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Technology in Medicine

SOMETHING is tearing apart the noble mask of medical practice. A gigantic force is shaking its traditional independent status. Some say that machines are the culprits—they have made medicine invasive, costly and impersonal. Some are concerned about new the organisational set-up—bureaucracy is the devil, large size is wasteful, so 'small is beautiful'. Undoubtedly, the introduction of new machines in medical care has not only made medical technology visible, but also made it an independent issue for discussion and for evolving alternative practices. They have also widened the scope of discussion by naturally making it open to people other than doctors. Ironically, while monopoly capital has introduced them into medical care, they have made a dent in the monopoly of doctors to discuss medicine.

Medical technology, to use a broad definition includes drugs, devices and medical and surgical procedures used in medical care, and organisational and support system within which such care is provided. This definition is applicable to all systems of medicine. We, however, restrict ourselves to allopathy. For allopathy is the dominant medical system internationally, it has an organic link with capitalism—the dominant socio-economic system—and above all, we have insufficient information to correctly understand the role and nature of technology and emerging trends of technological change in the context of capitalist development in other systems of medicine.

While discussing new and recently-developed medical technology—for that matter all such technologies—we need to recognise that most of them are not developed by the application of advances in the basic sciences in one field. New medical technologies are not only founded on the developments in the basic sciences in medicine alone, but also on the combination of this with developments technologies in other fields. For example, the cardiac pacemaker was developed by using advances made in solid state physics, developments in vacuum technology, electrical engineering as well as in anatomy and cardiac physiology, and surgical techniques and development of silicon rubber and epoxy resins.

Though on the face of it a technology seems to develop out of the accumulation of scientific and technological knowledge and skill, this accumulation is encouraged, discouraged and selectively manipulated in the socio-economic context. Further, the diffusion for widespread use of any technology is determined by these forces. In the case of medicine, the flow of capital into the medical service sector and the concomitant organisational maturity of medical care system provided an objective basis for widespread diffusion of new medical technology in the advanced capitalist countries.

Penetration of Capital into Medical Services

Medical care is predominantly organised as (1) individual and group medical practice which has its roots in the petty-commodity production in which the physician owned his/her skills as well as essential tools, (2) organised hospital-based

medical care which has traditionally been charitable, state-financed or owned, or non-profit voluntary. Historically, though health care particularly, its public health component was recognised as an essential economic function as early as the mid-nineteenth century, the penetration of private capital and consequent capitalist industrialisation of technological components of medical care took place much later. This was due to the specific place of the service sector in the capitalist economy. Services of all kinds, including medical service, rendered as a commodity or otherwise, are essential to capital to revitalise, reproduce and even improve labour power. But they do not in the process of actual rendering of services, produce surplus value. Capital on the other hand, flows naturally into the surplus-value producing sectors of economy.

Therefore, the initial penetration of capital into the medical service began into those technological components of medical care—notably the tools of the physician—which could be converted into commodities containing surplus value. Thus, the physician who was a petty commodity producer gathering herbs, chemical, etc, and compounding them into medicine to dispense it to the patient, was gradually alienated from these tools. The doctor became dependent on the supply of that tool (medicine) from capital. The doctor no longer remained an independent petty commodity producer, although he/she did retain the character of the individual private medical practitioner. The latter characteristic was not radically affected because the doctor retained the exclusive knowledge and skill of prescribing drugs produced by the industry. The doctor still remains indispensable for sale of (and realisation of the use value of) the commodity drug. Therefore, doctors are the most important target in capital's market strategy. For this purpose it is necessary that the doctors identify with the interest of capital. The common method used for such purpose by the industry is ideological, combined with material incentives. In the situation of intense competition, the industry consciously promotes irrational use of drugs and the use of useless drugs. This interest of the industry is well-reflected in the doctors irrational prescription practices. Indeed, once the doctor became the last executor of capital's market strategy, irrationalism was bound to dominate medical practice.

The rise of monopoly capitalism and the changes in its dynamic during and after the second world has provided objective basis for further technological changes in medical practice. In late monopoly capitalism there is a continuing compulsion to increase the rate of surplus value, to valorise the excess capital by investment in any possible area (such as armament, services, etc) and to lower cost of production through mechanisation and automation. In this situation, one of the best ways to preserve monopoly market is to accelerate technological innovation and consequent rapid introduction of new products in the market. This creates a situation of permanent technological and product renewal. This also creates a permanent need to dispose of obsolete technology and the product to the less developed countries (hence the slogan of technological transfer, albeit in neo-

colonial ways). It is this characteristic that is primarily at the root of continuous introduction of new drugs, devices and hosts of other things, irrespective of actual medical needs and priorities of the people, into medical practice.

Mirror effects of these developments are also seen in a third world country like India, due to neocolonialism as well as due to the needs of indigenous capital. The economic backwardness of the country puts certain limits on the extent to which capital can penetrate medical services sector and new medical technologies can be brought to widespread use. However, these limits are not absolute. Nevertheless, the forceful entry of new medical technologies has created forces which are transforming individual medical practice as well as hospital care much more extensively than the proportionate economic value of such technologies.

Recent Technological Changes

Since the late 1960s after making its initial impact on the production of drugs, the logic of late monopoly capitalism started affecting other medical technologies. Within a decade it unleashed a massive assault on medical care with a plethora of new diagnostic and treatment devices. Not only have new technologies entirely taken over the essential functions of doctor in a medical care but aids him/her in performing those functions. (They also create new functions.) In the process each function becomes a specialised one as it needs the aid of a special, complicated and costly machine. Thus a rapid division of diagnostic and treatment functions takes place. These changes in medical care also accelerated certain changes in the way medical care is traditionally organised.

In the sector of individual private medical practice many new private practitioners with technological speciality were added. Indeed we have come a long way from X-ray clinics to CT scan centres. The proliferation of diagnostic centres run by individuals, institutions or companies has lengthened the route which the patient travels in order to get diagnosed and treated.

The accelerated fragmentation of functions has further impersonalised medical care. The business nexus of generalists, specialists (medical), specialists (equipment), diagnosticians and what not have expanded the naked play of market forces (with the attendant corruption and irrational medical practices) in medical care. No wonder all these escalate the cost of medical care.

In hospital-based medical care too far-reaching changes have unfolded. Fragmentation has increased the number of departments. New equipment and procedures have led to a new division of labour inside the hospital. The need to co-ordinate all such activities has given rise to such bureaucratisation that even many old styled but business-oriented doctors have started feeling uncomfortable. The costly requirements like controlled environment for equipment, posh premises to match the high cost of services, etc, make hospitals a huge investment. Thus the gradual conversion of traditional non-profit and charitable hospitals to for-profit and fee-for services hospitals is inevitable, though this is at different stages and in countries where state services are there, it is generating powerful forces for privatisation.

These changes are also accompanied by another signifi-

cant development. Capital for the first time showed interest in going beyond the production of drugs and devices to organising hospital based medical care in line with industry on a large scale. Investor owned or corporate hospitals have concerned significant proportion of hospitals in developed capitalist countries while in India the process has barely started with the Apollo hospital in Madras.

With this, discussion on proletarianisation of doctors is no longer academic. Doctors seeking employment is not new. What is new is the logic of corporate for-profit hospitals, absolute control by the capitalists, continuous introduction of new technologies, inevitable need to use them at high price to realise investment and earn profit etc. That is profit is no longer incidental or one of the parts of a doctor's medical practice. Medical practice is now incidental to the organisation primarily devoted to profit.

Social and Ethical Issues

The production and sale of irrational and useless drugs with doctor's prescription over-the-counter and even selling prescription drugs directly by the chemists are well-known to us. We do not elaborate on it here as it forms a separate subject for discussion. However, it should be noted that by the time new equipment based medical technology made its entry, the doctors had sufficiently encouraged the technology culture (capsule and injection) amongst people or section of people that matter for it to build further upon.

Since the new technologies are very expensive and in short supply, it has to be rationed. In the market economy, this rationing does not take place according to need but according to the capacity to pay. This is not a new ethical issue. But earlier it did not confront the doctors so blatantly as it does today with new technologies.

The doctor is also confronted with legal problems, more of them where medical insurance has taken roots. Withholding a diagnostic procedure or delaying treatment with certain equipment invite a spate of litigations in many advanced capitalist countries. Doctors pay huge sums as premium to insurance companies to protect themselves from bankruptcy. In the US they have now even agreed to allow their colleagues to review or assess their competence. This has accelerated the production of literature on medical ethics to equip them with enough knowledge of law and pitfalls in practice. In our country this aspect is yet to become major issue.

Despite the high cost and legal issues, the fast use of such technologies is an absolute need for capital. To generate quick demand from the people, more elaborate methods are used than just enlisting doctors, support. So it goes beyond the doctor, directly informing people. This is one of the reasons why in our country import of a nuclear magnetic imaging makes front page news. In this way unnecessary use of such equipment is systematically organised.

As said earlier, technological obsolescence being a major problem, the traditional methods of assessing technology before its introduction are waived. Most of these new technologies are accepted on the basis of description of their excellence, but not tested through careful trials. Neither com-

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But none of this is relevant to whether Whitehead is 'unfit' to raise her child. What is relevant is that she gave birth to the child and began raising that child.

What are Society's Responsibilities?

In the struggle to end women's oppression and guarantee children the best care possible, the working class needs a twofold approach. It needs to fight for women's right to enter the work force and all arenas of society without any restrictions or discriminatory treatment because of their child-bearing capacities. It also needs to fight for the government to carry out its responsibility to provide care for children and all other dependent human beings, instead of allowing the burden for this care to fall on individuals, especially on women.

The government should provide lowcost child care from infancy on up. It should guarantee an education, medical care, decent housing, and recreation for all the young, aimed at helping them develop into independent human beings. All laws or practices that discriminate against children—based on class, race, sex, handicaps, or 'legitimacy'—should be eliminated.

The working class must also challenge any disqualification of women based on their having or not having children.

This being with championing the right of women themselves to freely decide when and if to bear children. It means

the right to safe, legal abortion and birth control, as well as sex education in the public schools. It means protection of women from forced sterilisation.

Women's physical ability to bear children should not be used as a pretext to super-exploit them on the job paying them less than men, excluding them from certain jobs, or denying them employment if they are pregnant or already have children. The working class should demand equal pay for equal work and affirmative action so women can achieve full equality in employment and education.

Workers should demand full maternity benefits for women, including the right to return to the same job—without loss of accrued seniority time—after the birth of a child. Absence from work because of pregnancy should be treated exactly like other contractual situations related to leaves from work.

For women who have children, the working class should demand all the state aid they need to care for them. And it should defend their right to have the courts compel men who walk away from shared responsibility for children to pay child support.

The struggle for these demands is part of the fight for a different type of government, one that acts in the interests of workers and farmers, not a handful of capitalist families. By bringing such a government to power, working people will lay the basis for further measures to provide care for children and to achieve equality for women

(Continued from p 2)

puterised tomography nor nuclear imaging are tested in the same way as drugs are required to.

Not only instruments but many medical and surgical procedures are also introduced without adequate trials. For instance results of the systematic trial of amniocentesis were published only last year after its extensive use for over a decade. The chorion villi biopsy is already extensively used without any scientific trial. Because of such a situation many innovations like gastric freezing, high concentration oxygen for neonates, the use of hyperbaric oxygen in intensive care, insulin coma for the treatment of schizophrenia etc were introduced without evaluation, used and subsequently abandoned after they were proved ineffective or unsafe.

Amniocentesis and chorion villi biopsy remind us their large scale misuse for female foeticide in India. In fact some of the technological innovation appear explicitly geared towards use of sexist and racist cultural practices to gain fast currency and early returns on the resultant technology.

Every country that is attempting to meet the genuine needs of people, has to take crucial decision about selecting appropriate technologies as an alternative to the costly, rendering services to few and profit oriented technologies. In the field, activists are also required to select and develop alternative technologies to provide immediate relief to people. Therefore, in addition to the technology being a political question, it is also a direct practical problem in political practice. This has led many to experiment with various alternative methods of medical care using simple but effective technology and develop models to prove their feasibility. This question is also linked with proliferation of the non-

government organisations and needs detailed discussion.

Such experiments in alternative technologies are not limited to using different physical tools but encompass the way medical care is delivered and attempts to humanise it.

—Amar Jesani

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Development of Medical Technology

The Example of Neurology

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The brain has remained an enigma through millenia despite the fact that the vast progress in medical technology has helped to visualise it and for its functions to be studied directly and indirectly. This article traces the impact of medical technology on our current understanding of the brain and its role in the developments in neurology. It points out that while some innovations in different branches such as physics, electronics, etc definitely aided the physicians' understanding, often tools which have evolved have ended up being overused. Moreover, even its necessary use has come to be confined to the class which can afford to pay the fancy prices that are charged. Medical technology is thus neither value neutral in its evolution nor in its use.

THE explosion of medical technology in the last century, especially the past 25 years has irreversibly changed the face of medical practice all over the world. This phenomena, greatly accelerated by the advent of the transistor and miniaturised electrical gadgets was rooted in the Cartesian school with the question of mind and soul separated from the body, dealing with the latter as a machine to be understood and treated as a sum of its parts. If its philosophical origins are found in Descartes its ability to discover, probe, explore, remove, and sometimes cure illness is almost wholly due to the enormous advances in human understanding and knowledge about the nature of the electromagnetic spectrum.

Medical technology is no more value neutral than any other technology. It arose in the dynamic expanding world of an aggressive, confident European mercantilism. Today it is still only available at a price and with priorities set by the successors of those merchants. It has benefited from the European Renaissance, the scientific revolutions of the 17th and 18th centuries and the atomic age. This article will review at some length the history of the development of medical technology, emphasising its philosophical origins. It will comment on the impact of modern medical technology on diagnosis and treatment, and discuss the advantages as well as problems accruing from its ascendancy. I shall use the example of neurology for two reasons; first being a neurologist I felt competent to comment critically on the development and impact of technology on neurologic practice; secondly, the nervous system has presented medical technology with its greatest challenge as this organ system has been virtually inaccessible to human manipulation until a few decades ago. Also the correlation between structure and function of the brain is rudimentary compared to other organs like the heart, liver or kidney.

While a review of development of technology in many important aspects of the neurosciences has been attempted some topics like neurophysiology and neuroradiology have been covered extensively, others like neurosurgery rather cursorily. This unevenness, partly due to personal interest in the early history of the discovery and investigation of electricity and its role in neurology, reflects the difficulty of reviewing such a vast topic except at inordinate length.

Development of Neuroscience

The function of the brain, its effect on consciousness and limb movements must have been evident to hunters even in the Paleolithic age. The first recorded description of the brain

and its coverings are found in Egyptian papyri written around 500 BC (McHenry 1969, p e). In ancient Greece, Pythagoras (582 BC-500 BC) taught that the brain was concerned with reasoning. His discovery of mathematical principles underlying music and the three sides of a right angled triangle for which he is renowned represent the first examples of the human mind's ability to give theoretical concepts a reality of their own (Bergland, 1986, p 10). A student of Pythagoras, Alcmaeon performed one of the earliest recorded dissections of the human body (sixth century BC) and described the optic nerves. Further progress about knowledge of brain structure and function took a tortuous course. Some of the prominent authorities on brain function like Aristotle (384-322 BC) and later Galen (130-200 AD) seem not to have dissected a human brain (Spillane, 1981). Their ideas of the brain as a cooling organ (Aristotle) or as the transformer of the quintessence of life or pneuma into an animal spirit which in turn was carried through the tubular nerves to the body (Galen) may have arisen because of their ignorance of its structure. Dissecting the human body was frowned on at various points in history in Greece (Spillane, 1981, p 7), in India (Basham 1967), and later by the Catholic Church (Bergland, 1986 p 54). However many observers were aware that the brain was the seat of intelligence, dreams and thought. Hippocrates of Cos (400-370 BC) wrote:

Men ought to know that from the brain, and from the brain only, arise our pleasures, joys, laughter and jests, as well as sorrows, pains, griefs, and tears. Through it... we... think, see, hear, and distinguish the ugly from the beautiful, the bad from the good, the pleasant from the unpleasant. (Bergland, 1986, p 28).

Erasistratus of Chios (circa 310 to 250 BC) was struck by the greater number of convolutions in the human brain compared to animals. He related this difference of the superior intelligence of humans. But for nearly two centuries the heart was considered the organ of rational thought in Europe and curiously also in India (Basham 1967; Winter 1975). In Europe, Aristotle's views reigned supreme: pneuma from heaven came to the heart via the trachea and lungs. The brain was a cooling gland that regulated the temperature of the pneuma brought to it by the arteries.

In addition to mistaken ideas about brain function, knowledge of brain structure was limited by the peculiar biologic properties of the organ. The brain is extremely soft and friable with its components easily distorted or destroyed unless the organ is frozen or hardened by the addition of a fixative like alcohol or formalin. (EScourolle and Poirier, 1973). Only in the eighteenth century was the technique of fixation of brain tissue by alcohol developed which allowed

adequate dissection of brain tissue (Spillane, 1981, p 18). Thus neuroanatomy illustrates a feature common to all aspects of neuroscience and even science in general: the observation of Thomas Kuhn regarding the dependency of creative thought on technological advances (Kuhn, 1962). Prior to the fixation of the brain by additives one can only speculate on the reactions of observers to brain tissue "oozing like porridge from the skull in a battlefield or even when delivered promptly with the severed head from an executioner". Covered by membranes, full of convolutions and cavities it must have appeared "a most mysterious object of exploration" (Spillane, 1981, p 18).

Along with countless other branches of knowledge, medical science grew by leaps and bounds with the coming of the Renaissance (1440-1540 AD). Printing allowed technical advances to be disseminated rapidly and effectively. Andreas Vesalius' (1515-1564), *De Humani Corporis Fabrica* (*The Fabric of the Body*)—the most complete and accurate description of the human body was published in the same year (1543 AD) as Nicolas Copernicus' *De Revolutionibus Orbium Coelestium* (*On the Revolution of the Celestial Orbs*). Earlier Leonardo da Vinci (1452-1519 AD) had drawn an outline of the ventricles of the brain. He had first inserted a needle in the ventricles, filled them with melted wax and used the casting techniques of bronze sculptors to delineate the shape of the cavities of the brain. Vesalius' anatomical studies led him to question Galenic physiology though he refrained from criticising Galen. Later, in 1629, William Harvey, a student of the School of Medicine at Padua founded by Vesalius, discovered the pump-like function of the heart, described the circulation of blood and helped overthrow Galenic concepts of the pneuma and other mysterious spirits. In the opening year of the seventeenth century Giordano Bruno (1548-1600) was burnt to death for his vision of an infinite universe. When the century ended science had come of age, Galileo (1564-1642) had displaced the earth to its modest position in the solar system, Aristotle had been dethroned, his dynamics discarded.

The phenomena of magnetism was described at length by William Gilbert (1544-1603) in *De Magnete* published in 1600. Gilbert was a court physician to Elizabeth I. Magnets, he showed, possessed the virtue of attraction. Force could be exerted by material bodies which were not in contact with one another. Gilbert exemplified the experimenter scientist who Francis Bacon (1561-1626) deemed necessary for the advancement of learning. Speculation was to be replaced by observation, vitalism by mechanisms. Magic lost its hold as an explanation for natural phenomena in the seventeenth century as science unravelled some of these mysteries. It was the era of mercantile capitalism, of the formation of the Bank of Amsterdam in 1609, the Bank of England 85 years later, of the Dutch and British East India Company, of the horrific Middle Passage which for over three centuries carried some 13 million African slaves to the New World. With the development of trade over long sea routes to the Americas, India, China and Indonesia came the imperatives of more accurate navigation charts, skilled shipbuilding, of better implements of war, of a union between merchant and scientist, of education no longer under the aegis of the church

but of new colleges which quickly became centres of science. Gresham College, in London, founded in 1579 with monies provided by the will of Thomas Gresham, a financial agent to the Crown and founder of the Royal Exchange, was where the Royal Society first met (Bernal, 1971, p 459). The scientific revolution had begun, everywhere old dogmas crumbled. Descartes' (1596-1650) *Discourse on Method* (1637) discussed a new system which "exhibited that individual arrogance which was one of the great liberating features of the Renaissance, the same arrogance that expressed itself in the great navigators, in the conquistadores, in all the defiances of authority that characterised the end of the feudal period and the beginning of one of individual enterprise" (Bernal, 1971, p 443). "I think therefore I am"—mind became more certain than matter, Aristotle's three souls were dispensed with, only one, the rational soul existed and that too only in the human. It resided in the pineal gland. Descartes' philosophy completed the dualism of mind and matter. Later Cartesians dropped the emphasis on the pineal gland and sought to explain living organisms by the laws of physics. "If all movement of matter were determined by physical laws, mental events must be equally determinate" (Russell, 1945). Even the soul was composed of atoms, thought came from the movement of atoms. Descartes also commented on the conditioned responses that would be described by Ivan Pavlov (1849-1946) over 200 years later. "If you whip a dog five or six times to the sound of a violin he would begin to howl and run away as soon as he heard that music again" (Brazier, 1984, p 24). Descartes recognised the need to explain how the contraction of one muscle must be accompanied by the relaxation of its opponent. His legacy was the mechanically operating model of the human body, a model very influential in medical science even today.

Antoni van Leeuwenhoek (1632-1732 AD) opened the world of small things with his microscope just as Galileo had uncovered some secrets of the stars with the telescope. His study on nerves, hampered by lack of hardening or staining techniques, left him a convinced Galenist—nerves were little canals which carry humor. So the first use of the microscope did not clarify nerve structure. Indeed the issue remained unresolved even a century later (Brazier, 1984, p 37).

Arguments continued about the release of spirits down the nerves, spirits that led to muscle contraction. Outstanding physicians like William Croone (1633-1684) and Thomas Willis (1621-1675) did not "confront the problem defined by Nicolaus Steno (1635-1686); The (muscular) heart continued to beat when taken out of the body, cut off from its nerves and blood supply (and from the soul)" (Brazier, 1984, p 62). Giovanni Borelli (1608-1679) found that when an animal was submerged in water, and its muscles were slit open no bubbles appeared in spite of vigorous muscle contraction by the struggling animal. Therefore he felt, muscle contraction could not be due to gaseous spirits. As the Seventeenth Century drew to a close science had become organised in the manner suggested by Bacon. Powerful scientific societies replaced groups meeting in private homes, scientific journals were started and publishing houses were established that brought out only science related books.

The eighteenth century established science as an indispen-

sable feature of what was to become the Industrial Revolution. Capitalism was transformed from a "phase dominated by merchants and small manufacturers to one dominated by financiers and heavy industry" (Bernal, 1971, p 503). The age of European colonisation was about to begin. The history of America, Africa and Asia would now reflect indelibly the consequences of those ships that had come to their shores over 200 years ago. For Europe would discover from this century onwards the principles governing essential properties of matter like electro-magnetism, it would harness the power of steam and achieve its dominance of other continents aided by the knowledge of these powerful forces in nature. In addition, the seventeenth century had seen the first revolution in Europe; the Civil War and the execution of Charles I of England. These were only the most dramatic manifestations of a world in ferment. In the ideas of the Levellers and the Diggers the seed of a society equal and free from exploitation was eloquently expressed by Gerard Winstanley:

Freedom is the man that will turn the world upside down, therefore no wonder he hath enemies. . . the earth should be made a common treasury of livelihood to whole mankind, without respect of persons" (Hill, 1975).

These revolutions would recur in America and France in the eighteenth century, the questions raised and problems faced by them continue to confront us today, from general societal issues to the availability, relevance and effectiveness of modern medical technology.

The intellectual advances of the eighteenth century made that period famous as the Age of Enlightenment. Theories about brain function changed and the nervous system could be explained without the existence of a soul. D'Alembert (1717-1783) one of the co-editors of the Encyclopedia shared John Locke's (1632-1704) view of the nervous system; all knowledge was derived from sense experience, hence the sciences should be based on actual perception. The relationship of the brain to the spinal cord was still a puzzle. The function of the nerve roots that were attached to the cords was unknown. Jacques-Benigne Winslow (1669-1760) introduced the concept of a 'sympathetic' system made of 'small brains' or ganglia that were centers for communication between the nerves and various organs. Jiri Prochaska (1749-1820) proposed a purpose for unconsciously initiated movements—preservation of the individual. Such a purpose made the teleological significance previously ascribed to these movements irrelevant.

Discovering Electricity

Many experiments began investigating the new and mysterious phenomena of electricity. Perhaps it was related to nerve conduction. By the early 18th century it was already known that the human body could be charged electrically if it was insulated from the ground. At first it was thought that a layer of air had to be present between the subject and the ground. The characteristics of conductors and non-conductors were only beginning to be understood (Brazier, 1984, p 176). More knowledge about the nature of electricity was necessary before its action on an animal's body could be studied. Also if animal tissue itself produced electricity, the current produced would be very small and need exquisitely

sensitive instruments to detect it. These gadgets designed crudely at first by Alessandro Volta (1745-1827) would be modified later by Waller (1887) and Einthoven (1903), (Cooper, 1986), Adrian (1929) and Berger (1929), (Licht, 1971) to herald the use of electrocardiography, (EKG), electromyography (EMG) and electroencephalography (EEG) respectively.

These developments came slowly. Initially a technique for sorting an electric charge had to be discovered. It happened accidentally to Petrus van Musschenbroek (1662-1761) at the University of Leyden. Musschenbroek had been trying to conserve electricity in a conductor and delay the loss of its charge to the air. He thought electricity was a fluid and tried at first to fill an empty glass jar, then one filled with water with this fascinating effluvium. He charged the water with electricity with a wire leading from an electrostatic machine, but to no avail. The electricity dissipated once the electrostatic machine stopped running. One day, his assistant, Andreas Cuneas picked up the jar containing charged water in one hand and at the same time reached out to remove the wire from the electric machine with the other hand. On touching the wire he got an electric shock—his hand had formed one 'plate'; the charged water another, and the glass jar the intervening dielectric. A condenser was born (Brazier, 1984, p 180). The Leyden jar as it was called later contained no water, instead it was coated on its inner and outer surface by a tin foil. The jar became a source of entertainment. The Abbe Nollet (1700-1770) used it for a spectacular demonstration of electrical power. He lined up a human chain of 180 soldiers at Versailles for the benefit of the King of France. The entire line of soldiers leapt into the air when the men at each end touched the poles of a Leyden jar. The Abbe repeated this experiment for the Monks of Chartreuse this time using a human chain 3 kilometers long! (Sking, 1948). The Leyden jar was used by all kinds of 'medical' men to treat a variety of nervous ailments. John Wesley, the Methodist-reformer who wrote a pamphlet on the subject said that he was "firmly persuaded there is no remedy in nature for nervous disorders of every kind, comparable to the proper and consistent use of the electrical machine" (Schiller, 1982, p 4). Electrotherapy persists today in many forms as ECT or electroconvulsive therapy for some psychotic disorders, as transcutaneous and spinal cord stimulation for relief of pain and for relaxing spastic muscle and the EEG is used in biofeedback therapy. The scientific basis of these therapies are unclear, their usage sometimes as in the case of ECT, being based on the erroneous observation that since epilepsy and schizophrenia never occurred in the same patient, convulsions might result in elimination of the symptoms of that psychosis (Solomon and Patch, 1974).

Meanwhile, in the eighteenth century research began on the torpedo fish whose power to shock was known to fishermen and whose ability to cause pain was thought by Ibn Rushid (Averroes) (1126-1198) to be similar to the effect of a lodestone. In 1722 Abbe Lazzaro Spallanzani studied the anatomy of the torpedo in terms of its ability to shock. He was convinced the shock was electrical, a fact which Luigi Galvani (1737-1798) later confirmed. Galvani cut the nerve

supply to one side of the electric organ of the torpedo and found that this side failed to discharge. On severing the head of the fish the discharge was destroyed even though the heart was intact. The mechanism of electrical discharge thus was independent of the circulation. Electric fish aroused sustained scientific interest for here was an animal that produced electricity. But was animal electricity similar to the one physicists studied? Was it triggered by the brain? Michael Faraday (1791-1867) gave an ambivalent answer to the first question, he was not convinced that nervous fluid is only electricity. The second question remained unanswered for a century because there were no instruments to detect the passage of small currents.

Galvani's *Commentary on the Effects of Electricity on Muscular Motion* was published in 1791. Although Galvani was only one of several individuals like Calдини and Fontana who had directly stimulated nerves with electricity, and his discovery came about accidentally like the Leyden Jar, his commentary enabled the science of electricity and physiology to come together and 'each took a great leap forward' (Spillane, 1981, p 147). On 20th September 1786 Galvani had dissected out a nerve-muscle preparation of a frog and placed it on a table on which an electrically charged frictional machine lay at some distance. In Galvani's words "when by chance one of those who were assisting me gently touched the point of a scalpel" to the exposed nerves of the frog "immediately all the muscles of the limbs seemed to be so contracted that they appeared to have fallen into violent tonic convulsions. But another of the assistants, who was on hand when I did electrical experiments, seemed to observe that the same thing occurred whenever a spark was discharged from the conductor of the machine" (Spillane, 1981, p 146). An electrical charge had been transferred to the insulated nerve-muscle preparation by induction from the machine nearby. Galvani then studied 'atmospheric' electricity lightning in a thunderstorm to excite frog legs. The lightning conductor was invented by Benjamin Franklin in 1753. Interestingly Franklin's rebel tendencies had irritated George III who insisted that the lightning conductors at his palace should have round knobs instead of the sharp points Franklin had suggested! (Bernal, 1971, p 602). Galvani attached one end of a frog's leg to an iron wire antenna under the roof of his house and to the other end a wire that led to the water of a nearby well. When lightning flashed in the sky the frog muscles contracted. Later he found that frog muscles contracted when hung on iron gratings by bronze hooks that penetrated the spinal cord, irrespective of atmospheric conditions (O'Leary and Goldring, 1976). Though Galvani was aware that the muscle contraction arose because of contact between dissimilar metals he saw it as proof of animal electricity. In 1775 Volta showed that the frog leg merely served as an electroscope. Volta produced electricity without any animal at all, he simply put two plates of metal one of copper, the other zinc with liquid between them and invented the first electrical battery.

Galvani and Volta differed in their attitudes to Napoleon who was then the first consul of France. Napoleon conquered the area of Lombardy converting it into the Cisalpine Republic with himself as its president. Galvani refused to take the oath

of allegiance to the Republic and lost his position at the University of Bologna, while Volta supported Napoleon and was honored with medals, and a title (Brazier, 1984, p 215; Skilling, 1948, p 44).

The French Revolution resulted in the formation of the Ecole de Medicine and the Ecole Polytechnique which became models for scientific teaching and research. Only the most eminent scientists were employed as salaried professors. The gentlemen amateur and the patronised client scientists of the past were thus replaced. In the Napoleonic period the first consul turned emperor took a personal interest in science. He saw the utility of science for industry and war.

With the nineteenth century came revolutionary advances in the knowledge of electricity. In 1820 Oersted (1757-1851) accidentally found that electric current deflected a magnetic compass needle at a right angle to the current. Ampere (1775-1836), Gauss (1777-1855) and Ohm (1787-1854) studied the magnetic fields produced by currents. Faraday showed that a magnet moved near an electric conductor produced a current, a discovery of enormous practical significance because electricity could be produced by mechanical action and used to operate machines. The science of electromagnetism was born. It is striking that the Leyden Jar, Galvani's animal electricity and Oersted's observation of magnetic deflection were accidental discoveries. Thomas Kuhn has commented that the difficulty in science is not in making a discovery, but to know one has made it (Kuhn, 1962). This is particularly true when existing theory cannot explain or predict phenomena. The people who are likely to succeed are generally "sufficiently broadminded, and sufficiently critical or ignorant of orthodox theories to make the discovery" (Bernal, 1971, p 608). The belief that electricity is the 'stuff of thought' began with Benjamin Franklin who wondered whether it was the unseen force that extended through our universe. The study of brain electricity was pursued from Galvani onwards. It has helped to understand some aspects of brain function but has been sadly ineffective in solving the problems of brain disease (Bergland, 1986).

The first half of the nineteenth century saw an increase in knowledge about the internal structure of the brain. Johann Reil (1759-1818) studied the lobes of the cerebellum, and by soaking the brain in specific salt solutions was able to separate bundles of nerve fibers that carry specific messages from the body to the brain and vice versa. Luigi Rolando (1773-1831) described the cerebral convulsions, Charles Bell (1774-1842) demonstrated that the anterior nerve roots of the spinal cord carried messages that led to movements of muscles, while Francois Magendie (1783-1855) showed that the posterior nerve carried sensation of pain, pressure, heat and cold. The laminated structure of the brain with six layers of nerve cells was recognised by Robert Remak (1815-1865), who besides showing continuity of the axons (nerve fibers) with neurons or nerve cells of the spinal cord, also noted that some nerve fibers were not white (myelinated) but grey (unmyelinated). Camrillo Golgi (1843-1928) developed a silver chromate method of staining neurons which gave the first pictures of the architecture of these cells. Silver salts for reasons yet unknown bind only to the surface of nerves. Theodore Schwann (1810-1882) who describ-

ed the myelin sheath that surrounds most nerve fibers was much influenced by Rudolph Virchow's (1821-1902) cellular basis of disease. Virchow wrote "every animal is a sum of vital units, each of which possesses the full characteristics of life. The character and unity of life cannot be found in one definite point of the higher organisation for example, in the brain of man, but only in the definite, constantly recurring disposition shown individually by each single element" (Bergland, 1986, p 64). Schwann while accepting Virchow's idea that organisms consisted of individual cells which functioned symbiotically argued that brain cells had to know what their neighbours were up to. He conceived of the brain as a gaint spider web with every neuron *directly* connected to every other neuron. His microscopic methods did not allow him to see the synapses (Greek: to clasp) later described by Ramon y Cajal (1852-1934). Cajal, using Golgi's stains, found that every nerve fibre was separate, ending in tiny bulbs (boutons terminaux) rather like little hands that were *contiguous* with similar bulbs from other axons but lacking any *continuity* between them. But Cajal's discoveries did not lessen the belief in the notion of the brain as a giant-circuit of nerve cells.

More attention was placed on the electricity that flows along the surface of cells than in the activity that went on inside the cell. The synapses became circuit-breakers. Charles Sherrington (1856-1952) who had learnt Virchow's cellular theory in Berlin, continued the work begun by Stephen Hales (1677-1761) 200 years before. Hales had found that the hind legs of a decapitated frog would move if the cut end of the spinal cord was compressed—a type of reflex action. Incidentally Hales made the first direct measurement of arterial blood pressure. Marie Flourens (1794-1867) correctly placed the vital centers of breathing in the medulla, and noted that the cerebral hemispheres received and controlled sensation while the cerebellum co-ordinated body movements. Marshall Hall (1760-1857) showed that reflex action consisted of three parts: a nerve leading from the irritated part to the spinal cord, the cord itself and a nerve going from the cord to the involved body part. Sherrington, known as the father of modern neurophysiology, outlined the sensory nerve supply of the body in terms of the appropriate level of the spinal cord to which the nerve conveyed information about sensibility, and performed several experiments that demonstrated the nature of the tone that is present in normal muscle at rest.

Meanwhile in 1825 C L Nobili's astatic galvanometer increased the sensitivity of measuring electric current by a multiplier effect. Increasing the number of turns made by coil of wire increased the deflection of a magnetic needle when the wire carried electric current. The astatic galvanometer was further refined by William Thompson—later Lord Kelvin—in 1858 into the mirror galvanometer used to receive telegraphic signals. A tiny steel piece, smaller than a sewing needle was suspended by a single fibre. It was a permanent magnet hung at the center of a coil of many turns of wire. When current flowed this tiny magnet swung to one side or another depending on the direction of flow of current. The magnetic force required to turn this needle was very small. A small mirror attached to the needle reflected a beam of light thrown on it onto a screen. The screen had a scale of

degrees by which the amount of current in the coil could be measured by the deflection of the spot of light reflected from the mirror. The mirror galvanometer was to be used by Hans Berger in recording the first EEG in 1928. DuBois Reymond (1818-1896) who had built a galvanometer with more than 4000 turns of wire described the resting current seen in excised nerves and muscles and postulated on electromotive force that preexisted in tissues. Edward Hitzig (1828-1907) and David Ferrier (1843-1928) used electrical stimulation to localise the control of body movement by the cerebral cortex. As the recording of electrical potential of the nerves continued Claude Bernard (1813-1878) who demonstrated the paralyzing action of the poison curare selectively on motor nerves, spoke of the nervous system as the highest expression of the milieu interior "which inter-connects all the tissues of the organism and makes them react one upon the other" (Spillane, 1981, p 265).

New Tools and Techniques

The latter half of the nineteenth century saw the invention of many tools and techniques now considered essential in medical diagnosis and treatment. Needles and syringes were invented in 1865 (Bergland, 1986, p 39). Herman Helmholtz (1821-1894), who measured the velocity of the nerve impulse, invented the ophthalmoscope in 1851. It was now possible to look into the eye, the Shakespearean 'window of the soul'. The swelling of the optic nerves that occurred with brain tumours was observed within a few years, haemorrhage and pallor of the optic discs were also noted. Lister's aseptic surgery and the use of chloroform accelerated the use of surgical techniques; the pocket thermometer was introduced in 1896; Pasteur and Koch established the microbial basis of many diseases and in 1895 Wilhelm Roentgen (1845-1923) discovered the x-ray (De Jong, 1982).

The flowering of clinical neurology also took place during that half-century. In France Guillaume Duchenne (1806-1875) who had no formal appointment to any hospitals in Paris, but was allowed to visit outpatient clinics, made major contributions to modern neurology (Dubowitz, 1982). He used electrical methods to study muscle disease, introduced biopsy as a technique in clinical medicine, designed an ingenious needle for muscle biopsy, and described several muscle diseases for the first time including the dystrophy that carries his name. Jean Charcot (1825-1893) founded clinical neurology and psychiatry came into use in the decade of the 1860s when Charcot began his work in earnest. The history of the Salpêtrière itself serves to highlight the intimate connection between the larger society and the medical world. It was built in 1603 as an arsenal, deriving its name from saltpeter, the principal ingredient of gunpower, that was once manufactured at the site. In 1656 it was converted into a asylum for infirm and abandoned women, in the eighteenth century it housed the 'infirm and insane'. Pinel and Esquirol conducted their psychiatric studies on these hapless victims of France's industrialisation. At the end of the eighteenth century its inmates were described by Coguel as "madwomen seized with fits of violence—chained like dogs at their cell doors and separated from keepers and visitors alike by a long corridor protected by an iron grille; through this grille is pass-

ed their food and the straw on which they sleep; by means of rakes part of the filth that surrounds them is cleaned out" (Foucault, 1965). In McHenry's laudatory version, "Charcot, who took charge in 1862, saw this motley collection as a veritable mine of neurological material. Containing some five thousand inhabitants of whom three thousand were neurotic paupers and epileptics, the Salpêtrière offered Charcot a source of case material that was unique in the history of neurology" (McHenry, 1969, p 284). Indeed it did. Charcot described the lesions of multiple sclerosis, motor neuron disease and an inherited nerve disorder now known as Charcot-Marie-Tooth's disease. Charcot is notorious for his role as the charlatan of the Salpêtrière in his preoccupation with hysterical seizures, which according to him occurred exclusively in woman, and which he claimed to cure by compressing their ovaries with his own invention: an ovarian compressor (Veith, 1965, p 232).

In England, Hughlings Jackson (1835-1911), William Gowers (1845-1915) and Charles Brown-Sequard (1817-1894) laid the foundations of clinical neurology at the National Hospital for the Paralysed and epileptic. Jackson is remembered for his seminal work on epilepsy which he defined as "sudden, excessive, temporary discharge" of neurons. He pointed out that lesions of the brain produced a duality of symptoms; loss of function like loss of speech, movement, consciousness and positive symptoms like increased muscle tone, increased reflexes, or uncontrolled motor activity (McHenry, 1969, p 309). Jackson argued for a hierarchical manner of functioning within the nervous system, being heavily influenced by Herbert Spencer's picture of organised societies where primitive lower orders (the spinal cord and nerves and muscles) were kept in their place by the more highly developed upper echelons (the brain). Recent research however reveals that the brain though highly organised does not have a command post at the apex. When Jackson lectured on cerebral function he would draw a pyramid to represent the hierarchy he considered present in the brain. Modern analysis of visual function however shows that neurons of the cerebral cortex operated in parallel not in series. There is no master decision-maker and the brain it seems functions in a democratic and interactive fashion (Ferry, 1986). William Gowers was like Jackson a clinician but differed from the latter's analytical and physiological approach. Gowers was a keen observer of symptoms and signs and described many entities for the first time including myotonic dystrophy, sleep paralysis, and palatal myoclonus.

American neurology began with studies of *Injuries to Nerves and their Consequences* by S Weir Mitchell (1829-1914) who had followed with interest the cases of nerve damage brought forth in such large numbers by the civil war. Mitchell's study of gunshot wounds published in 1864 is but one of a long line of publications and advances in medicine that have occurred through history by the close alignment of the medical profession with the services required of them and rendered by them to the state. As Bernal states "much medical knowledge and practical treatment was learned in the hard world of the military surgeon" (Bernal, 1971, p 393). From the shaman of yore ordering the rain or sun for the welfare of the tribe to Ambroise Pare (1510-90) unlettered

writing in colloquial French about gunshot wounds, Weir Mitchell is but one link in a chain. The United States' Public Health Services' connection with US imperial policy overseas and racism at home is well-documented in Walter Reed's (1851-1902) typhoid and yellow-fever related research following the US occupation of Cuba after the Spanish-American War of 1898 (Bean 1983; Lyons and Petrucelli 1978) and the scandalous study of the natural history of syphilis exclusively in black men, a study that ended only in 1970. (Jones, 1981).

Developments in Physics

As the twentieth century dawned, James Maxwell's (1831-79) electromagnetic theory established a unity between light, electricity and magnetism. Electromagnetic oscillations gave rise to waves in a hypothetical ether, similar to those of light but with much lower frequencies. In 1881 Michelson and Morley proved the non-existence of ether. Soon light itself was explained as a low-energy photon or a packet of energy virtually massless moving at an incredible but definite speed. Thomas Edison's (1847-1931) discovery in 1884 of the Edison effect that a glowing filament of an electric bulb could retain a positive but not a negative charge, i.e., current would flow only one way from a heated metal plate to a filament, led to the invention of the electronic valve. Electricity could travel without any wires through empty space. In 1905 Lee de Forest (1873-1961) mounted a piece of a zig zag wire between the filament and plate. This electric screen when negatively charged would repel electrons which could not get past this grid. However when the grid was positive or neutral electrons could flow on through to the metal plate. A very small current could change the voltage of the grid—a weak current could control a relatively strong current. The triode was born and with it the revolutionary possibilities of amplification and of power based on information. Radio and television, high-tension vacuum and valve techniques that followed integrated physics and electricity into the new applied science of electronics.

Cathode ray oscilloscopes provided electronic amplification of very weak signals even very tiny such as occurred between synapses. The Cathode ray tube in which a beam of electrons flashed across a tube on a horizontal axis could be used for on-line recording of a signal on a vertical axis. The string galvanometer, used by Richard Caton (1842-1926) in 1875 to directly record currents from the surface of the brain and 60 years later by Hans Berger, was replaced. It is noteworthy that Berger's publications were initially dismissed as artefacts and his records though carefully assembled were met with "monumental indifference, disbelief or even hostility" (Gloor 1971). Berger's work was ignored for several reasons. Neurophysiologists held a deeply felt belief in the brain as a highly complex neural network. Surely brain activity could not be the simple, regular waves Berger demonstrated. Also, Berger's reticent personality, and his refusal to cooperate in building Hitler's New Order unlike the bulk of the German medical establishment, (Light, 1985) forced him into retirement in 1938 and suicide three years later. Equipment to record EEG was further improved in the United States. Using a recorder developed by Western Union

for writing on a ticker tape with an ink stylus, replacing its magnets with more powerful ones of nickel, aluminium and cobalt alloy and by providing stiffer springs, it was possible to electrically record the human brain's normal background rhythm called alpha waves with frequencies of 8-13 per second at a paper speed of 3/8th of an inch per second. Brain waves would now be recorded easily; the action potentials of individual muscle fibres, and the velocity of nerve impulse could also be studied by using amplifiers and cathode ray oscillographs.

These advances in neurophysiology made possible by the improved radio and amplifying equipment, oscilloscopes and computers forged in "the furnace of human conflict" during the two world wars, (Walter 1971) were instruments designed for destruction transformed in neurology for more benign purposes. EEG has contributed to knowledge about epilepsy, sleep disorders, brain tumors and altered states of consciousness. But the test has not been anywhere as helpful as the volume of words written about it, well over ten million in the *Journal of Electrophysiology and Clinical Neurophysiology* alone, would suggest (Williams, 1974). Used indiscriminately to bolster physicians incomes, the EEG and EMG have been aptly described as wasteful, and pretentious (Menken and Sheps, 1984); or that as "most single records would best be reported thus: this record departs slightly from accepted standards of normality; nobody knows what this means" (Matthews, 1973). Similar caution has been expressed about the overuse of evoked potential techniques (Eisen and Cracco, 1983). This technique uses computers to store many elicited responses, averaging them and enabling one to record signals as small as one-hundredth of background activity. The electrical route of studying brain function which began in the eighteenth century has done very little for patient care (Bergland, 1986, p 76). Structural abnormalities of the brain are more easily and accurately uncovered by radiological techniques to the development of which we now turn.

As far back as 1838 Faraday had observed a luminous glow which (William Crookes (1833-1919) in 1876 called cathode rays, as they seemed to consist of particles torn out of the cathode or negative end of a highly evacuated glass tube. Nine years later Wilhelm Roentgen noticed something happening *outside* such a tube. It could fog photographic plates, pass through sheets of rubber, through human skin and flesh, but not through bone. Roentgen had discovered x-rays—a scientific discovery with a vengeance (Bernal, 1971, p 73). It unlocked doors in medical diagnosis, and many branches of physics. X-rays are photons with an energy level greater than 100 electronvolts (eV). (For comparison visible light photons have energies of 2 to 3eV). X-ray machines spread rapidly in Europe and the US as the high voltage generators and evacuated bottles necessary to produce x-rays were already available in many laboratories. It soon became clear that x-rays were useful only in differentiating gas from soft tissues and bone. They could not reveal useful structural details in most soft organs like the brain.

The brain posed special problems to clinical medicine. Generally physicians like to visualise the structures they deal with. In addition to vision, physicians till the nineteenth cen-

tury would palpate, and percuss the part of the body considered involved in disease. However the brain is inaccessible, being surrounded by the rigid bony skull, to the senses of sight, hearing, smell, or feeling, and it is very fragile. Palpating the brain, where there is no skull, would irreversibly destroy brain tissue! Thus the skull which protects the brain from mechanical insults also prevents it from being reached by the physician. Table 1 indicates the presently available means of imaging the brain. Even a quick glance at this table reveals the intimate connection between neuroimaging techniques and usage of some part of the electro-magnetic spectrum (See Table 2). Neuroimaging has advanced because of contributions from many fields of science: neurology, neurosurgery, clinical radiology, radiation and nuclear physics, engineering, mathematics, computer science, mechanical engineering and biochemistry to name a few.

Progress in neuroimaging though rapid was often acciden-

Table 1: Neurological Imaging Techniques*

Procedure	Image of brain that results
Neurological consultation	Imaginary construct of possible pathology
Electroencephalogram	Surface electrical activity below 80 Hz
Skull films	Distribution of crystallized calcium in head
Ultrasound midline	Position of 3rd ventricle
Isotope scan	Distribution of blood-brain barrier
Pneumoencephalogram	Location of cerebrospinal fluid compartment
Cerebral angiogram	Location of blood compartment
Computerized tomogram	Distribution of tissue radiodensity
Positron tomogram	Distribution of brain metabolism and blood flow
Nuclear magnetic resonance imaging	Distribution of brain water

(from Oldendorf, 1980)

Note * All of the special neurodiagnostic procedures mentioned can be considered ways of imaging the brain. Each produces images of the brain in a unique way, isolating some more or less restricted characteristic of the brain and constructing an image from it, thereby providing a restricted conceptualisation of the structure and function of the brain.

Table 2: The Electro-Magnetic Spectrum and Neuroimaging

	Wavelength (centimeters)	Photon Energy (electron volts)	Frequency (Hertz)	Neuroimaging Technique
Radio (upto VHF)	10-10 ⁵	0.00001	10 ³ -10 ⁸	MRI, Ultrasound
Microwave	0.01 + 10	0.00001 to 0.1	10 ¹⁰ -10 ²⁰	
Infra red	0.0001 to 0.01	0.1 to 1	10 ¹³ -10 ¹⁴	Skull xrays Computerised tomography Radioactive Isotope
Visible	2×10 ⁻⁵ to 10 ⁻⁴	1 to 6	10 ¹⁴ -10 ¹⁵	
Ultra violet	10 ⁻⁷ to 2×10 ⁻⁵	6 to 1000	10 ¹⁶ -10 ¹⁷	
Xray	10 ⁻⁹ to 10 ⁻⁷	1,000 to 100,000	10 ¹⁸ -10 ²⁰	Skull xrays Computerised tomography Radioactive Isotope
Gammamay	10 ⁻⁹	100,000	10 ²¹ -10 ²²	

(modified from Oldendorf 1980; Weinberg 1977; Young 1984)

tal. In 1912, an x-ray taken of a man with a skull fracture showed air in the cavities or ventricles of the brain. Six years later, Walter Dandy (1886-1946) "made the quantum intellectual jump from the clinical observation of air in the head resulting from head trauma... to its deliberate injection for diagnostic purposes" (Oldendorf, 1980, p 15). The pneumoencephalograph or PEG, used for over 50 years did not show the brain directly. Air injected between the middle (arachnoid) and inner (pia) layers of the coverings of the brain filled the ventricles of the brain and by comparing differences with a normal outline one could infer something about the size and shape of surrounding structures.

A Parisian neurologist Jean Sicard (1872-1929) had been using Lipiodol, an iodized oil for treating back pain. He injected the substance into the lumbar muscles and found that it was well tolerated and produced no serious side effects. He had noticed that Lipiodol was excellent x-ray material and used it to outline the bronchial tree in the lungs. One day one of his pupils injected Lipiodol into the lumbar muscles and was horrified when he found he was withdrawing cerebrospinal fluid (CSF) as he drew back the plunger of the syringe. He rushed off to Sicard, who asked how the patient was and on being told the patient was well, decided to look at the lumbar region on a fluorescent screen. Sicard first screened the patient standing up and saw that the Lipiodol had dropped to the bottom of the cavity surrounding the spinal cord (the spinal subarachnoid space). He then had the brilliant idea of tilting the patient head down and seeing the movement of Lipiodol (Bull, 1982). The technique of myelography was born, one which has proven very useful in diagnosing diseases of the spinal cord-like tumors and protruded intervertebral discs. In 1926 Egaz Moniz (1874-1955) performed the first cerebral angiogram in a living patient. A substance opaque to x-rays was injected in the carotid arteries that supply blood to most of the brain. This technique, still in use today, delineates tumors, hemorrhages, blood clots and vascular malformation of the brain. Research now concentrated on the development of a non-toxic contrast-agent. These agents had to confront the blood-brain barrier (BBB) which depends upon certain characteristics of the capillaries in the brain. A capillary, a tube with a diameter of 0.1 mm, length of about 1 mm has a wall of single flat endothelial cells that are about 0.001 mm thick. Blood and soluble substances in the plasma can pass through the walls of non-neural capillaries or diffuse through the intercellular clefts, or pores between two endothelial cells. Molecules up to 40,000 molecular weight can pass through these pores. Pinocytosis is another way of bloodcell exchange. Here the inner walls of the endothelial cell breaks, a small amount of blood enters the cytoplasm and is transported through the width of the cell and dumped into the extracellular space immediately surrounding the capillary. In neural capillaries, on the other hand, there is no intercellular cleft, the endothelial cells form 'tight junctions', and pinocytosis is virtually absent. Thus the blood and brain can exchange material only through the capillary cell. The tight junctions exclude molecules with molecular weights as low as 2000. Water-soluble polar compounds, i.e. those substances which have an electric charge at each end of the molecule, are

mostly excluded while lipid-soluble compounds rapidly and easily enter the brain. Paul Ehrlich (1854-1915) had discovered the BBB in 1885 when he noted that aniline dyes injected into an animal stained its body but not the brain or spinal cord. The BBB is 'lost' when the brain suffers any kind of insult like infection, trauma, or a stroke.

The contrast-agents that became widely used were iodinated organic compounds because they were the least toxic, stable in water-solution, with a high molecular weight, but low osmolarity, (1.5 osmolar solution only five times the 0.3 osmoles of brain capillary endothelial cells). Also the iodine atom's innermost shell of electrons (the k-shell) has a binding energy of 33 Kev. Incoming x-rays in computerised tomography have an energy level of 60 to 80 KeV. These rays can be captured by the k-shell electrons of iodine, deleting the x-rays and increasing the radiodensity of the tissue that contains it.

The second world war which sparked the development of nuclear physics resulted in many artificial radioactive substances being available by the mid-40s. In 1947 George Moore then an intern in surgery discovered that radioactive iodine injected intravenously emitted gamma rays which could be detected by a Geiger counter. Radioactive isotope imaging was refined in the next two decades using a thallium-activated sodium iodide crystal photo multipliers. The small amount of thallium breaks up the regularity of the sodium iodide crystals so that they scintillate or generate visible light photons when struck by gamma rays. These photons are amplified by the photomultiplier and the amplitude of the voltage thus produced measured electronically. Radioisotope scanning did not produce sharp images of the brain as attempts to sharpen the image by collimation resulted in many emitted rays being uncounted. Also Compton scatter or deflection of gamma rays by atoms in their path made the rays appear to have a different origin when they reached the detector, these 'incorrect' locations further contributing to a fuzzy image.

Visualising the Brain

By 1971, though the brain could be visualised indirectly by angiography, ultrasound, radioisotope scanning, PEG etc, these tests were either cumbersome, time consuming or very uncomfortable to the patient. W H Oldendorf around 1960 and G N Hounsfield in 1967 independently developed the technique of computerised axial tomography (tomos—a slice) based on tissue specific gravity. The fascinating story of the development of computerised tomography is recounted in Oldendorf's book *The Quest for an Image of Brain*. In 1960, Oldendorf applied for a patent for a device that produced a radiographic cross-section of the distribution of tissue structures based on regional radiodensity. A narrow collimated beam of high energy photons passed through the head and were counted after they emerged from the head by means of a detector fixed in relation to the photon source. Several points on a particular plane of the head were scanned using rotational and translational motions. The observed counts of photons were then processed by a computer which reconstructed the distribution of radiodensities within

the plane. Oldendorf was granted a patent in 1963 but found none of the major x-ray manufacturers interested in the device. As he ruefully remarks "their lack of interest was a matter not so much of technical unfeasibility (since they had more information than I had as to whether the idea was workable), but more of economic promise. A letter from one of the world's major x-ray manufacturer ended—even if it could be made to work as you suggest, we cannot imagine a significant market for such an expensive apparatus which would do nothing but make a radiographic cross-section of a head" (Oldendorf, 1980, p 85-6). Success came to Gordon Hounsfield who worked in the research laboratories of EMI Ltd. Hounsfield decided to use sodium iodide crystals rather than the photographic plates used for 50 years in radiology, because the crystals being 100 times more sensitive than the plates, allowed better differentiation of soft tissue density. As his device took five minutes to produce a picture he was advised to study the brain which did not move rather than the chest or abdomen as images produced of these regions would be blurred since no patient could hold his breath for five minutes. Today a picture can be produced in seconds allowing any part of the body to be scanned.

EMI pursued the development of the CT scanner as Oldendorf explains, being previously uninvolved in medically-oriented research they were not aware that the limits of technology had already been explored. The production of the CT Scanner illustrates a feature common to technological and scientific advancement under capitalism. The large x-ray manufacturers behaved in a manner similar to wireless manufacturers: too intent on immediate profits to indulge in expensive development (Bernal 1971, p 717) whereas the unorthodox approach of the inexperienced musical company led it to market one of the truly revolutionary diagnostic techniques in medicine. Two other brain imaging techniques have become available since 1971. They are positron emission tomography (PET) which measures regional metabolism of glucose or oxygen and magnetic resonance imaging (MRI) in which the magnetic property of hydrogen atoms is utilised. The hydrogen atoms of the brain are made to resonate in a strong magnetic field. They partially align themselves with the field and absorb energy which is subsequently reradiated. Images of hydrogen density and relaxation time allow striking pictures of the brain and spinal cord making virtually all parts of the central nervous system accessible to the human eye without tissue ionisation, injection of contrast material or radioactive substances being involved (Oldendorf, 1984).

C T and MRI scans have proliferated in the US, the number of C T scanners rising from none in 1973 to 800 in 1978 representing a capital investment of 400 million dollars (Oldendorf, 1980), while MRI scanners rose from none in 1978 to about 200 in 1985 leading the industry's two dozen firms collectively looking to annual sales worth 2500 million dollars worldwide in 1988 (*Lancet* 2:1169, 1984). Separate buildings, each costing as much as 1.5 millions dollars, have been constructed to 'contain' the magnetism surrounding the MRI equipment financed by 'venture-capital' groups who see them as tax shelters or investment opportunities (Goldsmith, 1984).

So the high-tech revolution in medical diagnostics is expensive, becomes obsolete rapidly and by virtue of the financial stakes involved, available at a stiff price therefore largely only to the affluent (see Table 3). Though the technology provides diagnosis more accurately at a crucial early stage of some diseases, and the greater precision of pinpointing lesions leads to a reduction in other tests (see Table 4) it is cost-effective in a rather narrow sense: to those able to get the test done. The issues of cost-effectiveness deserves a full discussion on its own. Suffice to say here that in the US corporatisation of health care promotes the use of capital intensive technology while ignoring the question of access to these services by the 35 million Americans who are either under and uninsured.

Improvements in neurodiagnosis aided the growth of neurosurgery. Injury to the head had been regarded as a surgical problem since antiquity (Flamm, 1982), but removal of tumors of the brain and spinal cord was first attempted only about a century ago. Victor Horsley (1857-1915) a pioneer who contributed to many neurosurgical techniques

Table 3: Costs of Various Neurodiagnostic Procedures in Relation to Discomfort to Patient, and Information Obtained

Procedure	Discomfort form Procedures	Information Obtained	Cost (US Dollars)
Neurologic Consultation	—	+++++	80-100
Skull xrays	—	+	55- 75
EEG	—	++	75-150
Ultra-sound (midline ECHO)	—	+	25- 50
Pneumoencephalogram	++	++	300-500*
Carotid angiogram	++	+++	550-1200*
Digital Subtraction Angiography	+	++	300-400
Radioisotope Scan	—	+++	150-250
C T scan (head)	—	+++++	300-500
C T scan (spine)	—	+++++	325-600
MRI scan (head)	—	+++++	600-800
MRI scan (spine)	—	+++++	600-800

Note: * If costs of hospitalisation are included these procedures would be much more expensive—daily room charges vary from \$ 175-250 1 day.

(modified from Oldendorf 1980; Gunby 1983)

Table 4: Effect of Various Procedures AT Dent Neurological Institute, Buffalo, N Y

Procedure	1973 (pre-CT)	1976 (post-CT)
Echoencephalograms	189	0
Pneumoencephalogram	39	5
Isotope brain scan	579	157 (16)*
Lumbar punctures	425	167
EEGs	1,047	731
Angiograms	111	87
Hospital admissions	355	351
Patients seen in ER	222	291
Office consultations	668	1,087

Note: * Sixteen tests were required by neurosurgeons and neurologists. The numbers below the line indicate that, despite the reduction of tests, the total clinic work load increased between 1973 and 1976.

(from Oldendorf 1980)

including decompressive surgery for brain tumors, laminectomy for removal of spinal cord tumors, nerve section for relief of exquisite facial pain (tic douloureux), etc deserves mention for his championing of social causes. He was an avowed agnostic who worked for Votes for Women (the Suffragette Movement) demanded equality for women in medicine, sought proper recognition for the nursing profession and urged health legislation that would benefit the poor (Cooper, 1982). He was disliked by the British medical establishment who feared his socialism (Taylor, 1986). A remark of William Osler's illustrates the attitude of the medical establishment then (and I suspect it would not be very different today) to Horsley's politics: "What demon drove a man of this type into the muddy pool of politics?" (Osler, 1916). Horsley though appointed to the staff of the National Hospital in 1886 was given no beds of his own in the thirty years he worked there.

Neurosurgery progressed rapidly in the twentieth century keeping pace with developments in neuroradiology. Harvey Cushing (1864-1939), a leader in modern neurosurgery, investigated the role of the pituitary gland and established that it secreted growth hormone. He linked the brain with endocrine function, a link that appears increasingly important as the number of neuropeptides discovered grows, their actions playing a pivotal role in memory, emotions, sleep, and the perception of pain. Indeed Bergland (1986) argues that we have come full circle. The brain may be what the Greeks imagined it to be: a hormonally modulated gland with the "stuff of thought" being large molecules or peptides and not electricity. The discovery of neuropeptides would have been difficult without a simple and safe technique to examine cerebrospinal fluid (CSF). Such a technique was invented by Heinrich Quincke (1841-1922) who was searching for a way to remove CSF from children with hydrocephalus. He inserted a needle with a stylet in the lumbar intervertebral place and removed CSF. He used the lumbar puncture to examine the constituents of CSF and described the changes in the latter in purulent meningitis (McHenry 1969, p 366).

The role of special chemicals or neurotransmitters that conveyed messages across a synapse was first described by Henry Dale in the 1930's. Acetyl choline, released by the vagus nerve which supplies the heart, slowed the rhythm of the heart. Soon other neurotransmitters were discovered and by 1975 it was known that the brain produced morphine like substances or endorphins. Presently over 45 neuropeptides are known and their effects on degenerative diseases of the brain like senile dementia and Parkinson's disease under active study. Tools used in peptide research include radioimmunoassay, immunocytochemistry and complementary DNA probes. Usage of monoclonal antibodies, introduced in the last decade, has made possible knowledge about the internal structure of the neuron. Disciplines that were unknown till the early seventies flourish in their own right today. Neuroimmunology, molecular genetics and neuropeptide research bring together branches of science outside the field of clinical medicine. Advances in knowledge are dependant upon a sophisticated and wide technological base. Often new techniques are developed for reasons other than what they are used for later. For instance monoclonal antibodies

developed out of Milstein and Kohler's attempts to learn more about the genetic control of synthesis of antibodies (Sattaur, et al, 1984). Presently brain function is accepted as both hormonal and electric, without a brain-body dualism. Both are dependant on and influenced by the other. A basic operation or function common to all areas is suspected but the manner in which integration of thought and behaviour occurs is unknown. Neither are we able to correlate structure and function at the level of a single cell (Philips et al, 1984).

Conclusion

The brain then remains the enigma it has been through millenia. It can however be visualised, directly and indirectly, its functions studied and modified by chemical, electrical and surgical means. Progress in medical technology and knowledge about basic biologic structure and function, which permit these interventions in the nervous system, records even more spectacular advances in other organs—the heart, the liver, the kidney and bone marrow can be transplanted. Machines can do the job of the heart, the lungs and the kidney. No part of the gastrointestinal tract remains hidden from the human eye with the use of fibre-optics. Setting broken bones, stitching up torn arteries, controlling bacterial, fungal and parasitic infection, these are but some of the techniques taken for granted by a majority of the citizens of Europe and North America. But the availability and relevance of this technology to a large section of humanity remains tied in to the social, philosophical and economic realities which govern our planet. Flowering first in Europe, and later North America, medical technology has concentrated on a cellular and clockwork like approach to the body. Preventive measures have generally received scant attention particularly those that focus on industrial pollutants as likely carcinogens or of individual habits like smoking that are promoted by big corporations. Prevention by inoculation against disease no longer has universal applicability.

Recently developed hepatitis and malaria vaccines are enormously expensive and intended only to aid soldiers of the "free world" as they are called to save democracy in tropical and equatorial climes. The electronic razzmatazz available at the beck and call of physicians follows the road of most commodities—the more, the better! Marketed expertly by companies out to make quick and big profits much of the application of medical technology is prohibitively priced and even unnecessary (Angell, 1985). Certainly it is difficult to account for the number of intensive care units, CT scanners, coronary artery bypass grafts in the United States without considering the links between medicine and the health care industry.

A society that cares neither for adequate prenatal care, nutrition, education, housing, and old-age security exhibits sudden concern for end-stage renal disease and elderly patients when government programmes assure physician, hospitals and biotech industries of sustained high income. A modern intensive care unit reflects uncannily the society from which it has emerged. Notwithstanding the underlying disease, modern death bed rituals are mounted. Every index of body function is tracked and treated without any

attempt at considering the patient's prognosis or the utility of these costly heroic efforts. Blood gases, body pH, electrolytes, urine output, continuous electrocardiographic monitoring and arterial blood pressure recording, respirators, nothing is ignored in this relentless pursuit of information.

Macabre though it may sound, patients die, but not before they are made biochemically and haematologically normal! The same system of hospital based technological intensive medicine is sought worldwide, an acknowledgement in part of its limited, but definite success in combating disease and relieving suffering. The control of infection proudly acclaimed as an achievement of medicine probably has more to do with better nutrition, sanitation and hygiene (McKeown, 1976). The efficacy of antibiotics has depended on the integrity of the body's defence mechanisms against disease. They are ineffective in infections such as the AIDS virus, which derives its lethal nature from its ability to destroy the immune system of the body. The AIDS epidemic illustrates the complex multifaceted nature of modern medicine. Though the medical establishment is baffled by the disease and presently unable to help its victims adequately, a remarkable amount of knowledge has been acquired in the five years since the disease became known. The medical profession not particularly noted for its compassion towards those society rejects or ignores, has been free of panic and prejudice while AIDS high risk groups consisted largely of drug addicts and male homosexuals. In fact, it has campaigned against hysterical and unwarranted measures such as quarantine very effectively. Medical technology helped uncover the human immunogenic virus as the cause of AIDS and may give us a vaccine in the next decade. Yet AIDS illustrates the limitations of modern medicine. It concentrates on treating disease not in learning more about why only a few acquire it. In any epidemic the disease affects a much larger proportion of the populace than is either incapacitated or killed by it. Factors that protect most individuals are only now beginning to be studied.

Finally and very importantly comes the question of resource allocation. It would cost a fraction (about 30 billion dollars) of the amount spent on arms (800 billion dollars a year) to feed, clothe and educate every person on earth. CT scanners and MRI equipment co-exist within a stone's throw of people scouring through garbage cans for food. Drugs that can save human lives are controlled by corporations notorious for overcharging poor countries. As Martin Ryle put it in a letter written several months before his death in 1984: "The benefits of medical research are real, but so are the potential horrors of genetic engineering and embryo manipulation. We devise heart transplants, but do little for the 15 million who die annually of malnutrition and related diseases. Our cleverness has grown prodigiously—but not our wisdom" (Ryle, 1985).

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But none of this is relevant to whether Whitehead is 'unfit' to raise her child. What is relevant is that she gave birth to the child and began raising that child.

What are Society's Responsibilities?

In the struggle to end women's oppression and guarantee children the best care possible, the working class needs a twofold approach. It needs to fight for women's right to enter the work force and all arenas of society without any restrictions or discriminatory treatment because of their child-bearing capacities. It also needs to fight for the government to carry out its responsibility to provide care for children and all other dependent human beings, instead of allowing the burden for this care to fall on individuals, especially on women.

The government should provide lowcost child care from infancy on up. It should guarantee an education, medical care, decent housing, and recreation for all the young, aimed at helping them develop into independent human beings. All laws or practices that discriminate against children—based on class, race, sex, handicaps, or 'legitimacy'—should be eliminated.

The working class must also challenge any disqualification of women based on their having or not having children.

This being with championing the right of women themselves to freely decide when and if to bear children. It means

the right to safe, legal abortion and birth control, as well as sex education in the public schools. It means protection of women from forced sterilisation.

Women's physical ability to bear children should not be used as a pretext to super-exploit them on the job paying them less than men, excluding them from certain jobs, or denying them employment if they are pregnant or already have children. The working class should demand equal pay for equal work and affirmative action so women can achieve full equality in employment and education.

Workers should demand full maternity benefits for women, including the right to return to the same job—without loss of accrued seniority time—after the birth of a child. Absence from work because of pregnancy should be treated exactly like other contractual situations related to leaves from work.

For women who have children, the working class should demand all the state aid they need to care for them. And it should defend their right to have the courts compel men who walk away from shared responsibility for children to pay child support.

The struggle for these demands is part of the fight for a different type of government, one that acts in the interests of workers and farmers, not a handful of capitalist families. By bringing such a government to power, working people will lay the basis for further measures to provide care for children and to achieve equality for women

(Continued from p 2)

puterised tomography nor nuclear imaging are tested in the same way as drugs are required to.

Not only instruments but many medical and surgical procedures are also introduced without adequate trials. For instance results of the systematic trial of amniocentesis were published only last year after its extensive use for over a decade. The chorion villi biopsy is already extensively used without any scientific trial. Because of such a situation many innovations like gastric freezing, high concentration oxygen for neonates, the use of hyperbaric oxygen in intensive care, insulin coma for the treatment of schizophrenia etc were introduced without evaluation, used and subsequently abandoned after they were proved ineffective or unsafe.

Amniocentesis and chorion villi biopsy remind us their large scale misuse for female foeticide in India. In fact some of the technological innovation appear explicitly geared towards use of sexist and racist cultural practices to gain fast currency and early returns on the resultant technology.

Every country that is attempting to meet the genuine needs of people, has to take crucial decision about selecting appropriate technologies as an alternative to the costly, rendering services to few and profit oriented technologies. In the field, activists are also required to select and develop alternative technologies to provide immediate relief to people. Therefore, in addition to the technology being a political question, it is also a direct practical problem in political practice. This has led many to experiment with various alternative methods of medical care using simple but effective technology and develop models to prove their feasibility. This question is also linked with proliferation of the non-

government organisations and needs detailed discussion.

Such experiments in alternative technologies are not limited to using different physical tools but encompass the way medical care is delivered and attempts to humanise it.

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Politics of Contraceptive Technology

Depo-Provera in New Zealand

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The development and dissemination of injectable contraceptives provides a good illustration of the politics of contraceptive research and its international dimensions. It is also an example of the capitalist patriarchal control over women's fertility. The article throws light on the \$ six million clinical trial which was conducted in New Zealand by Upjohn, the sole manufacturer of the contraceptive. Needless to say a majority of women on whom the drug was tried were black and working class as well as Maori women. The New Zealand trial was extremely important to the manufacturers for several reasons and moreover there were several conditions in the country which made it convenient for Upjohn. Not surprisingly women's struggles against these trials have been determinedly put down.

IN the patriarchal mode of reproduction, women lose their social power at the moment of conception when the work of reproduction begins. There is no right time to become pregnant because in this mode, sex, procreation and the socially necessary work of parenting are inextricably linked and all occur under male control. (Trainer, 1986). In theory however, contraception allows individual women to plan when they will confront this process. Female control of fertility is therefore an essential condition of women's self determination and is an important site for gender struggles.

Women do not make real choices about when or whether to reproduce. It is a misnomer to talk about 'free choices' when the means of contraception (the pill, injectables, intra uterine devices [IUDs] etc) are not primarily developed according to women's needs, but are determined by the forces of the capitalist patriarchy mediated by the state, the medical establishment and the multinational drug corporations.

In this article I examine the patriarchal means of contraception to discover the real relations behind their development and dissemination. I shall use the example of the injectable contraceptive Depo-Provera as one of the most horrific examples of the capitalist patriarchal control of women's fertility, and one that has special relevance for New Zealand women. I shall also attempt to link this discussion to the current struggle by Indian women to have a similar (progestogen based injectable) contraceptive, Net-Oen, banned in their country.

A Patriarchal Industry

Men dominate the contraceptive industry at every level; in research and development, as manufacturers and suppliers, and as regulatory authorities. Male dominance means that the contraceptive cafeteria reflects patriarchal needs to control female fertility. Common features of 'modern' contraceptives, are that they control female rather than male fertility. The form that their administration takes, is that birth control is a female responsibility. Virtually no research has gone into male contraception. The repertoire is currently limited to condoms and sterilisation, as patriarchy could not tolerate tampering too much with male fertility.

Birth control is also a commodity. The forces of patriarchy determine that contraceptives should be aimed at female fertility, but the detailed decision about which contraceptives will be developed are determined by the forces of capitalism. The bulk of research money pours into IUDs, the pill and methods of 'reversible' sterilisation including injectables, while barrier methods receive minimal investigation. Barrier methods have limited profitability whereas chemical methods

are "amongst the most profitable of all pharmaceuticals" (Bunkle, 1983).

Chemical methods are presented as more 'effective' but the real reason why they are given such priority is because they are administered by medical professionals, not controlled by the women who use them. Chemical methods are typically dangerous so women must be kept ignorant of their functioning.

The patriarchal monopoly of contraceptives and contraceptive information means that women must either 'accept' whatever is developed and offered by patriarchy and risk dangerous side effects, or 'fall' pregnant and face a possible lifetime of domestic drudgery. The social conditions of our lives and the wider political system in which we live influence the extent of risk we will take as well as the awareness of that risk. In countries like India, a women's ability not to become pregnant often means better access to housing, schooling for their children and health services: all typical family planning incentives, (Balasubrahmanyam 1986).

While modern contraceptives appear to give women some choice about when they reproduce, the real structures at work are patriarchal and hence, do not serve women's needs. Capitalist corporations require that contraceptives maintain profitability, imperialist nations require effective population control weapons and the medical profession demands that contraceptives are monopolised so that only medical 'experts' can administer them. Under these criteria, Depo-Provera and its injectable cohorts are ideal contraceptives.

Depo-Provera in New Zealand

Depo-Provera works by inhibiting ovulation and is administered by injection once every three months. It is however, a temporarily irreversible drug which cannot be purged from the bloodstream once injected. Those women then, who suffer severe side effects from it must endure these for at least three months. Millions of women are using Depo-Provera worldwide which given its dubious safety record, amounts to a massive experiment on women, (Bunkle, 1985). Since the patent on DMPA, the progestogen used in Depo, expired in 1984, other brands of injectable contraceptives have flourished. One of these is Net-Oen. Given that the active agent in progestogen-based injectables is similar if not identical to Depo-Provera, it could logically be argued that the side-effects will also be similar. Certainly the means by which multinational corporations have 'tested' and disseminated their particular brands have been surprisingly similar.

America's Upjohn Corporation took over the development of Depo in the 1960s. The drug had been used in the 1950s

but had been cast aside because it caused disease of the uterus (Unity, 1982). In 1965 Upjohn researches began human experiments on Thai women using three monthly doses of Depo which were later increased to six monthly doses.

In 1969 Upjohn applied to the American Food and Drug Administration (FDA) for a licence to sell the drug as a human contraceptive. A year later, the seven year study on beagle dogs and the eleven year monkey study required by the FDA began. In New Zealand the Health Department approved Depo Provera for use as a contraceptive before the results of both studies were released. The results revealed increases in both benign breast nodules and breast cancer. Meanwhile, other unsuspecting women were participating in trials of Depo in Bangladesh as were black women in South Africa and what was then Rhodesia.

In 1974 the FDA allowed the 'restricted' sale of Depo for 'patients' who knew the drug could make them sterile; who were unreliable users of contraceptives; who could not use other forms of contraception; or who had a history of contraceptive failure. In 1978, after three Congressional Hearings the FDA rejected Upjohn's application to market the drug in the USA.

A year later, the rhesus monkey study revealed that two out of the twenty high dose animals had cancer of the uterus and three had breast lumps. But Upjohn's enthusiasm was not dampened by these results.

Many developed countries including Australia, Britain (temporarily) and the USA have banned Depo pending proof of its safety. Evidence is still being gathered from millions of female 'guinea pigs' who still use it: essentially the poor in Jamaica, Thailand, Mexico, Sri Lanka and New Zealand. In countries where it is banned for general use disadvantaged sections of the population are also using it, in particular: West Indian and Asian women in Britain, aboriginal women in Australia and Chicano and Black women in America. Similar trials of other injectables with less of an international reputation than Depo are also being conducted, such as the Net-Oen trials in India.

The carcinogenicity of Depo has been the main issue in the debate over its safety. Other side effects are relegated to 'minor' or 'irrelevant' status, which women are expected to put up with. What are the effects of Depo use?

i) Long-term risks include:

- a) anemia
- b) diabetes
- c) temporary or permanent infertility
- d) uterine disease and permanent damage to the ovaries, pancreas, liver and adrenals
- e) lowered resistance to infection because of its negative effects on the production and distribution of antibodies: particularly damaging to poor women.
- f) child abnormalities: Depo is especially recommended for breast feeding mothers on the assurance that there are no negative effects on the production of breast milk. Yet Depo has been found in breast milk, and discovered in the fat tissues of breast fed children of Depo mothers. The drug also cannot be discontinued if a woman finds she is pregnant which means it could act on the fetus for several months.

g) cervical, endometrial and breast cancer: Depo users have revealed three to nine fold increases above normal rates of cervical cancer (Neal, 1979).

h) A New Zealand study found that several women had serious anaphylactic reactions which were almost fatal (Bunkle, 1983).

ii) Immediate and short-term effects include:

- a) abdominal discomfort
- b) dramatic weight gain or loss
- c) depression: progestogen is a well-known depressive drug.
- d) loss or suppression of sexual desire and/or orgasm: Depo is used in two American clinics to chemically castrate rapists. Suppressing libido is an ironic property for a contraceptive.
- e) headaches, dizziness and nausea.
- f) vaginal discharge
- g) breast discomfort and abnormal growth
- h) menstrual abnormalities are suffered to some extent by all women on Depo.

One respondent to a New Zealand survey was bled every day for three years and eventually had a hysterectomy, while about one Depo user a week is admitted to Auckland's National Women's hospital with uncontrollable bleeding. Yet Upjohn medical director, Norman McLeod, dismisses this by saying "Anyway, bleeding is more of a nuisance than a health problem and can be easily dealt with" (*The Press*, 1985) apparently by administration of controversial estrogen pills probably also produced by Upjohn.

Depo-Provera was not primarily designed to help women control the reproductive lives, so why do millions of women still use it? Probably the main reason why women still use drugs like Depo, despite their dubious safety records, is that they are not aware of the risks or the alternatives. We assume that whatever medical professionals and 'specialists' prescribe has been adequately tested and proved safe. This assumption could be fatal.

Scientific Evidence

The FDA ban on Depo effectively closed the US market to Upjohn and worse still meant the US 'aid' agencies could not supply it overseas. Upjohn has campaigned hard to have this situation reversed. The most effective strategy in this campaign has been to produce 'scientific evidence' that the drug is safe. It has spent millions a year (\$ 6 million on a New Zealand study alone) on research designed to produce the desired results. Investigations into the safety of Depo have therefore centred on its carcinogenicity (which is difficult to prove anyway) while its more immediate side effects have been ignored.

Upjohn's control of the information about Depo allows it to brush aside any evidence that questions its safety. In the first seven-year beagle study for example, Upjohn dismissed the findings that 18 of the 20 dogs receiving Depo died, by claiming that beagle dogs were especially prone to breast tumours.

The results of the rhesus monkey study were similarly dismissed by saying they were dose related. Upjohn's claim that Depo "is probably the safest hormonal contraceptive

drug available" is therefore totally unproven (Bunkle, 1983). So while medical practitioners may prescribe it in good faith, their decisions are based on mis-information produced and controlled by the company that stands to profit.

And profit it has. The first Reagan administration passed the Drug Regulations Act which rendered impotent the FDA ban on Depo sales to the Third World. Drugs judged unsafe for Americans can now be exported provided they are requested by the foreign government. Apart from Upjohn's profits, the assault on Third World women has other advantages:

"Population explosion, unless stopped would lead to revolutions: population control is required to maintain the normal operations of US commercial interests around the world... without our trying to help these countries with their economic and social development, the world would rebel against the strong US commercial presence. The self interest thing is the compelling element" (Ehrenreich, 1980).

Government applying for loans from organisations like the World Bank (with heavy US presence) are usually required to show that they are addressing their 'population problem'. Sterilisation programmes and campaigns of Depo-Provera and other injectables are pushed because they are immediately effective with long-term results.

Why New Zealand?

US imperialism concentrates Depo's three-way assault of racism, patriarchy and capitalism. Like other weapons in this armoury, Depo has been aimed at women in New Zealand.

In 1968, the New Zealand Health Department approved Depo for use as a contraceptive, before the study on its effects were complete and despite its ban in the US. Moreover, it is offered as "one of the many available choices" (Bonito, 1980) rather than approached conservatively.

There are several reasons why Upjohn has chosen to study women in New Zealand:

First, they reveal the highest rate of Depo use for a population whose social and ethnic composition resembles that of the US, where the company ultimately hopes to market the drug.

Second, the subsidised health system here is a great boon because it relieves the company from having to pay for any medical treatment required by women involved in the study.

Third, the ACC (Accident Compensation Corporation) Act absolves Upjohn of all damages suffered by the women. Drug companies have had to pay millions of dollars in the US in damages for the effects of drugs like Depo.

Fourth, since the New Zealand Medical Association monopolises and the state regulates the dissemination of contraception, the company does not have to seduce a wide variety of organisations.

That the power brokers—state and medical—are united in supporting the Upjohn study means the assault on New Zealand women will continue. But the Depo-Provera assault is not distributed evenly. There are definite targets.

In New Zealand, Depo is administered mainly to women who have the least access to contraceptive information; women for whom informed consent has little relevance. For

example:

1) One survey revealed that 42 per cent of Maori women and 11 per cent of Pakeha (European) women had used Depo while another concluded that the injection was the only contraceptive method used by a higher proportion of Maori women than European women, (Bunkle, 1982; Trlin and Perry, 1981). This reveals racist attitudes on the part of white middle class medical practitioners who view Maori women as unreliable users of contraception.

2) Working class women—one study discovered that the injection had been used by a higher proportion of women without school certificates and by women whose partners were in the 'lower' status category (Trlin and Perry, 1981).

3) Maternity patients and breast-feeding mothers—one study found that some women were given Depo as routine medication before leaving the maternity hospital and were assured that it would not alter the milk supply. Many were not told what they were being given until it had been administered but being in unfamiliar surroundings and subject to hospital rules they were not in a position to resist or complain.

4) Mental patients and intellectually handicapped women are given Depo on the excuse that menstruation is a 'problem' for hospital staff. This totally ignores the fact that instead of losing their periods some women 'flood' while on Depo. In addition a woman admitted to a psychiatric institution, perhaps suffering from some form of depression, "should not be subjected to a drug known to cause depression" (Clark, 1980).

Depo is also given to young women who are considered 'sexually irresponsible'; to immigrant women especially if they are of an 'undesirable' type (i.e. non-European); and to post-abortion women.

But by far the largest group using Depo-Provera however, are Black and working class women. Health professionals say this is because these women like Depo and cannot or will not use other forms of contraception. The reality is that women do not make choices about their reproductive lives under conditions that they control.

Black and working class women are under great pressure to accept stronger and more dangerous methods of birth control because an extra child could have quite disastrous effects on the quality of the lives of existing family members. When family planning incentives and disincentives are institutionalised as they are in some countries like India these pressures are even greater.

In a capitalist society doctors set up in areas where they can earn most, which means that women living in working class areas see doctors who are typically overworked. Quite apart from any decision those doctors may make about the contraceptive competence of any individual woman, they simply do not have the time to explain various contraceptive methods adequately.

Women are dependent on those who control the goods and the information. One New Zealand study found that 82 per cent of Depo users should not have taken it had they known the evidence against it (Amas, 1984). In India a Net-Oen camp was disrupted when half the women left after hearing about the dangers of injectable contraceptive use (Nair and Balasubrahmanyam, 1985). Women appear to 'consent' to

using dangerous contraceptives but what appears as consent is really submission.

Their 'decisions' are largely determined by the material conditions of their lives including their access to abortion facilities, their ability to support another child and by the limited information they receive from the birth controllers.

Contraception is an important area for gender struggles because as long as men control women's fertility, female sexuality and the work of reproduction will be inextricably linked. What forms have women's struggles against injectable contraceptives taken and how effective have they been?

Women's Struggle Against Injectables

The campaign against Depo was an attempt by New Zealand women's health groups to have the Upjohn study stopped and Depo-Provera banned in New Zealand. By publicising the side-effects of Depo use it was hoped that women could resist being manipulated into participating in the study and or using the drug. But the feminists who campaigned against Depo have been verbally attacked, threatened with libel suits, or dismissed as 'emotional' and 'hysterical'. Upjohn was not about to waste the \$6 million it had pledged for the study.

The study's essential aim is to produce data that will extend the Depo-Provera stranglehold. Not long after the study began Upjohn was claiming the success of its New Zealand study and claiming that it proved the drug's safety for use in America.

And while even statisticians and demographers criticised the study's protocol they have never been given the opportunity to back up their arguments with the data from the study because this has never been made public (*The Press*, 1983). Completed questionnaires go straight to Upjohn's New Zealand headquarters then directly, without being opened, to Michigan, USA, where data is stored on their company computer. Only Upjohn scientists have access to that data. The 'facts' that are concluded from the study will reflect the male-dominated and profit-oriented structures that created them. The opinions of lay women have no status alongside those of the country's medical experts. The \$6 million Upjohn was prepared to pay for the study is equivalent to the entire budget of the New Zealand Medical Research Council and must have been an irresistible attraction to those experts.

For women's groups, the struggle was diverted to the more immediate and probably winnable Dalkon Shield crisis. The anti-Depo campaign essentially failed, alongside rumours that new injectables are being secretly trialed at our top medical institutions.

It is interesting for New Zealand women to see the successes of our India sisters in the struggle to ban Net-Oen in their country. Perhaps this is because in contraceptive camps women do not confront the drug or the administrators of that drug alone, but can stand together for a collective refusal as in the example of the Net-Oen camp described above.

But despite the success and failures there are several points that need to be remembered:

Women should struggle against all 'types' of contraceptives rather than certain brands. The adverse publicity created about Depo had no effect on the development, trials and

dissemination of similar injectables marketed once the patent on Depo was lifted. The same was true of the Dalkon Shield debate: other potentially dangerous IUDs were left with their reputations intact.

It is also important that women share information across international boundaries and link our struggles so that getting rid of a dangerous contraceptive in one country does not mean that the problem is simply exported to more vulnerable women in some other country.

Perhaps the most effective strategy, and one that has ramifications for women outside the birth control arena, is to empower individual women or groups of women to stand up to the birth controllers. Empowering women means providing them with information to challenge the 'wisdom' of doctors, medical 'experts', technicians working in contraceptive camps and 'scientific evidence'. Information is power and both must be shared for women to take some control of their reproductive lives.

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Work, Ideology and Science

The Case of Medicine

vicente navarro

This article discusses the nature of work, ideology and science in Western capitalist societies. It analyses how capitalist or bourgeois ideology reproduces capitalist dominance in the spheres of production (Section I), politics (Section II), and science and medicine (Section III). Also, this article explains how the working class responds to that capitalist dominance through a continuous process of class struggle. Sections I, II and III show how class struggle affects bourgeois dominance in the processes of production, politics, and science and medicine, respectively. Special focus in Section III is on the analysis of (A) how bourgeois dominance appears in science and medicine; (B) how bourgeois ideology appears and is reproduced in medical knowledge; and (C) how class struggle determines the nature of scientific and medical knowledge. In this section, an alternative mode of production of scientific and medical knowledge, different from the prevalent bourgeois one, is presented and discussed. In all three sections, medicine and medical knowledge are chosen as the primary points of reference.

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"The docs keep telling me there's nothing wrong with the place where I work, I guess they are supposed to know it all because they have had a lot of education and everything. I'm no expert like they are, but I sure as hell know there's something wrong in that mill and other guys are saying the same thing. One thing I know for sure—that place is killing us!" — Cancer patient and steelworker from the Bethlehem Steel Corporation mills, Baltimore, Maryland, USA, 1978.

THERE is a concern among the centers of power in the Western capitalist world that something is going wrong with the nature of work in that world. Editorials in the daily press, articles in scholarly papers, reports of powerful foundations, exposé programmes on television, and even more recently, some commercial films have focused on different dimensions and components of what has been called the 'crisis at the work place' in contemporary society. Part of this crisis is the rebellion of the working populations against their conditions of work, rebellions which appear in different forms such as absenteeism, turnover, or just plain sabotage. These have reached such proportions as to become a cause for major alarm by the establishments of those societies. An example of this concern and alarm is one of the reports of the powerful Trilateral Commission. A major recommendation of that Commission, which includes representatives of the power structure of the top capitalist developed societies [1], is that "a major intervention is required in the area of work in our societies" to attack workers' discontent and alienation at its roots since, otherwise, those rebellions can threaten the whole survival of the Western economic system—a euphemistic term which is used to define Western capitalism. The representatives of the bourgeoisie or capitalist class, or, to use a more American term, the corporate class, as the most class-conscious of all classes, tend to perceive quite clearly from where they sit where trouble may come from, i.e., from the working class rebellion against the main column on which the entire capitalist system is built: the nature and the conditions on which basis work is extracted from the workers [2].

On the other side of the ideological fence, progressive forces in the United States have only recently begun seeing signs of that potential storm. Many, however, still seem to be stuck in that scenario so widely emphasised by ideologists of capitalism and radicals alike that the working class has practically disappeared as agents of change, and, instead, has been absorbed into society, becoming part of the larger consuming and undifferentiated masses. According to some radical theorists, other groups are supposed to have taken over that task of carrying on the much needed struggle for change. The working class, however, has been 'lost', and has

become part of that one-dimensional society [3]. Witness, for example, a most recent publication edited by a leading radical in this country who, in covering the changes in the cultural meaning of medicine, refers in his introduction to the impact of blacks' and women's struggles in the redefinition of health and medicine, but not once does he refer to the struggles which are taking place at the sites of work in the Western capitalist societies [4], struggles which I believe are among the most important ones in changing the nature of our society, including the definition of health and medicine. Just in the United States alone, millions of workers were involved in strikes last year which had to do primarily with work conditions and health. From the wildcat strikes among steelworkers in Ohio who asked to change conditions of work and medical regulations which applied in their working places, to the coal miners who struck for three months—threatening, as President Carter indicated, the stability of the economy, i.e., US capitalism—for the right to strike for health and safety conditions and for the right to retain some form of control over their health plans, many instances show that major struggles are taking place at the work place questioning the meaning of work under capitalism and its effects on the health and well being of our working populations. Health-related issues have been triggering points in many of those struggles, and health-related movements have had an important impact on changing the nature of political and social institutions, including labour's own institutions. A most recent example is the key role played by the Black Lung movement in creating Miners for Democracy. That movement rallied the majority of coal miners around the issue of democratising their union, the Union Mine Workers, and overthrowing the corrupt leadership of Boyle [5]. A very important issue—a key one—in that fight was a health related issue, i.e., the need to recognise and compensate black lung as an occupation related condition, and the right to strike for safety conditions. The miners fought a tough battle to redefine health and medicine, showing—against the verdict of coal companies, state and federal legislative bodies and agencies, and even large sectors of the academic community—that coal mining was indeed a very unhealthy occupation in our society.

The history of the working class in the United States, and other countries as well, is punctuated by a continuous struggle to redefine the nature of work and health. And these struggles have heightened to such an extent that, as the Trilateral Commission indicates, they are threatening the cur-

rent international capitalist order.

In summary the fight for the realisation of health is very much at the center of the conflict between capital and labour which takes place at the work place and heightens in moments of crisis like the current one. The struggle which occurs at the places of work in our Western societies is a most important one, since it questions the very basic social power relations of capitalism [6].

Nature of Work under Capitalism

Let us analyse the conditions of work of the working class, that class by whose sweat and pain the goods and services in our society are produced. A primary characteristic of work is that its controllers increasingly shape the nature of work to optimize their pattern of control over (1) the productive process; (2) the individual producers; and (3) the collectivity of producers—the working class [7]. By means of this process, the workers are: (a) compartmentalised into increasingly narrower tasks; (b) hierarchicalised by a division of labour which reproduces the class relations in society; and (c) expropriated from all possibility of controlling, influencing or having a say in the design or development of the work process of the products they create.

The outcome of this process is a set of relations which cannot be defined as less than totalitarian. Democracy, the capacity of individuals to control their own lives, stops at the gates of the working places. This set of authoritarian relations where one class—the bourgeoisie—controls that process of production and work, and the other—the working class—doesn't, is what Marx called the *dictatorship of the bourgeoisie*, understanding as such not a specific political form of government but rather an overwhelming dominance and control which the bourgeoisie has over the means and process of production. Nowhere for the millions of workers does that dictatorship appear more clearly than at the place of work. Michael Bosque, in his usual vivid way, puts this quite clearly when he invites the reader to

Try putting 13 little pins in 13 little holes 60 times an hour, eight hours a day. Spot-weld 67 steel plates an hour, then find yourself one day facing a new assembly-line needing 110 an hour. Fit 100 coils to 100 cars every hour, tighten seven bolts three times a minute. Do your work in noise 'at the safety limit', in a fine mist of oil, solvent and metal dust. Negotiate for the right to take a piss—or relieve yourself furtively behind a big press so that you don't break the rhythm and lose your bonus. Speed up to gain the time to blow your nose or get a bit of grit out of your eye. Bolt your sandwich sitting in a pool of grease because the canteen is 10 minutes away and you've only got 40 for your lunch-break. As you cross the factory threshold, lose the freedom of opinion, the freedom of speech, the right to meet and associate supposedly guaranteed under the constitution. Obey without arguing, suffer punishment without the right of appeal, get the worst jobs if the manager doesn't like your face. Try being an assemble-line worker [8].

But these characteristics of assembly line work are not unique to workers in the automobile industry or workers in manufacturing alone. Many other studies have been done showing how assembly line work where the individual worker is carrying out *predetermined tasks* over which he or she does not have much control, is also the most frequent type of work among sales, clerical and large sectors of public service workers. Indeed, that expansion of the atomised hierarchical

and authoritarian division of labour growing rather than diminishing in most areas of work in society, and is being presented as needed to increase the efficiency and productivity of the workers, i.e., to extract as much work as possible from the worker. But that demand by representatives of the capitalist class is not made without misgiving about how long the working class will tolerate those conditions of work. As a leading exponent of the establishment put it, "How long can our political system stand the seventy million who live the majority of their working hours in an atmosphere which is totalitarian?" [9]

In the following pages of this article, I will explain how bourgeois ideology [by ideology, I mean, with Gramsci, the ethical, juridical, political, esthetical, and philosophical ideas about social reality as well as the set of customs, practices and behaviours which consciously or unconsciously reflect that version of reality] reproduces these dominant/dominated relations in the sphere of production (Section I); in the area of politics (Section II); and in the area of science (including medicine) (Section III). Needless to say, dominance does not mean complete control [10]. The working class does not remain passive against that domination. A *continuous process of class struggle* takes place where the working class also wins most significant victories and determines changes in the boundaries, means and instruments of that dominance [11]. How this class struggle affects that dominance in the world of production, of politics, and of science is also covered in Sections I, II, and III, respectively. In all three sections, *I have chosen medicine and medical knowledge as the primary points of reference.*

I

Work, Market Ideology, and the Reproduction of Power Relations

How is class dominance being reproduced? By different means. For example, the division of labour within the working class, by dividing the labour force into different categories, erodes a sense of class solidarity. Also, tending to reproduce those dominant/dominated relations are the conditions of work, highly hierarchical and authoritarian, which tend to create a habit of submission and subordination, further accentuated by a fear of unemployment or dismissal which tends to produce an obedient body of workers and citizens.

But besides these reasons, there are two others which explain the reproduction of these relations. One, very important ideologically, is that this type of work is presented, not as a result of specific power relations in society, but rather as a logical, rational, and natural outcome of the unavoidable and unchangeable industrialisation and technologisation of the work process. Thus, the culprit of workers' pains is seen in the unchangeable industrialisation and technology of work rather than in the social power relations which determine this specific type of oppressive industrialisation and technology. Needless to say, the absence in the current historical period of models of alternative processes of production and work strengthens the ideology that ours is the only logical, rational and natural way of organising production. But dominant

ideology tries to impress on the worker that those relations are not only *natural* but also *fair*. This dominant/dominated relationship in the world of production appears as a fair exchange in the labour market in which these exploitative relations are veiled and mystified by making them appear as a matter of free, unfettered and equal exchange between the labourer who sells his labour and the capitalist who pays a wage for it. Needless to say, bourgeois ideology may even be willing to admit and accept that much work today is oppressive and does not offer the possibility for self-fulfilment to the worker. But this same ideology will quickly add that the worker is compensated with a fair wage and that fair wage will allow the worker to obtain the key to the door to his self-fulfilment in the house of consumption. The worker, denied the possibility for creativity and self-fulfilment in the world of production, is said to be given that possibility in the world of consumption. Moreover, while he has no control over the work process, he is being told that he has control over the product of that process where, not as a worker but as a consumer, he can, through the free expression of his wants in the market, allocate the resources in that society. Thus the sovereignty denied to the worker in the world of production appears as the sovereignty of the consumer in the world of consumption. In this scenario, the criteria and discussion of fairness is not over the control of the process of work but, rather, on the price to pay and compensate the worker for his work so that he may reach a sense of fulfilment, control, and pursuit of happiness in the world of consumption.

Suffice it to say, it is of paramount importance for the reproduction of the capitalist system that all struggles at the point of production be shifted to the area of consumption, with the focus of the struggle being the cost of labour—personal and social wages—rather than the control of the process of production. The acceptance of this shift in the struggle from the world of production to the world of consumption by the trade unions and their consequent focus on the price of labour has been a primary reason for the reproduction of capitalist relations. As Gramsci indicated "trade unionism by organising workers not as producers but as wage earners had accepted and submitted to the rationale of the capitalist system where workers are merely sellers of their labour power" [12]. The shift from workers to wage earners is a key mechanism of reproduction of capitalist relations and responds to the intrinsic need of capitalism to separate the world of consumption from the world of production, focusing all areas of conflict on the former and not on the latter. Capital, in its position within the class struggle, clearly perceives the correctness of Marx's position when he wrote in the *Grundrisse* that, "...the important point to be emphasised here is that whether production and consumption are considered as activities of one or separate individuals, they appear as aspects of one process in which production forms the starting point and therefore the predominant factor..." [13]. A predominant factor whose control capital cannot allow to be questioned.

A consequence of that bourgeois ideological dominance and acceptance of the *unalterability* of the process of work (and shift of the struggle from the world of production to the area of consumption) has been the acceptance by the

unions of damage created at the work place as being unavoidable, and thus the *champ de bataille* has been on the compensation for that damage. Consequently, occupational medicine, a branch of forensic medicine in its beginnings, had, as its initial task, to define for management the nature and size of the damage which needed to be compensated. Occupational doctors, still called company doctors in many countries today, had as a primary function, to defend management interests and obfuscate or veil the actual damage created at the work place. The struggle was, and still continues to be, between labour which demanded a higher compensation, and capital (helped by occupational doctors) who wanted to minimise that compensation, denying for as long as they could that there was any relationship between work, disease, and death. Let me add here that not only occupational physicians directly employed by management but many in academe, medical schools and schools of public health, supported directly and indirectly by grants or funds from industry or industry financed foundations, contributed to veil and mystify that relationship between work and disease [14].

A further consequence of the separation between the worlds of production and of consumption was that the damage created at the work place, when and if recognised, was perceived to be unrelated to the damage produced outside the work context. Thus, a dichotomy was established between the branches of medicine responsible for the definition and administration of disease at the work place (occupational medicine) and at the non-work place, in the world of consumption (medical care). That dichotomy, production/consumption, is still present today and is being reproduced in the structure of health services with different administrations responsible for those two separated branches of medicine.

In summary, that shift of the struggle around the work place from (1) control of work to compensation for damage; and (2) from the world of production to the world of consumption, has led to the establishment of occupational medicine as a separate branch of medicine historically controlled by management in charge of defining damage and compensation. Needless to say, the priorities within the social system were higher for the medicine of consumption than for the medicine of production, particularly considering that a primary function for the latter—the one of policing the labour force—was achieved under capitalism by other effective means than occupational medicine.

All these struggles on compensation were, for the most part, carried out under the supervision of the state institutions where capital was far more influential than labour, which leads me to discuss the second area where those dominant/dominated relations are being reproduced, i.e., in the realm of the political institutions.

II

Work, Political Ideology and Reproduction of Power Relations

In the same way that it is of paramount importance for the reproduction of the dominant/dominated relations at work to shift all struggles around the control over the pro-

cess of production to world of consumption, it is equally important to shift those same struggles from the world of work to the world of representative politics. Indeed, just as the worker/subservient relationship is concealed at the economic level of our society under the ideology of consumer sovereignty, the worker/subservient situation is concealed at the political level with the dominated worker being presented as citizen/sovereign. According to bourgeois ideology, people decide through the market what they consume and through the political process what they want. A clear representative of this position is Eli Ginzberg, Professor in the Business School at Columbia University, who begins a book entitled *The Limits of Health Reform: The Search for Realism*, with the following sentence. "In our society, it is till the citizens who, through their voice in the market place and in the legislature, ultimately determine how their resources will be allocated" [15]. According to this ideology, workers become citizens, and as such, have the same rights as the controllers of their work. The assembly line workers are supposed to have the same rights as the controllers of their work. The assembly line workers are supposed to have the same political and juridical weight, according to legislative discourse, as the Henry Fords of America. Both categories—bosses and workers—are abstracted into a new category, the citizens who decide, with equal weight, the major political decisions. In the political - juridical realm, they are both equal. But is it really true that they both have the same power to choose, decide, and develop different political alternatives? Many studies have been written showing that the Henry Fords of America, or of any other Western capitalist country, have far more power—an overwhelming power to shape the nature of what is discussed, voted upon and presented in the political debate—than the assembly line or other type of workers [16].

In order to consider them with equal political power, Ginzberg and others with him have had to consider them as individual citizens, an abstract category which levels off everyone independent of their position in the world of production where goods and services are being produced. But men and women under capitalism are not equal. That assumed equality in the realm of politics is continually shown as inequality in the realm of production. Under capitalism, the relations of production allocate men and women into different social classes, defined by their differential access to and possession of the means of production [17]. Agents within those classes have, indeed, different political and thus juridical power. The class which owns, controls and possesses the means of work has a dominant hegemony in the political - juridical apparatuses of the state and in the ideological - cultural apparatus of society [18]. It goes without saying that the intellectual representatives of that class deny this, dismissing it as a simplification, tolerable for "ideologues" but not for reasonable people. They present it as a matter of fact that the political juridical institutions are an outcome of people's will who, via the electoral process in representative democracy, periodically elect those on whom authority is being bestowed. Consequently bourgeois dominance in the apparatus of representation is denied by bourgeois ideology in which bourgeois domination is veiled and mystified as representing the popular sovereignty and the *vox populi*. Ac-

cording to this ideology, the workers, regardless of how exploited in the economic arena they may be, are still supposed to be free and equal citizens who, by their will, have chosen, and continue to choose, a system which reproduces that system of exploitation. This is the most important ideological legitimization of the bourgeois rule, i.e., people want it and choose it.

It is worth stressing that in this scheme of things, democracy is not—as Lincoln said—government by the people—but one occasionally *approved* by the people. Democracy is thus defined differently from self-governance. In such a democracy, governments come and go at the approval of the people. In this respect, the government is assumed to represent *we, the people*, and what happens in our societies is what *we, the citizens*, want. As Etzione recently indicated in *The Washington Post*, "*we, in the United States, have decided that we value production more than risk or damage at the work place*" [19]. And that *we* is supposed to mean, of course, the American people who have expressed their political will through their political institutions. *We, the citizens*, have chosen to maximise production rather than safety at work. It speaks of the overwhelming dominance which the bourgeois position has in official and academic discourse, that those authors such as Ginzberg, Etzione and many others can consider these expressions as merely factual and absent of ideological meaning. They would strongly deny, of course, that they are bourgeois ideologists who reproduce the scheme convenient and favourable to dominance of our lives by the bourgeoisie. It is easy to predict that the bourgeois theorists would dismiss as 'rhetorical' the interpretation that it is not *we, the American people*, but the capitalist class which primarily—although not exclusively—dominates the state functions; and that it is not *we*, but the controllers of work, who decide on the nature of production and consumption in society. They would, indeed, dismiss that as Marxist "rhetoric". But they do not realize, or want to realize, that theirs is also a rhetoric and one which reproduces a pattern of class power relations where the minority and not the majority makes the major decisions. In summary, each ideological position has its own discourse dismissed as 'rhetoric' by its adversary. The untenability and incredibility of bourgeois rhetoric which assumes that *we, the American people*, decide on major issues in society, is increasingly clear for all to see. The majority of American citizens who belong to the working class and lower middle class know reality far better than the bourgeois theorists. In many polls, they have expressed their belief that the two major parties are controlled by corporate America and that the government institutions work principally for the benefit of Big Business—that folksy term used to refer to the capitalist class [20].

In summary, then the dominant/dominated relations at the work place are being reproduced by shifting struggles from the world of production to the world of representative politics where the bourgeoisie is the dominant force. It is of paramount importance for the bourgeois order that a clear separation be established between the *economic* class struggle confined within trade union battles (primarily concerned with the price of labour and compensation of work and damage), and the *political* struggle carried out primarily by

the political parties in the realm of representative democracy. As many points in history, from the General Strike in Britain in 1926 to the May events of France in 1968, show quite clearly, the shift of the place and focus of struggles from the place of work to the arena of representative politics has had a most important effect in diluting threats to the bourgeois order. But why this dilution—this weakening of that threat when the area of struggle shifts from the floor of the factory to the parliament? One reason is that representative democracy converts the process of participation from active to passive, delegating popular power to elected and/or selected representatives. These representatives, however well they may represent the interests of the working class and popular masses, have to conform to a set of rules and operate within a set of state institutions where the bourgeoisie is, by definition, dominant—a bourgeois dominance which gives its character to those institutions, including the institutions of representation and mediation [21]. Thus, it has always been in the interests of the bourgeoisie to demobilise the mass struggles occurring in the places of production by shifting those struggles to the parliament or its equivalent.

The previous paragraphs should not be understood as shying away from or slowing down the struggles which need to be carried out within the state and organs of representative democracy. *The class struggle carried out within the apparatuses of the state can lead to substantial victories for the working class.* The National Health Service in the United Kingdom, for example, was, no doubt, a remarkable achievement for the British working class. But it would be wrong to consider the NHS as a socialist apparatus within a bourgeois state [22]. I have shown elsewhere how the NHS is under the hegemony of the bourgeoisie, a hegemony which appears in the ideology, composition and distribution of medicine in the UK [23]. Similarly, the occupational health legislation which has appeared in the United States from the late sixties and early seventies has to be seen also as a great achievement for the US labour movement. But the fact that these achievements have occurred within a state that is under bourgeois dominance explains the limitations and the nature of that progressive legislation. The consequences of bourgeois dominance are many. One is that programmes established by legislative mandates tend—in the absence of continuous pressure from the working class—to be manipulated by the components and strata of the bourgeoisie which are affected by that legislation. Lobbies of those groups are “always there, close to the corridors of power” to limit and change the progressive impact and nature of those programmes. But, more importantly, those programmes have to operate within parameters which are defined by the overall power relations in that society and which cannot be touched upon by those programmes. For example, great stress is made by all governments that occupational health programmes cannot interfere with the overall pattern of capital accumulation. Capital formation and the subsequent class power relations which it sustains cannot be affected by that type of legislation. And when it is, enormous pressures are brought to bear on governments to assure that that situation be reversed.

Last but certainly not least, another consequence of

bourgeois dominance in the apparatuses of the state, including those progressive programmes, is that the implementation of those programmes is carried out within the ideological framework convenient to the reproduction of the bourgeois order. For example, the prevalent approach of state regulatory agencies in occupational medicine is to protect the worker against an environmental agent such as the toxic substance which can harm the worker. Consequently, a struggle takes place around the allowable exposure of the worker to that toxic substance [24]. This struggle is a very important and needed one. But it is still carried out within that ideological dichotomy of worker versus environment which assumes and independence and autonomy where the worker is on one side of the working scene and the environment is on the other. The dichotomy of patient or potential patient versus environment characterises, as I will discuss later on, the conception of risk and disease in bourgeois science. At the same degree that the bacteria was perceived to be the external cause of disease, the toxic substance is now perceived to be the cause of that disease. In either case, however, such a dichotomy is a faulty one. The social power relations which determine the environment of exposures also determines the nature of the work process and of the agents of that process, i.e., the workers. The social power relations which determine the working environment also determine how the worker fits within that environment, relates to that environment, and perceives himself or herself in relation to fellow workers and to the controllers and managers of that environment. In other words, by focusing only on a specific item of that environment (the toxic substance) and by not touching on the power relations which shape both the environment and the worker, the bourgeois order is reproduced.

III

Bourgeois Dominance, Ideology and Knowledge in Medicine

In previous sections, I have discussed how bourgeois dominance appears in the world of production and in the political-judicial level of society, and how that dominance has many implications in medicine as well. In this section, I will focus on how that class dominance appears also in the production of knowledge in medicine. Many studies have been written showing how bourgeois dominance of our research institutions including medical research institutions has determined a set of priorities that, while presented as apolitical, are, in fact, clear political statements which reflect the class dominance of those institutions. Elsewhere, I have discussed how that overwhelming class dominance of our research institutions explains, for example, why most of cancer research in Western capitalist countries has focused on biological and individual behaviour, but not on other factors such as carcinogens that exist in people's work places which could be threatening to the sections of the bourgeoisie that have a major influence in the funding institutions for cancer research [25].

It would be erroneous, however, to believe that those cancer research priorities are merely a result of the influence of

powerful interest groups in the top corridors of power in funding agencies. There is more to it than that. These groups belong to a class—the bourgeoisie—which has an ideology or vision of reality with an internal logic and consistency which, in turn, leads to the support of some positions, conclusions, and priorities and to the exclusion of others. This bourgeois ideology is the dominant one under capitalism. That it is dominant, however, does not mean that that bourgeois ideology is the only ideology. In this regard, it has to be stressed that each social class had its own vision of reality and ideology. In other words, there is not under capitalism, just a single ideology which is upheld by all classes, races, and sexes. I stress this, because on both sides of the ideological spectrum, there are ideological currents which postulate that there is in any society *just one ideology*—the dominant or ruling ideology—which has resulted from that society's choice, wills and wants (as the bourgeois theorists believe), or from an overwhelming dominance, tantamount to control, which the bourgeoisie has in that society [26]. Agreeing with Marx, I believe that classes have different ideologies which also appear in different forms of culture.

Upon the different forms of property, upon the social conditions of existence, rises an entire superstructure of distinct and peculiarly formed sentiments, illusions, modes of thought and views of life. The entire class creates and forms them through tradition and upbringing [27].

But one of them, the ideology of the dominant class is the dominant ideology. As Marx and Engels indicated

... the ideas of the ruling class are in every epoch the ruling ideas, i.e. the class which is the ruling *material* force of society, is at the same time its ruling intellectual force [28].

But this 'ruling' does not imply that the working class ideology is either non-existent or absorbed in the bourgeois one. Nor does it imply that a clear-cut division exists between the two ideologies with a well delineated boundary between them. Class struggle is continuously taking place with victories and defeats which influence both ideologies. For example, I have already indicated in previous pages how bourgeois values appear in the working class. An example is when the working class accepts the belief that the nature of work is determined by industrialisation. And vice versa, the rhetorical (although not actual) acceptance by the bourgeoisie of democracy as a part of dominant ideology was forced by the working class on the bourgeoisie, when the latter social class needed an alliance with the former in its struggle against the aristocracy, then hindering the rise to power of the bourgeoisie [29]. In other words, democracy was not a set of values and practices spontaneously created by the bourgeoisie, but, rather, an ideology forced on the bourgeois ideology by the working class. The bourgeoisie has always fought by all means the expansion of democracy, including the expansion of universal suffrage, freedom of association, freedom of the press and many other freedoms which the working class has had to win with great sacrifice and not without heroic struggle.

In summary, there is, under capitalism, a dominant ideology which appears in all institutions including the institutions of science and medicine.

Class dominance in scientific medicine

How does the bourgeois vision of reality appear in science and medicine? In many ways. Let us outline some of them.

Dichotomy of Science versus Ideology

An extremely important view within bourgeois ideology is that there is a clear-cut dichotomy between science and ideology. Actually, science was the creation of the nascent bourgeoisie and was contraposed to religion (seen as the ideological expression of aristocratic dominance) which it was considered to transcend and supersede. Science was supposed to be a new global vision of reality which would rationalise and legitimise the new bourgeois social system. Galileo, one of the founders of the scientific revolution—and who, incidentally, was working as an advisor to coal owners on how to increase the rate of exploitation of coal miners [30]—established the basis for the creation of new knowledge based on what was called objective observation and not on theology. And that dichotomy, objectivity versus subjectivity, science versus ideology, has lasted throughout the history of science. Science was thus perceived as a body of neutral and value free knowledge built in a painstaking and linear process in which each new scientific discovery was built upon a previous one. Science and technology became part of the forces of production and as such, their development was considered to be intrinsically positive. According to bourgeois ideology, science and technology (and the process of industrialisation which they determine) were forces of progress, determining, almost in a fatalistic way, the nature and shape of society. The most recent versions of those positions are the ones taken by Daniel Bell [31] and others, who indicate that power has shifted from the owners of the means of production to the managers of the process of that production and, more recently, to the producers—the scientists—of what is perceived as the most important ingredient of production, i.e. science and technology.

It is worth stressing here that the bourgeois interpretation of the value free character of science has also appeared within the labour movement, particularly since Stalin [32]. As Sweezy and Bettelheim [33] as well as Lecourt [34] have eloquently indicated, the forces of production, including science and technology, under Stalinism were perceived as neutral. Their development was perceived to be a primary condition for the achievement of a change in the relations of production at a later stage. That change in the relations of production was perceived as needed, because they were retarding and hindering the full development of the forces of production. [Social relations of production are the relations which exist in a given process of production between the owners of the means of production and the producers, a relation which depends on the type of ownership, possession, capacity for allocating and designing those means of production and the use of the products of that process of production. Forces of production are the forces, instruments, labour and knowledge which are organised to produce goods and services in any society. How the forces of production are organised, designed and related among themselves is deter-

mined by the social relations of production.] In this dichotomy—forces versus relations of production—the forces of production were primarily understood as the instruments of production, and their development was considered to be the primary motor of history. The point that has to be stressed here, and Lecourt ignores it, is that instrumentalist understanding of forces of production already appeared in Lenin. It was Lenin who believed that the Western forces of production (including Taylorism) should be imported and put to proper and better use by the Soviet revolution. Lenin was an enthusiast of Taylorism. As Claudin-Urondo has indicated, Lenin conceived science and technology as neutral entities, rather like tools, the function of which can be changed depending on the use being made of them [35]. It should be pointed out that immediately after the October Revolution, a massive democratisation in scientific institutions, such as in the medical ones, took place with changes in the pattern of class control of medical schools and other scientific institutions and with changes in the class origins of the medical profession and other scientists. These changes had quite an impact in redefining the nature of those institutions, and in redefining the process of creating scientific knowledge. That democratisation had a very significant impact in redefining the nature of both scientific institutions and science itself.

The priorities within medicine, for example, changed quite substantially, and initial changes in the understanding of medical knowledge started taking place. This process of democratisation, however, was strongly reversed later on, in particular under the Stalin regime. Class control of scientific institutions and class origin of the scientists were reversed most dramatically under Stalin, giving strong political weight to the experts (scientists and technocrats) who became the controllers and administrators of scientific knowledge, closely supervised by the party apparatus. In this scheme of things, the development of the USSR meant primarily the fantastic growth of the forces of production (including science and technology) and the better redistribution of the product of that process. But it did not change the process of production and work nor those forces of production. The nature of science and technology (and, as I have shown elsewhere, medicine) did not change under Stalinism [37].

Foci of production are not neutral, however. They carry with them the social relations of production which determine them. In other words, a factory or a hospital is not a neutral institution. It is a hearer of power relations which determine how work in the institution is done, by whom, and with what type of instruments. How the work process takes place in these and other institutions in society is determined by the power relations existent in that society. It is not the process and forces of production which determine the social division of labour (as the theorists of industrialism postulate), but, rather, it is the social division of labour, its concomitant power relations and the ideological relations which those power relations carry, which determine the forces of production including science and technology. The power relations in society appear also *within* scientific knowledge, and the bourgeois ideological dominance appears and is being reproduced in the production of knowledge itself. The dominant

ideology reproduces itself in scientific knowledge. And this reproduction takes place, not only by selecting the subjects of inquiry, but also by choosing the method of inquiry, and the relations which the researcher or inquirer has within the overall process of production. Needless to say, this position—that bourgeois ideology reproduces itself in science and thus science is value loaded and not value free—is continuously denied by scientists and other bourgeois theoreticians. Science appears as the epitome of objectivity. And all series of ideologies rush to be called sciences to gain legitimacy and credibility in bourgeois society. Not only natural sciences; but a long list of ideological positions appear with the sanction of sciences, e.g., business sciences, management sciences, social sciences, political sciences, economic sciences. Sciences become the newly accepted vision of reality which would enable the citizenry to cope with the world in a better fashion. All types of ideologies are thus made compulsory subjects in our scholarly institutions, from schools to academe, provided they are presented as sciences (i.e., “value free and neutral”). In this way, while the parents of a ten-year old child would strongly object to having him/her subjected to compulsory classes of a certain religion or certain ideology, they would not object, or would not be given the right to object, if that subject were, or is, presented as a science, e.g., economic science. Science becomes that magic word which allows the transformation of value loaded knowledge into a value free one. Thus, the dichotomy of science/ideology constitutes a most powerful ideology for the reproduction of bourgeois relations.

Division Between Experts and Laymen

Once this dichotomy of science/ideology is established, then we have to ask what is science? And the bourgeois response is that science is an objective body of value free, classless and universal knowledge, based on testable observations of reality. As such, the production and reproduction of scientific knowledge takes place in scientific institutions by individuals who—in the overall social division of labour—have been assigned the task of producing and reproducing that knowledge, i.e., the scientists. *Science then becomes what scientists—a small group of individuals in society—do. And scientific medicine is what medical scientists and practitioners do.* Needless to say, all systematic knowledge which is produced outside those institutions, and by individuals other than scientists, is not considered science. According to this criteria, the documents produced by research groups in occupational medicine that concluded in the thirties, forties, fifties and even sixties in the United States that there was not a relationship between black lung and coal mining were supposed to be “scientific documents and conclusions” and thus trustworthy. On the other hand, the knowledge accumulated by generations of coal miners—knowledge which appeared in their culture as folk songs, popular writings, etc.—that the work in coal mines was destroying coal miners’ lungs was dismissed as cultural, folksy, ideological and in summary untrustworthy. Thus, knowledge is legitimised only and exclusively when it comes from the scientists. This dichotomy of science/ideology then appears operationally as the dichotomy of expert/non-expert in which the control of the definition

of science and expertise is delegated by the dominant bourgeoisie to another class, the petit bourgeoisie or professionals who carry on that task, namely, the production of knowledge under the hegemony of bourgeois ideology.

This last point of delegation raises the question of the autonomy of science. Can science become autonomous from the dominant ideology? My answer is yes and no [37]. Yes, *in the limited sense* that once established, it has an internal logic of its own, i.e. the logic of that discipline or branch of science. No, *in the major sense* that scientific knowledge is continuously growing under the dominance of bourgeois ideology. In other words, scientific knowledge and scientific situations are under bourgeois dominance, and that reality shapes the nature of that knowledge. For example, and as I will explain in the next section, bourgeois dominance in medicine established a vision and an understanding of disease in which that disease was seen as the lack of equilibrium within the different parts—organs and humors—of the body. This specific understanding of disease generated a medical knowledge which developed autonomously. But the division of labour within medicine—specialisation—developed according to the bourgeois understanding of disease. Consequently, this internal logic of scientific medicine led to the creation of specialities which follow organic bases: cardiologists, nephrologists, etc. Thus, medical knowledge developed according to its internal logic given by that bourgeois conception of disease. In other words, *bourgeois dominance always determines in the ultimate instance what occurs in the realm of scientific knowledge*[38].

How Bourgeois Ideology Appears in Medical Knowledge

In the previous section, I indicated how the bourgeoisie's definition of science—knowledge produced by an elite, the scientists—appears and is reproduced in our society. In this section, I will discuss how that bourgeois ideological dominance over science appears in the production of knowledge. But, first, let us clarify what we mean by production of knowledge. It is the process whereby a perception of reality is transformed into a specific product, i.e. knowledge, a transformation which in science takes place by intellectuals whose primary instruments of work are the theories and methods of science. Scientific theories in each science consist of a group of concepts which belong to that specific branch of science (e.g. the law of gravity in physics). Scientific method is the way in which those concepts are used. Both theory, and method allow that intellectual—the scientist—to transform this perception into knowledge [39]. Needless to say, this knowledge is being reproduced, not in abstract but in specific institutions, subjected to class hegemony and by scientists whose very specific visions of reality are moulded by the ideology of the dominant class (the bourgeoisie); their own social class (the petit bourgeoisie); their race; their sex; their discipline; their political position, among others. The scientist does not leave all those ideologies outside the walls of the scientific institutions. The scientists carry those visions of reality in the production of knowledge as well. That production is submerged

into and is part and parcel of those ideologies, of which the most important one is the ideology of the dominant class or bourgeoisie.

How does this bourgeois dominant ideology appear in medicine? By the submersion of that medical knowledge into the positivist and mechanistic ideology which typifies science created under the hegemony of the bourgeoisie, and which I would call bourgeois science. Actually, positivism and mechanism appeared as the main ideologies of the bourgeoisie in the nineteenth and twentieth centuries in Europe with the works of Hume, Comte, and, later on, Durkheim. According to positivism, science must focus on specifics to build up the general, looking at social phenomena as if those phenomena were natural, ruled by natural and thus harmonious rules. As Durkheim indicated, positivism reduces social phenomena to natural phenomena [40]. And within that interpretation, causality was supposed to be explained by association of immediately observable phenomena.

Positivism appears in medicine in its definition of disease as a biological phenomenon caused by one or several factors which are always associated and observed in the existence of that disease. For example, in one of the most widely used textbooks on epidemiology in the Western world, MacMahon describes epidemiology—the science of studying the distribution of health and disease—as an extension of demography, and he defines that distribution according to age, sex, race, geography, etc. giving major importance to those individual characteristics which are either biological or physical. Moreover, in explaining causality, MacMahon quotes Hume and indicates that causality can only be seen but not explained, since we can only focus on the degree of associations between several subsequent events [41].

A legitimate question at this point is to ask how that positivist conception of medicine came about. To answer that question, we have to go to the origins of scientific medicine as we understand it today. And these origins appeared primarily in the nineteenth and twentieth centuries during the same time that science appeared as a recognised and legitimised area of endeavour. Those were times of large social upheavals and unrest in Europe. Capitalism was being established, changing from a mercantile system to an industrial one. Those changes had an overwhelming importance in defining the nature of medicine as well as that of health and disease. One version advanced by the working class and by the revolutionary elements of the bourgeoisie, such as Virchow, saw disease as a result of the oppressive nature of existent power relations of society, and thus saw the intervention in smashing (the revolutionary) or modifying (the reformist) those power relations. Epitomised by the dictum that medicine is a social science and politics is medicine in a large scale (Virchow), its best representative was Engels whose work on the conditions of the working class in England was a dramatic document showing the political nature of the definition and distribution of disease. His solution was written, with Marx, in the *Communist Manifesto*; with his call for revolutionary change, where the first steps included the actual democratisation of political, economical, and ideological spheres in society. This version

of medicine, however, did not prevail. The bourgeoisie, once it won its hegemony, supported another version of medicine that would not threaten the power relations in which it was dominant. The bourgeois social order was considered from then on as the natural order where its class rules would be veiled and presented as rules of nature. Accordingly, disease was not an outcome of specific power relations but rather a biological individual phenomenon where the cause of disease was the immediately observable factor, i.e., the bacteria. In this redefinition, clinical medicine became the branch of scientific medicine to study the biological-individual phenomena and social medicine became that other branch of medicine which would study the distribution of disease as the aggregate of individual phenomena. Both branches shared the vision of disease as an alteration, a pathological change in the human body (perceived as a machine) caused by an outside agent (unicausality) or several agents (multicausality). This mechanistic vision of health and disease is still the prevalent and dominant interpretation of medicine. Witness a recent definition of health and disease in Dorland's Medical Dictionary in which health is defined as "a normal condition of body and mind, i.e., with all the parts functioning normally"; and disease is defined as "a definite morbid process having a characteristic strain of symptoms—it may affect the whole body or any of its parts, and its etiology, pathology, and prognosis may be known or unknown" [42]. From this mechanistic understanding of health and disease, it follows that the division of labour (specialisation) in medical knowledge and practice has evolved around component parts of that body machine, i.e., cardiology, neurology, etc.

A related point is that the mechanistic interpretation of medicine was built upon knowledge which had been generated previously (blood circulation by Harvey in 1628; microscope by Van Leeuwenhoek in 1683, and others). But it would be erroneous to consider scientific medicine as a mere linear evolution starting with those previous discoveries. *These discoveries did not lead to or create scientific medicine.* Rather, it was the victory of the industrial bourgeoisie which established that positivist conception of science and of medicine. The fact that those previous discoveries were used and presented as the originators of scientific medicine was due to the change in the correlations of forces and subsequent victory of the bourgeoisie as the dominant class under industrial capitalism. In this respect, scientific medicine was not the linear growth of previous knowledge. Rather, and to use a Kuhnian term [43], a shift of paradigm took place, establishing a new paradigm which carried a new, a positivist, vision of disease which added to what had already been built. This point has to be repeated, because it is part of the bourgeois understanding of scientific knowledge that this knowledge evolves linearly with "new" discoveries based on previous ones, as if these discoveries were the bricks on which the scientific building was constructed [44]. According to this understanding, science and technology grow and determine the nature of power relations in our societies; and the history of humanity becomes divided into stages determined by the discovery of new technologies which shape the nature of that historical stage, e.g., industrial revolution, nuclear age, etc.

Science and technology thus appear as the "motor" of history. But, as Braverman [45] among others, has shown, the so-called "technological breakthroughs" were not the ones which established new social orders—rather, the reverse was the case, i.e., a new correlation of forces used those *already known* technological breakthroughs which were, later on, presented as the actual cause of that change in the social order. But those breakthroughs or scientific and technological discoveries were used and put forward by new correlations of forces. The victory and subsequent hegemony of the bourgeoisie, for example, was the one which stimulated science, including scientific medicine. It was this political reality which determined the advancement of the positivist and mechanistic conception of medicine, health, and disease. In other words, the power relations which existed under the bourgeois order were the ones which determined the form and nature of medicine. It led to a scientific inquiry where the aim of that inquiry was the discovery of the cause of micro-organism, and the instrument of that inquiry was the microscope. By focusing on the microcausality of disease, however, science ignored the analysis of the macrocausality, i.e., the power relations in that society. Scientific inquiry in medicine developed into a search for the cause: bacteria, parasite, virus or, later on, the toxic substance. Consequently, the strategy of intervention was the eradication of what was supposed to be the cause of disease. Needless to say, that interpretation of disease and of medical intervention was supposed to be presented and perceived only and exclusively as scientific and certainly not political. The dichotomy of science vs ideology was made quite clear and explicit. The alternative explanation, i.e., the assumed "cause" was a mere intervening factor and the actual cause of disease resided in the power relations of that society, was dismissed as political, anti-scientific and in some circles perceived also as needing "eradication". In a report of The Rockefeller Foundation on Health in Latin America, it was stressed that there was a great need "to eradicate disease in vast areas of rural South America, otherwise the virus of the tropics will soon attack the metropolis, a virus that can be biological or, even worse, *political*" [46]. A clear call for scientific eradication of undesirable ideological explanations! The limitations of this strategy of eradication based on the unicausal interpretation of disease led to the later strategy of control instead of eradication. But, most importantly, that unicausal explanation was, and is, increasingly abandoned by the multicausal explanation of disease. Disease was later on supposed to be determined by several causes, some of which included socio-economic causes. But these socio-economic variables were added to other causes as if they were independent variables, independent of each other. Social class thus appears as one more variable which may be indirectly associated with the direct and most important explanatory variables. But this limitation of the concept of causality to the immediately observable association between disease (e.g., cancer) and other specific events such as smoking, occupation and others is intrinsically limited since it leaves the key question unexplained, i.e., how those different events are related. As a recent report on cancer research published by the United States government indicates, "a major defect in most cancer

research in the Western world (and I would add other worlds as well) is that most cancer research has been based on looking for a single or multiple cause, ignoring the inter-relations among those assumed causes" [47]. What this report touches on is that the primary cause for our ignorance of the causality of cancer has been a limited understanding of causality, a limitation that comes from the positivist understanding of knowledge which I have indicated. By focusing on statistical association, positivists are touching on the appearance but not on the reality of the phenomena. In other words, what are presented as "causes" are not the actual causes [48]. The epistemological problem thus created cannot be solved either by indicating that those assumed causes are intermediate causes, part of a network of causalities whose linkage among the knots (intermediate variables) can be measured by statistical associations. The actual way of studying disease in any society is by analysing its historical presence within the political, economic, and ideological power relations in that specific social formation. And by this, I do not mean the analysis of the natural history of disease but rather the political, economic, and ideological determinants of that disease, determinants resulting from the overall power relations which are primarily based on the social relations of production. These power relations are the ones which determine the nature and definition of disease, medical knowledge, and medical practice. The understanding of the evolution and causality of black lung in the United States, for example, cannot come from an analysis of the natural history of black lung. It has to come from an understanding of the class power relations in the United States and how the class struggle shaped both the scientific definition, recognition, and knowledge of black lung in the United States and the actual production and distribution of that disease.

What I have said so far should not lead, however, to the opposite conclusion that the inquiry should be limited to the discovery of associations between specific power relations and disease. In other words, it is not enough to establish an association between specific forms of capital accumulation or, say, economic cycles and certain diseases. It is not enough to say that capitalism, for example, determines a certain disease profile. It is necessary to research how those power relations appear, how they are being reproduced, and how they determine the nature of death and disease in society. The different categories of analysis such as world of production, consumption, and legitimation need to be understood in detail and related to the specific mediating mechanisms that those sets of relations have with the apparent "causes" of disease. In other words, what is needed is not the incorporation of the social as mere additions to 'environmental' variables which act on the individual; but, rather, what is needed is an understanding of how diseases mediate social relations, i.e., how the social power relations determine both the social and physical environment and the individual's experiences within that environment, including disease. Actually, there is an urgent need to break with that new dichotomy of individual/environment which is as false as the old dichotomy of mind/body.

Consequently, the terms of the discourse have to be chan-

ged. Instead of using the dichotomy, individual/environment, we should analyse how social power relations determine disease. Taking black lung as an example, we have to understand how the social power relations defined and determined the working and living conditions of the coal miners; how the workers struggled against them; and how, in that context medical knowledge and medical practice came into being to obfuscate or clarify the nature of the damage inflicted on the coal miners. Needless to say, in the process of this struggle, individuals and classes have different knowledge, perception, and ideologies regarding their own experiences, which leads me to the last point I want to stress, namely, the existence of bourgeois science and working class science.

Bourgeois Science or Working Class Science: Utopia or Reality?

Knowledge is accumulated, stored, produced, and reproduced in the daily practice of people's lives. And the nature of that knowledge varies considerably, depending on the social class practices. Each social class has its own practice which appears in its own ideology and culture, i.e., a vision of reality; and vice versa, that ideology and culture also appear as class practices. Thus, there is a bourgeois ideology, culture, and knowledge given and reflected in bourgeois practice. And there is a bourgeois knowledge and a working class knowledge. Both classes have different practices which generate different types of knowledge. The knowledge (legitimised under the name of science) produced by the bourgeoisie and reproduced in scientific institutions, which denied, for example, that there was any relationship between work and cancer, was bourgeois knowledge aimed at reproducing bourgeois power and practices. The knowledge (perceived in scientific discourse as 'hot air', 'folklore', or populist culture) produced by the working class and reproduced in its cultural forms, affirming that work was killing them, was, and is, working class knowledge based on experience. From this, I conclude that there can be two types of sciences: a bourgeois science and a working class science, each one based on different sets of knowledge and practice. To deny the above dichotomy is to assume a classless nature of knowledge, and thus a knowledge absent of practice. These two different and even conflicting visions of reality, the bourgeois and the working class visions, are not separated by clear-cut boundaries without one influencing the other. Through the process of class struggle, the working class develops and imposes its own vision of reality on bourgeois science: witness current interest in researching the relationship between work and cancer. This new development is due to a large degree to working class and the general population's outcry on the damage being created at the work place. But, still, the hegemony which the bourgeoisie has in all scientific institutions explains the nature and bias of that response, a bias reflected both in the choice of areas to be researched and the means and ways of researching it. The scientist does his/her job in institutions *with* the bourgeoisie. In this respect, the scientist is, to use a Gramscian term, an organic intellectual of the bourgeoisie who explains the reality with and for the bourgeoisie. This relationship of scientist/bourgeoisie is overwhelmingly clear in the United

States where most research is sponsored either by private foundations or by the state where capital's representatives are extremely powerful and influential.

The alternative, the socialist alternative, would be to carry on scientific inquiry *with* the working class, analysing reality based on the extremely powerful knowledge given by the daily practice of the working class, and *under* the direction of the working class.

In this I see a great area of struggle: to democratise the institutions and to change the patterns of accountability of intellectual workers: and to work together with manual workers until eventually that dichotomy of intellectual/manual will be questioned and diluted. No doubt, this change of accountability requires a tough struggle: the one of democratising our institutions. In this respect, it was a great victory for the Italian working class when it won the right to control occupational health services at the factory level and also when it won the right to undertake research at the factory with the researchers chosen by the workers. This is a clear example of how the struggle for democracy and for knowledge are one and the same.

Let me finish by saying that I am aware that many eyebrows will be raised when reading this section of my article. The nightmare of the Stalinist distinction between bourgeois science and proletarian science will undoubtedly be remembered. And the case of Lysenko will be immediately raised as a warning against those dichotomies. My answer to that legitimate concern is that the Stalinist version of proletarian science was not the science developed by the working class (which was not in power), but rather the version given by the Stalinist leadership of the party which identified proletarian science with dialectical materialism as defined and controlled by them. The fact that the agency of control was mislabelled proletarian science did not make that science proletarian, nor does it make the whole concept of class bound knowledge meaningless. That is the mistake of Lecourt [49]. It throws the baby out with the bathwater. There is proletarian knowledge and mass knowledge which will fully appear and will flourish unhindered when there will be mass democratisation in the process of the creation of knowledge with the deprofessionalisation of science, changing not only the class composition of scientists but, most importantly, the method and creation of knowledge, knowledge created not by the few—the scientists—but by the many—the working class and popular masses. As Gramsci once indicated, while all human beings are capable of being intellectuals, only a few are assigned that task. Similarly, while all human beings are capable of creating knowledge, only a few are given that task. Mass democratisation would imply a redefinition and redirection of that process of the creation of knowledge. *This process would not mean, of course, the absence of a division of labour. But it would mean a change in the power relations in the creation of knowledge with a dramatic expansion of the capability of creation of knowledge, with the working class and popular masses being the agents and not the objects of that knowledge.*

In other words, science is a social relation and, as such, the key operational issue is not only *for* what class that knowledge is being produced (the uses of science) but, most

importantly, *by* what class and its related question, *with* what class (the class character of sciences) that knowledge is being produced. The failure to understand the importance of these points explains the overabundance of references in which authors continue to search for the perfect socialist scientific method that would enable them to find the socialist truth. That search is not only a theoretical but a practical task as well. *And it requires a political and professional commitment to the working class.* In other words, it requires to break with the role to which the scientist is assigned under bourgeois order and to ally himself/herself with the working class, not to lead that class but to assist it in its potential for human liberation and creation of knowledge. Let me try to be very specific and advance an example of the proposed relationship with which I have experience, namely, two different ways and approaches to find reality at the work place.

One would be the bourgeois or positivist approach to find the nature of a specific health problem (e.g. toxic exposures) in a factory and a way of solving it. The 'expert' (epidemiologist or any other social scientist) usually called by management would (1) establish a *hypothesis de travail* based on his previous knowledge of that problem. Needless to say, it is part of the scientific ideology that he should be "objective" and unemotional about the issue under study. His only aim is to find the truth. As such, he would have a "healthy skepticism" about any subjective statements or situations, relying more comfortably on facts, and very much in particular on quantifiable facts: (2) try to obtain as much information as possible from each individual worker in order to ascertain the facts. Through questionnaires, interviews, medical records; etc, he would try to obtain from each worker as much 'objective' and quantifiable information as he could get and find relevant. He would also try to locate the collective dimensions of the problems by adding up the individual problems; (3) last but not least, he would try to test the hypothesis by statistical manipulation of quantifiable (objective) information.

He would finally submit a report to management's implementation. In that *modus operandi* of research, workers appear as passive subjects of research remaining in the background and not in the forefront in the analysis and solution of the problem. This method of inquiry and data gathering is the most frequent tool used in social science research. The citizens, workers, blacks, women, etc, are studied individually, providing information through key instruments of inquiry, questionnaires or interviews. In all these approaches, three ideological positions—presented as scientific conditions—are that (1) theory and fact are two separate entities of which the former is supposed to be built upon the analysis of the latter; (2) the expert, the holder of proper methods of inquiry, is the active agent while the studied object the worker or citizen is a passive one, i.e. the mere provider of information; and (3) collective information is the aggregate of individual information. The process and findings of this scientific inquiry are, of course, presented as objective and value-free (universal and classless) [50].

It is not surprising that in the late sixties, when many anti-authoritarian movements appeared in the Western capitalist world, many of those analysed passive objects—workers,

blacks, women—rebelled against that science and against those scientists. At that time, alternative relations of production of knowledge were established. In many Italian and Spanish factories, for example, workers committees and assemblies were established which rebelled against the type of science that was carried out in those factories. From then on, they did not allow any scientists to come inside the factory and ask them questions [51]. Instead, they developed another approach in which the process of inquiry was carried out under their direction. Consequently, a new production of knowledge took place in which (1) all information regarding the specific health problem was (and is) produced and discussed collectively with the correct understanding that a collective problematic is far more than the mere aggregate of individual problematics. Moreover, workers assemblies have a collective memory and experience that puts their perspective. They know what is going on and what has been going on in that factory process and environment for a long time. And they have first-hand experience with what that problem has meant in their collective and individual health and well-being. Out of their collective discussion, they develop a hypothesis of what is happening in the factory regarding the specific health problem. In that process of generating and collecting data, subjective feelings, anxieties and uneasiness are the propelling forces which guide all processes of gathering both objective and subjective data; (2) the workers call in scientists of their own choosing to assist them in the collection and analysis of whatever data the workers feel needs study. In this process, the workers keep a healthy skepticism about the meaning of science, expertise, and objective information. They scrutinise all objective data, and through the process of mutual validation, they accept the value of the data depending on how it fits within their own perception of reality. It is worth stressing here that many years of exposure to occupational medicine has taught workers the lesson that science is not value free knowledge but very value loaded knowledge, reflecting the values of institutions where science is created and the values of scientists who create that science; (3) once agreed collectively on the nature of the problem, the workers demand to participate collectively in the solution of that problem.

This collective production of knowledge based on collective practice is an alternate form of production of knowledge to the individual production of knowledge, characteristic of the bourgeois model. Needless to say, it puts the scientist in a *different social relation with the subject of study*. It puts him/her in an assistant role with his/her information and knowledge being just a part of a broader and more important knowledge which is created by the practice of the working class. Needless to say, the majority of scientists would oppose that diminution of their protagonism, since it would diminish their power. Many arguments are likely to be used against that change of power relations—ideological arguments presented as scientific arguments to defend specific class interests. The bourgeoisie and the majority of professionals will oppose that change by every means possible, including sabotage. Still, that the majority of professionals would oppose change does not mean, of course, that a minority within those professions cannot play a very impor-

tant role in taking sides with the forces for change. But in that process of changing class alliances, they will have to change, not only their roles (from leaders to assistants) but also their methods of work and the social and political context in which they use them. And it will be in that new realm of practice that new social relations and a new science will be created.

Struggle for Democracy

I have shown in the three sections of this article how bourgeois ideological dominance reproduces dominant/dominated relations in the spheres of production, politics and science, including medicine. Also, I have shown how the working class rebels against this bourgeois domination in a continuous process of class struggle, which leaves its mark on all those spheres. The class struggle takes many different forms, but aims at changing and/or breaking with those patterns of domination which oppress the working class and popular masses. It follows, from what has been said, that their liberation requires the breaking of that pattern of control where the few and not the many decide on the nature of our societies. And, by democratisation, I do not mean the mere existence of a plurality of parties and existence of civil rights. I mean far more than that, I mean a profound change in the pattern of control of the spheres of production, consumption, representation, ideological discourse, and scientific endeavour where the many and not just the few control. Specifically, democracy cannot be seen as limited to the passive and indirect realm of representative politics. It has to be seen, as Marx and Engels said, as the massive, active and direct involvement by the collectivity of workers and citizens in the governance of social institutions where they work, reside, study, enjoy themselves and are being taken care of. As Hal Draper has indicated, the greatest contribution which Marx and Engels gave to the history of humanity was to reveal the clear symbiosis between socialism and democracy. As he put it, "Marx's socialism (communism) as a political programme may be most quickly defined, from the Marxist standpoint, as the complete democratisation of society, not merely of political forms" [52]. The struggle for democracy needs to combine struggles in the institutions of representative democracy, where power is delegated to full-time representatives—the "experts" in politics—with, most importantly, struggles to achieve forms of direct and mass democracy where power is retained by the users and workers in all societal institutions. For example, in order to change not only the priorities but also the nature of medical and scientific institutions, there is a need to win control of those institutions, not only indirectly through elected officials in the realm of representative democracy, but most importantly, through direct and assembly type of democracy where workers, employees, users and communities control those institutions. In other words, a socialist transformation will not occur without a massive and direct participation by the majority of the population in that process of transformation.

To sum up, there is a need for the working class, through its different instruments and forms of struggle; to aim at a massive democratisation of our societies, understanding democracy, not as an exercise in voting every so many years,

but, most importantly, as a direct form of participation on a daily basis by the working class and popular masses in all economic, political and social institutions (including the medical and scientific institutions). It is only in this way that the democratisation of our institutions will imply a massive transformation of the majority of our working populations from being passive subjects to active agents in the redefinition of those societies, a transformation that takes place as part and parcel of their becoming the agents and not the objects of history.

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11. Class struggle is the conflict among classes that appears in all economic, political, ideological and cultural spheres of society and that takes place in the pursuit of their interests. Under capitalism, the main conflict is between the capitalist class and the working class.
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18. For an expansion of this position, see Navarro V. *Dictatorship and Democracy. Meanings and Implications for Class Struggle* (mimeo), Johns Hopkins University, Baltimore, MD, 1979.
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20. Hart Poll. *Common Sense*, Vol 3, 1975. That lack of trust of American people in the US political institutions represents a major crisis of legitimacy of bourgeois ideology in today's US.
21. Contrary to bourgeois ideology that postulates that the state apparatuses are neutral and can be used undistinctively by any class or group, I believe that the state's apparatuses reflect the power relations of the whole of society and thus are under the dominant influence of the capitalist class. That dominance explains its composition (the class position of the top echelons of the state personnel), its structure and its function (i.e. to reproduce the capitalist relations). For a further expansion of this position, see Part III, "State power and medicine" of Navarro V. *Medicine Under Capitalism*. Neale Watson, New York, 1978.
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The 'Baby M' Court Case in the US

Cindy Jaquith

Some months back a New Jersey court gave a ruling on a surrogacy case which has sparked off intense debate in the west on the entire issue of surrogate motherhood. In the Baby M case, the child was taken away from the surrogate mother on the basis of a contract she had signed with the father of the child and his wife. A myriad of prejudices against women and working people—some falsely presented as feminist ideas—have been put forward, along with a generous dose of pseudoscience and mysticism both in the court and outside it.

THE New Jersey court case of "Baby M" reveals a brazen disregard for children. By taking the child away from her mother, Mary Beth Whitehead, and by upholding a 'surrogate mother' contract, Judge Harvey Sorkow has struck a blow against rights the working class has fought for more than a century and a half.

The case began when William and Elizabeth Stern went to a surrogacy agency to hire a woman to bear them a child. Agency head Noel Keane arranged a contract between William Stern and Mary Beth Whitehead. Whitehead signed papers agreeing to be artificially inseminated with Stern's sperm, carry a pregnancy to term, and then deliver her baby to the Sterns for \$10,000 plus medical expenses. But in the course of pregnancy and the birth of the baby, in March 1986, Whitehead decided she wanted to keep her child, whom she named Sara. She informed the Sterns and said they should keep their \$10,000.

The Sterns filed a suit and immediately got Judge Sorkow to order Whitehead to hand her daughter over to the Sterns. The Sterns then went to Whitehead's house with five cops to seize five-week-old Sara. Whitehead escaped with the child to Florida, but private detectives hired by the Sterns tracked them down. The detectives took Sara away and turned her over to the Sterns, who renamed her Melissa.

Whitehead's Contract

Surrogate mother contracts are similar to involuntary servitude contracts in many respects, and just as exploitative, unjust, and invalid. The woman signs a contract guaranteeing that she will carry a pregnancy for someone else for nine months. According to Judge Sorkow's ruling, she is legally bound to this contract whether or not she changes her mind.

This is bad enough—but even worse given the nature of the rights she gives up. Whitehead relinquished control of her body for nine months with the contract she signed. She had to agree to "assume all risks" of the pregnancy, "including the risk of death." She had to agree to "abortion on demand of William Stern" if the fetus showed signs of "physiological abnormalities," determined by the doctor being paid by Stern.

Whitehead herself could not choose to have an abortion without "breaking" the contract. She also had to agree not to smoke, drink liquor, or use medications not prescribed by the Stern-paid doctor during her pregnancy. While these conditions were imposed on Whitehead, the contract allowed Stern to terminate the agreement immediately if Whitehead had a miscarriage in the first five months. And he wouldn't have to pay her a cent.

The other side of the contract that has no validity is that Whitehead agreed nine months beforehand to surrender a child she planned to bear. This is completely inhumane, both to the child and mother. Under adoption law, a woman has

a period of time after her baby is born to decide if she wants to put the child up for adoption, even if she concluded at some point in her pregnancy that this is what she wanted to do.

Women's Right to Choose?

Gary Skoloff, the Sterns' lawyer, made the fantastic argument in court that surrogacy contracts are actually an advance for women's rights. "You prevent women from becoming surrogate mothers and deny them the freedom to decide... it's being unfairly paternalistic and it's an insult to the female population of this country," he claimed.

This argument was defended by Jan Sutton, spokesperson of a group called National Association of Surrogate Mothers. "Surrogate child-bearing is not exploitation of women," she wrote in a letter to the *New York Times*. "It is our individual right voluntarily to create a child for another family. To deprive women of this right is clearly a threat to feminist concerns."

Surrogate contracts are not an extension of the fight for women's right to control their own bodies. That fight is to secure the right of the woman to decide when and if to have children, free from interference from the government, church officials, doctors, husbands, lovers, boyfriends, or any other individuals. This struggle has embodied the fight for birth control; sex education; safe, legal abortion; and protection from forced sterilisation. It is interconnected with the broader struggle by women to be treated equally with men in all aspects of society and not be disqualified because of pregnancy, children, or lack of children.

Surrogacy contracts run completely counter to this struggle, what it has already achieved, and the future it points to. Far from an expansion of women's rights, these contracts deny rights previously conquered by women and working people as a whole.

A *New York Times* magazine reporter visited the offices of Noel Keane. "His comfortable, two-story offices in Dearborn, Mich, were full of prospective surrogate mothers, often with husbands and babies in tow, and infertile couples who had come to check out the candidates for surrogacy," wrote reporter Annie Taylor Fleming.

"The well-groomed couples... were each assigned a private office, through which the surrogates were rotated, to proffer their fertility and show off the living, gurgling proof thereof." For each woman and eventual baby he successfully markets, Keane pulls down \$10,000 for himself.

Male companions of the women also get into the business. One man who accompanied his female friend to the office told Fleming, "I'll take care of her when she's pregnant again, but the baby means absolutely nothing. It's like watching someone's car for nine months. We're in it for the money; it's a business." Keane argues that he provides a public service,

that he is showing sensitivity to "the pain and cries" of the "infertile." Judge Sorkow upheld this notion of the 'rights' of the infertile. He ruled that state "refusal to enforce these surrogate contracts... would constitute an unconstitutional interference with procreative liberty since it would prevent childless couples from obtaining the means to have families."

'Rights' of 'Infertile'

To believe Keane and Sorkow, a new class of oppressed people—the infertile—has arisen. No one should deny them their 'right' to 'their own' child, a 'right' supposedly guaranteed by the US Constitution.

But Keane and Sorkow have things turned upside down. The government has an obligation to guarantee that every child has protection and nurture—health care, education, and decent living conditions. This obligation extends to other dependent human beings as well, such as the aged and people who are incapacitated by physical or mental illness.

But the government has no obligation to guarantee every adult the 'right' to 'their own' child. Judge Sorkow claims the law should recognise surrogacy contracts in order to satisfy an 'Intense drive to procreate'. There is no instinctual drive to procreate, however. There is an instinct to have sex—procreation is, sometimes a consequence.

The attitude that people must have 'their' child with 'their' genes so they can continue 'their bloodline' or 'family name' is deeply rooted in class society. William Stern presented this reactionary notion in the court case, explaining he had no living relatives because many were killed by the Nazis. He said he needed Whitehead's baby to continue 'his' bloodline.

The Nazis, of course, are the most famous advocates of continuing certain bloodlines. They also ended up trying to exterminate other bloodlines they deemed socially unfit.

Under capitalism, the welfare of the child is not the principal concern nor are the rights of the woman who gives birth. Defining the line of inheritance is. The working class, which has no property to pass on to its offspring, is nevertheless affected by ruling-class ideology about the family. Fears, insecurities, and hopes of immortality, all bred by class society, lead many working people to try to 'continue the family name'. This introduces enormous pressures, with the children being the greatest victims.

Surrogate mother contracts are simply the latest—and one of the most degrading—manifestations of the way capitalism treats children. If surrogacy served some socially useful purpose, it could be argued that society should promote its practice. But it serves no progressive purpose. Humanity is not on the brink of extinction. Many children are being born and many more will be. There is not a social need to increase the number of babies.

Surrogacy is not like adoption, which is socially necessary today. Despite the fact that adoption is immersed in profit-making and that abuses against the children and parents involved do occur, there is a need for this institution to help children without care.

And this is its starting point—not the 'need' of some adults to have 'their' child. The concept of adoption is that society must find a way to provide care to all children lacking it. That's progressive.

The concept of surrogacy is that society owes all adults the 'right' to 'their' child. There's nothing progressive at all about that—it is reactionary.

It opens the door to such things as the international baby racket that has received so much publicity and condemnation. According to the *New York Times*, the number of foreign-born babies adopted in the United States shot up from 4,868 in 1981 to 9,945 in 1986. The real number is undoubtedly much higher. Most come from Asia or Latin America. Some are outright stolen from their mothers by baby dealers; others are torn away under extreme duress by these merchants.

This happens because there are fewer children in this country available for adoption than there used to be, even though racist prejudices still prevent the adoption of many US-born children who are 'not white'. Capitalist businessmen preying on couples without children see a profit to be made, because the baby 'shortage' has driven the price of babies up.

But the fact that there are fewer homeless babies in the United States is good. It marks human progress on several fronts—in relation to society's treatment of children and other human beings, the advance of science and technology, and the advance of women's rights.

In many primitive societies, when it wasn't possible to feed everybody, it was the practice to kill some infants and other dependents. Under feudalism and lasting beyond, the first-born son in the families of the landed nobility had special rights over other children. This practice has also been wiped out.

The brutal exploitation of child labour in textile mills, coal mines, and agriculture has become illegal in this country. The labour movement won this victory, as it won the right to free, compulsory education through high school. A century ago, many children were still losing their parents in shipwrecks, epidemics, or other events. The number of human beings perishing under such circumstances is greatly reduced today in this country. And children without parents live under much better conditions.

Social attitudes toward 'orphans' and 'adopted children' have also been changing in a progressive direction. These children are less often seen as somehow abnormal and deserving different treatment than children who live with a biological parent. Prejudices have also subsided with regard to children born to unmarried women—so-called 'bastards' or illegitimate children.

Humanity as a whole has advanced and deepened its solidarity for all members of society. This has been the product of struggle by workers and farmers. And it is linked to advances in science and technology that have helped working people shed various aspects of exploitation, inequality, and prejudice.

Is Technology the Enemy?

It is important to recognise the progressive role science and technology play—including under capitalism. This is especially true in the light of arguments that surrogate births show society is becoming the victim of technology and predictions that science will turn most working-class women into 'breeders' of babies for the rich.

The trend is actually the opposite—women are having fewer children today than ever before and they have taken giant steps away from their socially imposed role as 'breeders'. This has happened because of women's victories in the fight for abortion rights and birth control, changing attitudes toward women, changes in women's own self-perception, and science.

Scientific discoveries mean that women today are better informed about sex and health. Access to birth control and abortion, while still restricted to some degree, allows them far more decision-making power about when and if to have children. Technology has also produced labour-saving devices that have greatly reduced the hours women spend on domestic labour, further freeing them to participate in the labour force and society as a whole. Women have seized on these advances to struggle for and win greater rights.

One result of this is a decline in the number of children women have, now that they have more freedom to plan pregnancy or decide not to have children at all. According to the US Census Bureau, the average number of people per household was 2.67 in 1986, down from 3.14 in 1970. There is also greater social acceptance of couples who live together and decide not to have children, and of adults who choose to live alone, also a growing category, according to the Census Bureau.

One consequence is the 'shortage' of children to adopt. A new phenomenon has arisen in relation to this, that of couples frantically seeking 'their own' child, frequently after not having had children earlier in life. Prior to this, many children were adopted by relatives or neighbours who already had children and took in others as an elementary act of social responsibility.

Technology has helped make possible the current situation where there are fewer children to adopt. Technology has benefitted women and all working people—increasing life spans, lowering infant mortality, boosting food production, and reducing labour time. And as such, it is being used by the working class to lessen exploitation and reduce class, race, and sex inequalities. It is not technology that is responsible for abuses like surrogacy, it is capitalism, with its drive for profit and its warping of human values.

Surrogacy is and will remain a marginal practice. Far from being 'the wave of the future', it is actually a throwback to the past. Judge Sorkow's ruling upholding surrogacy contracts has simply opened up the debate about this practice, exposing its real nature to many working people for the first time. On April 10, the New Jersey Supreme Court overturned Sorkow's ban on visitation rights for Whitehead. She now has the right to see her daughter once a week for two hours.

Judge Harvey Sorkow, who presided over the New Jersey trial, called it a "routine custody case". His portrayal of the trial as a dispute between a "father" and a "mother" confused the issues and distracted attention from the exploitative and unjust nature of surrogacy contracts. A custody case usually arises when two people who have been jointly raising children separate and cannot agree on who will get the children. William Stern and Mary Beth Whitehead were never jointly raising Whitehead's newborn daughter and never intended to.

Stern's sole 'claim' to the child was a scrap of paper called a surrogacy contract. In upholding this 'contract', the judge argued that Stern is the 'biological father' of Whitehead's child. According to the judge, this gives Stern a 'right' to "his own biologically genetically related child". Whitehead was merely "the surrogate" hired by Stern to "carry his child to term".

Psychologist Lee Salk, a witness called by Stern's lawyers, went so far to propose that Whitehead be termed a "surrogate uterus" rather than a "surrogate mother", to remove any suggestion that she has a legitimate relationship to her daughter. But it is precisely Whitehead's biological, social, and emotional relationship to the child that is key to the case. Stern's supposed 'biological' connection is irrelevant. Stern is not the 'father' of Whitehead's child. Richard Whitehead, who is living with Mary Beth Whitehead and her other children, is the 'father' in this case. Being a 'father' is not determined biologically (leaving aside the fact that there is no scientific way to prove it was Stern's sperm that made Whitehead pregnant).

Throughout human history, a 'father' has been the husband or companion of a woman who is raising children. It is based on his relationship to the woman that a man becomes 'father' to the children. Due to death, divorce, or husbands who walk away, many women may then live with someone else, who then becomes a 'father' to her children. They remain 'fathers' as long as they are living with the woman and sharing responsibility for the children. In a growing number of cases, women are bringing up children without 'fathers' at all.

Being a sperm donor gives no man a right to raise the resulting child, any more than being an egg donor gives a woman that right. (In the practice called 'surrogate gestation', a woman is implanted with the fertilised egg of another woman. The 'surrogate gestator' carries the pregnancy and gives birth, turning the baby over to the other women. The practice is used in some cases by a couple of one race who hire a woman of another race to bear a child who will also "look like them".)

Neither eggs nor sperm can be the basis for deciding who is the 'mother' or 'father' of a child, or who has the right to bring that child up. It is the woman who carries the pregnancy, gives birth to the baby, and begins nurturing that baby who has the right and responsibility to raise the child—and the right to all the social benefits she needs to do so. The only reason the state should intervene to take her child away is if she is guilty of child abuse.

Nothing of the kind was proven in the case of Mary Beth Whitehead. The Sterns brought into court an army of psychologists and social workers who insisted Whitehead was an 'unfit mother'. Their evidence? Whitehead had a 'narcissistic personality disorder', in part because she dyed her hair; she gave her children pandas, instead of pots and pans, to play with; she had a shouting match with a nun who teaches her son at a Catholic school; she once worked as a dancer in a bar; and her husband was an alcoholic.

Lawyers also proudly pointed out that the Sterns make more than \$ 90,000 a year, while Whitehead is dependent on the \$ 28,000 her husband makes as a sanitation worker.

But none of this is relevant to whether Whitehead is 'unfit' to raise her child. What is relevant is that she gave birth to the child and began raising that child.

What are Society's Responsibilities?

In the struggle to end women's oppression and guarantee children the best care possible, the working class needs a twofold approach. It needs to fight for women's right to enter the work force and all arenas of society without any restrictions or discriminatory treatment because of their child-bearing capacities. It also needs to fight for the government to carry out its responsibility to provide care for children and all other dependent human beings, instead of allowing the burden for this care to fall on individuals, especially on women.

The government should provide lowcost child care from infancy on up. It should guarantee an education, medical care, decent housing, and recreation for all the young, aimed at helping them develop into independent human beings. All laws or practices that discriminate against children—based on class, race, sex, handicaps, or 'legitimacy'—should be eliminated.

The working class must also challenge any disqualification of women based on their having or not having children.

This being with championing the right of women themselves to freely decide when and if to bear children. It means

the right to safe, legal abortion and birth control, as well as sex education in the public schools. It means protection of women from forced sterilisation.

Women's physical ability to bear children should not be used as a pretext to super-exploit them on the job paying them less than men, excluding them from certain jobs, or denying them employment if they are pregnant or already have children. The working class should demand equal pay for equal work and affirmative action so women can achieve full equality in employment and education.

Workers should demand full maternity benefits for women, including the right to return to the same job—without loss of accrued seniority time—after the birth of a child. Absence from work because of pregnancy should be treated exactly like other contractual situations related to leaves from work.

For women who have children, the working class should demand all the state aid they need to care for them. And it should defend their right to have the courts compel men who walk away from shared responsibility for children to pay child support.

The struggle for these demands is part of the fight for a different type of government, one that acts in the interests of workers and farmers, not a handful of capitalist families. By bringing such a government to power, working people will lay the basis for further measures to provide care for children and to achieve equality for women

(Continued from p 2)

puterised tomography nor nuclear imaging are tested in the same way as drugs are required to.

Not only instruments but many medical and surgical procedures are also introduced without adequate trials. For instance results of the systematic trial of amniocentesis were published only last year after its extensive use for over a decade. The chorion villi biopsy is already extensively used without any scientific trial. Because of such a situation many innovations like gastric freezing, high concentration oxygen for neonates, the use of hyperbaric oxygen in intensive care, insulin coma for the treatment of schizophrenia etc were introduced without evaluation, used and subsequently abandoned after they were proved ineffective or unsafe.

Amniocentesis and chorion villi biopsy remind us their large scale misuse for female foeticide in India. In fact some of the technological innovation appear explicitly geared towards use of sexist and racist cultural practices to gain fast currency and early returns on the resultant technology.

Every country that is attempting to meet the genuine needs of people, has to take crucial decision about selecting appropriate technologies as an alternative to the costly, rendering services to few and profit oriented technologies. In the field, activists are also required to select and develop alternative technologies to provide immediate relief to people. Therefore, in addition to the technology being a political question, it is also a direct practical problem in political practice. This has led many to experiment with various alternative methods of medical care using simple but effective technology and develop models to prove their feasibility. This question is also linked with proliferation of the non-

government organisations and needs detailed discussion.

Such experiments in alternative technologies are not limited to using different physical tools but encompass the way medical care is delivered and attempts to humanise it.

—Amar Jesani

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Strengthening the Cuckoo's Nest?

A Comment on Mental Health Bill

FREUD and subsequent psychoanalysis, psychotherapy and psychiatry have radically changed the worldview with regard to mental health and illness. Western capitalist countries and socialist countries have largely accepted these changes and have evolved structures and legal provisions that provide a relatively better deal to the mentally ill. However, in all these countries the changes have been within the overall framework of social control, which was anyway the purpose of feudal notions of 'lunacy'.

In India, as in most backward countries, the traditional 'lunacy' worldview is still dominant even within the modern legal framework. Mental health and illness in India was till last year governed by the Indian Lunacy Act of 1912 formulated under British imperialism.

The Indian Lunacy Act (ILA) incorporated only a one line definition of a 'lunatic'—"a lunatic is an idiot or a person of unsound mind"—but had as many as 46 sections dealing with how the property of a lunatic should be administered. Between the period of the enactment of the ILA and the new Mental Health Bill (MHB), passed by parliament in 1966, there have been significant global advancements in explaining, understanding and treating mental illness. But the new MHB in India provides only a cosmetic change over its predecessor. It condemns all mentally ill persons, excluding those mentally retarded, as criminals. The new definition of a mentally ill person is "a person who is in need of treatment by reason of any mental disorder other than mental retardation". Thus, apart from excluding the mentally deficient, the MHB is no different in its basic form from the archaic ILA.

Advances in psychotherapy, psychoanalysis and community mental health care, among other alternatives, are not even mentioned in the MHB. The wide range of mental illnesses is ignored. The monopoly of treating the mentally ill is given to psychiatrists who know very little about alternative

therapies. For the psychiatrist chemotherapy and electric shocks or even psychosurgery are the only means for dealing with mental illness. Psychiatrists trained in India do not have any significant exposure to even psychotherapy (with the exception of perhaps those trained in NIMHANS), let alone psychoanalysis and other non-invasive alternatives.

This sole reliance on psychiatrists in the MHB will only further medicalise a problem that has largely social origins. Historically, it has been well established in psychological and sociological research that mental pathology stems largely from society itself. Poverty, exploitation, insecurity, alienation and above all class society itself are harbingers of mental illness.

In spite of this knowledge the MHB is no more than a provision for locking up and managing the property of the mentally ill. It is interesting to note that "property" forms the cornerstone of the MHB as in the case of the earlier ILA. For the imperialist powers the ILA was an important means of controlling and manipulating the power structure by dispossessing many uncompromising landed aristocrats and local power brokers of their property by invoking the provisions of the ILA through which any magistrate could declare a person mentally unsound (without any aid of a medical professional). What the MHB has done is to shift the onus of establishing mental "unsoundness" from the judiciary to the psychiatrist. Thus the enactment of the MHB is consistent with the dangerous trend of the general medicalisation process of human health—it is more a police bill than a health bill.

Though on the whole psychiatrists have been critical of the MHB and have demanded amendments, the Indian Psychiatric Society (IPS) has welcomed the medicalisation and the provision in the bill for admission of mentally ill patients to privately run psychiatric nursing homes, besides government owned psychiatric hospitals, which alone were authorised earlier to admit such patients.

In fact the main interest of the psychiatrists in pushing this bill was to gain this provision. This provision too is consistent with the general trend of privatisation. However, in the same breath the IPS has strongly condemned the provisions for licensing and inspection of private psychiatric practice by a state authority—the IPS plans to approach the supreme court to rid the MHB of this latter provision (but it will not challenge the MHB itself)!

Medicalisation and privatisation of mental health care will only worsen the situation for the mentally ill. Further, as regards rights of the mentally ill person there is only passing reference with regard to protecting the patient from 'cruelty' of a practitioner. But this toothless protection is overridden by the fact that the family, state and the medical profession have full control over the patient physically, mentally and socially. The decision-making about diagnosis, therapy, admission, treatment and discharge are vested in the patient's family and doctor. The patient has no say whatsoever in the matter. Therefore a patient suffering from a simple neurotic condition may easily face confinement if the family (for instance in a family property feud) or the state (for instance in case of an ideological adversary or a political prisoner) sanction so on behalf of the patient who supposedly is incompetent to make a decision about his/her well-being.

Thus on the human rights front the new MHB fails completely. If at all, it strengthens control over mentally ill persons clearly abrogating their fundamental rights and implicating them as stigmatised and unlawful citizens.

Hence the MHB needs to be challenged not only by psycho-professionals of all variety but also by civil rights groups, lawyers and social scientists. The MHB's basic form needs to be changed from a social control perspective to a human rights perspective. Mental illness and health conditions need to be defined in detail and the independence of the mentally ill person needs to be protected. The protection should have a social basis, and under present conditions can be best ensured with the assistance of civil rights groups and the judiciary. All concerned, therefore must strive to make the MHB biased in favour of the mentally ill and not against them.

Ravi Duggal

Indian Workplace: 'Safe', 'Clean' and 'Healthy'?

A BILL amending the Factories Act has been passed by the Lok Sabha some months ago. While the Bill for the first time accords to workers some rights which had hitherto never been recognised, it needs to be dissected thoroughly. For the present it is interesting to note that even those rules regulations and norms which have been in force for decades continue to be ignored or openly flouted. Take the case of reporting of accidents and occupational diseases. Anyone looking at the data presented year after year in the *Indian Labour Journal*, the official publication brought out by the Ministry of Labour, would marvel at the safe, clean and healthy environment in Indian industry!

Take a look at the accident figures for three years—1981, 1982 and 1984 (the latest). In 1981 there were a total of 3,41,423 injuries of which 740 were fatal. In 1982, 3,02,268 injuries of which 599 were fatal and in 1984 there were only 1,15,442 injuries of which only 381 were fatal. Data was not available for 4 states in 1981, for 5 states in 1982 and for 9 states in 1984. While the figures are not strictly comparable because of inadequate reporting, it is interesting that the proportion of fatal accidents is less than 0.5 per cent in all the years. The accident rate, as everyone but the very naive knows, is extraordinarily low and is in no way related to the real situation. Injuries are reported only when a worker is incapacitated by them and thus a large number escape being recorded.

The case of the non-recording of occupational diseases is even more interesting. In 1981 there were 13 reported case of ODs, all of them being chrome ulceration. In 1982, there was a sharp jump in OD with 101 cases—with apparently an epidemic of silicosis (87 cases), all from Madhya Pradesh! In 1984 there was a sharp drop to 27 cases and all of them chrome ulceration again. Even more interestingly, the only state being troubled by OD was Maharashtra for no cases of OD were reported from anywhere else in the country! That the case reporting either of accidents or of ODs is atrocious has been highlighted in these pages some years back (*SHR*, Vol I:3). The article on 'Illness and Accident Reporting in Industry' had pointed out that the reporting has consistently declined since 1960. But is this very surprising given the fact that the number

of medical inspectors of factories had been 11 in 1981, went up to 42 in 1982 and down again to 10 in 1984? Given this kind of situation, what role do amendments ostensibly strengthening the Factories Act play—especially given the fact that workers' health has not been a prime concern in the labour movement in India so far?

Eyesight Problems Among Workers

THE electronics industry is the largest employer in the production sector in Malaysia. Upto October 1986, there were some 70,000 workers, most of whom are women.

Eyesight problems are reported to be occurring frequently and at an alarming rate among workers in electronics factories. Those affected come from the semiconductor assembly section. The work here requires the workers to use microscope daily to tie wires to pieces of semiconductors which are almost invisible to the naked eye.

According to a survey published in the book, *Health Hazards in Electronics* by Thomas H Gassert, 44 per cent of the workers in American-owned electronics factories in Malaysia complain of eyesight problems while 42 per cent complain of headaches.

The survey revealed that the eyesight problems are due to the use of microscopes and TV monitors as well as exposure to chemical vapours, smoke and dust on a long-term basis.

Eye diseases such as conjunctivitis are caused by chemical vapours and can spread from one worker to another because the same microscope is used by several workers. This problem is made worse by the long hours of work. Salaries and bonuses are paid based on a quota system and the quality of work done. Hence, many workers may be driven to work hard, without sufficient time or rest.

The survey also found that many companies do not teach the staff the proper use of the equipment. Microscopes and TV monitors which are defective are also not repaired.

Noisy machines can also harm the electronics factory workers as the noises can lead to hearing loss

and can cause tension which will lead to other health problems.

In electronics factories, some machines such as the metal stamping machines and the packaging machine are very noisy. The use of ultrasound to tie and test components also emits noise at a high level.

PP The safe level of noise, according to *Health Hazards in Electronics*, should not be more than 60 decibels and 16 kilohertz for an eight-hour working period.

The book says that loss of hearing among electronics factory workers is due to prolonged exposure to a noise level above 80 decibels.

This exposure can also cause tension which will eventually lead to other problems such as hypertension, increased heart-beat, vein disorder, irritability and a lack of concentration. All these in turn may lead to accidents at work, cause muscular tension, nausea and headaches.

Utusan Konsumer, March 1987

Campaign to Ban Hazardous Drugs

THE Drug Action Forum, West Bengal has initiated an interesting campaign for a ban on the manufacture and sale of unscientific and harmful fixed-dose combination of chloramphenicol-streptomycin. They have been circulating a letter to manufacturers requesting that they stop manufacturing these products. The letter is signed by 270 practitioners of West Bengal and sets out the reasons why they feel a ban is necessary.

The letter points out (1) that the combination has not been recommended against diarrhoea in any standard textbook of medicine and there is no scientific basis for such use; (2) that chloramphenicol is a valuable drug, the drug of choice for typhoid and its indiscriminate use may cause the development of resistance to typhoid bacilli; (3) that streptomycin is not absorbed through the gastrointestinal tract and is besides a first line drug in the treatment of tuberculosis and is in perpetual short supply; and (4) that there are many effective alternative treatments for diarrhoea when needed.

For more information contact WBDAF, P 254, Block B, Lake Town, Calcutta 700 089.

Women's Health Care in Brazil

carmen barroso

In 1982, the ministry of health in Brazil decided to present a comprehensive programme of women's health. The programme was drafted by four doctors, two of whom were feminists and clearly reflected the politics and the philosophy of the women's movement as it had been evolving in the previous decade. The author who was closely associated with early efforts in this direction writes about the problems encountered in evolving the plan and in implementing it.

BACK in 1982, I was helping the electoral campaign of a candidate for governor in the state of Sao Paulo, and together with a handful of other volunteers, I was in charge of drafting the items on women's health to be included in his campaign agenda. It was not easy, I can tell you!

To begin with, the very legitimacy of having a special programme for women was questioned. Again and again we had to argue that yes, all human beings are entitled to good health care, ~~but~~ women do have special health needs, both because of their biological reproductive functions and because of the sexual division of labour prevalent in our society. Other arguments had to do with priorities and there we were repeating that: Yes, we knew that infant mortality rates were unacceptably high, *but* did they know what maternal mortality rates were? Or: yes, we agreed that work-related accidents and illnesses that reached both men and women should be greatly diminished, but wouldn't they also agree that women did have a right not to have to resort to clandestine abortion?

When feminism, after decades of demobilisation, reemerged in the Brazilian political scene in the mid-seventies, the overall national priority was the struggle for democracy and the prevailing idea was that a focus on women's specific issues was divisive and self-defeating. Even where women's subordination was acknowledged, it was dismissed as an unimportant political question, a mere byproduct of class exploitation or a cultural tradition that would naturally disappear as a consequence of the development process. Forgive me the oversimplification but, as I said, I am referring to the prevailing ideas, those that set the climate where a project can grow or fade away. And feminism managed to flourish quite well thanks to a strategy of downplaying women's specific issues and to restricting them to those in the sphere of production. It thus managed not to alienate important partners in the struggle for democracy: the left and the catholic church.

But, by the end of the seventies, it was not possible to continue ignoring women's daily struggle to control their reproduction. The fertility rate was going down quite rapidly. And that in all regions of the country, in all social classes, and even in the rural areas. The demographic figures only became available several years later, but whoever had any contact with the poor soon became aware that pills, tubal ligation and clandestine abortion—no matter their high costs—were more and more widespread. And what was more surprising was that Mothers Clubs and other grassroots organisations—most of which had been created in the sixties under the umbrella of the catholic church—having evolved from their traditional handicrafts and religious activities to the active mobilisation to press local governments for ur-

ban services, were now presenting a new demand. Can you guess what? Sex education! The rationale presented was that they needed information in order to guide their children. But as soon as the question period was open after a given lecture, the issues that used to come up were those of frigidity and power relations between the couple.

Why did these problems begin to emerge in public? Intensive migration and the growth of megalopolis had resulted in the severing of traditional family ties and neighbourhood groups. That, together with increasing work alienation, had helped to raise the expectation towards couple relationships as a major channel of personal fulfilment. Besides, women's access to the mass media—especially to TV romantic novels, which were reaching 75 per cent of urban homes in 1980—all acted together to question the use made by many men of women's bodies. The word *use* does not reflect my intention to shock you: it is the common euphemism used by rural women to mean sexual relationship (and that certainly tells us something about the quality of this relationship!). To cut a long story short: the fact was that tensions were mounting in the bedroom, and these were showing up in group discussions whenever poor women had an opportunity to speak.

The year 1982, as you know, was when the debt crisis came to the forefront and the country had to resort to the IMF structural adjustment policies. As always happens in crisis situations, the old neo-malthusian ideology came out of the closet again as an apparently easy solution to the difficult economic problems. In 1983, sectors of the military, together with private family planning organisations drafted a plan to curb population growth. This raised the same fears prompted by similar attempts made in the sixties and seventies. The major fears were: diversion of government efforts from the root causes of poverty, foreign intervention on national priorities and open doors for coercion of poor people to have fewer children.

But at that point those arguments were no longer strong enough to resist the creation of government programmes. On the one hand, the advantages of fast population growth, an argument which was popular in the sixties, had long been discredited. On the other hand, contraceptives were widely available to those who could buy them, and it was difficult to deny that, in the absence of government support, poor women were going through tremendous sacrifices in order to regulate their fertility.

What happened then was that, instead of just opposing the population control plan, the ministry of health decided to present an alternative: a comprehensive programme of women's health. Drafted by a committee of four doctors, two of them feminists, the programme embodied a set of principles the women's movement had been formulating through

its practice in the previous years.

It started with a thorough diagnostic of the causes of mortality and morbidity among women over 10 years of age, which numbered around 45 million in 1980. Free health services provided through the public system or through the social security system had been mostly limited to pre-natal and natal care, and grossly inadequate both in terms of coverage and quality. The new programme was based on the idea of comprehensiveness. Services should not be restricted to reproductive functions, they should include cancer prevention and the control of sexually transmitted diseases, and be integrated with general clinical care. Married women of fertile age were not to be the sole clients. Older women and adolescents were also to receive adequate care. And public services should include both the provision of information and all means of contraception and infertility treatment.

An important element of the preventive aspect was the educational component. In order to enable women to take control of their own health, they should have access to needed information. But much more than that, they should have the opportunity to develop the attitudes conducive to the effective use of this information. That is, instead of the prevailing authoritarian doctor-client relationships, health services should contribute to the enhancement of self-esteem and self-respect, so that women could have pleasure in taking care of their own bodies.

All this was very beautiful and very nice on paper. But a small and inexperienced staff at the ministry of health had to spend an enormous amount of time in political negotiations to make the programme viable. Opposition came from two main sources: at first, from the democratic sectors who did not trust the military government and suspected the programme to be just another disguised population control initiative. This mistrust vanished gradually with increased transparency of the decision-making processes and the election of Tancredo Neves in 1985.

The other sector was the catholic church, whose teachings have little impact upon the practices of the members of its congregations, but whose hierarchy is very vocal. The ministry diligently courted the church and apparently managed for a while to get its agreement to look the other way. But the church became very active again last year, when the social security system joined the programme. The church efforts are now aimed at restricting the availability of what they consider unethical methods of contraception, that is, barriers, pills, IUDs and all others not based on periodic abstinence.

But, in spite of this resistance, some important achievements have occurred. What has been most remarkable has been the adoption by the health system of educational practices developed by the women's movement. It is now quite well-established that doctors, nurses and semi-literate health assistants, all need refresher training, and many in-service programmes throughout the country have aimed both at technical updating and at clarification of at

titudes and values.

Educational materials originally developed for consciousness-raising groups have been widely used in small-group discussions where health workers of all ranks have, for the first time, a chance to analyse critically their practices and assumptions about women as clients. The techniques used put an emphasis on respect for differences of opinion among group members, and are quite revolutionary in the sense that they cut across hierarchies in the workplace.

Another important innovation is that sex education is now a key element of the training programmes. Reproductive health issues cannot be separated from sexuality. Just to give an obvious example: if a woman cannot use a diaphragm because she cannot bring herself to put a finger inside her vagina, nothing will be accomplished by technical instruction. So sex education starts by re-examining the educational practices of our society that taught us to have shame and fear of our own bodies. And this, of course, is related to women's role in society. Therefore, a little history of Brazilian women is introduced in some of these training programmes.

As most health workers are themselves women, their evaluations of the educational programmes often point to self-awareness as an important by-product. But the ultimate aims of those programmes are two-fold: first, to influence the overall attitude of the worker towards the clients, who should be respected as autonomous human beings in charge of their own health and reproductive decisions; and second, to prepare the workers to conduct similar training sessions with the clients. This has begun to happen in many units, but it still depends largely on the initiative of interested workers.

An evaluation carried out in late 1986 pointed out as the major achievements of the programme, the development and printing of educational materials and norms of clinical procedures. These norms refer to sexually transmitted diseases, pre-natal care, breast and cervical cancer prevention. Family-planning norms have been developed but are not printed yet. Norms for childbirth are still in the drafting. The programme has also supported the development of national technology in the areas of spermicides and diaphragms. However, the units where the programme has been effectively implemented still are not more than a hundred, distributed among a few states.

What lies ahead for the future? I think it will depend on three widely different factors. First, the success of the programme requires an administrative reform to give it efficiency it now lacks. As it stands now, the decision-making is highly centralised and the decision-process quite bureaucratised. And this, of course, has greatly delayed its launching at the local level.

Secondly, the future of the programme is tied to the future of the women's movement in at least two ways. Women will have to remain active as a pressure group at the central levels of government so that the church hierarchy does not succeed in curtailing the scope of the programme. On the other

hand, at the local level, clients increasingly aware of their rights will have to keep a constant eye on the quality of the services to avoid abuses and a tragic gap between intent and consequences.

Thirdly, resources for the programme depend on the solution to the debt crises. At the moment the programme is mostly supported by a five-year grant from UNFPA. But even so, the programme relies basically on the smooth running of the public health services. And, as you probably know, Brazil has been exporting capital to the industrialised countries in the last few years. A large proportion of the GNP is going to service the debt, the balance of payments is going down due to increasingly unfavourable terms of exchange, government revenues are being sharply cut. In this scenario, institutional stability is threatened. At the level of the health services, a most likely outcome is a sharp drop in the already low salaries of health workers. They become demoralised and spend a large proportion of their time fighting against salary cuts.

If common sense prevails, and new economic agreements allow the economies of the third world to resume growth, the Brazilian health programme will be strengthened, its difficulties corrected. Since it corresponds to such great needs, and it has been drafted with such audacity and care, it deserves this chance.

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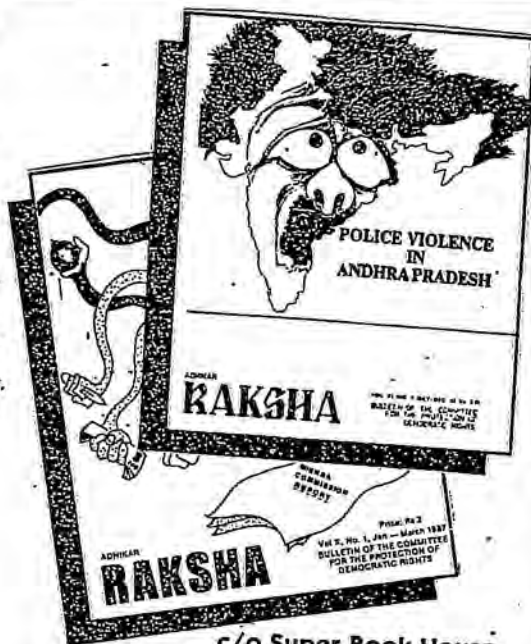
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Explosion of Alternative Information on Drugs

CAP Reports on Drugs and the Third World. *Chloroform—Sale and Hazards: a Malaysian Study*, no 9; *Pizotifen—Double Standards in Marketing*, no 11; *Cyproheptadine—Risks and Unethical Marketing in Malaysia*, no 12; *Stanazolol—Toxicity and Unethical Marketing in Malaysia and the Third World*. Consumers' Association Penang, Malaysia, 1986.

Consolidated List of Products Whose Consumption and/or Sale have been banned, withdrawn or severely restricted or not approved by governments, 11 Issue, UN, 1987.

IN the last couple of years, with the emergence of a vocal and visible consumer movement all over the world, has come about something of an explosion of alternative information in these areas. Until very recently, information about consumer products, etc, was the monopoly of the industry. Even the governments of most third world countries did not have access to data such as the hazardous nature of a drug, its side-effects if any, whether the drug was banned in other countries of the world, etc. This had a direct impact on the drug consumer movement in that the arguments of the drug companies were difficult to counter in the absence of relevant alternative information.

Thus breaking the information monopoly has become one of the prime objectives of the consumer movement, especially the drug consumer movement. Most groups all over the world have been producing volumes of literature which is very useful in showing up the drug industry for its unethical practices. All the publications under review fall into this category and are themselves a reflection of the growing strength of the movement.

The Consumer Association of Penang (CAP) brought out a series of reports in 1986 aimed at providing the public with the results of some of the important areas of CAP's activities.

The first of the series is on chloroform. The study finds that in Malaysia "despite all the documented evidence of its dangers, chloroform is present in many products". Strengths below 10 per cent are exempt from the Malaysian Poison Ordinance 1952 and the Poisons List 1983. Chloroform is a commonly used ingredient in cough preparations. Interestingly, the Drug Index for Malaysia and Singapore lists only three preparations under chloroform containing products. And yet the study has found numerous others in the market. It has also drawn attention to the inadequate information available especially with reference to the hazardous nature of the product, particularly when consumed by children. A review of the advertising of these products in the lay press has also been undertaken. Of the other three booklets, two are on antihistamines and one on an anabolic steroid. All the three were presented to the ministry of health, Malaysia in July 1986. In October the government announced that these three drugs had been banned. Manufacturers and distributors were given three months to withdraw all products containing these drugs.

Although pizotifen, an antihistamine, is classified as a Group C poison, the study group found that it could be easily bought over the counter. The drug used in the treatment of migraine in developed countries is heavily promoted as an appetite stimulant in Malaysia. No contraindications are ever

mentioned. Similar is the case with cyproheptadine, another antihistamine drug. In the US only one preparation of the drug, Periactin is marketed and is indicated for use in allergy conditions and as a supporting drug in anaphylactic reactions. The study finds that the company, Merck, Sharp and Dohme is practising double standards in its marketing of the product in developing countries.

The Consolidated List is in a sense a triumph of the drug consumer movement all over the world. In 1982, because of pressure from these groups, the UN General Assembly "aware of the damages to health and the environment that the continued production and export of products that have been banned and/or permanently withdrawn on grounds of human health and safety... is causing in the importing countries" and because many of these countries lack adequate information suggested to the secretary-general that a Consolidated List be prepared of products whose consumption and/or sale have been banned, withdrawn or severely restricted or not approved by governments. The list was to be easily readable, and was to contain both the generic as well as brand names. Needless to say, this sent shock waves through the multinational drug industry. The pressure that was put on the group entrusted with the task to leave out the brand names, is a telling illustration, if one were needed, of the enormous political influence that the industry wields on governments in the developed countries as well as in the third world.

The first issue of the List came out in December 1983 and again was the target of much flak from the industry and vested interests. The Coordinating Committee had to make a sustained campaign to scuttle the industry's move to do a hatchet job on the List, and all such future publications.

The current List is a 655 page volume listing 600 products (100 more than the last one). It is basically in three parts—pharmaceuticals, agrichemicals and industrial chemicals. It records the status of each of these products in all countries (or at least as many as have provided the information). At the end of the volume is a list of brand names of these products.

It must be stressed that this is the first time such information is available in a consolidated manner in one volume. Every effort must be made to keep the initiative from being killed. For one thing, governments either because of the usual bureaucratic problems or because they are under pressure from vested interests, are not very prompt in providing information about changes in legislation regarding particular products. It is here that voluntary groups could play a role.

PP

Workers' Health and Labour Militancy

gerald markowitz

The Struggle for Workers' Health: A Study of Six Industrialised Countries by Ray H Elling, Baywood Publishing Co, 1986, 500 pages; \$ 37.50.

US workers face a multitude of dangers on the job and the Reagan administration has been largely successful in hobbling the Federal Occupational Safety and Health Administration (OSHA) and state regulatory efforts. This book puts the problem in an international perspective, with very disturbing results. Elling shows that even at its best, OSHA compares very poorly with other capitalist countries' occupational safety and health systems.

Elling uses a Marxist framework to analyse occupational safety and health (OSH) problems: "Most if not all OSH problems stem from the inequitable exploitation of relatively powerless workers engaged in producing value which is expropriated for the private use of a ruling elite," he states. Elling surveys the history and political economy of the countries he studies, and details the OSH system in each. The countries studied are the US, Britain, the German Democratic Republic (GDR), the Federal Republic of Germany, Finland and Sweden.

Elling compares six elements in the countries' OSH systems: policy, sponsorship and control, education, organisation, information and financing. He concludes that Sweden and the GDR have developed the most comprehensive systems for protecting workers' health; Finland's system is somewhat less strong. Britain and the Federal Republic of Germany rank much lower, and the US offers workers the least protection, he concludes. While acknowledging that his conclusions are tentative, Elling's analysis is extremely useful for both activists and researchers.

Elling maintains the single biggest factor determining the quality of a country's OSH system is the strength of its workers' movement. In Sweden, for instance, 95-98 per cent of blue-collar workers are organised and 70-75 per cent of other workers are unionised. As a result, Sweden has developed a system that is light-years ahead of the US (where only 18 per cent of workers are unionised).

Swedish policy seeks to insure that employment is fitted to the health requirements of workers. Sweden's concept of health is also unusually broad, taking into consideration not only physical conditions but also the use of "piece work, shift work, incentive systems, and psychosocial factors related to physical and mental illness." For instance, Swedish research has shown that the degree of control workers have over their work affects their rate of coronary disease.

At the core of the Swedish system are 1,11,000 safety delegates elected through their unions. There must be a delegate in every plant with at least five employees. These delegates are empowered to interrupt work that poses an immediate or even long-range danger to workers. Every workplace with over 50 employees must have a joint labour-management safety committee in which workers are in the majority. The committee helps hire plant physicians and safety engineers. Sweden's system cannot even be compared to the US's non-system. Here, only workers who are represented by health and safety conscious unions like the Oil, Chemical and Atomic Workers can expect protection. Even so, Elling notes that Swedish workers are subject to some of the same pressures as those in the US. Even in Sweden, workers can be cowed by management threats to move or shut down in the event of costly health and safety demands.

Elling suggests that only a revived and militant labour movement can improve the US's abysmal health and safety system. But by describing what workers have won in other capitalist countries, Elling shows that the fruits of struggle can be crucial to workers' well-being.

Gerald Markowitz is coeditor of "Dying for Work" (Indiana University Press) and "Slaves of the Depression: Workers' Letters About Life On the Job" (Cornell University Press). Baywood Publishing Company is at Box D, 120 Marine St Farmingdale, NY 11735. Reprinted from *The Guardian* (US), August 8, 1987.

Systems Approach to Problem-Solving

Agencies Working Together: A Guide to Coordination and Planning by Robert Ross, Kevin Gilmartin and Charles Dayton, Sage Publications, 1982. Price \$ 7.95, pp 119.

THIS publication is part of the Sage Human Services Guides Series (Vol 28). It is an attempt at delineating various approaches to inter-agency coordination based on an actual study of such coordination in the state of California. With a spate of NGOs working in the field of 'human services' the need for effective communication and coordination between various agencies, so that they can help each other, also increases. In essence this book is a guide written for all sorts

of welfare and social service agencies. It discusses various methodologies and approaches 'tried out successfully' that can help build up effective inter-linkages between agencies in order to provide better services to their clientele.

The book is useful for those who feel that a systems approach solves most problems in management.

RD

Medicine in USSR Analysis Lacks Rigour

anant r s

BOB DEACON's 'Medical Care and Health under State Socialism' (*RJH* Vol 1.1) starts on a very sound note. In the first part, it separates six main aspects of socialist health care and shows that there is much more in real socialist health care than what the traditional left thinks it to be—widely available and almost free medical care. An analysis of medical care in any post-revolutionary society would be inadequate, unless it systematically goes into the aspects dealt with by Deacon. I would add two more aspects to a really socialist communist health care: (i) rational use of drugs and other medical facilities (investigations, hospital-beds, etc), (ii) a clear break from a medicalised attitude towards health problems (an attitude which believes that 'there is a pill for every ill', and still worse looks upon all deviations from the upper class white male model as abnormal or even all physiological phenomenon as health problems to be solved by medical therapy).

In analysing the Soviet medical policy, however, Deacon is not careful, or rigorous enough. The empirical basis of his conclusions is, therefore, quite problematic.

For example, he makes the usual mistake of comparing Soviet Union with advanced capitalist countries—the European Economic Community. This is an ahistorical comparison. These EEC countries were far ahead of Russia at the time of Revolution in 1917, and hence we should compare Russia of today with say Portugal or Italy which were also like Russia, quite backward, at that time. The USSR is even today backward in some respects as compared to the United States or some imperialist European powers. This in itself does not mean at all that Russia is not socialist or socialism is worse than capitalism.

In assessing whether or not USSR is spending 'more' money on health care, Deacon makes a second added mistake of taking the medical care expenditure of capitalist countries as 'standard'. It is well known that advanced capitalist countries were overusing drugs and other medical facilities, that the medical-industrial complex is a big racket. Hence if a country is spending less on medical care than these stupid civilisations, that by itself cannot be taken as a bad thing. An appropriate indicator would be to find out what percentage of medical needs are being met and in what manner. Admittedly this is a difficult indicator to quantify and we may not get proper, comparable data about this. But some rough estimation can be made. A rough estimation in a proper direction is better than a precise estimation in a wrong direction: If medical expense as an indicator of better care is to be taken, then the comparison has to be made with the pre-revolutionary situation. Finally, we must remember that the ultimate aim of a socialist society would be reduce the necessity of medical care and hence the relative proportion of medical expenses as well.

Deacon has properly drawn attention to the both 'relative and absolute rise' in USSR in the so-called 'disease of moder-

nisation' like cardiovascular diseases and cancer. But more information is needed to draw valid conclusions. As infectious diseases decline, even in a really socialist society, more people are likely to die of degenerative disorders. In the imperialistic countries a very large number of people die prematurely (in their forties or fifties) of these degenerative disorders because of the unhealthy 'American way of life'. One must know whether such a premature morbidity and mortality in the USSR exists or not, is rising or not and whether (like in western capitalist countries) it can be traced to wrong kinds of food, work environment, social environment and so on. The rise in the USSR in 'the age-adjusted death rate by 18 per cent over last decade' as quoted by Deacon is an indicator. But we need more information before drawing valid conclusions.

Deacon's article contains hardly any information about whether or not the domination of doctors as experts, over paramedics and the patients, the philosophy of 'the-doctor-knows-all-and-hence-will-decide-all' has decreased in the USSR or not. The lowering of the status of doctors in terms of their pay-scales and privileges is different from changing the role of expertise. In the absence of proper specific information on these aspects (point numbers nine to twelve in his table no III), his conclusions on these points cannot be taken as valid.

If all these and such points are rigorously taken into account to find out the *trend* (and not merely a static picture in a particular year), one has a hunch that one would come to the same or even more critical conclusion than Deacon's. USSR is a state socialist society which has gone far ahead of many comparable capitalist societies but cannot be called a socialist society in the sense in which Marx understood this concept. But one must be aware that Deacon's conclusions in this article are not based on solid evidence.

Lastly, a word about the sexual division of labour in medical care in the USSR. As pointed out by Deacon, 90 per cent of primary health care physicians in the USSR are women. This is quite in contrast to capitalist countries wherein males overwhelmingly predominate in this position. But in the USSR, in the thirties and forties, the status and pay-scales of engineers and scientists were kept much higher as compared to doctors since the planners gave higher priority to these skills. This tradition still persists, though it now appears to be changing. Men predominated in these more prestigious, more paying fields and women went to less prestigious, less paying positions of doctors. This shows that though USSR has got over the typical sexual division of labour as found in capitalist medicine, a different mode of sexual division of labour has taken its place; and has stabilised—something one does not expect in a truly socialist society. Deacon has missed this point in his discussions of medicine in the USSR.

Politics of MCH

padma prakash

MANISHA GUPTE's article (*RJH*, 1: 2) provides a broad framework for analysing health policy vis a vis women. The needs of capitalist accumulation mediate through patriarchal structures and relations suppressing women's rights to health and reproduction. This mediation takes different forms in different societies. In a country like India, it is interesting to look at the process by which the needs of capitalist development have simultaneously strengthened and altered patriarchal structures. It is especially necessary to take cognisance of the manner in which the Indian state has coopted and adapted the demands of a 'democratic' polity for its own purpose. The history of maternal and child services in India provide an illustrative example of this. In the evolution of policies and programmes directed at the welfare of mothers and children especially in recent years, it is possible to discern the way in which the state has, responded to the growing influence of the women's movement and has accommodated the demands of the increasingly vocal and influential consumers of health care. 'Programming reproduction' is just one aspect of MCH services. Further, there is also the question of how progressive movements must view such policies and programmes.

As early as the mid-nineteenth century concern for maternal health motivated a series of efforts. This concern was, of course, somewhat spurious. Introducing 'modern' methods of maternal and child care had served multiple objectives. Firstly, it was seen as a means of approaching women so as to "educate them... show them the beauties of christianity, for only then would the regeneration of India be a reality and the conversion of its people an accomplished fact".

Secondly, the MCH movement in India even in its limited spread, enlarged the base of operation of 'scientific' medicine which in England was becoming highly organised and sex and class biased. The MCH rhetoric of the time saw indigenous maternity practices as the main cause of the high maternal mortality and held modern practices, especially in hospitals not only as being progressive but safer and more hygienic. It was to staff these new lying-in hospitals that Indian women were encouraged to take up medicine. This is especially ironic since at about the same time women in Britain were fighting bitter battles to be allowed to train for and practise medicine. Clearly the move in India had little to do with encouraging women to enlarge their sphere of activity in society, but more with the needs of the colonial government.

Thirdly, the promoting of modern maternity practices through the MCH movement fitted well with the philosophy of the reform movement advocating women's education in India—so that as mothers they would be capable of giving birth to and bringing up a new generation of progressive Indians. The MCH movement became a vehicle for bringing about this 'regeneration' of India for both the British and the Indian liberals although it meant different things to the two. Its outreach however, was confined to the upper classes in the urban areas in the presidencies. Needless to say it hardly had any impact

on the maternal mortality or child mortality in the country.

MCH continued to be a priority area in the health policies of independent India. The Bhoire committee continued to view these services as not only a measure for reducing maternal mortality but as a necessity in order that women could adequately perform the function of motherhood. Facilities for the protection of women's health in the 'productive' sphere were mainly meant to ensure her 'reproductive' adequacy. But at the same time the maternity and child welfare centre "with its combined attack on the health and social problems of the Indian home" was expected to play a vital role in the programme of 'national reconstruction'.

Increasingly however, investments in the reproductive health of the woman became far more important than her health in the factory or the field. "The protection of the health of the expectant mother and her child" (irrespective of whether she occupied a place in the sphere of production) became of paramount importance "for building a sound and healthy nation". The mother became officially recognised in policy as the channel for 'educating' the entire family. After this although MCH continued to be a national programme its focus became increasingly narrow and its implementation poor. Quite apart from the fact that MCH programmes did not recognise the real causes of maternal mortality their impact on the section of the population which accounted for a large proportion of maternal deaths was minimal. Interest in MCH also began to decline. (For example, there were hardly any ICMR research projects in the area after the mid-sixties. This disinterest in the health of the mother is manifest even in those areas outside MCH which had some import for maternal health. For instance, research in anemia—increasingly the focus became narrow and oriented towards developing quantification methods which all but ignored the real problems in the area.)

Recent years have seen a revival of interest in MCH which has to be seen in the context of other developments such as the status and location of women, the current priorities of the state as well as the pulse of popular/mass movements.

In the last decade a great deal of attention became focussed on women's status and issues affecting their status. This decade, the UN Women's decade ironically enough, also saw a deterioration in the economic situation of women. Much work has been done on how the development processes have in fact been the cause of women losing their jobs and the means of livelihood—as for instance happens when the introduction of new technologies in agriculture results in women having to give up their traditional occupations, or when modernisation of processes handled by women in industry results in the loss of jobs.

At another level, the only sector which has recorded a growth in employment, the service sector, has also registered a significant rise in women's employment. In other words it would not be wrong to infer that while the

economic and social status of women of the labouring classes is rapidly declining, women who have access to formal education, generally from the better-off layers of the urban working class and the middle class, are finding jobs in the expanding service sector. This in turn contributes to the growing purchasing power the middle class which provides a market for the products of the expanding consumer industry. This factor has to be kept in mind when assessing the purported objectives and the real impact of any programme such as the MCH.

Secondly, there is the undoubted impact of the women's movement not only on national policies but internationally as well. The movement has had the result of highlighting the low social, economic and health status of women. Indices such as maternal mortality suddenly became major issues which needed to be tackled or at least should appear to have been dealt with.

Thirdly, the health status, health care structure and the priorities of health care have undergone a change. One could well hazard a guess that the class differential in health status has become sharper than ever before (See for instance NIN's nutrition surveys which actually shows a decline in consumption levels—although of course, the NIN has grossly tried to cover it up). Inevitably the sex differential in health status would also have sharpened. As a consequence the class biases in health care delivery have become clearer. In addition, the trend towards increasing privatisation as well as the more widespread use of the fee-for-service principle even in state health services will aggravate the disparities in people's relative access to service. Inevitably of course, the priorities of health programmes have also changed.

All this has to be taken into account in understanding the real nature of MCH programme. Because the state needs to sustain the growth of the purchasing power of the expanding middle class, women's employment in certain spheres is a desirable goal. Thus health care for women so that they are able to handle the two spheres of activity becomes a necessary service which the state accepts responsibility for. Promoting the small family norm is again desirable—both so that resources can be optimised as well as because the process of socialising children to fit into patriarchal society can take place efficiently.

Thus for instance, quite clearly, the nutritional supplement component of these programmes is irrelevant to the section of the population who cannot obtain two full meals. Pumping an expectant mother with vitamins when she has abominably low calorie intake is an absurd exercise—and the state is well aware of it. The component is really meant for a different class—the small farmer/lower middle class, where there is just about sufficient food but not enough to take care of the extra needs of pregnancy. On the other hand, the anganwadi programmes may well be used by all sections, including the poorest women who may then be 'released' to work the fields without encumbrances or alternatively at the EGS sites thus increasing the numbers on state dole (which accrues to the image of a welfare state).

But most importantly these programmes are redefining and restructuring the role of women in patriarchal class society at the present juncture. Beginning with the breastfeeding campaign, the immunisation programme and the anganwadis, the woman's role in the upbringing of the child is being redefined. The concept of the family with its hierarchies as the primary socialising institution in capitalist patriarchal society is being reemphasised. Investments of all kinds in the family and in children are rising. In order to ensure the continued existence of the family, the ruling class has to reetch the female stereotype which will accommodate the new feature of an employed mother and wife. The setting up of a department for women and children cannot be regarded merely as a response to the pressures of the women's movement. It has a necessary role to play in drawing up a new image of Indian womanhood. It is in this context that we have to assess any programme, whether in health or otherwise, directed at women.

How then do we regard these programmes? Should we reject them entirely? Or can elements of these be used to advantage to weaken the very structures which the state is trying to strengthen?

While this needs to be tackled in a more elaborate manner, here are some pointers. For one thing, any critique of state services—especially in MCH—must ensure that the trends which emerge as a result do not reject state services by opting for more expensive and perhaps less efficient private care. This will only mean that the tendency of the state towards ridding itself of its welfare obligation will get an added boost. On the other hand, by highlighting the inadequacies of the service, there is an opportunity to initially pressurise for better service but in the long run also to show up the non-viability and insincerity of the welfare goals.

At the same time the sexist and class bias of these services also need to be brought out in the open. The fact that these programmes project a model of Indian womanhood which reinforces existing norms which themselves need to be challenged is a task that the health groups and the women's movement must take seriously. And this is a difficult challenge—it comprises not merely in confronting the real objectives of state services, but in tackling the inherent sexist and class ideology of the medical establishment.

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On Headaches

It's beautiful to be a communist
even though it gives you lots of headaches.

And the thing is that the communist's headaches
are supposed to be historical, that is to say
they don't go away with aspirins
but only with the realization of Paradise on Earth.
That's how it is.

Under capitalism our heads ache
and they decapitate us.
In the struggle for the revolution the head is a time-bomb.

In the construction of socialism
we plan headaches
which doesn't make them any less frequent, just the other way around.

Communism will be, among other things,
an aspirin the size of the sun.

roque dalton (El Salvador)
