the Grant Medical College was opened in Bombay after

getting approval from Lord Auckland. Soon regular medical training was systematically endeavoured, in different parts of the country. The early medical teaching institutions between 1845 and 1900 were as follows:

Hyderabad Medical School	..	1846
King Edward Medical School, Indore	..	1848
Agra Medical School	..	1854
Amritsar Medical School	..	1864
Campbell Medical School, Calcutta	..	1873
Temple Medical School, Patna	..	1874
Orissa Medical School, Cuttack	..	1875
B.J. Medical School, Poona	..	1878
Ahmedabad Medical School	..	1879
Calcutta School of Medicine	..	1886
Christian Medical College, Ludhiana	..	1894
College of Surgeons and Physicians, Bengal	..	1895
Hoffkine Institute of India, Bombay	..	1899
Berry White Medical School, Dibrugarh	..	1900

Some western physicians who contributed to other sciences in India other than their own, were O' Shaughnessy (1854) who developed telegraph, N. Wallich (1786-1854) and George King (1890) who were great botanists.

In 1854, the Educational Dispatch of Charles Wood (Lord Halifax) promoted further diffusion of scientific education by the creation of universities on the model of London University. Three universities came into being : Calcutta (January 1857), Bombay (July 1857) and Madras (September 1857) with their associated medical faculties. In 1876 the Indian Association for the Cultivation of Science was founded by Dr. Mahendralal Sarkar, a renowned physician of Calcutta, through public contributions. Lord Curzon passed the Indian Universities Act (1904) which approved Post graduate teaching and research. Medical research in India did not develop, remarkably up to the middle of the 19th Century. Dr. E. Hare (1847-1850) introduced quinine successfully in the treatment of fevers, Carter and Crawford made important dissections and woodcuts, Robert Koch discovered vibrio cholera at Calcutta Medical College Laboratory in 1884, while Ronald Ross in 1897 discovered mosquito as the vector of malaria. Lister and Lamb worked on Plague, Semple's work in the Pasteur Institute is illuminating and so also Haffkine's work on anti-cholera inoculation.

Creation of the Indian Research Fund Association in 1911 is an important landmark in the history of medical research in India. James Esdaile pioneer of medical hypnotism or mesmerism (1845-1851) performed thousands of painless operations at Calcutta with 3% mortality. In 1890 the Imperial Bacteriological Laboratory was founded at Poona, which was later shifted to Mukteswar (1893). History reveals that Bengal Presidency was the first to have an organised and Europeanised medical

service in the early British India. It was also fortunate to have the first modern medical college in India. Scientific medicine was relatively meagre in the first quarter of the 19th Century while a rapid improvement is noticeable in the last two decades.

BIBLIOGRAPHY

- Banerjee, D. N., A rapid survey of the evolution of Hindu Medicine during the last 6,000 years with a review of contemporary history of the World—*Jl. Indian Med. Assoc.*, June 1940.
- Biswas, A. K., *Science in India*, Firma K. L. Mukhopadhyay, Calcutta, 1969.
- Bose, N. S., *The Indian Awakening and Bengal*, Calcutta, 1969.
- Bose, D. M. *et al*, *A Concise History of Science of India*, INSA, N. Delhi. Centenary Vol. of the Medical College Bengal, Calcutta, 1935.
- Chaudhuri, N. C., *Clive of India*, JAICO, 1977, Bombay.
- Chichero A., On the Multiplicity of Socio-Economic Structures in India in the 17th to the Early 19th Century—*Social Sciences Today*—U. S. S. R. Academy of Sciences, Vol. 33, 76.
- D'Souza P. E., *Pulse*, Vol. 1, No. 1, Bombay.
- Dutta, P. C., Medicine in India, *Indian Jl. Hist. Med.*, Dec. 1958.
- Dutta K. K., *Dawn of Renacent India*—Allied Pub. Bombay, 1950.
- Hoernle, A. F. R., *Studies in the Medicine of Ancient India*, Oxford, 1907.
- Jaggi, O. P., *Indian System of Medicine*, Vol. 4, Atma Ram, Delhi.
- Long, James Rev., *Calcutta in the olden times*, Sanskrit P. Bhandar, Calcutta, 1974.
- Mason, S. F., *A History of Science*, Collier Books, N. York 1962.
- Marti-Ibanez, F., *The Epic of Medicine*, Clarkson N. Potter, N. York, 1962.
- Marshall P. J., *East Indian Fortunes*, Oxford, 1976.
- Majumdar, R. C., *History of the Freedom Movement in India*, Calcutta, 1962.
- Rao, M. S., *A Historical Outline of Mesmerism, Hypnotism & Suggestion*, N. I. P., Jaipur, India.
- Neelameghan, A., The Royal Hospital at Goa as described in some 17th Century Travel accounts—*Indian Jl. Hist. Med.*, Dec., 1961.
- Sarbadhikari, K. C., Western Medical Education in India during the Early days of British Occupation, *Indian Jl. of Med. Ed.*, Vol. 1, No. 1, 1961.
- Sigerist, H. E., *A History of Medicine*, Vol. 11, N. York 1961.
- Spear, Percival, *A History of India*, Vol. 2, Penguin Books.