This chapter examines the relationship between technology, medicine and public health. The focus here is on public health, and we begin with a review of the origins of modern public health, and the impact of the notion of 'scientific' medicine, as well of changes in the social sphere, on the concept of public health, and on organization of medical care.

Locating medical technology in medicine and healthcare systems

The deterministic notion about technology has its counterpart in the field of medicine, in the views regarding medical technology. For instance: in a colloquium in 1980 on medicine and technology it was argued that there was a technological imperative in medicine. 'What began as simple tools and purely effective extensions of the physician’s personal approach to the patient have, especially in the last 80-100 years, become intrinsic, self-propagating, requisite and almost autonomous elements of today’s biomedicine'. The colloquium concluded 'I would guess that by 1990 we will be proceeding in a more rational way in the practice of medicine and the distribution of healthcare' (both quotes in Wolf and Berle 1981, cited in Hofman 2002).

The use of technology in present day medicine is thus accepted as natural and given, as an inevitable feature of modern medical practice, and by some as even the master of physicians. In addition, in the dominant academic and popular perception the present healthcare systems, based on the biomedical approach to health and use of sophisticated technologies, are based on a scientific approach and hence objective, and free of extraneous influences. While the use of certain kinds of technology in modern medicine has been a matter of concern, still the relationship between technology, medicine and healthcare systems is taken to be inevitable and essential, and largely beyond any questioning. Despite a range of reservations and conflicts, there has been dominance of technology in medicine, and to seek technological solutions to health problems. Through the 20th century transformations in healthcare have only led to more intense use of technologies. There has been growth and development of hospitals as institutions of delivery of medical/health care and as centers of medical technology (diagnostic, therapeutic and supportive facilities); and consolidation and cementing of the relationship between technology and medicine, and hence between technology and healthcare. How does one understand and account for this?
Insofar as medical technology is concerned with health, and dominates the landscape of present-day healthcare systems, an understanding of healthcare systems and of public health is essential to understanding and locating medical technology. A look at the origins and formative period of both, public health and modern medicine, sheds light on the circumstances by which the medicine of the mid-nineteenth century got organized on a scientific basis, into modern scientific medicine and subsequently it took a technological turn. This chapter examines therefore the relationship between technology and medicine, and the implications of this for public health.

2.1 Growth of Relationship between Technology and Medicine

Much of the incursion of technology into medicine as we see and experience it is a phenomenon of the previous century. It began in the industrialised countries of the west towards the closing decades of the nineteenth century and took firm roots by mid-twentieth century. In examining the history of the relationship between modern medicine and technology, Blume identifies three main/important elements that gave rise to the dependence of medicine on technology (Blume 1992).

1. The intellectual and practical transformations in medicine in the latter part of the nineteenth century, leading to giving a more scientific basis to medicine. In keeping with the times, there was an overall ferment and move in mid-nineteenth century towards giving medicine a scientific basis, to make use of the power of the scientific method and reasoning processes. This triggered off debates among medical doctors over the possibility of ‘bringing the power of the scientific method into the hospital ward, without distancing medicine from its natural focus on human beings under care’ (Blume 1992 p 13). From these emerged the notion of clinical research and science. This impacted on medicine in two ways. Firstly, the establishment of a body of clinical scientific knowledge required a technology of observation and measurement, as they could not be accomplished with the unaided senses of the physician. Instruments were being created that provided the physician with (apparently) more precise, quantifiable and recordable information on the patient's condition (Reiser 1978). Secondly, clinical research came to be associated with transformations in the institutions of medicine, namely the hospital and the medical profession. Thus, use and advocacy of new instruments was related with the ‘reform’ of medicine, with the introduction of notions of ‘objectivity of medical science, and a gradual shift from caring to curing. By the beginning of the twentieth century there was complete domination of ‘scientific medicine’ in the realm of medicine and public health.

2. From the early twentieth century there began organised, public provisioning of health services - such as school health services, industrial health services and organised medical care in
military service during World War I, which led to certain kinds of expectations from the medical system, such as physical examinations to look for signs of disease before its onset, and for assessment of physical fitness for certain tasks. Physicians were expected to detect signs of disease before they surfaced, which led to their employing sensitive and precise methods of physical examination. A physical examination was needed to enlist in the military-police-fire-fighting services, to obtain a factory job, to become eligible for pension, to attend school and so on. 'The new industrial social order, with extended public and private provision for huge numbers of people, required information on the health status of much of the population' (Davis 1981). The nature and scale of what was required of the medical profession led to its growing reliance on technological means of diagnosis and examination, and on technologies having certain characteristics. Physicians began to rely on instruments to aid them in such tasks. An important influence was the reliance upon physical examinations by financially oriented institutions, such as life insurance companies, and recruitment for the army. Medical technology provided the means by which a large number of physicians could respond to the increasing demands of insurance companies, for assistance in selecting healthy policyholders. According to Davis, 'The change from an agrarian society to an industrial one, which placed unique demands on the body in the completion of specific tasks to reach new economic, social and political goals, led to the recognition of impairments and diseases which previously seemed unimportant or were tolerated without being diagnosed and treated. Precision in physical diagnosis provided a method of defining and detecting impairments such as those which prevented an employee from carrying out his industrially related job or purchasing life insurance' (Davis 1981). Davis (1981) describes at length the impact of the requirements of the expanding life insurance industry, in the USA in late 19th-early 20th century, for data on the health status of potential insurers. It demanded systematic and precise diagnostic information, methods of detecting disease and of discovering the signs of health, in order to determine whether it was safe or profitable 'to place at risk a given amount of money for a given time upon a given life'. Physical diagnosis thus assumed monetary value to the commercial world. The development of instruments and laboratory tests to carry out portions of this physical examination brought about greater uniformity and reliability to the thousands of examinations undertaken each year by a diverse group of examiners. Medical education of that period included a course on insurance medicine. As the amount of insurance sold to a policy-holder increased, the medical examination became more crucial and extensive. By the end of the 19th century companies were demanding minimal standards involving specific physical diagnostic techniques to be met in carrying out the medical examination. It was the rule of many companies to pay the examining physician an extra fee for urinalysis, and later, also for special examinations such as x-radiation and electrocardiograms. Davis concludes that '....This need or desire for the physician to evaluate an individual’s bodily functions through physical
diagnosis when the person did not appear ill ... was an innovative diagnostic practice which emerged from changing social factors and available medical technology. ... Medical instruments expanded the range of criteria by which to judge the individual's state of health and provided new criteria for determining the presence of disease in its earliest stages. The physical examination became the direct link between the physician and a host of individuals employed by, or receiving the services of, a variety of institutions. Through institutional requirements, the physical examination and its attendant technology developed, in part, in response to forces external to medicine. This pattern continued into the twentieth century with new techniques such as x-radiation and electrocardiography being adapted for the purposes of job-related and other institutional physical examinations'.

3. In subsequent times, commitment to technological progress in areas such as medicine came to be shared with the producers of new technology, namely the industry. During the Second World War there was tremendous utilization of technology and science. During the Cold War period, because of the priorities of atomic and space research, there were significant advances in electronics and materials sciences. All these happenings had several consequences for development of medical technology. Not only did entrepreneurs begin to see medicine as a 'fertile field for exploitation', sections of the medical profession also began to develop a growing enthusiasm for new technology (Eden 1984, cited in Blume 1992 p 73). Since the Second World War medical equipment has become very big business. A medical equipment industry, based partly on the redeployment of wartime expertise, came into being to provide the technologies. At present physicians, engineers, manufacturers find common cause in supporting technological advances in medicine. Blume argues that the common interests, including economic ones, of sections of the medical profession and of the manufacturing industry are crucial to technological innovation in this field.

Thus we find that the association between medicine and technology arises from several elements. Some are internal to medicine, relating to the profession and specialisation, while some have been external to it, as in the processes of large-scale social and economic reorganisation brought on by industrialisation and capitalism, which not only placed new kinds of demands on medicine; it also influenced medical practice in certain ways. The need of instruments for diagnosis and measurement of various body parameters brought technology into scientific medicine, and thus began the coming together, the association of medicine with manufacturing itself.
It is not that this creation of 'scientific medicine' came about wholly without resistance. As discussed in a later section, there were debates in the mid-late 19th century about disease causation and factors affecting the health of populations, as well as on role of medicine with respect to the same, about the goals and basis of medicine. Further, Reiser's account reveals that the routine practice and organisation of early-twentieth century medicine was slow in changing and in accommodating the new ways of representing and understanding disease that were being made possible. It indicates that medical technology has been a contentious issue within the medical profession right since its origins. Beginning in the seventeenth century, the introduction and acceptance of medical technologies has been a long-drawn out process, marked by tension/contestation between the proponents and opponents of the concerned technique/technology. One of the reasons for this was the reservations about or opposition to machine-generated data from sections of the medical profession. In part this was related to the other reason, namely the limitations of the technique/technology itself and the time taken in its refinement. According to Reiser two movements developed within the medical profession in the late nineteenth and early twentieth centuries, by which time technologies like the x-ray and the clinical laboratory had started becoming widespread. These raised important questions about the uncritical reliance of medicine on technologically generated facts. The first attempted to reverse the growing neglect of the patients' views, his/her history and description of symptoms. It emphasized that they constituted important evidence and should be carefully considered by the doctor in evaluating illness. The second emphasized that all techniques used to gather and evaluate medical evidence, including those based on technology, were liable to significant error. In different ways both groups have raised doubts about the wisdom of over-reliance on information obtained by technology. They also urged physicians to explore their own attitudes towards illness and ways of reaching medical judgments.

Perusal of medical literature of the first half of the twentieth century shows that there were debates about and concern within the medical profession over the impact of these developments on medical practice - about the tendency for (over) dependence on technology, over its possible gains and losses to medicine. The delegation of responsibility for diagnosis to technical experts raised basic moral problems for twentieth-century medicine (Reiser 1978 p 171). For instance, Tinsley Harrison, a well-known American clinician and author of medical text-books, noted 'the present-day tendency towards a five-minute history followed by a five-day barrage of special tests in the hope that the diagnostic rabbit may suddenly emerge from the laboratory hat' (cited in Reiser 1978, p 158). In 1910 the English physician and bacteriologist Wright expressed concerns over the use of bacteriological tests by physicians who lacked thorough education in bacteriology, as also the implications of the fact that the field was relatively young and new bacteriological
discoveries were being made. Such concerns arose also among later physicians, who realized many doctors ordering laboratory tests had little working experience with the wide range of techniques used to analyze specimens or the criteria used by laboratory workers to make judgments. Without this knowledge they could not adequately subject laboratory evidence to medical scrutiny. George Pickering, English clinician and professor of medicine, commented in 1955 that "To rely on data, the nature of which one does not understand, is the first step in losing intellectual honesty. The doctor is peculiarly vulnerable to a loss of this kind. And the loss naturally leaves him and his patients poorer" (Reiser 1978 p 173).

In the 1950s the hazards of hospitalization were acknowledged and the term "disease of medical progress" was used and some doctors documented the "disturbing incidence of medical misfires". In a Presidential address before the Association of American Physicians in 1975, Rogers dwelt on the "dilemmas posed by the expanding capacity for intervention in human disease". He discusses some of the problems, such as the financial burdens for the patients, the "worrisome incidence" of iatrogenic diseases and the tendency for specialization among physicians (Rogers 1975). In his view there was need to sensibly restrain technology and the curiosity of the medical professionals and their desire to be thorough. So he called for "technologic restraint coupled with discrimination" in the use of the "powerful tools we now have at our command", and to adopt "a patient-oriented approach to problems rather than a problem-oriented approach to the patient".

An important issue that was sought to be raised in some way or the other was that of limitations of technologically generated evidence. During the nineteenth century some physicians had been troubled by the faulty data that could be produced by mechanical flaws in their instruments and by differences in the perceptions of observers who viewed the same data. These problems were not comprehensively investigated until the early twentieth century when several empirical studies appeared concerning sources of error in measurement, observer variation and the issue of misinterpretation of data generated by machines. It was pointed out that facts obtained from the laboratory are in one sense no more objective that those collected at the bedside – both types of evidence must be interpreted by the human mind. Instruments are only powerful transmitters. Essentially all data are subjective: in all observations an opinion is registered at the same time that a fact is recorded" (Reiser 1978 p 183).

It thus emerges that the reliance of medicine on technology has been questioned from within the medical profession itself. However, despite such reservations and conflicts, there has been dominance of technology in medicine, and to seek technological solutions to health problems.
Subsequent transformations in healthcare have only led to more intense use of technologies. Through the 20th century there has been growth and development of hospitals (and supportive diagnostic, therapeutic facilities) as institutions of delivery of medical/health care and as centers of medical technology; consolidation and cementing of the relationship between technology and medicine, and hence between technology and healthcare. How does one understand and account for this?

The history of public health sheds light on the circumstances by which the medicine of the mid-nineteenth century got organized, on a scientific basis, into modern scientific medicine and subsequently it took a technological turn. Therefore, we take a look at the history of public health and developments therein over time. This is also necessitated by the fact that, insofar as medical technology is concerned with health, and dominates the landscape of present-day healthcare systems, an understanding of healthcare systems, as well of public health is essential to locating medical technology in both these.

2.2 Public Health: Historical and Current Developments

This section looks at the concept of public health, and at historical and current developments in the area.

Modern public health is viewed as a major governmental and social activity, multidisciplinary in nature and extending into almost all aspects of society. A commonly used definition of public health is that of the WHO, namely that 'public health is the science and art of preventing disease, prolonging life and promoting health through the organized efforts of society'. Other elaborate descriptions abound. Winslow described it as 'the science and art of preventing disease, prolonging life and promoting physical health and efficiency, through organized efforts for the sanitation of the environment, control of community infections, education of the individual in principles of personal hygiene, organization of medical and nursing skills for early diagnosis and treatment of disease, and development of the social machinery which ensure to every individual in the community a standard of living adequate for maintenance of health' (Winslow 1951). Savitz et al (1999) describe public health as a mission, as a set of societal actions to assure the health of the people. Many disciplines contribute to public health - namely epidemiology, clinical medicine, sociology, economics, political science, toxicology, molecular biology, anthropology, nutrition, sanitary engineering, industrial hygiene, policy analysis and risk assessment. Public health policy decisions are made not solely on health considerations, but are also based on economics, politics, culture and ethics. It is for the public health worker to incorporate the relevant findings along with other information into policy
decisions. For many public health is not just a set of disciplines, information and techniques, as characterized by the text-book definitions, but is, above all, a `shared social vision' (Fee 1985).

Contemporary public health has been shaped by and is based on the premise that the health of the individual and of people, in general, is linked to medicine and its curative services, to high-tech clinical interventions, and to biomedical and clinical research. As a consequence, the healthcare system is largely medically determined. While it is not explicitly stated, implicit to this view is the positivist view of science and medical progress and advances, and a celebration of the (medical) sciences, glorification of medical professionals and research. In such a view public health is a component of medicine, and translates to applying scientific medicine to larger populations. There is uncritical acceptance of science, technology and of existing forms of medical care. However, the history of public health shows that this has not always been so. For some time now a debate has been going on in the field of public health; between a narrow biomedical focus on control of infectious and chronic diseases, and another broader one to address the social and economic factors that adversely affect health and well-being.

The following features are observed in most parts of the world today, where public health is equivalent to application of biomedical sciences through public health programs, or in other words is same as applied or preventive medicine.

- The health of the individual and the people, in general, are linked to medicine and its curative services, to technological/clinical interventions, and to biomedical and clinical research.
- The healthcare system is largely medically determined.
- In turn, medical care services are unevenly distributed, and largely favour tertiary and secondary hospital care, with inadequate attention to primary care.
- Preventive services are generally neglected and receive little financial support.
- The emphasis vis-à-vis disease prevention is placed on secondary prevention, which is within the province of the physician, rather than on primary prevention, which is in the larger social domain.
- Health promotion, which is concerned with improvements in the economic and social conditions of the population, such as employment, income, housing, working conditions, education, and rest, is never considered.

Having said all that, one needs to state that these definitions and discussions about public health conceal much more than what they convey. While public health refers to a descriptive notion of the health status of populations and of organized efforts in that regard, historically it has been associated with locating the health of populations in the environmental and social
conditions of living, and with social change. Szreter relates public health to a historical, social and scientific movement, which, with its complex range of institutions, 'conspired to act on the public's health locally, nationally and internationally, for at least the last two centuries'. He refers to it as 'an intrinsically political subject and cannot be divorced from organized human agency' (Szreter 2002). Intrinsic to the notion of public health is the concept that although health is a personal good, it is not only an individual responsibility, but a collective responsibility as well. While monitoring and restoration of individual health constitute a task mainly for the curative sector in medicine, however, the health of an entire population is subject to the actions of the society and the state.

In the following sections we review some of the major developments in public health in England and the United States of America in the context of the industrial and political revolutions of the modern era. It reveals that the period from mid-18\textsuperscript{th} to mid-19\textsuperscript{th} century was crucial for the genesis of modern public health as a response to the problems of industrialization and the associated processes of urbanization, with the 1830s and 1840s being the formative period, when there was an explosive growth of cities, and concentration of work and workers inside factories and in urban slums.

Rosen describes at length the works of several physicians and others on the emerging diseases and their origins, the health and sanitary reform movements of the 19\textsuperscript{th} century, and movements to improve health and prevent disease through social reform and legislation (Rosen 1958). Since the early 19\textsuperscript{th} century at least, public health has been characterized by a debate on disease causation and on the factors affecting the health of populations, and on role of medicine with respect to the same. According to Rosen ideas of disease causation did not change radically until the development of bacteriology and immunology in the late 19\textsuperscript{th} century. Since then there has been a tension between a broad environmentalist view of disease and one emphasizing action of specific disease causing agents; between the idea that issues such as hygiene, water supplies and waste removal are more fundamental than a sophisticated scientific understanding of disease causation and transmission. However, we find that this obfuscates, or rather glosses over, a more fundamental and intense debate of that period regarding role of poverty and of living and working conditions, in ill-health and disease causation.

\textbf{2.2.1 PUBLIC HEALTH in late 18\textsuperscript{th}-19\textsuperscript{th} century – Salient Features}

All text-books on public health trace the origins of modern public health to mid-19\textsuperscript{th} century England, in general, and specifically to the Sanitary Reform Movement, initiated by Edwin Chadwick and others. In the history of public health the sanitary reforms of Chadwick are
considered to be the 'social' stage of public health, and the beginning of progressive public health programmes.

In England, towards the end of the 18th century factories began to increase in number and in the course of the 19th century the factory became the characteristic institutional form for the organization of production of items such as machines, tools and other articles of consumption. As this new industrial system grew, more and more workers were needed to work in these factories. Poor Laws were appropriately changed to release labour for the industry. By the second decade of the 19th century, poverty and social distress worsened due to the agricultural and industrial changes, and became more widespread. On one hand, the landless wage labourers, rural domestic workers, land-poor peasants, and peasants living on infertile land starved and died in dire poverty. On the other, those who joined the 19th century 'forced draft urbanization' to swell the ranks of the new urban industrial proletariat fared no better (Turshen 1977 p 52).

The process that created the factory, the market economy, and the modern urban environment, also gave rise to a virtual deluge of health problems. The coming of industrial capitalism in the early 19th century was accompanied by the exploitation of workers, especially women and children, in extremely hazardous and unsanitary conditions in mines and textile mills. Such brutal conditions were worsened by equally bad living conditions. It was a period of major epidemics. While there were several outbreaks of cholera and yellow fever, other infectious diseases were continually present in the impoverished urban communities, and appeared from time to time in the form of severe outbreaks and took a heavy toll of lives. These were typhoid, typhus, small pox, dysentery, diphtheria and scarlet fever. Change from the traditional diet and overcrowding were probably the two major factors that combined to render the immigrants extremely vulnerable to the harshness of their new working and living conditions.

Conditions in the coal mines and factories of England were brutal and dangerous – extremely long working hours under wretched and unsanitary conditions, general employment of the cheap labour of women and children, frequent accidents due to unprotected machines, lack of ventilation and insufficient time for meals. The evils of child labour in textile factories had been an extremely important political issue in the north of England. Turshen cites Marx on this, who had shown how the so-called domestic industries and the intermediate forms of production between them and manufacturing depended on use of child labour and an unrestricted working day, since the sole basis of their competitive powers was the unlimited exploitation of cheap labour (Turshen 1977). A number of studies had been carried out that pointed to the prevalence of a large number of occupational diseases. As early as 1802, owing to a series of epidemics in
Manchester, the health of the factory workers was taken up in Parliament, and despite opposition, Robert Peel a mill worker himself, secured the passage of the Health and Morals of Apprentices Act, to improve the condition of the child workers in the cotton mills. Five labour laws had been passed between 1802 and 1833, but the Parliament voted no money for their implementation. So the Acts were largely inactive, and agitations by the workers continued (Turshen 1977).

Public attention was first drawn to these problems in the first industrial city of Manchester. A series of epidemic fevers there drew the notice of the community to the significance of factories and congested dwellings as providing conditions in which such diseases could flourish and spread. The spread of typhus during the winter of 1795 led to the formation of a voluntary Board of Health. However, all such attempts were very weak and ineffectual. With the progress of the 19th century more and more people started moving into towns and the increasing growth of unhealthy conditions and spread of epidemics far outstripped attempts to address and solve them. This was the situation throughout much of England.

Financial considerations influenced largely the spread of towns and cities. There was virtually no planning. Manufacturers erected factories in accordance with their requirements, and as workers and their families streamed into the area, speculative builders constructed housing on any land available near the places of prospective employment, without any concern for the quality of the houses built. Inferior housing built back-to-back in congested areas was profitable and hence increased in number. Workers were compelled to live in these congested urban areas because their employment was often of a casual nature, and so they had to be on the spot or lose the opportunity of earning the pittance that they needed for subsistence. While there were a large number of saloons and bars (for relaxation and recreation), there was little interest in providing sanitary arrangements, since such expenditures were not considered remunerative. There were no arrangements for bathrooms or privies, or for sewage and garbage removal, nor any public parks. The situation was similar from the 1830s onwards, in other industrializing countries of Europe such as France, Belgium, Prussia, and North America. Generally, there was large-scale influx of the displaced, unemployed rural poor into urban areas, overcrowding, congestion and neglect of the poorer districts, accompanied by periodic epidemics of cholera and other diseases.

Hamlin gives an idea of the political crisis prevailing in Britain in the 1830s and 1840s (Hamlin 1995). It was in the middle of a depression, as also on the verge of revolution. There were calls for greater democracy, regulation of working conditions, and abolition of tariffs on imported food. Hamlin goes on to show how many of these social questions often were framed as questions of health, disease and wrongful death, and many of the complaints were laid at the
doorstep of the new Poor Laws of Edwin Chadwick and associates. 'The key word in the vast stream of attacks on Chadwick and associates was “starvation” (Hamlin 1995 p 857).

A re-look at Chadwick

Rosen cites several studies that were conducted in that period by members of the medical profession into the epidemics and fevers that were a regular occurrence in the ‘hovels and cellars of factory towns and cities’, like Manchester, Leeds, Birmingham and others (Rosen 1958 p 206). The health of the factory worker had become a matter of concern as early as the end of the 18th century, owing to a series of epidemics in Manchester. A group of physicians that was appointed to look into the typhus epidemic of Manchester was fully aware that the repeated epidemics were connected with the cotton mills, many of whose workers were children. They recommended legislation to regulate the hours and conditions of work in factories, as well as other measures to prevent or reduce the spread of disease. Little was done however, and the situation worsened (Rosen 1958 p 158). Similarly, a surgeon of Leeds, Thackrah, in his work on ‘the Effects of Arts, Trades and Professions on Health and Longevity’ documented the deleterious impact of contemporary working conditions, including low and uncertain wages, on health, resulting in incapacity, permanent disabilities and premature death (cited in White 1991 p 81). He revealed that the deplorable working and living conditions prevailing in the city of Leeds were responsible for higher sickness and death rates than those of the surrounding countryside (Rosen 1958 p 207). The situation progressively deteriorated, and there were cholera epidemics in 1831 and 1832 in the urban shanties in London and other cities. It was also observed by then that there were severe outbreaks of ‘fever’ in Ireland, then in Scotland and England, and that the working population was more severely attacked than other elements of the community. In 1840 a Select Committee on the Health of Towns had conducted the first general investigation of the subject by a public body, and exposed the problems of overcrowding, poverty, ill-health, crime and heavy mortality. It had proposed appointment of boards of health, appointment of sanitary inspectors, and an act to regulate future buildings, and a sewerage act. As also that special attention should be given to water supply, and to provide public bathing facilities for the poor.

The largest and fastest growing industrial cities suffered a mortality crisis in the 1830s and 1840s, with life expectancy in such cities as Manchester, Glasgow and Liverpool falling to levels not seen since the mediaeval Black Death (Szreter 1999). Differences in mortality became evident from the works of physicians, who were using epidemiological reasoning and methods to make their observations. Mortality was clearly associated with class. In his ‘Condition of the Working Class in England’ Engels refers to an investigation by a doctor for the Health of Towns commission. It was found that the mortality in the best houses on the best streets was 1 in 51, and
in the worst houses on the worst streets 1 in 25. He also cites Chadwick's Report: In Liverpool in 1840, the average longevity of the upper classes, gentry, professional men, etc., was 35 years; that of the business men and better-placed handicraftsmen, 22 years; and that of the operatives, day-labourers, and serviceable class in general, but 15 years. 'The death rate is kept so high chiefly by the heavy mortality among young children in the working-class' (Engels 1845).

At the hearings of a Select Committee, in 1832, on the Employment of Children in textile factories, most of the medical evidence was given by well-known physicians or surgeons of the day, holding prestigious London hospital appointments. When asked whether from general principles of practice or study, many injurious consequences, such as effects on the health and the limbs, and shortening of life could be traced to the factory system of labour, all agreed that the such work would be very injurious to the constitution, and engender a variety of physiological effects and diseases. Such as scrofula, consumption from leaving the overheated factory for the cold night air; and so on (cited in Hamlin 1995, Engels 1845). These elite medical practitioners agreed that the effects of the factory atmosphere could appear as many different diseases. A few prominent physicians made social causes of disease a focal point. For instance: W.P. Allison, professor of medicine at Edinburgh, lead a campaign for Scottish poor law reform, arguing that it was the physician's professional obligation to act to remove sources of disease. According to Alison the most readily removable cause of typhus was hunger, and hence the practice of depending on charity was unacceptable. A Manchester practitioner Howard wrote a treatise on how to recognize the symptoms and postmortem appearance of chronic hunger, for he insisted that this, and not any specific disease, was a major cause of death there.

For one section of the community these outbreaks of diseases created an economic loss, which adversely affected the whole community. According to Rosen, it was this recognition of the economic and social costs of preventable disease, which provided the stimulus for action to better public health (Rosen 1958 p 212). Edwin Chadwick, a member of the Enquiry into the administration of the Poor Laws of 1832, was of the view that pauperism was the consequence of disease for which the individual could not be held responsible, and that disease was an important factor in increasing the burden of the poor rates. He concluded that it would be good economy to undertake measures for the prevention of disease. In 1848 he wrote that 'the sanitary measures that were instituted had strictly and exclusively an official origin......they arose as a consequence, although an indirect and perhaps an accidental one, of measures directed by the Government in 1832.............. In the course of some investigations with the view to discriminate the causes of pauperism, excessive sickness and its preventable causes were suggested by circumstances which appeared in the course of that enquiry and .......
afterwards, under the Administrative Commission, in 1838, when a heavy amount of claims appeared as a consequence of the prevalence of an epidemic, I felt it my duty to call the attention of the Commissioners to the preventable nature of a large proportion of the cases, and recommended a special investigation of them........" (Rosen 1958 p 209).

In 1838 this Poor Law Commission appointed three Medical Inspectors to look into the prevalence and causation of preventable disease in London, and opined that "the expenditures necessary to the adoption and maintenance of measures of prevention would ultimately amount to less than the cost of the disease now constantly engendered" (Rosen 1958 p 211). It was in this context that the Report ...on an inquiry into the Sanitary Condition of the Labouring Population of Great Britain appeared in 1842, a report which is considered by many to be the fundamental document of modern public health. The Report concluded that disease, especially communicable disease, was related to filthy environmental conditions, due to lack of drainage, water supply, and means for removing refuse from houses and streets. Chadwick propounded the theory that epidemic fevers were due to miasmas, arising from decaying animal and vegetable matter. According to him the defects which were most important and which come most immediately within practical legislative and administrative control, are those chiefly external to the dwellings of the population and arise from the neglect of drainage. Instead of being concerned with the 'social' factors that had been highlighted by several others, the problem of public health was reduced to an engineering problem. What was needed was an administrative organ to undertake a preventive program by applying engineering knowledge and techniques in an efficient and consistent manner. Chadwick stated in this Report that 'the great preventives ..................are operations for which aid must be sought from the science of the Civil Engineer, not from the physician, who had done his work when he has pointed out the disease.........' (emphasis added, Rosen 1958 p 215).

Thus the main features of the Chadwick era or the miasmatic era of 19th century public health are:

➤ The opposing views about the causal relation of living conditions and disease. Edwin Chadwick argued that disease produced by the physical environment caused poverty. Many in the medical profession in the 1830s had a constitutional conception of disease that explained illness and disease in terms of injury to the constitution, and in terms of living conditions and personal histories rather than as the presence of some particular disease entity. A key feature of this approach was that it needed to take stock of how all aspects of living – diet, work, emotional state – affected a person's health. Others like Frederich Engels, based on his study of the impact
of the Industrial Revolution on the workers and their families, understood poverty to be the cause of disease.

- Demonstration of where and how to look for causes in terms of clustering of mortality and morbidity.
- Excellent field surveys, construction of national statistical systems for vital data and statistical analysis of large numbers.
- Reforms in terms of drainage, sewage, water supplies and sanitation, which generally brought about improvements in health.

Rosen concludes that medicine played a secondary part in the sanitary reform movement of the mid 19th century and that the impulse to sanitary reform did not come from the medical profession, even though some physicians played a significant part in calling attention to the community problem of ill-health (Rosen 1958 p 225). He says that legislation on health and sanitation resulted from a variety of forces within the social and economic order. It resulted less from a concern for the welfare of the poor than from a growing realization after 1850 that endemic and epidemic disease caused by defective sewerage or infected food was a problem of the entire community, and that the cost involved was a form of waste that could be eliminated. In the view of the sanitary reformers unmodified laissez-faire economics was a licence to exploitation; some degree of public regulation of private property and personal behaviour was essential to protect people from unnecessary hazards to their health. Given the dangerous conditions of work and living, the question was of how much, what kind of regulations and for what purpose. At what point should the economic freedom of investors be limited by the demands of public health? Disease was considered as an unproductive drain on the economic well-being of the entire community: a sick worker meant the loss of productive labour, and the death of each male worker added a widow and children to the relief rolls.

Rosen gives credit to Chadwick for being a great reformer. Till date, Chadwick and his Report/Sanitary Reforms are assigned great significance and occupy centre-stage in the history of public health. It is accepted public health wisdom now that the social dynamics of disease flow from the miasma theory of Chadwick; and that it was replaced by the restrictive single-cause, germ theory in the late 19th-early 20th century. However, one finds that there existed a substantial and substantive body of work in that period, which encompassed the relation between ill-health and the social conditions of living and working far more completely than did Chadwick’s miasmatic theory. The latter addressed only inadequately many of the diseases and health problems that had arisen and had been studied or were being studied in different quarters. Chadwick and his colleagues ignored the substantial epidemiological data, which implicated
such social factors as poverty, poor working and living conditions, as well as the existing medical theories and explanation of disease causation, which were multi-causal and constitutional. Chadwick was successful to the extent that, as bureaucrat and a public figure, it was his miasmatic view that prevailed officially, and legislation was introduced to improve sanitation in cities and towns. However, it is not that awareness and concern for the health of the working people and its relation to the inhuman conditions did not exist among other sections of the community.

Rosen is also not quite correct in stating that medicine and physicians had little real knowledge to contribute toward a solution of the major problem, which concerned the transmission of communicable diseases. As mentioned earlier, by the mid-1800s physicians like Villerme, Buchez and Guerin in France, Neumann, Virchow and Leubuscher in Germany, and dozens of lesser-known doctors had studied the economic, social and occupational causes of disease and worked for reforms to eliminate them. Many physicians and sanitarians identified and statistically documented inhuman and dangerous working conditions, unemployment, miserable living conditions, malnutrition, and general poverty as the major causes of the high disease rates and early deaths among the working-classes of Europe. Many physicians were part of progressive social reform movements, and participated in the revolutionary movement of 1848 (Brown 1979 p 128). By the mid 19th century close clinical observations made in earlier periods had led to descriptions of diseases such as whooping cough, typhus fever and scarlet fever. In addition, physicians had made many epidemiological observations of these epidemics and studies of disease transmission as well. Work had also advanced on identifying several living agents that caused specific diseases, resulting in the germ theory of contagious disease. There was a reasonable understanding of the nature of the communicable diseases prevalent then and of socio-economic differences in disease. These formed the basis for co-relation of disease with not just working conditions, but also with the ‘filthy environmental conditions, polluted water supplies, and the decaying garbage and wastes clogging the streets’, as described by Chadwick (Rosen 1953 p xxvi and p 214). Many of these studies were highly effective in furthering the cause of sanitary reforms. Yet these views were not taken into account.

The medical profession did have its views and doctors had actively worked on the epidemics among industrial workers, and had made recommendations even before the Report of 1842. Why is it that these ideas of disease causation were ignored? The dominant miasma theory of Chadwick and associates that diseases were caused by poisons emanating from soil, air and water, sidelined the existing understanding, which encompassed the full range of living conditions
affecting human survival, namely living and working conditions, unemployment, poverty, and hunger, in addition to filth and miasma.

Hamlin elaborates on this less-cited and scarcely recognized, nevertheless sophisticated understanding of multiple determinants of health, that was central to the medical thought of late eighteenth-early nineteenth century, and widespread in medical literature in this period, such as reports of epidemics, testimonies of medical men on factory work, or prison life, or water supply, or treatises on physiology or on specific diseases, and in medical text-books (Hamlin 1992; 1995). This framework viewed health as the totality of physical, chemical and psychological influences. It integrated body and mind, and viewed the body as an intricate and fragile machine able to preserve its textures, and health as a powerful and positive safeguard against disease. A great many environmental factors - lack of good food, rest and warm dry clothing - could sap its energy and lead to disease. In this framework the inquiry began with the diseased person and took up the question of why s/he had been afflicted in a particular manner. Disease causation was attributed to "proximate" cause, being the disease process itself, and "remote" causes. Remote causes were all those elements that undermined/weakened the constitution and led to ill-health. These were divided into 'pre-disposing' and 'exciting', and included factors that were non-naturals, more or less controllable, which in deficit or excess led to ill-health. Such as food, air, sleep, fatigue, exercise, state of mind, temperature, light, and humidity. With sufficient pre-disposition an exciting cause was not necessary for disease.

Removal of pre-disposing causes was widely held to be a sufficient means of avoiding the disease. Many writers pointed out that the poor were especially often ill because they were so continuously under the influence of pre-disposing causes and could not be expected to be healthier until the state of society changed. Hamlin cites several works that manifest such a framework. John Mason in 1795 saw 'price inflation as the cause of almost all the diseases I am considering'. He described a typical weaver's family in which income was insufficient to maintain the necessaries of life. Little could be expected of the surgeon. The report of the Irish fever epidemic (1817-1819) by Barker, a professor of chemistry, and Cheyne (physician) was based upon experiences and opinions of a great number of independent practitioners. Almost all of them emphasized: (i) the centrality of pre-disposition – the miserable conditions of a large part of the population, living in hunger, damp and cold, and anguish of the mind. A Committee of Cork medical men ascribed the continuance of the fever to want of employment, of sufficient food, clothing, cleanliness, free ventilation. These pre-disposing conditions could be traced to economic conditions, such as combination of unemployment due to low demand for agricultural
labour and high food prices. Bank failure was identified as a cause, leading to higher classes having no money to employ the poor. In a public debate in 1840 between Allison and the Chadwickians the former's thesis was that poverty was a major factor in inducing disease. The totality of the debilitating conditions in which the poor lived was responsible for fever. Whereas the latter claimed the problem could be isolated to the nasty filth with which reasonable well-fed people were surrounded.

Hamlin argues that the sanitarian movement of the Chadwick era represents the rejection/exclusion of this constitutional medicine, and a narrowing of outlook in favour of a single 'exciting cause' - filth in the environment - for disease causation. This process of exclusion involved ignoring, both the medical sensibility of the time, as also the enormous evidence collected by the medical profession from around the country. By restricting cause of disease to a single exciting cause, social issues got effectively marginalized. Hamlin's work clearly brings out the fact that at that time there were 'ready resources for building many different kinds of public health movement', for a medically sanctioned program of reform. Yet, as Hamlin says, Chadwick, the social administrator, took a narrow view, while William Farr (and others, including physicians) emphasized role of social factors in disease causation (Hamlin 1995).

Other contemporaries of Chadwick, like Frederich Engels in England and Rudolf Virchow in Germany, carried out studies of factory and mines workers and understood poverty to be the cause of disease. Whereas, according to Chadwick disease produced by the physical environment caused poverty. Rudolf Virchow recommended economic and political reforms as the solution to the typhus epidemic in Germany in that period. Engels used public health as a focal point for demonstrating exploitation of the workers by the factory owners. He did not simply survey and write about the working class conditions. He made a general analysis of the evolution of industrial capitalism, of the social impact of industrialization and its political and social consequences, including the rise of the labour movement. He rejected the position then commonly held that poverty was an offense meriting severe punishment as a warning to other potential paupers. He traced the roots of illness to the organization of production and the social environment, and gave a clear analysis of the causal relationship between social structure and physical illness. According to him industrialism forced working-class people to live and work in conditions that inevitably led to sickness.

As we have seen, in the early 1800s numerous reports were being published on urban living conditions and the appalling health conditions of the working population. Engels was the first to deal with the working class as a whole, and not with a particular section or industries. In his
detailed, heart-wrenching work on Condition of the Working Class in England, published in 1845, he describes the ways in which deprivation created an environment where workers could not remain healthy or enjoy a normal life (Engels 1845). In "The Great Towns" he writes 'Let us see what pay for his work society does give the working-man in the form of dwelling, clothing, food, what sort of subsistence it grants those who contribute most to the maintenance of society.........Every great city has one or more slums, where the working class is crowded together' (pp 61-62). He then describes at length the conditions of slum after slum, in several cities and towns of England – London, Manchester, Lancashire, Glasgow, Edinburgh and several more. He refers to other studies, commissions and newspaper reports to corroborate his description. He covers a wide range of subjects, such as: infectious diseases; occupational diseases, environmental toxins, lead poisoning, industrial accidents; nutrition and adulterated food supply, housing and clothing, alcoholism, prostitution and begging; mortality rates and social class, maldistribution of medical personnel. The air was polluted; slum houses were overcrowded and poorly ventilated; so were the workers' dwellings; there was neither clean water nor sewerage; no medical care was available and workers' mental health was threatened by constant insecurity. They had neither proper clothing nor healthy food.

He describes the effects of the working conditions on the workers - children, men and women -and says 'A pretty list of diseases engendered purely by the hateful greed of the manufacturers! Women made unfit for childbearing, children deformed, men enfeebled, limbs crushed, whole generations wrecked, afflicted with disease and infirmity, purely to fill the purses of the bourgeoisie. And when one reads of the barbarism of single cases, how children are seized naked in bed by the overlookers, and driven with blows and kicks to the factory, their clothing over their arms, how their sleepiness is driven off with blows, how they fall asleep over their work nevertheless, how many hundreds came home so tired every night, that they could eat no supper for weariness and want of appetite, that their parents found them kneeling by the bedside, where they had fallen asleep during their prayers; when one reads all this and a hundred other villainies and infamies . . . how can one be otherwise than filled with wrath and resentment against a class which boasts of philanthropy and self-sacrifice, while its object is to fill its purse a tout prix (at any price)?' (Engels 1845 p 180) Wages were almost stationary for many workers until the 1870s, when they began to rise. Meanwhile the price of a staple such as wheat did not significantly fall until 1880. He goes on to say 'How is it possible, under such conditions, for the lower class to be healthy and long lived? What else can be expected than an excessive mortality, an unbroken series of epidemics, a progressive deterioration in the physique of the working population.....' .
Virchow was one of the great pathologists of the nineteenth century, most notably contributing to the understanding of disease at the cellular level (cellular pathology). He also initiated a series of influential investigations concerning the effects of social conditions on illness and mortality. He presented pathological observations and statistical data and argued that the resolution of these problems required fundamental change. He is well-known for his investigation of the epidemic of relapsing fever among coal miners and their families, largely Polish, in Upper Silesian province of Prussia, in 1848, while working as a staff physician at the Royal Charité Hospital in Berlin. In his report he covered the following topics: a geographical, anthropological and social account of Silesia, description of the housing, education, diet, drinking and medical beliefs of the workers, analysis of the role of the Catholic church and perpetuation of caste-like social stratification; detailed clinical account of typhus with case descriptions and autopsy reports; assessed validity of available health statistics; and analysed morbidity and mortality of typhus by age, sex, occupation and social class. He concluded that the underlying causes of the epidemic were more social than medical. Economic and political conditions, giving rise to poverty and underdevelopment in the area played a major role. The conditions in which workers were forced to live made them vulnerable to disease. The experience led him to the concept of “artificial epidemics” arising in periods of social disruption:

“Artificial epidemics...are attributes of society, products of a false culture or of a culture that is not available to all classes. These are indicators of defects produced by political and social organization, and therefore affect predominately those classes that do not participate in the advantages of the culture.”

This report earned him notoriety in Germany as a progressive leader; he was suspended from Berlin Medical School, to which he returned in 1856. He advocated democracy, education, freedom and welfare; and absolute separation of church and school in Upper Silesia as measures to improve health conditions. With a colleague Lebuscher, he founded and edited a medical weekly, Die Medicinische Reform in 1848. Through the medium of this weekly he called for improvements in employment and income, housing and nutrition. He questioned the increases in military budget while that for education stagnated, and refused to be knighted.

Virchow defined the new field of social medicine as a 'social science that focused on illness-generating social conditions' (Waitzkin et al 2001). If disease was socially derived, then ill health was to him an indictment of the political system. He argued that medicine 'must intervene in political and social life. It must point out the hindrances that impede the normal functioning of vital processes, and effect their removal' (cited in Brown 1979 p 127). He stood on the
barricades during the March 1848 Berlin uprisings and later played an active political role, serving as Berlin city counselor, a founder of the German Progressive Radical Party, and a member of the Prussian and German parliaments. During the revolutionary days of 1848 his journal proclaimed that “Medicine is a social science, and politics nothing but medicine on a grand scale” (cited in Anderson et al 2005).

Virchow’s contemporary von Pettenkofer, also a physician, opposed the germ theory that the bacterium was necessary and sufficient to cause disease. Pettenkofer’s theory was that four conditions were essential for cholera to strike – specific micro-organism, certain local conditions, seasonal conditions and certain individual conditions. The mere presence of an infectious agent was not the same as occurrence of disease. Another contemporary Grotjahn insisted on the importance of social factors other than hygiene in disease causation. (Later, in 1911, Grotjahn wrote in his Social Pathology that the etiology of disease lay in biological and social factors).

We find that Rosen does not take account of all these. Rosen poses the debate as miasma versus contagion (Rosen 1958 p 288), which, as already discussed, is not entirely correct. Even when the view that specific contagia are the sole cause of infections and diseases was being presented and discussed, physicians like Pettenkofer and others opposed it. According to them, while infectious diseases were due to contagia, specific or non-specific, the contagious agent could not act except in conjunction with other elements such as the state of the atmosphere, condition of the individual or social factors. When Koch presented his discovery of the tubercle bacillus to the Berlin Physiological Society in 1882, many medical scientists did not share Koch’s view that this bacillus causes tuberculosis. Virchow and others argued that since pathogenic micro-organisms lived in healthy bodies, they are not the cause of disease. In their view, invading micro-organisms could cause disease only after the host organism had been weakened by some physiological or environmental misery (cited in Brown 1979).

Throughout much of 19th century the problems of sanitation and epidemics remained the same. Despite the revelations of the Royal Commission subsequent to Chadwick’s Report, no immediate action was taken by the government to improve conditions. Legislation to implement the recommendations was delayed partly because the need to keep property intact imposed limits on the extent to which reform might be undertaken (Rosen 1953 p .......).

However, it led to activities of various kinds by different voluntary and community-based groups. Some of these undertook activities such as providing better dwellings for the poor, or setting up model bath-houses in parts of London. Some worked at disseminating knowledge of urban conditions and organizing public opinion for legislative action for improving health. Some
of these consisted of members of the social elite (Lords, Earls and so on) (Rosen 1958 p 218). The idea was to mould public opinion through education and awareness, for remedial legislation. In short, they were actions of the urban middle class based on values of order, efficiency and social discipline, and the ethos that social conditions must be improved ("the humanitarianism of the successful"). Finally in 1848 the Public Health Act was passed. However, the sanitary legislations enacted during this period did not carry any obligation for enforcement. Local improvements continued to be made on a piecemeal basis. Local authorities were never able to overcome the problems of community health, and left untouched far more problems than they remedied. Yet, Rosen concludes that enough progressive change did take place to yield useful though moderate benefits (Rosen 1958 p 229). The developments in England had their influence on public health thinking in other countries, especially in North America. For instance: establishment after 1845 of a number of voluntary health associations, patterned after those in Great Britain. Civic laypeople, physicians and public officials came together in these associations, and undertook "a crusade against a gigantic and growing evil" (Rosen 1958 p 240).

Conditions in the factories

The new class of industrial workers organized themselves in trade unions and political parties, refused to compete against one another, and took action to secure for themselves various kinds of social services including health services. (Rosen 1958 p 227). Reforms were won only as a direct result of these struggles. Even then piecemeal protective legislation for improving working condition in mines and factories was granted grudgingly by the Parliament and resisted by the industrialists. While it did mitigate the harshness of the earlier laissez-faire system, however, it was not extensive to throw the system out of gear. During the 1830s factory workers demanded shorter and safer working conditions and prohibition of child labour. Between 1833 and 1864 a series of Factory Acts were passed. However, even then only child labour was protected. Protective legislation was favoured for children, but regarded as "unsound for adult women and men" (Rosen 1958 p 265). All legislation in the 19th century for the protection of workers in Britain was preceded by agitations and public inquiries, and was enacted into law in the face of determined opposition. However, these Acts did not cover much of the industrial population. These efforts to improve the conditions of factories and mines workers were concerned with and targeted at primarily children and women. It was only during the early 20th century that measures were taken to deal with the working conditions of adult workers. Even then they had little connection with what we now know as occupational health.

By ignoring the issues raised by sections of the medical profession and civil society regarding cause of ill-health, Chadwick can be considered to have laid the basis for a focus on immediately
visible causes of ill-health such as dirt, filth and foul drinking water, and excluding or avoiding other issues raised, such as those of radical changes, or of economic and political reform, or even that of occupational diseases. While filth was an important agent of disease causation, still they had their limitations as far as improvements of health were concerned. That medicine and the medical profession 'had little real knowledge to contribute toward a solution of the major problem, which concerned the transmission of communicable diseases' (Rosen 1958 p 225), was not important, and not completely correct. While the biological element in the causation of these epidemics cannot be disregarded, still they were caused in considerable measure due to social and economic factors. This was recognized by many of the physicians and others writing on them. It is important to understand (i) why other views were ignored and it was Chadwick's sanitary view that prevailed, and resulted in the establishment of public health legislation and administration; and (ii) what happened subsequently.

According to Hamlin ignoring the 'constitutional medicine' explanations in favour of a miasmatic view of ill-health was an attempt to steer medicine away from what could become 'a political critique of the industrial revolution.....' For Chadwick a table of causes of death expressed in politically innocuous terms (such as death from such and such disease) would help to subvert the possibility of professional medicine becoming political medicine. .........'. (Hamlin 1995).

According to Turshen the plight of the urban proletariat could not be ignored for several reasons. Firstly, the working class was coming together in trade unions and demanding better working and living conditions, and taking action to force through reforms. Secondly, mortality and morbidity were becoming so extensive that the capitalists' attempts to extract maximum profit through lower real and social wages were conflicting with their need for a productive and reproductive labour force. Thirdly, the conditions were becoming so bad that the epidemics formerly confined to the east ends of large cities, where the poor lived, were spreading to the rich west ends and beginning to kill members of the affluent ruling class. However, the reforms required to deal systematically with public health would have been too costly, and even ruinous, to the capitalists. One response to these conditions was the Sanitary Reform Movement.

Writing about the beginnings of public health in North America, Miller says that its periods of greatest advancement have been associated with movements for social reform and activism. In a Presidential Address to the American Public Health Association he says:
The genesis of health departments was more a matter of desperation than of enlightenment. Industrialization had spawned cities that were crowded, filthy and disease-ridden. Fearsome epidemics swept through urban populations, threatening rich and poor alike. Activism by the poor produced the tangible results that history recorded. Duffy’s history of the New York City Health Department documents that the New York City riots of 1863 evoked constructive action in a way that Lemuel Shattuck’s scholarly report had not. Shattuck had developed a plan for an integrated health 13 years previously. Despite conscientious efforts by community reformers to enact his plan in Boston and New York City, little was done until public demonstrations demanded it. The 1863 draft riots were essentially a revolt of the poor against privilege and property. From that uprising community public health had its beginning. This significant phase of achievement organized the power of local government around improved sanitation and epidemic control’ (Miller 1975).

We see that whatever reforms were introduced were as an outcome of the struggles of the working class. Turshen points out that ‘even the half-hearted attempts to deal with the health of the collectivity flourished only between 1850 and 1875 (in England). By 1880 government funds were being withdrawn, and by 1898 official interest had so far declined that the government medical officer testified that he occupied the lowest status of anyone in the whole public service……….’ By the end of the 19th century public health had become a technical engineering specialty. Public health services were limited to sewerage systems, food and water inspection, and prevention of epidemics. Measures such as improvements in sewerage disposal, sanitary engineering, protected water supplies, setting up diagnostic laboratories for proper identification and isolation of patients and carriers, disinfection, immunization, pasteurization of milk, were being instituted in many places. And the prestige of public health practitioners declined.

As far as the health conditions were concerned, overall there was a decline in general mortality rates from 1840s to 1900 (Rosen 1958 p 339). There was a dramatic reduction in deaths from typhus fever, due to improvements in living conditions and personal hygiene, and in typhoid fever as well. It is not that the public health measures were not effective – they were responsible in large part for the decline in mortality from typhus, typhoid and cholera. This was recognized, for whenever there was threat of a cholera epidemic, the Medical Department could be sure of funds (Turshen 1977). Survey of the working class districts of London from 1889-1902 showed that the general level of living had improved. However, by the end of the 19th century relatively little had been accomplished. While the real purchasing power of the worker had risen, however, the increase in wages was only in relation to the extremely low wage levels of the mid-19th century. A substantial portion of the labouring population was still living on incomes beneath the
subsistence level. Malnutrition and maternal mortality was high, and health of the children was extremely poor. The same unhealthy conditions in urban communities that had been brought to public attention in the 1830s and 1840s were still being exposed 30 years later. 'The Commission which sat in 1867 found in existence the main evils that were revealed by the Committee of 1840; the Commission of 1884 found in existence the main evils that had been revealed by the Commission of 1867. In many towns the death rate was higher in 1867 than in 1842............' (Hammond 1927, cited in Turshen 1977).

Writing in 1892, Engels describes the situation thus:

"Again, the repeated visitations of cholera, typhus, small-pox, and other epidemics have shown the British bourgeois the urgent necessity of sanitation in his towns and cities, if he wishes to save himself and family from falling victims to such diseases. Accordingly, the most crying abuses described in this book have either disappeared or have been made less conspicuous. Drainage has been introduced or improved, wide avenues have been opened out athwart many of the worst "slums" I had to describe. "Little Ireland" had disappeared, and the "Seven Dials" are next on the list for sweeping away. But what of that? Whole districts which in 1844 I could describe as almost idyllic have now, with the growth of the towns, fallen into the same state of dilapidation, discomfort, and misery. Only the pigs and the heaps of refuse are no longer tolerated. The bourgeoisie have made further progress in the art of hiding the distress of the working class. But that, in regard to their dwellings, no substantial improvement has taken place is amply proved by the Report of the Royal Commission "on the Housing of the Poor," 1885. And this is the case, too, in other respects. Police regulations have been plentiful as blackberries; but they can only hedge in the distress of the workers, they cannot remove it."(Engels 1892).

In his view, "Thus the development of production on the basis of the capitalistic system has of itself sufficed – at least in the leading industries, for in the more unimportant branches this is far from being the case - to do away with all those minor grievance which aggravated the workman's fate during its earlier stages. And thus it renders more and more evident the great central fact that the cause of the miserable condition of the working class is to be sought, not in these minor grievances, but in the capitalistic system itself" (Engels 1892 p 442 – emphasis in original). He goes on to say that as far as the condition of the working class during this period was concerned, there was temporary improvement even for the great mass. But 'this improvement always was reduced to the old level by the influx of the great body of the unemployed reserve, by the constant superseding of hands by new machinery, by the immigration of the agricultural population, now, too, more and more superseded by machines.' (Engels 1892 p 447). According to him
improvements could be recognized for two protected sections only of the working class – the factory hands, and those trades in which 'the labour of grown-up men predominates, or is alone applicable' (Engels 1892 p 448). 'But as to the great mass of working people, the state of misery and insecurity in which they live now is as low as ever, if not lower. The East End of London is an ever spreading pool of stagnant misery and desolation, of starvation when out of work, and degradation, physical and moral, when in work. And so in all other large towns – abstraction made of the privileged minority of the workers; and so in the smaller towns and in the agricultural districts....'

What this brief historical review indicates is that the period of the origins of modern day public health was much more complex and of far more significance than simply introduction of sanitary reforms. The very concept of public health, and of public action to improve health of people, originates from, and is rooted in, the massive social upheaval caused by the coming of industrial capitalism, and its devastating impact on the lives and health of large sections of the rural poor that migrated to the cities and became the industrial working class. Public health became a major concern for several reasons. Government responsibility and action were initiated to protect the health of the population. However, it was a contested issue. There were several explanations regarding the genesis of the problems; a variety of approaches to disease causation and health existed, with different ideological and practical consequences. What prevailed and received state patronage were initially, the sanitary views of the social reformers, and later that of the germ theory, both with a limited focus on environmental factors such as filth and germs as disease-causing agents. These have been at the cost of ignoring and sidelining the many social factors that were indicted and implicated by the medical understanding of that time. Such choices and actions taken have had extremely far-reaching implications for modern public health and medicine, including such aspects as the very definition of health. It marks the retreat of medicine and public health from the major social issues of that period. This Sanitarian Movement laid the foundations for modern public health systems, in which action is implemented through government institutions at various levels for clean water supplies and improvements in housing conditions and hygiene & sanitation, with inclusion in later years of other measures such as immunization and nutrition programmes, and programmes to protect health of new-born children. We find that: (i) Public health problems of communicable diseases were addressed initially (in the mid-19th century) by sanitary measures, and subsequently, measures made possible by knowledge of bacteriology and immunology were incorporated. These measures were instituted not because of the benevolence of the rulers and the bureaucracy, but also because of their needs to minimize economic losses. (ii) Much of the public health measures were implemented by legislation and bureaucratic intervention. It thus led to the establishment and
organization of health departments with various regulatory and enforcement functions, and hence to extensive organizational involvement of the State to enforce measures at the community level.

There was a dramatic decline in infectious diseases since the late 19th century in the industrialized countries of the West. While some attribute it to improvements in sanitation, nutrition and general living conditions (McKeown 1976), it has also been argued that specific public health interventions regarding factors as urban congestion actually played the major role (Szreter….). Radical analysts have discussed the role of colonialism/imperialism in improving the conditions of the working-class in the colonizing country in the early 20th century, and transferring many of these problems to the colonized populations (Turshen 1977).

2.2.2 The 20th century – ‘Scientific’ Medicine & Public Health

At the time that measures for sanitation of the environment and other measures based on bacteriology and immunology were going on, there was ferment within medicine in the second half of the 19th century. According to White, a wedge came into existence between public health and medicine, for various reasons. Conflicts and debates arose about role of medicine – about its priorities and values, about preventive versus curative aspects; about the role of public health and medicine; and from the need for regulating medical practice and standardization of medical education. The germ theory, with its single-cause, single-disease, single-treatment concept, became the dominant view in medicine and public health. It shut out other theories of health and diseases, other approaches to improving health and other modes of clinical practice. In the words of White, ‘scientific and clinical myopia came to characterize the work of all those concerned with the health and medical enterprise’ (White 2001 p 79). ‘Microbes as necessary and sufficient factors in the genesis of disease’ became the prevailing view.

According to White, the germ theory offered a ‘quick fix’ for the epidemic diseases of the times. It allowed the ruling elite – the politicians, industrialists, landowners and even the medical profession - to avoid the message of the hygienists and the social reformers, a message that was bound to engender vehement opposition from many vested interests. ‘Speedy results without social and political upheaval were promised by the advent of the germ theory’ (White 2001 p 76). In White’s view the social reformers in England, Europe and America, such as Chadwick, Shattuck and others, argued for improvements in housing, working conditions and the urban infrastructure. As a consequence they were viewed as threats to the property owners, newly emerging industrialists, and all others with a vested interest in maintaining the status quo; that is
so long as deterioration of the environment did not promote or perpetuate epidemics that decimated rich and poor alike (White 2001 p 89).

Growth of scientific medicine and public health as application of scientific medicine

White describes some of the initiatives and actions in Britain, Germany and the US, in late 19th-early 20th century that laid the foundations for the formal organization of medicine as a profession with uniform goal, education and standards of practice. According to him, in Europe, conflict emerged over the balance in the content of medical education between the viewpoints, interests and priorities of the two major branches of the profession – the academic faculties and the practitioners in the community. (In other words, what White broadly characterizes respectively as the 'scientific medicine' faculty and the 'public health' faculty). Should medical education be based on the academicians' limited clinical experiences or that of the community practitioners? Or should both be given equal importance? A related issue was over the scientific content of the educational experience. Should it be based largely on the current research interests of the professors or should it reflect all the concerns of society that center on health and disease? He goes on to say that in Europe medicine came to be gradually dominated by academicians, as against the then practicing physicians who were largely part of the public health infrastructure. Medical education did not include the full spectrum of factors that were believed to influence health and disease, nor any discussion of the clinician's responsibility for preventing disease as well as for treating it. The professors gradually restricted their concerns to hospitals and adjacent bacteriology laboratories; their own exposure to the population's health problems became more restricted. The prospect that the natural sciences (as symbolized by laboratory research) could yield better understanding of diseases, if not better therapies, became a basis for assigning it top priority. The dominance of academic and research-oriented physicians had another impact on medicine, apart from leading to a drift away from a public health orientation. According to White, '.........the excitement associated with the new advances in bacteriology was determining the educational and research priorities for the academicians. Curative medicine was still relatively impotent but it dominated medical education and practice; public health and preventive medicine soon were to evolve in a world of their own' (White 2001 p 84).

There was gradual denigration of public health throughout the medical curriculum by the leading medical academicians in Europe. Billroth, a Professor of Surgery in Germany argued that between university professors and practicing physicians, the former should establish and control the standards; it is their perspectives, values and experience that should determine the content of medical education. In his view the individual patient should be the focus of the medical profession; the precursors of illness and the state of the population's health were not concerns for
the medical faculty\textsuperscript{2} \cite{white2001}. \textit{A hundred and fifty years on, these views still dominate discussions about the mission of medicine and of epidemiology.}

Public health and hygiene was taught separately as post-graduate diploma courses in medical schools, to certify competence for those medical graduates who wished to become Medical Officers of Health in the government bodies. Departments of hygiene were set up in schools of medicine and were concerned largely with occupational diseases, industrial hazards and environmental sanitation. Public health and hygiene were still considered part of the academic mission of medicine, although a peripheral one. Leading clinicians (i.e. professors of medicine) of the day took interest and played an active role in developing teaching in public health. By the later part of the 19\textsuperscript{th} century, separate institutes of hygiene were set up within medical schools and formal academic institutionalization of public health began. \textit{Physicians like von Pettenkofer, who headed the Institute of Hygiene in 1865, envisioned the modern public health programme as one based on: a careful survey of existing conditions, intelligent planning based on scientific investigations, and above all, patient and continuous pressure on public opinion} \cite[pp 92]{white2001}. Scientific advances were supporting the measures he advocated for improving the health of the public, and for the education of physicians. In 1867 at a meeting of the British Medical Association to discuss teaching in public health, it was felt that the co-operation and support of the Social Sciences be obtained \cite[p 106]{white2001}. This group encountered increasing opposition to the importance of their ideas, as well as to the need for formal training in public health, which imparted a population perspective to medical education.

It emerges that a general disdain appeared for `applied' as against `pure/theoretical' work among members of the medical profession, and that a conscious choice was made by influential members to support scientific medicine as against the kind of public health that was then advocated by several members of the medical profession.

White does not attempt to analyze the reasons for this shift, or why was it that the germ theory came to prevail, or why there developed the `schism between medicine and public health'\textsuperscript{2}.

\textsuperscript{2} Billroth maintained that `from a scientific point of view it would be possible to oppose the claims of all these subjects to be taught at the university (i.e. medical jurisprudence, public sanitation, and hygiene)\textsuperscript{2}'. According to him, `The physician, as one of the most important members of the community, is expected not only to help in cases of individual sickness, but in community diseases as well. He is even expected to do his part in curing the stupidity and indifference of humanity. A beautiful task, but one that can be accomplished only by many generations of physicians, and then only imperfectly!... ... The fanatical champions of public health are fighting for a goal that is too high for my myopic vision. I can admire the struggle, but I cannot become interested in it' \cite[pp 85]{white2001}.
as he calls it. Here again, Turshen gives an explanation for the low regard for public health, and the rejection of the public health basis for medical education. The major beneficiaries of public health were the urban working-class, and its major targets were 'the slum houses, noxious factories, inefficient water boards, and offensive burial grounds'. More important, the public health work of that time tended to highlight the failings of capitalism. Many of the regulations of the public health acts entailed considerable financial losses for industrialists and other influential members of the rising bourgeoisie. Therefore, public health practitioners were not honoured in the same way that successful hospital practice was rewarded. According to Turshen a systematic response to the public health problems of the collectivity 'would have been antithetical to capitalism' (Turshen 1977). The public health problems, which persisted throughout the 19th century, were not seen as a problem in the organization and planning of town life. Collective formulations of disease causation could not be allowed to gain currency. The dominant classes of capitalist society wanted to avoid the development of public health, because collective action on health problems could strengthen political resistance. The germ theory could be used to mask the social factors underlying disease causation, and to shift the responsibility for disease back onto the working class, by denying either that social factors had anything to do with disease, or that capital was in any way responsible for the presence of microbes. The corollary was that clinical medicine, by locating the diagnosis and treatment of disease at the level of the individual, provided them with a means of social control; patients would fail to make common cause with each other to protest the external, underlying conditions that make them ill.

In the USA the process of separation of public health from medicine, and the domination of organized 'scientific' medicine came about through a different process. According to White neither the practicing profession nor the emerging academic branch of the medical establishment showed much interest in prevention or in public health. There the conflict was not between the practicing physicians and elite academicians, 'but between two groups of academic elitists', namely academic medicine vs clinicians (White 2001p 88). Change began in 1871 with reform of medical education, imposed on the Harvard medical faculty by Charles Eliot, the new president. According to Eliot the future of medicine lay in strengthening the 'basic sciences', the 'hard sciences' (White 2001 p 87). The educational reforms advocated and implemented placed greater emphasis on laboratory medicine and much less on clinical experience. Experimentation was considered superior to observation in understanding of health and disease. According to White, 'the laboratory superseded the clinic and the bedside as the site for investigations'. The patient and the community, with their social and environmental influences, were not viewed as important sources of information for understanding the genesis, natural history and management of disease.
at either the individual or population levels. All truly useful information, as also effective therapeutic and preventive interventions, was to come from studies in the laboratory.

America gradually assumed world leadership in medicine and related fields by the end of World War I. By that time the so-called 'medical model' of public health was gaining ground in medicine. The question was: was this to be a reductionist model, based on the germ theory of disease, supported by the highly successful field of bacteriology, and its research laboratories and accompanying specialization? Or was the medical model to be an ever-expanding paradigm that continued to embrace a broad spectrum of environmental, occupational, cultural, social, psychological, economic, and political influences on health and disease at the micro and macro levels, in addition to a broadened biological base? Who was to decide or, in more practical terms, whose views were to prevail? On what evidence was the "model" to be constructed for organizing society's efforts to cope with ill health at the individual and population levels?" (White 2001 pp 111-112).

According to White the entry of the Rockefeller Foundation in the first decades of the 20th century, and the subsequent setting up by the Foundation, of separate schools of hygiene and public health away from medical schools, in the USA and in different parts of the world, played a major role in institutionalizing the schism that had been developing between medicine and public health education over the earlier decades. White opines that most of the seminal ideas in the evolution of medicine's responses to the public health problems were generated by clinicians – they reasoned epidemiologically, and designed, advocated and implemented measures to improve the health of populations, using epidemiological and statistical methods and concepts. They had been applied at the insistence and with the leadership of physicians, many of whom were associated with medical schools. He says that while Chadwick, Shattuck, and Shaftesbury were the only laymen of importance in spurring the politicians to more effective action, the influence of the non-physicians, especially practitioners, their policies and practices, was relatively modest compared to that of the clinicians who controlled the medical establishment and advised the politicians (White 1991 pp 66-67). Furthermore these activities were perceived as a part of the overall mission of the medical profession until the first quarter of the 20th century. In 1916 when the Rockefeller Foundation decided to support the creation of schools of public health separate from the schools of medicine in the US, this mission was substantially curtailed. Other major factors contributed and a 'schism' developed between medicine and public health, between the individual and population-based approaches to health and disease. He does not specify what the other major factors were, or what they could possibly be.
As in the earlier decades, what maybe broadly called the environmental/social notions of disease causation reared up their head in different forms. Wade Hampton Frost and others argued that along with the agent, the host and environment also needed to be taken into account (Kreiger 1994). The classic studies of Goldberger and co-workers on the biologic and social etiology of pellagra linked its prevalence in the Southern states of North America to the cash-economy of the region. Whenever the cotton market crashed, there was a subsequent rise in prevalence of pellagra. Still others argued for examining 'social determinants' of health, under the banner of 'social medicine'.

By early 20th century Western society had been transformed by technology and had become industrialized and urbanized. Medical science too had become highly technical and highly specialized, and this had its impact on medical care and public health. Sigerist analyzed the medical care scene prevailing in the US then and concluded that radical change was necessary. Writing in the early 1930s he said, in the context of the US, that there were social aspects of medicine and public health that somehow had been submerged as public health had become compartmentalized and categorized, and the practice of medicine burdened with market-place considerations (Viseltear 1973). According to Sigerist 'Medicine as we practice it today is a service that is being sold by the physician and purchased by the patient. Medicine, therefore, definitely has an economic aspect. It has to fit into an economic system. How can we discuss any of these features if we do not know the elements of economics, if we do not know the mechanism of production, what wages are and what determines wealth or poverty in a society. Without economics there is no understanding....... [Further] you cannot afford to be disinterested in sociology. The physician is serving society. He has to fit himself into a given structure of society. He has to see patients who come from all strata of society and has to treat diseases that are quite often due to an environmental influence........' (Note 21 in Viseltear 1973). He implored the younger generation of physicians not to 'stand aside', but to become involved in the social aspects of medicine, to study history, sociology, political science and economics.

Viseltear also cites Winslow on the medical care scene in the US in that period. 'Certainly problems of medical care had emerged prior to the mid-1920s. Concern with need, inadequacies and inaccessibility of health services, the cyclical relationship between poverty and illness had all been described in detail in the many medical economic surveys and social commission reports of those states that had considered social insurance legislation in the early decades of this century......... the fact that rural areas were often without the services of physicians, that the high cost of adequate care had created a financial barrier between consumers and providers, and that medical services had not become preventive in nature but
Another view of growth of 'scientific medicine'

While White gives a rather simplified, sanitized account of the separation of medicine from public health, and the dominance of organized clinical medicine in Europe and the US, however, the history of the professionalization of medicine, as we see it today, can be considered as a political process with its roots in late 19th century US. As Brown shows, in the US medicine came of age during the same period that corporations grew to dominate the larger economy. As corporate capitalism developed, it altered many institutions in society, including that of medicine (Brown 1979 p 4). Modern scientific medicine was not simply an inevitable, natural outcome of the coming together of science and medicine in the 19th century. While the concrete scientific developments of the period led to the application of scientific thought and investigation to problems of disease, and were adopted by the reformers of medicine as an essential component of the medical reform process, scientific medicine had equally important economic and social origins. It succeeded because it gained the support of dominant sections of the American society. The growth and influence of organized 'scientific' medicine came about not simply through cultural assimilation or through the demands of industrial organization, but also by individuals who acted on its behalf. Using documents, such as unpublished letters and memos, from the Rockefeller and Carnegie Foundations' archives, and other published material from journals, Brown traces the historical ties between American medicine and corporate capitalism. He demonstrates that the rise of scientific medicine and the reform of medical education at the end of the 19th century required the support of the medical profession, as well as of the wealthy capitalists. Private philanthropic foundations were the major external influence on American medicine in its formative period from 1900 to 1930. In this period they gave some $300 million for medical education and research (Brown 1979 p 193).

The rise of science in the latter part of the 19th century provided the opportunity for the reformers in the medical profession to gain public confidence and raise the status of the profession. Physicians and biological researchers in Europe had been consciously applying the methods and principles of scientific research to problems of disease, though their work had little support, and played a very minor role within the medical profession. Since the middle of the century medical research started giving more applicable findings. It gradually provided practitioners with a somewhat more effective medical practice, enabling them to increase their credibility with the people. Medical research provided new tools of understanding and held out hopes for more effective ways for prevention and treatment than orthodox medicine had. All
these developments gave medical science a technically more effective direction, albeit a more reductionist one, as many would say.

In the US too there were changes in medical practice, reflecting the acceptance of the developments in Europe. American physicians who could afford the expense spent time at the then famous German and Austrian laboratories, and studied medicine in Germany (Brown 1979 p 72). While most American doctors who studied in Europe went on to have lucrative private practices on their return, a few went into developing laboratory medical sciences. By 1885 American medical science ‘came of age’ with the opening of the Johns Hopkins medical school, with almost the entire faculty trained in Germany, and with heavy emphasis on basic medical sciences. Medical practice also began to change with physicians introducing into their work those scientific medical practices that were uncomplicated and acceptable to patients, and seemed effective.

‘Scientific medicine’ came to be adopted as the medium for professional reform and uplift of medicine in US. It also became the ‘ideology of professionalization’ (Brown 1979 p 73). It enabled the medical practitioners to form a strong political organization, and to gain political and financial support from the dominant groups in society, which at that time were associated with industrial capitalism. The association of medicine with science also got it support from the newly emerging technical, managerial and professional groups associated with the growth of capitalism (Brown 1979 p 60). These classes were particularly attracted to the germ theory of disease, and this kind of medicine, which shared their world outlook, their values, and their industrial culture. Disease, in this view, was seen as an engineering problem that was amenable to technological intervention, which in turn was possible with sufficient talent and resources. For the industrialists the application of this kind of medical science and research held the possibilities of reducing the toll that disease took of society’s resources (like Chadwick’s thinking 50 years ago). The small increase in the effectiveness of the new ‘scientific medicine’ was re-inforced in propaganda by the profession and the media. From the 1890s on popular magazines and newspapers, along with leading medical journals, praised the accomplishments and predicted the future success of medical science (Brown 1979 p 77, 79). They portrayed medicine as an ‘exact science’ and the physician as an inquiring and skeptical scientist, and wrote of the ‘Triumphs of Medicine’ and ‘War against Disease’.

In keeping with this thinking the sciences – the physical sciences, anatomy, physiology, bacteriology, pathology, biochemistry, microbiology, and so on – became the foundations of medical education, as against thinking about health and disease in terms of relationships between
the person and the environment. Increasingly, medical education came to be dominated by academic physicians, as against the practicing physicians. The need for research and teaching of medical sciences created a whole new category of academic medicine.

This professionalization had a negative impact, among other things, upon the provision of medical care. Scientific medicine was promoted as the only effective therapeutic method. Through their campaign the medical profession excluded other methods of prevention and therapy. Those who could afford it went to specialists. The most oppressed groups suffered the most. While the poorer classes were excluded from entering the profession, they also lost the medical care that was indigenous to their communities and was available to them—such as those of midwives and other healers. The poor filled the teaching hospitals, to become teaching and research material; or went to charity clinics. The working classes, excluded from private specialists and charity clinics, resorted to the non-elite general practitioners. Women also suffered from unnecessary surgery and over-attention from gynaecologists.

In the conflict referred to earlier in this section, between the practitioners and academicians in medicine in the US, the Rockefeller Foundation supported the medical scientists (the academic medical men). The practitioners wanted to control entry into the profession, have a medical training that imparted technical training to the doctors, and wanted the medical schools to provide material support and propaganda to continue the dominance of this scientific, technological medicine. What they wanted was unity among the academicians and practitioners. The academic clinicians argued that 'it made sense for those who were the source of medical science to direct the resources of the new scientific medical system' (Brown 1979 p 188). They wanted a greater share of the money spent of medical care, and to control, through their medical centers, the healthcare services. The Foundations, in the name of objectivity, wanted a rationalized medical care system (in other words, efficient and unified) that would contribute to the health of the people. The Rockefeller Foundation, therefore, gave more than $100 mn towards medical education. It too ‘believed’ that medical schools were the center of the scientific and technological system of medicine. Brown cites some of the clinicians leading the American Medical Association on the conflict, who resented this attack by the General Education Board (GEB) on their interests. 'The Rockefeller philanthropies had become a disturbing influence by dictating the scheme of organization of our schools....... Their position had become a real menace to sound development. The GEB had been badly advised by men who are laboratory workers and teachers of anatomy and pathology........These men regarded the laboratory as representing the science of medicine, and they rather feel that clinical medicine is not scientific
medicine’ (Brown 1979 p 190). They argued that in the training of physicians the controlling influence must lie with the teachers of clinical medicine.

The growth of medical science, research and practice required investments in hospitals with fully-equipped operating rooms, x-ray machines and other diagnostic and therapeutic facilities, in laboratory facilities, and expenses for highly specialized faculty and researchers. All this implied technology, resources and investments, which were beyond the means of the physicians themselves. While the needs of medicine itself led to the growth of medical science and research, and organized medicine, however, the development of corporate capitalism, accompanied by the rise of private philanthropy, in that period in the US was perhaps the most important condition. It not only provided the ideological and cultural support for scientific medicine, but also the material support and resources for medical research and education.

Industrial capitalists, especially Andrew Carnegie and John D Rockefeller, established the philanthropic foundations that made available vast grants of money for medical research, medical education reform and modern hospitals. They did this because they believed that support of scientific medicine would be a good investment in the economic, social and moral order of corporate capitalism. Brown summarizes it thus ‘Medical research and education as a whole, however, were helped immensely by the Rockefeller fortune. Under the skillful direction of foundation officers, the Rockefeller wealth became the largest single source of capital for the development of medical science in the United States, the conversion of medical education to a scientific research basis, and the development of public health programmes in the United States and abroad’ (Brown 1979 p 104, emphasis in original). For the first quarter of the century, the Rockefeller officers, under Frederick Gates, developed a definite strategy for their capital investment in medicine.

The value of ‘a healthy workforce’ had been recognized by the mid-19th century in many contexts. Health was found in a variety of ways to be profitable; healthy workers were an employer’s ‘human capital’ to be utilized for production of salable goods and services. It was not concern for the workers’ needs that led to better working conditions, and health and welfare programs for them. Rather these reforms in that period arose, on one hand, from the unions and political organization of workers, and, on the other, from the realization among the capitalists that production was lost due to illness, rapid turnover of workers and strikes. The firm that took pains to keep its workers and arrange for their welfare found increased productivity, and increased the dependence of the workers on the company, and lessened the threat of unionization. As early as 1892 firms found it profitable to prevent the loss of experienced workers, as ‘it was impossible to
get new men to run successfully the complicated machinery of a modern steel plant' (Brown 1979 p 115). They found it 'good business to conserve life and health', for thereby 'one of the most important items of economy in production is secured' (Brown 1979 p 115).

The material benefit of medicine was a healthier population and thus a healthier workforce (Brown 1979 pp 113-114). The Rockefeller Foundation, through Gates, consistently articulated the perspective and interest of this entire class of the early 20th century in a stable and healthy workforce. He viewed the public health in a larger capitalist class perspective (Brown 1979 p 117). However, he was not alone in his views. Over time the leaders of corporate capitalism in the US, and elsewhere, believed that government-sponsored sickness insurance, workers' compensation and other social security measures would reduce the appeal of radical labour and socialist movements. Leaders of many corporations also believed that medical care, when extended to the whole population, would substantially improve the health of workers and their families, which included future workers.

Among those leading the reform of medicine there were broader views regarding the importance of medicine to society. For Eliot, the Harvard president, who launched major reforms in 1869, the primary object of medical research was striving for 'truth in the abstract', and its secondary object was applied, 'to prevent industrial losses due to sickness' (Brown 1979 p 118). According to another reformer, Welch, scientific medicine made possible the 'great industrial activities of modern times, efforts to colonize and to reclaim for civilization vast tropical regions, [and] the immense undertaking to construct the Panama Canal' (Brown 1979 p 119). According to Brown, academic doctors were content to support the uses of medical science laid down by the philanthropic foundations, whose funding programs guided the development and utilization of research. As he points out, the medical profession thus accepted the capitalist definition of health, as the capacity to work; and subsequently public health became application of scientific medicine to populations to keep them healthy and fit to work.

Medical science also held value for Gates and other industrial capitalists as a cultural force. Brown quotes Gates' views on the human body, disease and health, and the potential of medical science and research, and says that Gates believed that: scientific medicine would help unify and integrate the emerging industrial society with technical values and culture; and legitimize capitalism by diverting attention from structural and other environmental causes of disease (Brown 1979 pp 119-122). Berliner too describes the process by which scientific medicine came to dominate the field of medicine, the contradictions in the process and how they were resolved.
by the Flexner Report. The European version of the Flexner Report had great influence on medical education in Europe also (Berliner 1975).

Of all the Foundations, the General Education Board of the Rockefeller Foundation was "the leading influence in remodeling American medical schools on the Hopkins plan" (Flexner, quoted in Brown p 193). The more than $ 82 million they gave for medical reform by 1930 had a tremendous impact. This Board sought a rationalized medical care system, directed by medical schools that were committed to a scientific and technological type of medicine. With their wealth and influence, the Rockefeller philanthropies thus promoted the dominance of scientific and technological medicine. As Brown puts it 'Because of the ideological appeal of this new medicine and its presumed technical effectiveness, the philanthropies and many other groups in industrialized societies took to the analytic theories and the research and development methodologies of medical science, and advocated the organization of medical practice solely around technological medicine. By 1930 they had firmly established the importance of well-equipped medical centers for all medical practice and health care organizations, as well as for training new medical professionals and for developing knowledge and technique' (Brown 1979 p 194).

The Rockefeller Foundation was also the first major source of funds for professional education in public health. Largely because of their faith in Welch's commitment to scientific and technical approaches to health issues, the Foundation gave $ 1 mn to the The Johns Hopkins University between 1916 and 1922 to set up the first full-fledged school of public health in the US. Between 1921 and 1927 they gave $ 3.5 mn to Harvard University to organize another school. In all they contributed more than $ 25 mn for the development of public health schools in the US and abroad. The Foundation then launched a worldwide program of support for schools of public health and institutes of hygiene, such as the London School of Hygiene and Tropical Medicine, and in several cities across Eastern Europe, in Calcutta (All India Institute of Hygiene and Public Health), in Manila and in Sao Paulo. They also spent several millions more on fellowships for foreign medical personnel to be trained in public health (Brown 1976).

Brown discusses the interests that led the Rockefeller philanthropies to help professionalize public health work. According to Brown professional public health today owes much of its growth and development during the 20th century to the needs of colonialism and imperialism. Schools of tropical medicine were established by the colonial powers at the turn of the century (London School of Tropical Medicine in 1899) to train doctors for the colonial medical services, and apply the medical sciences to the disease-problems of the tropical colonies. This was
necessitated by the fact that tropical diseases ‘decimated’ the European and American personnel, as well as reduced the efficiency of native working-populations. These schools of medicine and medical research institutes were successful in reducing the toll from tropical diseases, especially for the foreign personnel. The Rockefeller public health philanthropies were within this imperialist tradition. The Rockefeller public health programmes abroad were intended to help the US investments and to develop and control the markets and resources of those nations (Brown 1976). It was also believed that tropical diseases – especially malaria, hookworm and yellow fever – were obstacles to the development of underdeveloped countries and to them receiving the ‘benefits of civilization’. The biomedical sciences and their application through public health programmes would increase the health and working capacity of these peoples and help induce them to accept western industrial culture and US domination.

The Rockefeller Sanitary Commission for the Eradication of Hookworm Disease was founded in 1909 to tackle the hookworm problem in the US South. Brown describes the activities and the stated aims of this Commission and the General Education Board there, as revealed by the documents of the Foundation archives – internal memos and correspondence between the members and other published reports. As explicitly stated the Sanitary Commission was intended by its founders to integrate the ‘backward’ South into the industrial economy controlled by the Northern capitalists. To that end it sought to increase the productivity of Southern agricultural and industrial workers. The General Education Board was formed in 1902 to promote education there for expanding industrialization. In 1913 the foundation established the International Health Commission (IHC) to extend worldwide the hookworm and public health programmes initiated in the US. The IHC organized, financed and directed major campaigns against hookworm in the British Empire, including India, Latin America and Asia. In 1914 they began a campaign against yellow fever and in 1915 another one against malaria. The hookworm program was given priority ‘on account of the direct physical and economic benefits resulting from the eradication of the disease and also on account of the usefulness of this work as a means of creating and promoting influences’ (Brown 1976 p 899). The Rockefeller programmes were also intended to reduce the cultural resistance of the ‘backward’ and ‘uncivilized’ peoples. The Foundation discovered that medicine and public health were far more effective than missionaries and armies for placating primitive and suspicious peoples. In Philippines the Foundation outfitted a hospital ship to provide medical care and to bring the ‘benefits of civilization’ to the rebellious Moro tribes. Their medical work paved ‘the way for establishing industrial and regular schools’ and served as an ‘entering wedge for permanent civilizing influences’. The Foundation created organizations and government ministries and departments, and trained local doctors and personnel who were willing to co-operate, to control and run these programmes. The Foundation
seemed willing to hand programmes over only to British colonial governments and other
governments that would keep the personnel selected and trained by the Foundation. By the 1920s
the Foundation had worked in more than 60 countries. The importance of these programs and
the lack of sufficient trained personnel led the Foundation to promote the establishment of
schools of public health. These schools were to develop useful medical knowledge and train
personnel for the programmes and departments it was organizing.

Thus the history of modern medicine (and along with it that of the present public health
system), as we see it today, is analyzed by Brown as a political process, with its roots in late 19th
century US. Members of the corporate class, acting through philanthropic foundations,
articulated a strategy for developing a medical system to meet the needs of a capitalist society.
They believed that the goals that they set for medicine would benefit the entire society, just as
they believed that the private accumulation of wealth and private decisions about how to use that
wealth were in the best interests of society. Health came to be defined as the capacity to work
and increased productivity of populations was the measure of success of public health
programmes. Foundations and other corporate class institutions insisted that medicine serve the
'needs' of the corporate class society. The medical profession and other medical interest groups
each tried to make medicine serve their own narrow economic and social interests. The
dialectics of their co-operation and common efforts, on one hand, and their clashes and conflicts,
on the other, and the momentum of the economic and political forces set in motion by their
actions, shaped the medical system as it grew. As Brown points out, once public health
programmes were launched by the Foundation, the internal logic and momentum of these
programmes and the historical conditions assured that the ends of capital and imperialism were
served; no explicit conspiracy was needed to achieve these ends (Brown 1976).

The strategy thus initiated, and the economic and social forces set in motion in the early
decades of 20th century continued to develop over the later years. Although Foundations
continued to provide leadership in medical affairs, the State soon took over from them the
dominant financial role in education, research and development of medical care. However, in
both the industrialized countries and in the newly independent colonies, the State continued with
the Foundation-formulated strategies of developing technological medicine and instituting
healthcare systems for delivery of this medical care. Out of this history has emerged a medical-
healthcare system that is now dominant not just in the USA, but has been carried to and adopted,
with modifications, in most parts of the world, including India.
Organized medicine dissociated itself from the public health that was advocated in the 19th century, and reformulated the concept of public health without its social concerns, defining it as 'the application of scientific and medical knowledge to the protection and improvement of the health of the group'. Similarly, epidemiology, which informed the medical profession's way of thinking in the 19th century, also lost the population perspective over the 20th century. While traditional epidemiology was motivated, at least partially, by public health concerns and the population was the level of study, modern epidemiology came to be motivated by science and, informed by a positivist approach, became a set of generic methods and techniques for measurement of disease occurrence.

Since the 1990s a vigorous debate has been going on over the role and mission of epidemiology. Several reasons have been forwarded for this shift. According to Pearce, some of the reasons for the lack of interest in the population perspective may lie in the personal and professional situations of epidemiologists. Firstly, in most countries the main sources of funding are government or voluntary agencies that have little interest in, or sympathy for, studies of socioeconomic factors of health. They have been most supportive of studies that focus on individual life styles, and 'epidemiologists either through choice or through necessity, have tended to go where the money is'. He adds that socioeconomic factors are 'too political'. However, as he rightly points out, the decision to not to study socioeconomic factors is itself a political decision to focus on what is politically acceptable, rather than what is most important in scientific and public health terms. Secondly, perhaps the main reason that socioeconomic factors receive little attention in epidemiology is because they are not considered to be real causes (Pearce 1996).

It is significant that in this situation of debate and contestation, clinicians like White – writing under the aegis of the Rockefeller Foundation- call for a re-integration of epidemiology, medicine and public health, and for 'academic medicine' to provide the leadership to the entire health establishment to cope with today's public health problems (White 1991).

2.3 Technological medicine and organization of medical practice and care in the 20th century

The political-economic context and manner in which technological medicine has developed has created opportunities for development of new industries that now play a powerful role in medical politics as well as the medical economy. Technological medicine needed not just technology, but also large capital and operating expenditures. Hospitals developed a powerful position in modern health care as the major centers of medical technology. While hospitals provided doctors with diagnostic and treatment facilities that made them technically more sophisticated and enhanced
their prestige, at the same time, these hospitals required increasing funds. Such funds could not be raised from patients’ fees, nor could physicians themselves provide the capital to build and equip hospitals. So the hospitals had to depend on sources such as philanthropy, government and commercial banks for the capital needed. As the operational expenses increased, they became dependent on the resources of insurance companies and the government. Physicians also needed medical schools to produce the advances that might be applied to medical practice, to train and socialize new members of the profession; drug companies to produce their drugs, and medical equipment and supplies companies to supply the machinery for diagnosis, management and therapy. Hence technological medicine made physicians dependent upon, capital-intensive commodities, ones that required substantial capital investments and hired labour to produce. Thus “the forces of production’ in modern medical care came to require high capital expenditures and co-ordination among specialists” (Rodberg and Stevenson 1977).

Since the mid-20th century medical technology has been the foundation of several new industries, which directly profit from the emphasis on technical approaches to health problems. These are respectively the drugs and pharmaceuticals industry, and the medical devices and equipment industry. The availability of medical technology enabled the medical profession and all these new interest groups to further divide medical care into discrete service units and products that could be sold in the medical market. Health insurance – both private and government (Medicare and Medicaid in the US) – effectively subsidized the rapid expansion of capital-intensive medical care. Banks were among those who profited from this expansion by providing hospitals with profitable commercial loans, usually guaranteed by the government. Clinical laboratories, hospital and medical supply, drug, and nursing home industries similarly boomed. With these developments, over time, the power of physicians shrank relative to the increasing economic and political power of the capital-intensive medical sector. According to Brown, in the US doctors have found themselves in a struggle with hospitals, insurance companies, medical schools, foundations, government health agencies, and other groups with an interest in a rationalized health care system, one in which more emphasis is given to capital-intensive services.

Rodberg and Stevenson analyze the nature of the contemporary organization of health care industry in the USA, and its role within the capitalist system of production (Rodberg and Stevenson 1977). They discuss how healthcare has got commoditized, and what that implies for the nature and dynamics of healthcare. They place it within the larger service industry, which has become an important part of economic activity. They point out that the service sector has become important as a direct result of the development of capitalism, and the associated
phenomenon of urbanization, where services such as transportation, water supply and sewage disposal, etc. have to be provided to large clusters of people. Provision of healthcare also has become one such important service. They show that as provision of services requires smaller capital than production of goods, the provision of services in commodity form goes on by small businessmen, shopkeepers and individuals. It has got organised along capitalist lines under special circumstances, such as when there is need for expensive equipment or special marketing situations (p 106). For instance they identify several forms in production of healthcare in the US:

pre-commodity - communal (practicing native Americans); petty commodity (individual private practitioners); capitalist commodity (industrialized, high-technology, hospital-based) and social (planned use-value oriented). They identify some distinguishing features of health care, because of which it does not take along a 'pure' capitalist commodity form. Such as: use-value, and not market criteria such as profitability alone, determines the organization and distribution of health care. Social criteria, such as that some form of health care be available to most people, influence decisions such as how to finance healthcare, where to locate hospitals, and what kind of healthcare should be offered.

Rodberg and Stevenson describe the healthcare industry in the capitalist system in US as performing four interrelated economic functions. As a commodity its production allows accumulation of surplus. This process opens up investment opportunities and absorption of surplus, and is an area where new markets are constantly being created. It also serves to absorb surplus labour, and maintain labour in working condition. Finally it performs certain ideological functions. We look at the first two aspects here. While the provision of healthcare services to workers and their families contributes (indirectly) to accumulation by their employers (insofar as these services improve their capacity to work), accumulation is also encouraged within the healthcare industry itself. As healthcare facilities have grown and multiplied, the complex of intermediate, profit-making companies producing drugs, equipment and supplies, and construction has benefited immensely, and has become an intrinsic part of healthcare services. These profit-making institutions have made a place for themselves in the generally non-profit making area of healthcare, both by producing the material goods needed, as well as by providing medical facilities for those who are not adequately served by the voluntary or the public sector. Generally speaking there are no non-profit drugs or equipment making companies. In the industrialized countries one outcome of state financing of healthcare has been the market expansion for the peripheral firms, i.e. those supplying drugs and equipment, other systems and communication, and construction firms. New, costly technological innovations are being promoted and adopted especially since the 1970s, even when there is evidence that they are no
more effective than other less expensive ones. Such investments keep up employment and profits. It has also opens up new markets for old and new goods, within the US and abroad.

A new structure for delivery of healthcare services emerged in the early 1970s in the US, a major component of which was the health maintenance organization (HMO – insurer-type intermediaries between hospitals and employers). HMOs made possible the organization of health services delivery under conditions of advanced capitalism in the US (Salmon 1975). The immediate context was the increasing crisis in the US healthcare sector since 1970s due to increasingly expensive nature of scientific medicine; the income-maximization goals of the petit bourgeois professionals (and individual capital like drug and equipment manufacturers) came into conflict with the pressure by capital as a whole to keep down healthcare costs. Since 1968 big business started exploring investment possibilities in medical care and at ways 'to get in'. Large corporations planned to go beyond financing and peripheral supply roles to enter health services delivery as well (Salmon 1975).

The organization of medical care along the lines of the market-system has thus had the profound effect of transforming medicine and its technology, and healthcare, into a commodity, not only in the US but all over the world. The provision of health care on payment in capitalist societies has become one of the most significant ‘service sectors’ of modern capitalism. Like many other services health care is offered for a price.

Brown describes the impact of such technological medicine on provision of medical care (Brown 1979 pp 212-215). It led to medical care getting organised along the lines of the market-system in the USA. The availability of medical care (production and sale, as he calls it) got distributed according to the class structure rather than on the basis of need. It also distorted the character and supply of medical care. Insurance coverage of hospital care encouraged hospitalization for diagnostic and therapeutic procedures that could be done more safely and inexpensively outside hospitals, or avoided altogether. So well-insured persons – whether well-off or poor- became victims of excessive care. Physicians concentrated themselves in specialties and locations where they could take best advantage of the market for their services, such as in the well-off areas of big cities and the expanding suburbs, than in the poor and working-class areas. Most importantly, physicians abandoned general and primary care practice for more lucrative and prestigious specialties, or for a career in medical research. The rural areas, with its limited market for specialty services and isolation from centers of technological medicine, were of no interest to the physicians, and the urban poor were of interest only when they served as research and teaching material. Thus technological medicine combined with the market organization of
medical care, to divert physicians from areas and types of services in which they were most needed to those that were profitable, most interesting, and professionally rewarding to them.

While analyzing the phenomenon of entry of financial and industrial capital in medicine and healthcare in the US, McKinlay refers to the 'medical-industrial complex' (McKinlay 1977, 1978, 1979). He lists out several features of medicine that make it immensely profitable, and states that 'the business of medicine has been rendered a highly desirable arena for the presence of capitalist institutions' (emphasis in original). Given such attractive features it was not surprising that many large manufacturing industries with very diverse operations had got into the medical business. In addition larger financial capital institutions – commercial banks, life insurance companies, mutual and pension funds, diversified financial organizations, foundations – had also entered the medical arena.

According to McKinlay, the industrial and financial capital institutions in medical care impose the same logic (profitability through expansion) on this field that they have been doing in other sectors of the economy since around the turn of the twentieth century. Their presence has ramifications at all levels. Among other things, it fosters fetishization of illness through an intensified sales effort. He uses the analogy of automobile production to explain his point (McKinlay 1978). In earlier times the automobile was a relatively simple commodity, which for some people fulfilled an uncontrived need for transportation. Over the years, and primarily in response to the structural requirements of profitability unnecessary values, in form of accessories (fulfilling contrived demands) have been added on to the original commodity, so that we now have the paradox of values being derived more from its unnecessary parts than from the necessary ones. Indeed, it is now difficult for the average person, confronted with a vast sales effort, even to know what constitutes the automobile's unnecessary and necessary parts. Even if one could, one cannot now purchase the latter without also purchasing the former. Furthermore, more workers are now associated with and more surplus value is extracted from, the unnecessary added part than from the necessary part of automobile production. There exists a comparable situation with respect to medical care. What started off as a relatively simple set of possibly effective procedures fulfilling some uncontrived human needs has been transformed into an increasingly sophisticated, yet ineffective body of unnecessary components. The latter includes demonstrably ineffective procedures, wasteful use of (bio)technology, unneeded ancillary testing, overutilization of hospitals, ritualistic surgery and so on. Such socially wasteful activities probably now outweigh the demonstrably effective and necessary part of medicine. It is now impossible for the average person to distinguish these between these parts, and no enlightenment is likely to come from those self-interestedly involved in their production. Furthermore,
nowadays one cannot obtain the relatively simple yet effective part of medicine without also being obliged to purchase its expensive, yet unnecessary and ineffective part. And more and more highly trained workers are increasingly involved in the task of producing these unnecessary added values than in the socially useful production of effective, low technology health care.

In an address to the Massachusetts Medical Society in 1980, Relman referred to the new 'medical-industrial complex' in the delivery of health services in the industrialized countries (Relman 1980). By this 'medical-industrial complex' he meant 'the large network of private corporations and investor-owned businesses, engaged in the business of supplying health care services to patients for a profit - services that, so far, were provided by non-profit institutions or individual practitioners'. He clarifies that he does not have in mind the companies that manufacture pharmaceuticals or medical equipment and supplies. In his view there is nothing particularly worrisome about them, they have been around for a long time, and no one has seriously challenged their social usefulness. Furthermore, he feels that in a capitalist society there are no practical alternatives to the private manufacture of drugs and medical equipment. It was the former that had potentially troubling implications for the future of the medical-care system. It was not only very large, but also highly profitable, and was expanding rapidly. According to Relman, such a health care system 'may be more efficient, but it creates the problems of overuse and fragmentation of services, overemphasis on technology and 'cream-skimming', and it may also exercise undue influence on national health policy'.

In the early 1990s in the US a growing number of hospitals, health maintenance organizations (HMOs), nursing homes, home-care services and hospices became for-profit companies, publicly traded on the stock exchanges. HMOs transformed into multi-million dollar businesses depending on a mixture of public funding, private health insurance and user charges, acquired non-profit hospitals cheaply and gained effective control over US hospitals (Sexton 2003 p 43). The pursuit of market-share, search for profitable admissions and relentless cost-cutting came to dominate all aspects of healthcare. By the late 1990s pressure to protect profit margins led to such measures as insurers and hospitals avoiding sick patients and outright denial of care to many, and micromanagement of physicians. 'More than any other country America has turned healthcare into a business' (The Economist quoted in Sexton 2003 p 43). Healthcare became the largest sector of the US economy.

Woolhandler describes at length the negative impact of this corporate healthcare in the US on coverage, quality of care, etc. According to her features such as consumer responsiveness and notion of choice as promoted by the market enthusiasts are rather illusory. For-profit hospitals
cost more and provide worse care. Much of their excess costs are due to higher administrative costs; they actually spend less on clinical personnel than do non-profit hospitals. Studies have found higher death and complication rates at for-profit hospitals. In areas where managed care predominates, charity care shrinks and research suffers. Academic leaders attest to the damage that managed care has inflicted on research, teaching, care of the underserved and collegial relations (Woolhandler 2003).

As Sexton points out what the American experience brings out clearly is that policies that encourage and promote private, for-profit healthcare providers undermine the public healthcare sector in several ways (Sexton 2003). Competition among providers translates to competition for patients – the private sector tends to take the healthier and wealthier ones, while the public sector has to bear the burden for the most vulnerable people. There is loss of preventive services: the public sector has less money for them and the private sector is not interested in them. Private healthcare providers do not aim to provide healthcare to society, rather they provide health products or surgical solutions. They will not supply inherently unprofitable care to anyone, least of all to those who are in no position to pay for it. (Finally healthcare cannot be planned on the basis of individuals, or a highly segmented medical practice; it is about populations and allocating appropriate resources according to well-worked out priorities).

The organization and financing of healthcare systems in England, in European countries in general, has been different. Solidarity and universal coverage are considered to be distinctive goals in the organization and functioning of the European health systems (Koivusalo 2003). In Britain the 1911 National Insurance Act made general medical services available to manual workers and others on low incomes, and incorporated the principles of social insurance with contributions from the individual, the employer and the state. Government at both central and local level became increasingly involved in direct provision of healthcare services during the first half of the twentieth century. The extension of access to healthcare for the entire population came about through the 1946 National Health Services Act. Such provision of healthcare became known as the NHS model, and became a model held up as the distinguishing feature of the welfare state, and one to be emulated. It provided access for the whole population to hospital care, community-based general medical services and drugs at no direct cost, or at minimal cost, at the point of receipt of the service (Uttley 1991 p 4-5). The origin of the NHS is linked to movements of the working class. According to some, the ruling class in Britain had become acutely conscious of the Russian Revolution of 1917, and the revolutionary movements in Europe following this and the World War I. Welfare reforms, including the NHS, were therefore granted
following the Second World War, in response to the threat of revolution posed by the working-class movements and other oppressed peoples internationally in the 1940s (Shaoul 2003).

Global political economy and the health services

The international monetary crisis in the 1970s set in motion adjustments worldwide in economic policies, to assure stability and continued US dominance (Salmon 1975). By the late 1980s worldwide economies were beginning to be restructured. The economic reforms that were initiated overturned the planned expansion of welfare and led to introduction of restrictive monetary policies. Such resolution of the economic problems had significant implications for healthcare and for the social sector in general. *It gave rise to a restructuring of health services in the name of social efficiency.* Health sector reforms were initiated in many advanced capitalist countries, as well as developing countries, that had a public healthcare system, irrespective of whether it was funded by taxation or by insurance (Sen 2003a).

Macro-economic measures aimed at curbing public expenditure on health were introduced in the mid-1970s in the UK. Shaoul has analysed the rise of neo-liberal policies that have been given rise to several kinds of health sector reforms in the UK in the context of globalization. According to Shaoul the neo-liberal policies arise from the workings of the economic system itself (Shaoul 2003). The reforms were as follows: a series of measures under the umbrella of New Managerialism that comprised: (i) a series of institutional measures to control healthcare expenditure as a whole and to generate income; (ii) measures to cap the activities and scale of the public sector; and (iii) a set of financial, organizational and managerial measures to increase outputs and reduce costs through greater efficiency at the point of service delivery. In addition there were (iv) introduction of quasi-markets and the reconstitution of healthcare providers as business units charging for the services on a competitive basis; and (v) use of private sector to finance, build and operate non-clinical services. *According to her the chief characteristic, of all these economic, financial and organizational 'reform' measures, is that they are 'the techniques used by the private sector to generate profit out of the production of commodities for distribution to the providers of finance'* (Shaoul 2003 p 152). Henceforth, state services were to be organized on a similar basis. Furthermore, there was an emphasis on financial management as a proactive tool to manage public healthcare in order to achieve objectives, not simply as a tool to record income and expenditure. This approach was accompanied by emphasis on the three Es - economy, efficiency and effectiveness - and the growth of performance measures which attempted to capture and compare the performance of public sector providers. The underlying basis for all these was the assumption that the tools of private sector management could improve the output and thereby resolve or contain the 'problem' of rising cost of healthcare provision. *It*
represented a change in the way that public health was managed in two significant respects: from planning on the basis of perceived need to managing by financial numbers; and from decision-making and control by the service professionals to decision-making and control by managers.

This financial regime that got set in place, under which public services were to be run as private sector operations in the public sector, added a new set of stakeholders, with claims on the surplus for the physical replacement and improvement of the capital infrastructure and repayment of finance capital that must be met. Shaoul argues that these changes mark a very definite transformation of social relations in several aspects. Firstly, the relations of production in health are being realigned so that they match those of the private sector. Second, services funded by the public through taxation are being organized by the state to serve more directly the financial interests of the private corporations, not the public, via outsourcing and partnership arrangements. Third, the public is being reconstituted as the customer for the goods and services so produced (Shaoul 2003 p 153). While these measures may appear, and were presented as a form of decentralization that permits local decision-making, their real function was to create the structures and mechanisms for the private sector to more easily control, own and direct public services and public policy. Further, these changes are part of an ongoing process whereby the social and public services pass into the private sector through sub-contracting, buy-out mechanisms, and sale and lease back operations such as the private finance initiative (PFI). Finally, such services are then integrated into the wider international economy as they are taken over by the trans-national corporations. In other words, the social welfare functions of the nation-state are being integrated into the world economy, not for the benefit of the population at large, but for capital. The significance of the neo-liberal policies is that they provide the ideology and mechanisms to create an international market for health.

Similarly, Iriart et al too argue that the current health sector reforms are related to the crisis in the model of capital accumulation, due to factors such as recession, growing employment, profound transformations in production processes, increasing domain of finance capital in the world economic system, and increasing Third World indebtedness. The State is identified as the cause of the crisis, due to its inefficiency in managing the productive enterprises and services, and its growing social expenditures. Hence there is need for reforms and restructuring (Iriart et al 2001). Iriart et al also show how there is a 'social construction' of a new 'common sense' at the ideological and economic level. According to them ideas of efficiency, effectiveness, cost, choice, benefit, decentralization, community participation had been recommended earlier on, in the context of health as a public good and state responsibility (within an economic model of capitalist accumulation). These are being 'recaptured' now in different meanings, which are being determined by the new context. In the new context the 'new common sense' that is being
constructed is that of health as a private good to be acquired, and is not a public good or universal right, nor is it a state responsibility.

Thus, while the ostensible rationale for these changes is that of shortage of funds in the public sector, however, the global transformation from welfare/state provision to markets in reality is related to changes in the nature of the accumulation process, wherein there is a decline in profits from manufacturing industries and a parallel search for profits from other sectors of the economy. As mentioned earlier, services have been a significant part of the economies of industrialized countries, and are governed by complex domestic regulations. Changes over the past have targeted this services sector for privatization and rapid global integration (Sen 2003b pp2-3). These processes have been facilitated by the developments in communications and information technologies in the past two decades. Over the past decade the processes of globalization, mainly through privatization and expansion of corporate entities and market-led activities, have increased. The integration of commerce, investments and finance into the global economy has become the major force in the setting of public policies, including those in the health sector. The establishment in 1995 of the World Trade Organization (WTO), with its legally binding General Agreement on Trade in Services (GATS), has been one way of consolidating this process.

Sexton provides a detailed explanation of the GATS, which has been established under the aegis of the WTO to increase international trade in services. She discusses the legal constituents, proposed revisions to it and key corporate aims. She also examines its power to overrule any national legislation to provide national services and the potential for private companies to capture the most profitable components of publicly provided and funded healthcare services. Particularly under threat from GATS are public services, such as healthcare, education, energy, water and sanitation. Through a revised GATS, the private sector can get further access to the public sector and make existing privatization practically irreversible (Sexton 2003). She argues that by means of GATS the WTO is "stage-managing a new privatization bonanza. Multinational and trans-national corporations, including pharmaceutical, insurance and healthcare companies, are lobbying hard to capture the chunks of GDP that governments currently spend on public services such as health and education. Revisions to GATS are by and large being proposed by trade negotiators from countries bent on obtaining better market access to export markets for domestic industries" (p 45).

Health-related services cover not only professional and clinical services (such as hospitals and doctors), but also insurance, infrastructure, diagnostic laboratories, support, nursing, occupational, community care and pensions services. So companies active in insurance,
hospitals, laboratories (clinical laboratory, imaging and therapy such as dialysis), and support services (such as catering and cleaning) all have an impact on healthcare services. While multinational corporations (MNCs) play an important role across all major sectors of the economy, in the past few years they have also entered public services, and are also increasingly involved in many aspects of healthcare services (Hall 2003 p 77). GATS could also enable pharmaceutical companies to run hospitals. In the US the pharmaceutical industry, among the fastest-growing and most profitable sectors of the world economy, is integrating vertically into managed care companies and other services. Private healthcare companies, particularly US ones, are targeting countries which have a sufficiently affluent elite willing to pay for healthcare or which have an existing private health service base. Regions of special interest are Latin America, Southeast Asia, China and the Pacific Rim, the Middle East, and to some extent south Asia (Notes 10, 11 and 18 in Sexton 2003). Among the reasons given by MNCs to justify their interest in Latin American countries is the reduced possibilities of expansion in the US market, and hence the need for new markets (Iriart et al 2001)

The US private healthcare sector also wants to gain access to `rapidly expanding healthcare expenditures in many developed countries' experiencing 'an increase in their aged population' (Gould 1999, in Sexton 2003). During GATS renegotiations US negotiators have made healthcare a special target. 'The US is of the view that commercial opportunities exist along the entire spectrum of health and social care facilities, including hospitals, outpatient facilities, clinics, nursing homes, assisted living arrangements, and services provided in the home' (Kuttner 1999, in Sexton 2003). The US Coalition of Service Industries is calling for majority foreign ownership of all public health facilities to be allowed:

We believe we can make such progress in the (GATS) negotiations to allow the opportunity for US businesses to expand into foreign healthcare markets..... Historically, healthcare services in many foreign countries have largely been the responsibility of the public sector. This public ownership of healthcare has made it difficult for US private sector healthcare providers to market their services in foreign countries.

Thus the impact of globalisation on healthcare services is considerable. It is pertinent to mention here that since 1990s global public-private partnerships (GPPPs) are becoming common in the international health arena. Earlier international public health was dominated by the public sector through UN agencies and bilateral organizations, with NGO participation. Today there is much closer involvement of the private corporate sector, in the name of concern for corporate responsibility and accountability, and to improve their image (Buse and Walt 2000).
Hall examines some features of involvement of multinationals in the privatization of healthcare, especially in relation to the ventures promoted by the World Bank and the International Finance Corporation (IFC) (Hall 2003). These organizations have taken an international lead in facilitating and promoting privatization. In Hall’s view the behaviour of multinational in healthcare is not so cogent or as expansionist as in other sectors. Still there are areas that are increasingly coming within the arena of multinational activity. These are the four broad areas of insurance, hospitals, clinical-laboratory and technical services, and support services. However, as Hall points out, *globalization may not necessarily arrive at the first stage if privatization. In the case of HMOs in Brazil and Philippines, local companies first established the privatized systems and then the multinationals arrived, through joint ventures or acquisitions, during the 1990s.* This is taking place in India also. For example: clinical diagnostic and therapy services services are being privatized in a number of countries, such as Brazil, India and Canada. In Canada, for instance, private MRI scanning has opened up in an otherwise public healthcare system. There is growing evidence of international expansion in such as MRI scans and dialysis. Fresenius is a German company, which started by manufacturing kidney dialysis machines and expanded into providing dialysis clinics in many countries. It now offers other clinical services as well as hospital management. AstraZeneca, a pharmaceuticals multinational and among the world’s largest manufacturer of cancer drugs, has taken over the management of several cancer treatment centers in the US. Quest Diagnostics is a major US laboratory testing company, which has expanded into UK, Mexico, and recently in India. It is no coincidence that this is the area that the World Bank and IFC seem keen to finance in the developing countries (Lethbridge 2002).

Hall draws attention to two aspects of multinational activity, which, according to him are of significance. **One is the marketing activities of MNCs, which are central to the processes of privatisation and globalisation in all sectors.** One of the activities in this connection is an annual trade conference on the global potential for private healthcare organised by a body called the Academy for International Health Studies (AIHS), which is a private healthcare business association in the US, not an academic institution. In December 1999 an important conference sponsored by this Academy for International Health Studies and the American Association of Health Plans, the International Summit of Managed Care, was held in Miami Beach. The conference was targeted at "chief executive officers, presidents, board chairs, chief financial officers, directors of marketing, and business development officers" (Waitzkin and Iriart 2000). Participants from the World Health Organization (WHO) and the Pan American Health Organization (PAHO) also played prominent roles at the Summit. The World Bank, International
Monetary Fund (IMF), and U.S. Agency for International Development (USAID) used the Summit to promote an expanded role for multinational corporations in healthcare throughout the world. Representatives of these multilateral lending agencies emphasized the privatization of public health systems and social security funds in Latin America, Africa, and Asia. Also participating were officials from Mexico, Brazil, Argentina, Chile, Colombia, Uruguay, Paraguay, India, Nepal, Thailand, Indonesia, the Philippines, Singapore, Nigeria, Zimbabwe, South Africa, Cameroon, Oman, United Arab Emirates, Romania, Canada, Germany, the Netherlands, Switzerland, and Australia. The policies discussed at the Summit called for public sector cutbacks, privatization, and greatly expanded activities for multinational managed care organizations (MCOs) throughout the third world.

The conference held in December 2000 treated healthcare worldwide simply as a marketing opportunity. The proceedings reveal how multinationals are working with each other, with governments, and with international bodies in a global marketing effort (Buse and Walt 2000). The companies involved in the conference were principally concerned with insurance, and was attended by high-ranking ministers and officials from many countries. There was a keynote address by Jeffrey Sachs, chairperson of the WHO Commission on Macroeconomics and Health, on ‘HealthCare Globalisation in the 21st century: Issues and Challenges’, and a joint WHO-WB presentation on ‘State of the World’s Healthcare Report’. There were workshops and seminars on such topics as: Private Health Sector Investment – Opportunities and Challenges in.............Argentina, Australia, Brazil, Chile, Egypt, Germany, Indonesia, Israel,.............; and ‘Globalisation of American Managed Care’ etc.

The other aspect Hall raises concern about is the role of numerous divisions of the WB in driving privatization in healthcare, through projects, investments and institutional support for the multinationals and local companies. Specific loans from the WB, or IDA often involve, and are conditional upon, privatization of the relevant services. The International Finance Corporation (IFC) is a division of the WB that invests solely in the private sector – it has a declared policy of extending the role of the private sector in public services including healthcare. Its investments in healthcare are all financial investments in private facilities, usually hospitals or clinics providing diagnostic and therapeutic services. These investments have no relation to public healthcare needs or policies. In some cases the hospitals or ventures are set up for the benefit of tourists, as in the Dominican Republic. In Asia it had investments of nearly $ 70 mn, in a number of private hospitals in China, India, Indonesia, Sri Lanka, Vietnam and some other countries. The investments are with partly local and partly multinational companies (Hall 2003 pp 88-89). Hall also describes the activities of Multilateral Investment Guarantee Agency (MIGA), another
division of the WB that provides investment guarantees to protect mainly against political risk. Together with IFC MIGA has provided remarkable support to DVI Inc., a US firm that finances the leasing of medical equipment, such as MRI scanners and treatment equipment (Hall 2003 p 90). From these patterns of development Hall suggests that a much wider range of companies are intervening in healthcare and destabilizing public policy than is often recognized, and that the hospital corporations of the US are not among the leading players. He concludes that, as much attention should be paid to the behaviour of the World Bank, especially the IFC, as to the marketing strategies of multinationals, or policies of bodies such as the WTO (emphasis added).

As mentioned earlier, Latin America has become a target for the privatization of healthcare in the name of 'reforms', pushed by the World Bank, Inter-American Development Bank, US-trained national economists and US healthcare providers and insurers. The findings of a comparative study of managed care in several Latin American countries reflect the process of transnationalization in healthcare (Iriart et al 2001). They demonstrate the entry of the MNCs of finance capital into the private sector of insurance and health services, and their intention to assume administrative responsibilities for state institutions and to secure access to medical social security funds. International lending agencies like the World Bank are supporting this privatization and corporatization, as a condition for further loans.

2.4 Social Medicine versus Public Health
As delineated above, the period that has been crucial for the genesis and subsequent consolidation of medicine and public health, and for technology as well, is characterized by the growth and consolidation of industrial capitalism and its various institutions, and conflicts engendered by this process, within and between countries: working class struggles, the two world wars, and the emergence since the mid-20th century of the US as a State with tremendous power, control and influence on world affairs and institutions. Science and technology as we see and understand them today have been used as allies in this entire process. It is not totally unexpected that there is permeation of the capitalist ethos into medicine, and production and use of all the dominant kinds of technologies, including that of medical technology.

In the late nineteenth century the knowledge that became available in pathology and microbiology, in the natural sciences in general, may have made social factors seem unimportant in the etiology of disease. After separating itself from the idea of a role for social factors in disease-causation, the dominant organized medicine, and public health seem to have come full circle. Both fields are now marked by debates concerning social determinants of health. The dominant discourse now revolves around the dichotomy of good and bad, around glorification or
vilification of what has come to be known as biomedicine and the biomedical model of health, and debates between advocates of this biomedical model, on one hand, and the social model of health, on the other. Such debates are reflected also in epidemiology. In general, one finds that, despite the extraordinary success of the reductionist, mechanistic modes of thinking in biology and in medicine, there are signs of dissatisfaction with this Cartesian reductionism as the universal theory. One sees and reads, increasingly, about need for holistic, structuralist, systems theories.

However, what is not so well known is that there always existed and still exists a long and rich history of alternatives, and of progressive activism from within medicine, which can be traced back to, at least, the same period that saw the rise of industrial capitalism, and its social and medical problems, namely the early 19th century. As described earlier on, many physicians of that period carried out studies of the relationship between society, disease and medicine, and some participated in progressive social reform movements, and in the revolutionary movement of 1848 in Europe. Although by the latter part of the 19th century these ideas were denigrated and relegated to the background in Europe and North America, nevertheless the ideas remain. The study – and the forms of medical practice that derived from it – became known as social medicine. Social medicine is based on the concept that medicine by its very nature is social. The way we define health and disease, the methods used for diagnosis and treatment, how we finance and provide health care, all these cannot but reflect the social environment in which medicine operates. Social medicine looks at these interactions in a systematic way and seeks to understand how health, disease, and social conditions are inter-related.

Over time the term “social medicine” took on varied meanings, as it was adapted to differing societies and diverse social conditions. Nonetheless, certain common principles underlie the term, namely:

1. Social and economic conditions profoundly impact health, disease, and the practice of medicine.

2. The health of the population is a matter of social concern.

3. Society should promote health through both individual and social means.

Social Medicine is a widely respected discipline of research, teaching and clinical practice in Latin American countries. Anderson et al (2005) trace the origins of the concepts of social medicine to the conditions in nineteenth-century Europe and their subsequent development in Latin America, South Africa, and the United States.
Although he was not the first to point out the links between society and health, the German physician, Rudolf Virchow, is considered by many to be the founder of social medicine (see sec 2.2). Much of the early inspiration for social medicine came from European health statistics demonstrating major mortality differences between classes. Health and disease were correlated with wealth and poverty. More than a hundred years later, this remains true today and health inequalities are becoming an active area of research and activism, especially in several Third World/developing countries. Social Medicine spread through continental Europe in 1880s; it was incorporated into medical education and practice in countries such as France, Belgium, USSR and Czechoslovakia.

According to the proponents of social medicine the disparities in health of populations are an indictment of the social system, and can be removed only by social reform or radical changes. Thomas Hodgkin, known for identifying Hodgkin's lymphoma, and the Canadian surgeon, Norman Bethune, who worked to preserve the Republic during the Spanish Civil War and died helping the Chinese revolutionaries, are just two examples of physician activists. During the twentieth century Latin America developed as one of the most active centers of social medicine. Two of its most prominent members—Salvador Allende and Che Guevara—are well-known for their political engagement for change, and their ultimate execution by puppet military regimes.

In a review of the developments in social medicine in Latin America, Waitzkin et al tell that adherents of Virchow's vision immigrated to Latin America near the turn of the century and helped establish departments of pathology in medical schools and initiated courses in social medicine. Such as Max Westenhofer, who directed for many years the department of pathology at the University of Chile medical school and influenced a generation of students. The roots of Chilean social medicine date back to the mid-19th century but took a sustained form after the nationwide strikes of 1918. During that year salt peter workers in the northern desert encouraged work stoppages in other industries with the goal of improving wages, benefits and working conditions. One of their organizers, Recabarren, emphasized the destructive effects of malnutrition, infectious diseases and premature mortality. During the next three decades Recabarren and his political allies agitated for economic reforms as the only viable route to decreasing mortality and morbidity among the poor. During the 1920s and 1930s social medicine flourished in Chile partly as a response to the demands of the labour movement. In the 1930s, Salvador Allende, a public health physician, served as Chilean minister of health. He produced an analysis of the social origins of disease and suffering in Chile: La Realidad Medico-Social Chilena. He conceptualized illness as a disturbance of the individual fostered by deprived social conditions. He described the living conditions of the working classes that generated illness. He emphasized the social conditions of underdevelopment and international dependency, as well as
the effects of foreign debt and the work processes. He argued that the solution to health problems lay not simply in improved medical care but also in better sanitation, housing, nutrition, and working conditions. Echoing Virchow, Allende wrote: "[I]t is not possible to provide health and knowledge to a malnourished people, dressed in rags and working under merciless exploitation."

As Minister of Health his proposals advocated far-reaching social measures, rather than medical solutions to the health problems. He proposed income redistribution, state regulation of food and clothing supplies, a national housing program, and industrial reforms to address occupational health problems. Rather than viewing improved health care services as a means toward a more productive labour force, Allende valued the population's health as an end in itself. Later he introduced the legislation that created the Chilean national health service, that guaranteed universal access to health services, the first of its kind in the Americas. He linked this reform with other efforts, including a less dominant role for multinational corporations within Chile. Because of his advocacy of a unified health service in the public sector, the Chilean national medical association frequently opposed him, because of fears of his policies on private practice. Allende was elected President of Chile in 1970, and was executed in the violent political coup of 1973, during which there was also unprecedented repression of the general population, and especially of health workers.

In Ecuador leaders in social medicine trace their roots back to more than 150 years, to the early 19th century, when the physician Espejo linked his work as a physician to the revolutionary struggles against Spain. In his efforts to control epidemics he became convinced, like Virchow later on, that poverty, inadequate housing and sanitation, and insufficient nutrition fostered such outbreaks. During the 1930s the physician Paredes studied occupational lung diseases and accidents among Ecuadoran miners working in a US-owned mining company. In addition to legislation that improved working conditions, his efforts led to a broad consciousness in Ecuador about the effects on health of 'economic imperialism' by multinational corporations.

The Cuban Revolution, which began in 1959, emerged as one of the most important centers of social medicine. Cuba's improved public health system emerged as part of a social revolution in which improvements in health occurred as an integral part of broad structural changes in the society as a whole. Ernesto 'Che' Guavara was an Argentinian physician who got involved in the Cuban revolution, and like Allende, was killed later in Bolivia, fighting for his cause. Che called for a corps of physicians and other health workers who understood the social origins of illness and the need for social change to improve health conditions.

Latin American social medicine has developed a rich body of theoretical and practical work examining the relationship between health and society. While Marxist theory has stimulated
social medicine, conceptual work has focused on the strengths and limitations of traditional Marxism in their context. It emphasizes 'praxis', namely developing a close relationship between theory and practice. Influenced by Gramsci's work, Latin American leaders have emphasized theory that, both, informs and takes inspiration from efforts towards social change. Practitioners have been involved with community organizations, unions, and political movements; many have become victims of political repression. Research and teaching activities often take place in collaboration with labour unions, women's groups, Native American coalitions and community organizations. Liberation theology and the educational innovations of Paulo Friere and his associates in Brazil have been other important influences.

Both historically and currently leaders in Latin America have distinguished social medicine from traditional public health. For instance: in Argentina during the 1920s a group led Juan Justo, a surgeon, tried to move beyond the public health initiatives of the time, known as higienismo - 'hygienic interventions' - which emphasized infection control, improved sanitation, nutrition and such other efforts to improve population health. This higienismo usually aimed to improve labour force productivity, in the interest of national development and international investment. Justo too called attention to the pervasive effects of social class on health outcomes and health services. His work led to efforts that sought broad social change as the basis of improved health. However, as higienismo gained dominance, Justo's became a minority position. The traditional public health efforts throughout Latin America provided a background to which contemporary practitioners of medicine there responded. For instance: they reacted critically to the Rockefeller Foundation's public health initiatives, which emphasized the productivity of labour in enhancing the activities of the US-based MNCs. According to them traditional public health tends to define a population as a sum of individuals. Specific characteristics, such as sex, age, education, income, and race/ethnicity permit the classification of these individuals into groups. By contrast much work in social medicine views populations as well as social institutions as totalities whose characteristics transcend those of individuals. It therefore defines problems and seeks solutions with social rather than individual units of analysis. Seen this way the population can be analyzed through such categories as social class, economic production, reproduction, and culture, and not simply through the characteristics of individuals.

With regard to definition of social class, social medicine practitioners adopt the Marxist position. They argue that exploitation of labour remains an inherent condition of economic production, especially in less developed countries. As a result, they have maintained a vision of social class rooted in the relations of economic production, rather than in such demographic characteristics as income, education, and occupational prestige. This theoretical position has led to the choice of research questions that focus on the labour process itself in both industrial and
agricultural settings. The second focus is on the family as the unit of reproduction, and on exploitation of women. Since women currently bear the triple burden of wage labour, housework and child-rearing, social medicine groups have focused on research on women workers and the effects of their roles in economic production and reproduction. Lastly, social medicine groups also believe in the task of demystification of the dominant hegemonic ideology. During earlier years this involved focusing on the development ideology fostered by North American and European governments. In recent times, this task has emphasized the health policies of the World Bank and other multilateral lending agencies, which have encouraged increasing indebtedness, privatization and cutbacks in public services, based on market-based principles.

Latin American social medicine has also adopted a highly critical stance toward traditional thinking in medicine and epidemiology. Practitioners of social medicine have argued that 'a lack of explicitly stated theory in North American medicine and public health does not signify an absence of theory. Instead an a-theoretic or anti-theoretic stand means that the underlying theory remains implicit' (Waitzkin et al 2001 p 1597). In case of organized medicine and public health it is the positivist and reductionist, biological focus, which reduces the unit of analysis to the individual. Furthermore, rather than seeing disease as an isolated, static state or event, social medicine conceptualizes the "health-illness" state as a dialectic process, a concept that expresses the fluid, complex relationship between the normal and the pathological. This dialectic exists within a social structure that creates distinct patterns of diseases and distinct medical ideologies to explain and treat those diseases.

The opening of markets in healthcare to MNCs over the last decade has received critical attention. Several groups have collaborated in evaluating managed care as a privatization initiative by MNCs and lending agencies. These studies have emphasized the detrimental effects on access to services as the public sector 'safety net' deteriorates, and have demystified the claims that market-oriented practices improve conditions for the poor. Among other themes, research on effects of violence and trauma on health has also received priority in several countries. In Colombia the social tradition of violence – previously linked to poverty and cycles of rebellion – is now related to narcotics traffic and paramilitary operations. Chilean investigators have studied families whose members experienced torture, exile or death during the dictatorship. Researchers in Argentina have focused on the survivors of the more than 30,000 individuals who 'disappeared' during the Argentine dictatorship.

We see thus that the way in which medical care is provided has important political ramifications. Socially-minded physicians began to look for ways in which their medical practice might reflect different social values. Another important strand in this search was the development
of community medicine in many developing countries in the mid-20th century. Many of the ideals of the community health movement were embodied in the “Declaration of Alma-Ata” issued by the World Health Organization in 1978 at the International Conference on Primary Health Care.

Concluding Remarks
One finds that the pre-dominance of theories is not necessarily related to their rationality or superior explanatory power. A constellation of larger social forces too - patronage, power groups and their interests, as also nature of social organization play a decisive role. We find that in the period that is looked upon as ‘the golden age’ of public health, public health was a contested issue, and a choice was made from among different views that existed regarding health and disease causation. There were possibilities of a different kind of public health and medicine, which had social justice as the foundation, and which could have guaranteed health and social justice. However, the choices then made in favour of technically based sanitary measures, and subsequently acted upon led to a technological basis for public health measures. The advocates and proponents of 'scientific' medicine got the patronage and promotion from wealthy industrialists and their philanthropic foundations, thus providing much-needed resources for research and growth, and thereby enabling the dominance of the biomedical view of disease and health, and focus on 'exciting factors' only. The consolidation of industrial capitalism by the early twentieth century, accompanied by faith in and euphoria regarding progress in science and technology as being ends in themselves, led to intensive use of technology in medicine, as in many other areas of life. Furthermore, the provision of such technologically based medical care and preventive measures (public health measures) has taken a certain trajectory; which has been in keeping with the needs and demands of a health system for an industrialized, capitalist society. Through the 20th century it has largely remained a responsibility of the state to ensure health of the people, and provide healthcare, with healthcare provision being the cornerstone of the welfare states in Europe, as well as in many developing countries. However, since the turn of the 20th century the demands of the international economy have started to affect healthcare provision, leading to introduction of criteria of markets in the provision of healthcare, and have led to health sector 'reforms' in the name of efficiency and effectiveness. These reforms have enabled entry of a range of private interests in the health field, including international finance institutions.

However, we see that challenges to this dominant paradigm continue to remain. Despite many odds, the social medicine stream, and to some extent, advocates of the community health approach in the developing countries continue to carry on the heritage of the Virchow and his contemporaries. And so medicine and public health continue to remain contested areas.
REFERENCES


