

PSYCHE AND SOCIETY

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Editorial

Wing-footed Human Mind

We know biologist Alfred Wallace (1823-1913) of Great Britain discovered 'natural selection theory' independently of Darwin. Gradually it became evident that the dissension between Darwin and Wallace at least in one area caused some sorts of trouble. Dissenting Wallace delivered a separate judgement – it is impossible to evolve such an organ like human brain (with such a huge working capacity of judgement, intelligence, memory, creativity etc.) from any primate lineage by the process of natural selection. It must have been created by some 'intelligent design' (wonder who could have done this!). Wallace even stated that in the necessity of nature's adaption there was no need to create a mathematical genius like Newton or a musical genius like Beethoven.

We know, Darwin was very much embarrassed for Wallace's this kind of opinion and he had expressed this *bete noire* to Wallace in a private correspondence. After all Wallace was co-discoverer of his 'natural selection theory'. But Darwin was firm in his opinion that there was no special designer for human species and there is no other way that human brain can evolve except natural selection. Because it is the most important, creative and only method, responsible for evolution of the bio-kingdom and man is just a twig of its huge branching tree. So in this way i.e in this selection process the human brain evolved from primate brain and its ancestral lineage.

But natural selection utterly fails to account for conservation and development of the minute and rudimentary beginnings, the slight and infinitesimal commencements of structures, however useful those structures may afterwards become. Suppose much or most of the wing of a bird or an insect must arise all at once because incipient stages could have no adaptive value.

However the principle of functional change in structural continuity represents Darwin's elegant solution to the dilemma of incipient stages and his natural selection theory remain correct in all these aspects, though it is a separate big story. But we can mention here the tidbits.

It is not an easy task to disembarass ourself of the responsibility of dispelling all our doubts that had been developed from Wallace's statement. Because it is a long continuing problem to find out the solution regarding growth and development of human brain in respect of evolutionary adaptation. In other words the *Homo sapiens* has developed this huge brain or the central nervous system just fifty thousand or hundred thousand years ago. Our hearts are filled with wonder when we contemplate the vastness of infinitely superior human brain. So what is the reason behind that nature selects this organ as 'origin of the fittest'?

If we abide by the laws of natural selection in this case then we have to explain the special structure and function of human brain according to nature's laws of adaptation. Then we must have to infer that only to develop ourselves as better food-gatherers and to adapt ourselves accordingly in a better communal life, we needed this kind of brain! Again one can cite Beethoven and Newton's unimaginable endowment for his purpose and infer that this is not quite a reasonable answer. So we have to search out whether there is any other similar example like development of human brain in the animal kingdom.

We can find some similar argument 'with admirable art and force', in the history of science among protagonist and antagonist regarding growth and development of wing of a bird or an insect, human eye etc.. We can readily understand how complex and fully developed struc-

tures work and how their maintenance and preservation may rely upon natural selection. But how do we get from nothing to such an elaborate something if evolution must proceed through a long sequence of intermediate stages, each favored by natural selection?

So how can natural selection explain the incipient stages of structures that can only be used in much more elaborated form? Since a small move toward a wing could hardly promote survival? No creature can fly with two percent of a wing, but why must the incipient stages be used for flight? If incipient stages originally performed a different function (here thermoregulation in case of a wing) suited to their small size and minimal development, natural selection might superintend their increase as adaptations for this original role until they reached a stage suitable for their current use.

Darwin's theory is rooted in the proposition that natural selection acts as the primary creative force in evolutionary change. This creativity will be expressed only if the fortuitous variation forming the raw material of evolutionary change can be accumulated sequentially in tiny doses, with natural selection acting as the sieve of acceptance. If new species arise all at once in an occasional lucky gulp, then selection has no creative role. Selection at best, becomes an executioner, eliminating the unfit following this burst of good fortune. Now take the example of *Archaeopteryx*.

Archaeopteryx, the first bird, is a complex melange of reptilian and avian features. Scientists are still debating whether or not it could fly. But what it do with wing rudiments that surely could not produce flight? Birds evolved from dinosaurs, they arose from a lineage particularly subject to problems with temperature control. *Archaeopteryx* is smaller than any dinosaur and probably arose from the tiniest of dinosaur lineages. Small animals, with high ratios of surface area to volume, lost heat rapidly and may require supplementary devices for thermoregulation.

Moreover it is seen that proto-wings should help an insect under these three hypotheses of continuity in adaptation - (i) increasing the lift or drag ratio as the major boost to gliding, (ii) increasing drag to slow the descent rate in parachuting, (iii) measuring the moment about the body axis produced by wings for the hypothesis of attitude stability.

In various experiment it is seen that thermoregulation and aerodynamic effects are symmetrically opposite to each other. Wings work well at the smallest sizes, with benefits increasing as the wing grows. However, beyond a measured length, further increase wing confers no additional thermal effect but significant aerodynamic effect.

In this way researchers have actually measured the functional shift by showing that incipient wings aid thermoregulation but provide no aerodynamic benefit - while larger wings provide no further thermoregulatory warmth but initiate aerodynamic advantage and increase the benefits steadily thereafter.

We can propose the same reasoning regarding outgrowth of this huge cerebral cortex. We know that its structural and functional parts do not match to the best of our knowledge uptill date. At least the process of adaptation can not explain all the functioning part of human brain of modern man. So we have developed and considered various theories like exaptation, spandrel etc. where we conclude that these parts of the organ originally developed for some other purposes but currently it is functioning for another purposes. In other words there is a massive functional shift in the case of human brain with the same structural continuity.

Nature does not always match our faulty intuitions. Complex objects often display the interesting and paradoxical property of major effect for apparently trifling input. Internal complexity can translate a simple quantitative change into a wondrous alteration of quality. Perhaps the greatest and most effective of all evolutionary inventions, the origin of human consciousness, required little more than an increase of brain power to a level where internal

connections became rich and varied enough to force this seminal transition.

According to Pavlov this huge cerebral cortex is the receiver and analyser of internal and external *signals* and this is a dialectical method. So as the brain grows it grows with the capacity to analyse or abstract more and more *signals* of objects rather than with their essential properties. Thereby we consider the process of stripping an idea of its material accompaniment was only possible due to this huge development of cortex. **P A S**

An Introduction to Correctional Psychiatry

(Continued article - concluding part)

Basudev Mukherjee

[Author, a psychiatrist of Pavlov Institute, Kolkata attached to Alipore Central Correctional Home, Kolkata for the last twenty years. In the concluding part of this article he discusses overall quality of life (with DALY), physical and mental health and causes of death of the prisoner of West Bengal in reference to Correctional Psychiatry. Specially his objective is to inject the problems of Correctional Psychiatry into the vein of General Psychiatry. In this article the words 'Jail', 'Prison', 'Correctional Home' are used interchangeably. Ed. PAS]

Release Order from physical dependence

A considerable number of accused, who reside at the prison are either drug-offender, drug-pedlar or habitual substance-abusers. It has been observed that a few long-term convicts also indulge themselves regularly or irregularly according to availability of these substances (alcohol, hemp etc.). In this situation they prefer alcohol as a substance. There are ample reasons behind it. The prime reason is, maximum number of prisoners are poor and they solely depend on physical labour for their livelihood. Generally they have grown the habit of taking alcohol from an early period of their life. In modern terminology they are *excluded* section of the population. In their family and social set-up they are habituated since childhood to indulge their cortex by taking various substances as per availability. Though this is a kind of polyabuse-habit, yet there are some confirm heroin-addict in prison population. But we face maximum difficulties while treating chronic alcoholics. Hence they contribute a considerable number of the total deaths in prison.

On the other hand what we observe that the heroin addicts ruin their life at an early age. Though the available street heroin is usually mixed with various adulterants that minimise the addictive properties of heroin. Yet it is fact that the drug addicts have some innate vulnerability so they cannot abstain from these substances throughout their life. It may be because they had passed through a difficult growth and development period like high risk pregnancy and not getting proper care in their critical period of childhood. It is our clinical experience that the patients who are suffering from attention-deficit-hyperactive disorder or minimal invasive brain lesion of the higher cortex and those who are not cared properly, have the greatest risk for development of various antisocial personality disorder in adulthood.

It is fact that these inmates become habituated to all sorts of substances from an early age. But heroin is not easily available in prison or outside, so as a substitute they use almost anything having some hypnotic properties like chasis, bhang, hemp, sleeping tablets etc.. In a central or large prison about ten percent of the total inmates are habituated of taking such things regularly.

The history of substance-abuse is as old as the history of mankind. In many ancient scriptures use of different kind of substances have been written. One can easily find that some of the great historical personalities were confirmed addicts. But the fact that, their addiction-habit did not necessarily interfere with their performances. Somehow they had managed to maintain their professional lives. Following these instances we can infer that if one can control his addiction-habit, then the matured adult people can better support their professional lives. Because they cannot live without these substances or its substitutes.

But problems multiply when a person develops the habit of taking substances in a much younger age. Within a short time he loses his control and creates tremendous difficulties for himself, his family and society too.

In the past when no medicines were available to treat psychiatric patients, various substances were being tried to give relief to these acutely disturbed patients. In this respect we can remember the movement launched by Freud to get sanction from the state of using cocaine for the treatment of psychiatry patients. Gradually due to pressure mounting from these movements, State accepted the proposal and appropriate law was enacted. Subsequently it was seen that those sanctioned substances were being used by the general population indiscriminately and recklessly. As a result the State was forced to ban the substance.

Thus it is a fact that a number of substances were being used initially as medicines but afterwards these substances were banned due to misuse or abuse. Even the same substance had been converted to a lucrative substance of addiction. Surprisingly this thing did not happen in case of alcohol. Though alcohol is the oldest substance used regularly by a certain section of population of any society to create an euphoric mental state. It is also used in religious and social gatherings, used to get relief from anxiety and tension and for smooth induction of sleep. And we know that after its regular use, it may develop physical dependence. Although the prison inmates do not get the opportunity to take it regularly.

However in the year 1982 N.D.P.S. Act was promulgated. Since then gradually and regularly a large number of accused are overcrowding the prison files as substance abusers, substance-peddlars, substance-offenders. Naturally they are creating a near total disorder in this already existing chaotic condition of this heterogeneous prison population. It is needless to say that prison is not a proper place for any kind of de-addiction activities. However the accused lodged here as offender creates all kinds of nuisance and foil the effort to any kind of deaddiction activities. It is a fact that at least in this case for various reasons all efforts of treatment, service, guidance etc. become futile almost hundred percent.

Though only a small number of prison population actually suffer from this incorrigible habit ('lathkhuri' habit in the language of prison). But prisons have to accommodate these poor irregulars as there is no other better place to accommodate them as a long term basis. These persons come to the prison again and again, spent a reasonable time according to their case and trial process and get physically little bit fresh and get out of the prison. The numbers of such old irregulars is about 5% of the total residents inside jail. Some of them commit suicide, others die due to malnutrition, tuberculosis and AIDS in the prison or outside hospital. But the problem of treatment of chronic alcoholic is much more difficult in comparison to these chronic street abusers.

Suppose, there was some incident of poisoning and death due to hooch. So police raided an illegal country wine-shop for usual media pressure and arrested as many found there. Some one aged Brindaban Naskar of Nodakhali, an old customer, told with folded trembling hands, "I haven't done anything wrong Babu." But police took him in the van with an angry tone, "quick, let's go" and apply a kick on his back. Since then he took at least two days to reach inside the prison via court and police lock-up.

Meanwhile he was deprived from his daily requirement of alcohol, so by this time he would develop some metabolic abnormality such as withdrawal symptoms, acute organic brain syndrome or even with various metabolic crisis. As alcohol had become an essential ingredient of his body metabolism including alcoholic liver due to his habit of taking it regularly, so subsequently he would develop certain abnormal behaviour.

His blood pressure had raised to an alarming dangerous level. Already he was exhausted physically and mentally. So in this precarious condition he might utter one or two irrelevant sentences. Annoyed with this it was natural that his immediate neighbours i.e fellow inmates, returned him with few slaps. More dangerously he is a chronic alcoholic and all sorts of metabolic disturbances had already set in.

As his haemoglobin level was 6 Gm percent (average normal level is 13 Gm percent) so he would suffer from incipient heart failure. His blood pressure was abnormally high. Already he might have cirrhosis of liver and time and again his alcoholic heart sent the alarming message, like his tortured wife, "I am failing, it is impossible for me to continue in this way, either you must stop or I should stop." That means as his overall body metabolism was synchronised with alcohol so it was yarning for the daily requirement. As if his health condition was tuned with the Raga 'Darbari Kanara' but being thrown into the prison he was asked to play with the Raga 'Mian Ki Mollar'.

However he was bewildered, confused due to hepatic precoma and could not explain his condition to anybody. As a result he was destined to die in the jail-file at the dead of night and on getting information the jail-doctor would come and declare him dead. Even if he did not die at that night, he was a bonafide beneficiary to take eternal rest within few days.

It is a common picture found in prison that these kind of moribund condition of the inmates have been detected at the eleventh hour.

However this type of custodial death is very common in any moderate or large prison and it is a burning problem or menace to the authority. And it is not easy to overcome this difficult situation in present prison set-up. It is commonly said that his associates initiated the person into drinks or alcohol to have a taste of it, but subsequently it becomes a regular habit of him ('daily-passenger' in the language of prison). Because to get out of the problems that has developed in body and mind due to withdrawal reaction of alcohol dependence, he is being compelled to take alcohol.

Something more left to say. Alcohol is the oldest substance being used to get relief from various form of stress and strain. A little quantity of alcohol is a blessing to those who suffer from complete or partial insomnia. Alcohol is also a wonderful analgesic or anodyne to reduce bodyache for those who are habituated mainly in physical labour (for this very reason Marx identified religion with opium).

During winter in acute cold a few gulps of alcohol reach the stomach, the body becomes warm and appetite also die down. More to say that with this inebriated state there is an euphoric feeling, a feeling of ecstasy, navigating in a dreamy world. So much so that a fairy will take this poor distressed half-naked fakir to the heaven, holding his hands. It is not known to this writer whether any substance in this world has so much qualities like alcohol.

But those who believe in Aristotelean 'Golden Mean' and obey it from their core of heart, always suggest, 'Don't cross the limit'. Yet who cares for it. These chronic alcoholics have already destroyed their families. Not only that, probably this regular habit of taking alcoholic drinks has also ruined his quality of life and his present status of physical and mental health. It is very doubtful whether any person loves him or wants his association.

Therefore in this helpless lonely condition alcohol is his trusted friend, philosopher and guide. Though like a 'jealous mistress' alcohol always enhances its demand due to usual body

tolerance. But it never ditches him. So even he sometimes suffers from paranoid ideation yet he cannot become unfaithful to alcohol. But even prison is so impervious to reasoning that it cannot realize how much he is now missing his old beloved counterpart (*Et Tu Brute*) !

Chronic ailments in prison

There is a common old proverb to be in vogue in prison. That is – eat little, do work, never express rage-reaction, interiorise your grief and then you will be able to serve and complete the prison term smoothly. Those who have minimum knowledge about prison, would accept how much wisdom this proverb carry. Academically this is somekind of 'naive sense of dialectics'. Let me explain.

All our prisons are abode of idleness that anybody willing to do any work does not get the opportunity. In this situation suppose a man, who was engaged as an agricultural labour, sentenced to life imprisonment because of his involvement in a murder case relating to land dispute or witch-hunting, has to serve at the prison for a period of at least fourteen years. Had he been a rich or influential person he could have managed to get release showing thumb to the judicial system, but he is a poor labour. So it is beyond his capacity to get rid of this prison. On the other hand he would be always anxious for his helpless wife and children whom he has left behind.

Moreover he has to show good manners in jail and to serve the prison term as a loyal, gentle, sober inmate. All these stress act upon his health. Taking everything into considerations it is fact of his life that he has to complete his term of imprisonment in this way smoothly.

At present his age is thirty. At this age as an adult he has developed some regular habits of lifestyle. So if he has any habit of addiction he has to give it up here. He has lost his normal sex-habit that is an important form of catharsis. Everything has become in a muddle. In a simple way it can be said that from his old food habit he will eat more and he has to metabolise this extra calorie. On the other hand he will do less physical work and will suffer from a lot of anxiety, tension and depression.

He has to spend many a sleepless night. On one side he has to suffer from tremendous agony for his family, on the other part he has in mind that he has to be released at the shortest possible time without any scratch on his 'history ticket'. All these contingent factors create a lot of pressure on him which is no mean. As a result within coming ten years he would be vulnerable to or suffer from various chronic ailments as obesity, diabetes, hypertension, arthritis, cardiovascular problems etc.. So virtually when he would be released after serving his prison term he would be scarcely fit for any work to maintain his livelihood. Over and above he would be utterly harried to meet the expenses of medicines and investigation charges.

In our prison these things are more evident. Any sentence may be considered so stringent like this. Now we have to know the character of these chronic diseases. It is to be noted that there are a considerable number of classical cases of such diseases like peptic ulcer, gastritis etc. that has been written in the medical text books. There are numerous etiology to develop this syndrome-complex. For example many prisoners are compelled to live in a overcrowding condition, change their food habit, take contaminated water, sustain considerable psychological stress etc..

All these factors help the dangerous strain of the bacilli *Halicobacter pylori* to grow exuberantly in the stomach. Subsequently some precancerous ulcers will flourish in the stomach. As a sequele he would be chronically suffer from acidity, belching, flatulance, indigestion, chronic diarrhoea and gradually he becomes resistant to all sorts of medicine.

Next will come the consideration of ailments like hypertension, diabetes, increase blood uric acid etc. that we frequently detect as mature onset problems, seen to be developed in

adults or now a days as it is called lifestyle disease. Besides, tuberculosis is very common in jail. Problem regarding chronic alcoholism and addiction is also very common. Regarding hypertension nothing is to be said anew. But in comparison to outside population the incidence of hypertension here is three times greater.

It should be remembered that there is a close relationship among the diseases like obesity, hypertension, diabetes, increase blood uric acid level etc.. It is very difficult to assess when and which part of this disease complex will make the life miserable or unbearable. So it is meaningless to consider these diseases separately, so far existing quality of life of the prisoners are concern.

In comparison to outside at best it can be said that if the prisoner is genetically vulnerable to such disease then he would suffer some years earlier from this disease complex in the prison. Besides his emotional stress would also play a great role in this matter. All these disease process would create a miserable condition on him who is ill-tempered or and who is still not acquired the capacity to bear the sufferings of incarceration.

As a result of these metabolic problems his serum lipid profile may exceed a dangerous level and it may add insult to the already compromised cardiovascular or cerebrovascular circulation. Due to this reason a considerable number of prison population die of heart attack.

Generally the medical specialists suggest to the executives to practice some physical exercises regularly at gym, practice *prayanayam*, *Yoga* or relaxation therapy etc. and also prescribe a list of different foods that can be exchanged as low calorie diet. Specialists also prescribe various methods so that they can reduce their tension of their existing lifestyle. The essence of this suggestion boils down into a proverb in the language of inmates with an awareness of the following matter. You have to eat less, to do work as far as possible, to absorb hardship and sufferings of captivity, not to get angry in any circumstances so that you could be in a better position to spend your jail-term smoothly. And then only you would be able to meet your family members after release with a smiling face.

Another thing, we should keep in mind that there is no such arrangement in our prison to treat all these chronic diseases properly and it is not at all possible. Because to do this we need a system that should be build up for regular check-up of risk group of prisoners and then they would be offered with necessary required advice of specialist doctors. In outside population even the rich and educated people cannot follow or honour these prescriptions properly. So naturally we can be sceptical that how far it is possible by our illiterate prisoners to follow these schedule.

Anybody can ask, would these prisoners not been affected by these time if they were outside the prison? This is a difficult question if we consider the contingent situation, as we have no control study regarding this kind of epidemiology. Yet it can be confirmed by our long observation that because of confinement all the disease process of a prisoner would progress relentlessly.

Psychiatric diseases in prison

Due to repeated admission and release of the same person within few months in the custody, it is very difficult to ascertain the exact number of prisoners suffering from mental illness. Only some evaluation can be done for those who stay here for a long time. Approximately ten to twelve percent of the total population express some confirm sign-symptoms of psychiatric diseases. These population comprises of homeless, vagabond, drug-addict, physically or mentally tortured (including post-traumatic stress disorder) etc..

In the history of modern period of human civilisation, even only a few years back, prison was considered as a safe custody for these mentally ill population under age-old Lunacy Act.

Generally these psychiatric patients being burden to their family were uncared for a long time and they loitered around the streets. For any reason police took them into their custody and subsequently brought them in presence of judge. The judge then considered to keep him in prison as safe custody.

Sometimes it happened so that one mentally ill person was creating so much disturbance to his family that it was impossible for the already ruined poor family to take care of him. So with the help of the neighbours he was deposited to the local police station. Police with the help of court, requesting the judge, somehow managed to keep him in prison. In this way it could be found that a considerable number of chronically ill psychiatric patients were lodged in the prison for an indefinite period. They were the most neglected part of the prison population.

Because they were in the custody without doing any offence and sometimes beyond any range of punishment they served the jail-term. They were the non-criminal lunatics or NCL. Even in the year 1992 there were a big file in Kolkata Presidency Correctional home to accommodate at least three hundred female NCL. Now according to the directive of Supreme Court of India, the whole process is declared illegal detention (see Mental Health Act -1987).

So during these years the psychiatric patients were shifted from prison by phases to the State mental hospitals and other non-governmental institutions. But as a direct consequence of this programme a large number chronic psychiatric patients are now loitering around the streets of a big city. Because previously they were kept in prison but now they have no place to reside. Because the State mental hospitals are overflowed with the existing patient population and during the last twenty years the bed for mental patient have not increased considerably.

So now we have to think that how can we accommodate these chronic mental patients who have no body to take care for. How can we rehabilitate these considerable number of psychiatric patients. Certainly this is a question of human rights and human dignity. These persons would not suffer a miserable life like street dogs. We must do something for them in a civilised society. But we know it is not easy to make a solution because in this age of globalization even the State is looking after profit making institutes or resource generation. Though these mentally handicapped persons are actually abandoned and only State can invest on them.

Recently we have got the opportunity to meet with a team of experts working in Great Britain with the same programme. Mental Health Act was enacted there in the year 1983. Actually we have inspired by their example. Though they have almost solve the problem of the mental patients. There National Health services is looking after the health of the prisoners. So only the security part of the prison programme is under the perview of the prison administration and it is helping and assisting the health service persons for maintaining all sort of health programme among the prison inmates and also chronic mental patients.

They are maintaining a liaison with the outside State hospital and can easily shift the acutely ill patient to outside State hospital for further management. We think only in this way it is possible to raise the standard of medical service for the inmates and mental patients. Now we can consider broadly the psychiatry or mental health status of the prison inmates. This is most important because in this age of modern civilization we are now thinking to convert age-old prison system to a fruitful correctional services. In this process we have to know actual mental state of the offender. Are they recidivist due to some innate or acquired psychiatric disorder?

The usual problem is we have not much hard core data in this field, so we cannot say with confirmity that there is a definite relationship between offence and psychiatric disorder. Even we do not know anywhere in this country somebody has done any research project with this problem. There are a huge number of publications done in Western world with reference to this problem but we think it would not be befitting for our society with much difference

socioeconomic and cultural historical background. Though we can consider their inferences for some general, common conceptual similarities.

It is a common concept that some people are highly emotive type and when they are triggered by even some trivial causes they purport for any crime. In other words it is a kind of impulsivity or emotional upsurge on the part of a person to do any crime. Though we know that this is not true for all cases, even for those who organise criminal activities or run a criminal syndicate.

After all it is our common experience that those who are very much active with their all six inherent vices (namely sex-passion, anger, greed, infatuation, vanity and envy collectively called six cardinal passions of man) they generally are active as offenders. It is fact that the offenders are generally emotional and all these vices are activated due to high level of emotions. And these persons are conditioned from their childhood in such a fashion that they can not restrain their passions easily.

On the other hand we have seen that the persons suffering from small or serious mental disorder have some amount of abnormality regarding formation and expression of emotion. Certainly they have conditioned with some negative learning symbols during their growth and development period. So it is natural to assume that there may have some connections or relationship or link with recidivism and mental disorder. But as there is no hard core data to prove this so anybody can guess anything and that turn to be mere conjectural. Again it is our working and clinical experience that a considerable number of prison population is suffering from some kind of mental disorders.

Rather we can say that the percentage of mental disorder seen among prison inmates are much higher than the outside general population. It is also seen as if these psychiatric patients drift one place to another and finally a percentage gravitate towards the prison. But who are these persons? They are not the previously stamped NCL. They are accused in the legal sense and either their trial are going on or it has been completed.

But there are various contingent factors that may create this type of situation. This may be the case that he has some abnormality or personality disorder but unfortunately he happens to be entangled with a criminal group and offer himself as a forerunner to perform the major part of the offence. In another situation he may have some vulnerability and succumb to the pressure of police, prison, court lock-up etc.. Again it may happen that he is much volatile in temperament and this condition has aggravated in prison situation. In another condition some of the inmates develop major psychiatric illness after residing few years in prison set-up.

In this way we can find innumerable instances where the person with some amount of psychiatric vulnerability convicted or remained as an undertrial prisoner for a long period. But it is very difficult to avoid this situation. The trial court would proceed following its norms and it is impossible to justify the truth that the person is suffering from mental illness. There are system so that the lawyer on behalf of the prisoner can make an appeal to get relaxation regarding sentence or punishment due to mental illness. But it is not an easy task as it is a long drawn process and it needs active cooperation from various agencies such as family members, court, prison, psychiatry hospital, welfare units etc..

Now who would bell the cat for this unfortunate prisoner? Even the family members do not share the responsibility or they are ignorant, poor and helpless and do not know where to appeal for proper justice. However we have to admit that a considerable number of jail inmates are suffering from minor or major psychiatric problems and their sufferings would continue. So we have to consider what are the actual problems these inmates are suffering from being residing in prison and what are the problems the prison administration is facing to manage them.

First of all if they are detected as an undertrial prisoner that he is suffering from some

psychiatric disorder than something could be done by appealing to the trial court. Now primarily if the court is satisfied with the documents, then it would direct the prison administration to make all arrangement for proper treatment of the accused. In this issue his lawyer may appeal that the prisoner be granted bail so that he can treat himself according to his choice, as prison is not a proper place to treat such type of ailment. But generally this appeal is rejected on the ground that the person may make this appeal to the judge to evade trial.

Suppose considering all these matters the judge ordered that the patient should be treated for his mental illness or the illness should be judged by competent authority whether in his present mental state he is fit to stand trial or not. But in spite of such court order it is not guaranteed that the prisoner would get proper treatment. Even the prison administration may send the patient at regular interval to outside State mental hospital for better treatment. But it may happens that due to non-availability of past record from the family members the specialist may ask for it and naturally the whole process i. e. final treatment of the prisoner is unusually delayed. However at best the prisoner may get to receive a prescription.

But again we are not sure that he would get his prescribed medicines regularly at prison as it is a process of long continued treatment and to use psychiatry drugs regularly in prison is very much problematic. Because any central prison is a den of worst kind of drug-addicts and they are always in search for any kind of psychotropic drugs. So there is every chance of abuse of these drugs and it is very difficult to manage or supervise the whole affair systematically by any person. It is our experience that even the family members are not able to provide this kind of services to the psychiatric patients regularly.

So it can be said blindfolded that the prisoner with psychiatric ailment will suffer from lack of hygiene, lack of proper diet, lack of clean dresses, lack of proper medicine etc.. So his quality of life would further deteriorate. And sometimes his problems would aggravate. However he may be shifted to outside State hospital. But administration would not be successful in every time of doing this for various reasons. Even the most irony is, the general duty medical officer engaged in prison, who have to intervene this emergency situation of mental patients, has no training in his professional career to manage this crisis.

Again intermittently this patient may suffer from acute disturbed condition and acts violently towards his fellow inmates and get equal return. That may be fatal sometimes. Because at that time it become impossible to overpower him. Besides he may commit suicide or at best suffering a long period with irregularities of treatment he turns to a chronic psychiatry patient. Most of the time they suffer from various chronic mental and various physical illness, commonly due to pulmonary tuberculosis and thereby shorten their average lifespan.

There is such allegation that this chronic psychiatric patients are exploited as homosexual partner. It is very difficult to prove or disprove this allegation. Because they live in such an environment that happening of these incidents cannot be ruled out.

However considering all these things the psychiatric patients in prison can be categorised in the following manner.

1. Undertrial or convict, suffering from psychiatric problems before admission to prison.
2. Undertrial or convict, now manifesting mental illness, though we do not know whether he has any previous morbidity before admission to prison.
3. The inmate is not confirmed psychiatric patient but intermittently he shows various signs-symptoms of psychiatric disability. This disability include fear, anxiety, depression, panic attack etc.. This group include drug-addicts, person suffering from psychosomatic, somatoform and personality disorder etc..
4. Some inmates are highly emotive and some may show evidently various types of abnormal behaviour regarding expression of emotion or emotional intelligence. But it is very difficult

to judge or ascertain or categorise them in any conventional classification of mental illness.

Now let us summarise the state of mental illness existing in prison set-up. That can be enumerated accordingly.

1. Probably it does not happen that a physically fit and mentally sound person becomes a mental patient due to incarceration. In this perspective it can be said that those who are vulnerable to mental illness, may succumb to the stress and pressure effect of incarceration. Though these victims usually suffer from neurosis type of mental illness.

2. Frequently it is observed that the inmates who show various type of abnormal behaviour are the victims or worst sufferer of traumatised growth-development period.

3. A large section of substance-abusers including alcoholic, admitted to jail at almost regular interval. They may suffer from some psychiatric disability (comorbidity) in addition to their substance-seeking behaviour.

4. It is needless to say that if somebody suffer from psychiatric disability in prison, the intensity and duration of illness would be increased due to lack of proper treatment and nursing care. Even the family members desire that he should remain in custody as he would be their burden if released. So it happens that the family members do not try for his release or at the time of his release even they deny to receive him. So the administration has to face various problems with this released chronic mental patients, as they are kept here for safe custody.

5. Number of psychiatric patients residing in prison are considerably high in comparison to outside general population. This is due to multifactorial causes. It is fact that these helpless poor persons often suffer the drift of the social tide or they are the victim of the vortex of social system which gravitate round a central body (prison).

Whatever might be the reason there should be some regular permanent arrangement in a central prison for treating such prisoners with a competent psychiatry unit as there is no immediate solution to overcome these problem.

In prison at least five percent of the inmates would be found, suffering from some amount of mental retardation. Naturally they are the victim of various adverse situation. They are forced to do many work which others are not ready to do. But we have no arrangement to segregate the prisoners according to their classes of personality or behaviour or history of offence. So it is not possible to provide them any special service according to their need. Though it is essential to prepare them for their mainstreaming and after care services.

It is needless to say that presently we have no programme or planning at least in West Bengal regarding rehabilitation or after care services of the prison inmates as a whole. So there is no congruity or arrangement regarding the service system or vocational training programme existing in prison.

Suicide in prison

Like anywhere the incidence of suicide is very much complicated in prison. It is fact that if an adult person decides to commit suicide then it become impossible to keep him alive. So it is the duty of all concern specially the medical staffs to keep constant vigil. Besides if any person expresses such intention or desire anywhere anytime to the co-inmates then it should be taken seriously and the person should be watched constantly. But it is not an easy task. The rate of suicide is a bit higher in prison population in comparison to general population.

It is presumed that habit of drug-addiction and feeling of loneliness, depression, disrespect for the incarceration or sudden change of environment, living condition or any bad news from home - all these isolately or conjointly act on the mind of the inmate and can provoke him to commit suicide. Though it is certain that the person involved is vulnerable in all the cases and there is some history of previous psychiatric illness. Again this kind of incidence depends

on various contingent situation so that some momentary change of decision or situation can change the whole scenario.

After the incident when we gather information from co-inmates we find that the inmate has divulge his intention or suicidal ideation for several times. But in all cases these abnormality of behaviour of the inmate were not taken seriously. Generally the inmates are habituated to speak anything for his feeling of intense stress and pain of captivity. So the persons surrounding him do not give much attention to the matter specifically or are not ready to recognise his psychological distressed condition.

Even if it get due attention then the question arises, is it possible to make a constant vigil on such an adult person by this ever tottering prison administration. Besides the administration feel very much awkward position regarding handling such type of incidences. Because overburdened with various routine works the administration remain very much reluctant to provide the amount of attention and concentration required to manage this type of disturbed inmate. So the incidence of suicide happens at regular interval, the inmate suffers, his family members suffer and the administration suffers too.

Research works on mental ailments

Our prison is an ideal place to conduct research works on mental diseases. Because in a large prison apart from among the addicts, psychiatric patients, chronic alcoholics one can get the opportunity to observe a large number of heterogenous distressed people either temporarily or on a long term basis. Besides one can get the opportunity to know the relationship and interaction between criminal justice system, mental state of a person and the society in a larger dimension.

Notwithstanding we can comprehend through this work and make a sketch, how a large number of prisoners languish in the prison, suffer from mental diseases or distressed condition. Even in this horizontal and vertical programme we can find out their ultimate fate. Huge scope is there to know exactly the socioeconomic-cultural status of these population, their lifestyle, their premorbid personality etc.. On the other hand it is highly necessary to understand all these intricate facts if we want to launch any after care programme to bring these inmates in the mainstream or if we want to provide mental health services to these poor distressed people.

Specially it is badly needed to make the Correctional Services sensitize regarding all these matters. In general it is seen that the administration feel very much perturbed and is in trouble when a mental patient's behaviour acutely disturbed the environment or a very much unpleasant situation is created by some addict. Even the medical officers have not got the requisite training to handle these situations. Practically they want to avoid this type of situation. Besides not only the number of mental patients are increasing in prison day by day, but there is a huge pressure from media, the Human Rights organisations for providing proper care and treatment of the prisoners.

In this situation it is necessary to set up a psychiatry unit in all the big prisons where a considerable number of inmates need treatment for any emergency situation or regular treatment and check up for mental diseases. And it is impossible to tackle this situation without proper training.

Conclusion

In this country has a considerable percentage of its population incarcerated. Though the picture is same everywhere but due to rapid urbanisation and infiltration from neighbouring countries and States the prison population is growing at a rapid rate in this State. Drug crimes

are also in the rise from 1% in 1980 to now almost 15% in 2005. Same is the condition of disability adjusted life years (DALY) and judicial custody deaths. Most of the inmates in prisons represent poor, socially backward, minority community individuals who have broken society's laws. Almost 85% population in jail are undertrial and are there for minor misdemeanors related to manifestations of chronic mental illness or homelessness, or both. Youth confined in juvenile detention centres are often the failures of family services. Many children labelled 'bad' turn out to be mentally ill. However convicted felons in prison are unable to vote, have little control of their lives, and are believed to be the dregs of society. They have few advocates.

It is a stark reality that in our present system in jails there is a hierarchy of authority or empowerment and for the average prisoner, the person on immediate authority over him is the mate or the 'in charge'. This system lies at the very heart of jail corruption.

Whether any correction is possible for a full grown adult that we do not know. But while incarcerated at least we can take care of his health specially of mental health for the benefit of the society and whatever remote sense of reference to correction. As we are closely interrelated social animal and we desire mainstreaming of these unfortunate individuals. 'Unfortunate' in that sense that they are not only the victims of their Pavlovian brain type or social-economic contingencies. But they are illiterate and is very poorly educated in the general sense of the word as he has no idea of their rights.

Again correctional system including after care or rehabilitation is a dynamic process with full of contingencies. Specially it has been changing at the level of ideal and modern correctional philosophy believes that the offenders are sent to prisons on punishment and not for punishment. In a people's republic, democratic country of us we should try our level best to humanize the living conditions for the prison inmates.

Our objective of correction is rehabilitation but at present the legislatively prescribed objective is only safe custody. There is a great variation among the offenders, they need to be individualized. But prison labour as used to be monotonous wearisome, non-remunerative and non-innovative so far rehabilitation is concerned. Modern correctional philosophy puts more reliance on community based treatment. So to translate the correctional ideals into reality it needs active co-ordination and co-operation from various agencies of the society. For this we have to develop an informal social justice system apart from presently existing overburdened criminal justice system.

When all mental health disabilities are included estimates are that on an average 10% of male and 20% of female prison inmates have serious mental illness. So it is increasingly necessary to address the psychiatric assessment and treatment needs of the correctional population and to ensure after care services when they are released back into the community.

In a biosphere in which life is interdependent, the mental health status of the least members of society strongly influences the mental health status of the greatest members of society. Behavior is contagious. Correctional psychiatry is Community psychiatry.

The only way to progress is to first admit the problems exist in the first place, and then to tackle them head-on. We admit that there is shortage of equipment or shortage of skilled staff but the fact is that much better use could be made of the existing facilities. So we should also admit that there is tremendous lack of supervision and of quality correctional service. The primary problem is the same problem that besets so many other areas of jail and other officials like that of 'mindset'. And the problem of mindset is equally significant amongst both staff and prisoners. The mindset which prevails seems to dictate that any problem must be covered up at all costs, without thought to the fact that ultimately the falsehood will be detached which would result in far worse trouble.

In West Bengal a few years ago (vide *The Calcutta Gazette, Extraordinary*, June 13, 1997),

jails were converted into 'Correctional Homes' with great fanfare. Politicians and others got huge mileage out of this. But the problems remain the same. As the purpose of corrections is to seek control and retribution whereas purpose of medicine is to strengthen and to heal. These two goals *i.e.* security and welfare conflict. However we have to overcome it and to travel a long distance for fulfillment of our correctional ideals and objectives.

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- 9 ^ 2006, But Has 1984 Finally Arrived? (<http://www.indymedia.org.uk/en/2006/09/351051.html>) Indymedia UK, 19 September 2006.

See also

- *Discipline and Punish* by Michel Foucault
- Big Brother, a character from the novel *Nineteen Eighty-Four*
- *Big Brother*, the popular reality television series
- London's "ring of steel"
- Governmentality, and the Foucaultian idea of Biopower
- Information Awareness Office
- Mass surveillance
- Omniscience
- Right to privacy
- Totalitarianism
- *The Transparent Society* by David Brin also *Kiln People*
- *The Traveler* by John Twelve Hawks
- Video surveillance
- Panopticon (album) by isis (band)
- Panopticon (Internet culture)
- Total institution

External links

- Panopticon (<http://cartome.org/panopticon2.htm>) – by Jeremy bentham (online version)
- Special Issue on the Panopticon (<http://www.surveillance-and-society.org/journalv1i3.htm>) – Surveillance and Society
- Scare tactics: embedded reporting and the Panopticon effect (http://www.disenchanted.com/dis/humanity/scare_tactics.html)
- Control and Surveillance from Computers In Society (<http://www.chris-kimble.com/Courses/cis7.html>) – on-line Course
- [1](<http://books.google.com/books?1> id=mGIYAAAMAAJ&printsec=frontcover&dq=editions:ozyluvvsgsq1-]

In Reference to Education and Alienation

Dhirendranath Ganguly

The severity and complexity of educational and cultural crisis in Western Countries are gradually increasing. So many things have been written on this subject for the last ten years that it is impossible for anyone to follow all these articles within twenty years. I have read some of it but could not find the causal relationship of these problems from these discussions. Though they have tried to depict the problems as details as possible but they have not tried to find out the cause. Many times the causal relationship has been jumbled up in these writings. Almost everyone has emphasized on some similar problems.

The students of this age have lost faith on the present education system and methods. Again they haven't any respect for the traditional culture also. They are mostly averse of this social system based on paternalistic authoritarianism and hierarchy. But it is fact that this authoritarian hierarchy imposes its superiority at School, College, University, factory, Party in all these social spheres. The lifeline of any democratic social system is bureaucracy. Democracy does not curb the authority of bureaucracy instead it has strengthened it. Their main slogan is discipline and rules and regulations. They want change phase-wise and gradually.

But today's youth demand immediate change. So their 'Revolution of Immediacy' confronts with authority's 'Evolution of Gradualism'. More factors are in the considerations along with these, such as tremendous increase of students number, media explosion, rapid progress of science and technology etc.. Over and above there is poverty and other related problems in the poor countries such as us. The discussion on Nuclear Warfare is not getting the same importance as before. Rather the rejected uncertainty theories on atomic world are heard much more.

The present generations are specially suggested by these theories. So they are restless and involved in some unjustifiable works. These type of articles are drawing our attention much more. All these are in the category of reports of newspapers. No fundamental effort is seen to indicate the basic causes of the crisis of education, rather to overcome the crisis they are much more concern with the immediate remedial measures, recommended and directed by the various Commission and Committees on their reports.

I have not that impertinence to deny the usefulness of all these pragmatic approaches. Those who are trying to realize the problems from the psychological point of view are merely confine themselves in the discussion of so called Oedipus Complex or frustration-aggression complex or eros-thanatos complex. Even somebody is trying to explain the whole crisis in an attitude of automation related problems of this age of technology. Again some philosopher erudites have tried to measure the crisis of education and culture with the level of existential alienation.

Yet I have found no originality or novelty in them. Only the person (Istvan Meszaros) who has tried to reach the root of the crisis with the help of Marxist alienation theory, has attracted my attention to a great extent. Following his methodology I like to engage myself in discussing the educational problems.

Most of the time we engage ourselves discussing the crisis of formal education or institutional education. But our period of learning stretched from womb to tomb and not merely with the help of some formal or institutional education of school, college or university. According to

Paracelsus our whole life is meant for learning. We cannot live even ten hours without learning anything. So if we confined ourselves only discussing the crisis of education with formal education and its system then the actual causes and solutions of this crisis cannot be attained.

In this capitalistic system of society, individual student-centred education system has been introduced with a commercialisation attitude. In our social system being fettered with cast and creeds only the privileged class has the right and opportunity for any sort of formal and non-formal education. The boys of other caste used to take lessons of family profession or general knowledge from elders since their childhood. It is not that there is no exception.

It was happened that person from lowest caste (Shudra) was beheaded due to his audacious act of studying *Vedas*. Even a sincere student had to sacrifice his thumb to his preceptor as remuneration for acquiring knowledge, though he was rebuffed by the same preceptor. But no pandemonium happened for these incidents, even the incident did not bring any crisis in the educational system.

In the Western Countries outside the Church the common people had got their lessons of earning their livelihood in such a way so that they could communicate with their lifestyle without any disturbance. The lessons of informal education and its reformations that man acquires from the nature and society helped him to maintain his life somehow compromising with nature and society. Kings need to consider about any sort of education only to get some clerks and bureaucrats. The education was something personal matter and preceptor centred.

With the emergence of capitalistic production system and modern nation-state in Western society the radical change of educational system had taken place. There began a lot of thinking about this. The producer and the modern statesman cannot depend on Churches or preceptors. A new educational system needed for farm production, accounting system, marketing management etc.. The demand of education increased day by day for this state and class-society which was based on capitalistic production system. There was rapid development of natural science and technology. To adapt with this new situation a new philosophy-psychology was required.

In the early phase of capitalism bemused by the Renaissance, overwhelmed people planned for open and total education, tried all sorts of efforts to free individual on the basis of a dream of utopia. Everyone even art and literature was interested to spread their education based on science. Gradually the state and society came forward to shoulder their responsibilities. But within a few days according to the rule of class-society, retraction of the spread of education was inevitable.

In a 'surplus-valued' society the man evacuated from their agricultural land began to overcrowding cities or urban areas with the expectation of earning their livelihood. The supply of labour crossed the demand of labour enormously. Child labour and unskilled labour were much profitable. As a result the interest to build up a total educational programme in a liberal bourgeois society gradually subsided. They became just some mechanical implements without any education for their bare subsistence. Even condition of the skilled worker was identical.

These all happened during the middle part of eighteenth century. So much so that such an unadulterated profit-making person like Adam Smith had to say that the educational system was hampered due to the 'division of labour' of this bourgeois society. "On the one hand, it impoverishes man to such an extent that one would need a special educational effort to put things right. But no such effort is forth-coming. On the contrary - and this is the second aspect of the negative impact on education - since the division of labour simplifies in an extreme form of the work processes, it largely diminishes the need for a proper education, instead of intensifying it."

Acquaintance with the part of a machine was enough for a worker. It require a specific

type of muscle movement to run the machine. During the time of operation of the machine the worker's attention was solely focused on his specific part of job. He did not get any opportunity to think of the other side of the operation. On the contrary when he was engaged in his rural environment he had to think of many things. When any problem cropped up he himself had to solve the problem. As a result his cognitive aspect of mind was enriched.

But the possibility of improving the cognitive aspect of skilled and unskilled worker has been closed. They have to earn and maintain their livelihood with little education according to the requirement of the owners. Their vision and attitude are bound to be narrowed if they are conditioned day by day to perform with the work schedule of one seventh of a pin or less than ten percent of a button. It is natural that he should be disinterested about education. He should be indifferent to the enquiry of life.

According to Marx's description, alienation of the working class begin in this way. The indifference and alienation towards education was found at the very first stage of alienation from labour. In Adam Smith's version it is, "The minds of men are contracted, and rendered incapable of elevation. Education is despised, or at least neglected, and heroic is almost utterly extinguished."

In this way the child labours were alienated not only from education, they were also alienated from their families. Being capable of earning wages from an early age they showed negativism to the authority of his father and became addicted to drinking for relaxation and entertainment at lesiure hours.

Adam Smith however did not think it as a sequale of the internal contradiction of capitalism. On the otherhand he thought like other contemporary ethicist that these were individual moral corruption. Even a progressive utopian like Robert Owen thought that the problem of education would be solved if we appealed to the conscience of haves and have-nots. "It is confidently expected that the period is at hand when man through ignorance, shall not much longer inflict unnecessary misery on man; because the mass of mankind will become enlightened, and will clearly discern that by so acting they will inevitably create misery to themselves."

Only Marx for the first time realised that the inherent laws of capital alienated man from his human essence and made him inhuman. Long before Adam Smith and Robert Owen perceived that without ethics and proper education the exploited class one day would shake the foundation of the society with violent attack. But their liberal appeal and every efforts for reforming educational system would not be able to check the speed of alienation in the eighteenth-nineteenth centuries. From the middle of nineteenth century education became more commercial. Though at that time there was scope for universality of the higher level education through university. In the era of *Laissez Faire* economy we had heard of 'harmonious', 'manysided development'. Today's university education, formal education are chiefly engaged in making experts. Today's postgraduate students are getting the same one-dimensional almost identical education that the factory workers got at the eighteenth century.

There the knowledge of various subjects and departments are stored at the separate container under the supervision of respective head of the departments. No one is concern regarding the stored knowledge of others. Just as like the dweller of a metropolis who is indifferent about his next door neighbour. They all have different language, symbol and signals. "We are all aware of the disintegration of thought and knowledge into an increasing number of separate systems, each more or less self-contained with its own language, and recognising no responsibility for knowing or caring about what is going on across its frontiers. . . . The story of the Tower of Babel might have been a prophetic vision of the modern university; and the fragmentation which is spotlighted there affects the whole of society."

Today's higher education make the intellect of the students constricted, encircled within a

boundary and splitted the personality. The ingredients of alienation are concealed within this education system. This is one part of the crisis. In my opinion it is important one. The social scientist of all over world specially of America have discussed much regarding the problem. I have said earlier that these discussions are heavily informative and knowledgeable! Again those who are in unison with the iconoclasts are indirectly strengthened the conservatism.

All are whirling round the existentialism or pragmatism. Only Meszaros has tried to understand the chaos in the field of education with the help of Marx's alienation theory. I think he has succeeded. In any affluent country, the students of junior faculty who are well off and whose future is secured are leaning towards left? This is such a wizardry that has no answer. This is the opinion of a reknowned American intellectual.

Another group is of the opinion that a few ruffian and academic swindler are responsible for all these indiscipline in their country and this country. The crisis would be solved if they could be chastised. They admit that a little disorder is there in the field of education. But that is not such an extent that the students and sometimes professors would make an impossible demand to take the full charge in their hand, creating chaos and pandemonium.

Yes, the number of students have increased, the research opportunities have decreased but can it be said that the education system has reached to a dead-lock? According to Meszaros, there is crisis and chaos in all the Universities of the Western countries and education has reached on the crest of the crisis. But this crisis is not only confined or concentrated to any country or this University or that University.

According to his opinion this crisis is universal. This crisis is the internal problem of social system. "Today's crisis is not that of some educational institution but the structural crisis of the whole system of capitalist interiorization." If we do not realise the word 'interiorization', as referred by Meszaros, we cannot enter into the discussion of educational crisis from the perspective of alienation.

Knowing merely the system and distribution of production one cannot be able to know the real picture of capitalist country and its social system. Without the active participation of a group of persons who are not directly related to the distribution of production, it is impossible that a state could survive. It is highly necessary to make this kind of active participant for perfect stabilisation of the society.

Those who are not exhausted with their daily chores can only come forward to perform these activities. Or it can be their livelihood to save the society from inside. The artist, litterateur, psychologist, sociologist, philosopher, professor, teachers those who are called intellectuals in our society in common language, are more or less involved within to protect the health of the society. In spite of their formal education they learn from their life-experiences.

The formal education means the education imparted from school, college and university where they get the identical education, yet they can form different types of opinion and can support different pathways. It is not possible without the active help and assistance of these persons to maintain spontaneously within the society the commodity fetishism of capitalism, exploitative social relations etc..

In one side there is exploiter and the ruler and in other side there is oppressed and exploited. We know that always these two outside groups comprising opposing self-interest do not express outwardly in the form of struggle or conflict or they do not do so. As long as the viewpoint of most of the litterateurs, philosophers, psychologists regarding analysis of social justice-injustice, criteria of social values, ethics etc. remain on the side of capitalism, the internal peace remain intact in spite of outside pressure. According to Meszaros, "They succeed in this only because the particular individuals 'interiorize' the outside pressure."

So long the severe struggle between formal education and informal education is absent,

so long there is no heaven and hell difference observed between announced and practised moral value premises, upto that level a large number of artists and litterateurs could be tied anyhow with the social system and education system. The crisis do not develop in an intense form. There is possibility of temporary solution of the problems provisionally.

In the opinion of Meszaros, today's intellectuals and most of the would be intellectuals failed to tied themselves with the internal system of capitalism. Due to the pressure of the centripetal force of alienation they are coming outer fringe of the society. The difference between announced and practised moral values become obvious. Formal and social education become incongruous. It is impossible to accept the interest of military-industrial complex as the interest of nation. Question arises regarding purpose of every aspect of education.

It is not possible to make a crisis-survey without considering in larger perspective the crisis of formal education system. "Formal education is closely integrated in the totality on the social process, and even as regards the particular individual's consciousness, its functions are judged in accordance with the identifiable *raison d'être* in society as a whole." One can see only the crest of one-tenth of the floating ice-berg, remaining submerged nine-tenth is out of sight of us. Observing part of the total crisis we can perceived that the students, teachers, intellectuals are not really interested as before to remove the production related alienation.

Rather we can say, the depth and extension of this alienation can not be repaired with the process of 'social engineering', 'moral rearmament' etc.. As Meszaros thinks, "Thus the 'contestation' of education in this wider sense, is the greatest challenge to capitalism in general, for it directly affects the very process of 'interiorization' through which alienation and reification could so far prevail over the consciousness of the individuals."

Once the state and statecraft required to create education and intellectuals but that necessity is no longer exist now. They cannot be managed to use in the act of 'interiorisation' effectively. Now intellectuals are made for the purpose of financial reasons. In Meszaros's language, the intensity of the crisis has been increased due to the excess production of intellectuals along with the increase of consciousness and the sense of alienation. The influence and strength of corporate houses has been increased on the field of education and universities specially on the reasearch division.

Besides the growth of economy have naturally increased the number of intellectuals. In the era of capitalism it is inevitable that there would be contradiction between politics and economy. The whole business community chalk out their programme with an eye to immediate and short term profit making interest. On the other side in the interest of the common people, the capitalist state and state-administration tries to prevent the tendency of the individual of unrestricted personal gain. Often the interest of state politics courts defeat to the interest of capitalism.

In spite of widespread tendency of the alienation and commodity fetishism becoming fatal to capitalism, knowing fully well that excessive production of intelligentsia is harmful, yet the American multi-millionaire have failed to adapt any political programme for their future security. According to Meszaros, the monopoly capitalism of America are numerous problem-ridden and they cannot combat the national and international challenges effectively. No way out is found to remove the crisis of education.

In the field of education of West Bengal and in India there is no end of confusion, chaos, indiscipline or disorganisation. According to the experts this is the result of the contradiction due to the incongruities of the new state and state-consciousness and the old educational infrastructure. Till date the reformation of education somehow tries to retain the old house just changing one or two parts of the main building or white-washing it. The radical and overall well planned change are not tried out any time.

There is dearth of interest and enthusiasm regarding implementation of the recommenda-

tion promulgated by Kothari Commission six years ago, though by no way it can be said as revolutionary. The criticism which have been done by the opposition leftists are solely from its negative side. In West Bengal specially during the year 1967-71, schools and colleges were attacked, examination postponed, teaching closed. Into the school-colleges where there are five or seven hundred students, only a few students entering there and hurling bombs and showing pistols, created a deadlock to the education system.

How this could be possible? Is it possible that being the disciple of Mao-Che-Morighela, those five boys became equal to the five hundred students? Why the leaders did not come forward to perform or planned any constructive programme or did not cooperate regarding education? Was there any earnest initiative on the part of the leaders, teachers of our society, organising other boys into groups to resist the destruction of institutions, demolishing statues, burning schools?

Some artists, literati had got the honour writing satire savoury stories depicting Bengali boys as worthless and coward. It was said that these were the handiworks of some antisocial, 'urban guerilla'. People are inactive and coward, they did not assist the government and government armed forces. We heard and read these type of complains. But did not hear that anyone had tried for to investigate the causes behind it. How these antisocial 'revolutionaries' became intractable irresistible hooligans under the umbrella of the Naxalites? No one came forward to explain this.

I am not being engaged in to review the opinion of Meszaros in an objective by comparing America or other countries to judge the crisis of education system of our country. In no way crisis of America is our crisis. But in my opinion in discussing the crisis of education of our country it is necessary to comprehend the alienation problem.

Modern education was first introduced in this city Calcutta at the early nineteenth century. The children of uprooted comprador bourgeois, landlords of permanent settlement, traders etc. got the opportunity to receive the english education and became alienated from their people and their culture and kept themselves aloof. Is it so that as a result of it we got the Bengali Renaissance?

The mental attitude of the 'Young Bengal' of Nineteenth Century is seen in the present 'Hungry-Angry' generation. Only due to time lapse it has changed to that extent. Most of the students of todays school-colleges are much more alienated from their rootless disjointed predecessors. Not only anger but also a deep sense of disrespect has been developed within the mind of the children of those antipeople, morally degenerated, coward, voluptuous intellectuals.

They realize that they have no connection or communication with eighty percent rustic population of their own country who have no english education. Again they are perceiving also that having engaged in the education programme of the rulers, ninety percent of them can not be share-holder of the ruler-exploiter. They do not know what is the remedy of this intolerable situation. So sometimes they want to destroy the educational system and sometimes participating with this system they are making its teaching examination system, a mockery.

After all they cannot perceived this educational machinery, educational system, school-college-university - these formal educational methodology as their own. And they have lost all the ways and means of learning from the society and life long before due to the kindness of their forefathers.

What I do think, the successors of the english educated 'Young Bengal' have alienated not only from the formal education system but also from the total education system of society, from society, from mainstream of life as a whole. They have no sympathy for the educational institutions, they have no reliance on education, they have no interest to attribute value to anything.

There is no scarcity of boys and girls who are ready to sacrifice their lives for any value-laden ideology. The scarcity is of morality, the ideology has crumbled down, mental construct image has been abolished. The number of slum area, refugee, illiteracy, starving population have only increased. As a result of riot, famine and partition only the process of alienation is increasing steadily. Only a fractional part of the total detached incoherent activities throughout the country is reflected in the field of education.

The students, teachers, education-businessmen and controllers of educational system are alienated from each other. There is rivalry and animosity between them and they feel no tender cordial relationship with the essence and concealed message of the country. And those whom we call anti-socials, delinquent, perverts etc. are actually alienated from the whole society. So no question arises for them to apt with the mainstream of the society.

I am not so optimist nor I do believe that they would be able to mix with the mainstream of society, when the Naxalite movement will cease and they get an opportunity or when the formal education would be in order. If we enquire the causes of crisis of education of any country then we must keep in mind regarding the global crisis of capitalism.

Regarding crisis of education there is possibility to get one or two hints from the writings of Gramsci, Meszaros.

Written in July, 1972

(All the quotations used in this article are taken from Istvan Meszaros's book, *Marx's Theory of Alienation.*) P A S

Darwin's Impact on Religion and Philosophy

Debiprasad Chattopadhyaya

To begin with, it needs to be emphasised that Darwin's real concern was neither religion nor philosophy. He was surely not a theologian, as surely again not a philosopher. He represented instead what may be aptly described as "the alluvial mind" – allowing facts to silt down upon it and assume a definitive shape of their own. For years and years, as it is well-known, Darwin just allowed the evidences to accumulate, until the sheer mass of these did indeed point to a conclusion, or, what is perhaps better called, a generalisation. He was, in other words, basically an observer – one of the most patient and prodigious observers that history is aware of – and out of the staggering mass of the observation of facts emerged the theory of biological evolution. Darwin himself presented this theory as forced by facts upon a reluctant observer as it were. And if you can imagine removing the data so meticulously and cautiously arranged by Darwin, what you will be left with as Darwinism is only a skeletal remain making a mockery of science and philosophy.

So that is what Darwinism is. Yet the fact is that over a century theologians broke their lances with Darwinism. And with a few exceptions like T.H. Huxley – who, in any case, does not figure prominently as a professional philosopher – Darwin so terribly vexed practically the entire professional world of philosophy, specially of his own country, that he seems to have only one comparison, namely, that of his slightly junior contemporary, Karl Marx, who also allowed his conclusion to emerge from the accumulation of a vast amount of factual data, and this only to be confronted with the most intense opposition from the theologians and professional philosophers. Indeed, judging from the methodology followed as well as the resistance provoked by the two, there is much in common between Darwin and Marx. So also in the essential direction of the generalisations to which they were led by their data. "The double

notion that species and social systems are alike immutable has yielded, in both its parts, to a remorseless explication of change" (Barrows Dunham, *Heroes & Heretics*, Alfred A. Knopf, New York, 1967, p. 407). "Darwin showed that control over nature could be regarded as the highest form of adaptation. And Marx? Marx showed that man's control over nature needs completion by a similar control over his own society." (Ibid., 413)

But let us for the present leave Marx, whose very name may touch some sensitive spot even in the minds of the contemporary admirers of Darwin.

Darwin died on the 19th April 1882, and was buried in Westminster Abbey. Nothing could be more shocking than this burial to some of the champions of organised religion. Reverend Dr. Lang viewed it as "proof that England is no longer a Christian country" (ibid., 413). Howsoever naive such a judgement may appear to us, the fact remains that the priest had also ground for his anger. "So vast was the range of this (Darwin's) generalization that supernature was expelled from most of the territory left it by the Enlightenment. For if the human race had derived from apes, and all vertebrates from some reptilian monster that crawled out of water to test the primeval slime, why, then a connection between men and God was much more remote than Scripture had led one to believe" (ibid., 407-08). In the delightful reading book *Apes, Angels and Victorians*, William Irvine tells us that even Mrs. Darwin wrote rather sadly of her husband's "putting God farther off" (ibid., 407n).

But not merely the question of God. Christianity, in its doctrinal aspect, had been heavily dependent on the views of Plato and Aristotle. The emancipation of modern science from the spell of these was Darwin's making. After Copernicus and Galileo, Platonism and Aristotelianism received the most severe shock from Darwin. Here is how J.D. Bernal puts the point: "From the moment it was propounded, the theory of evolution became the centre of a scientific, ideological and political battle. Darwin had, almost unwittingly, made as demanding a break in the Platonic doctrine of ideal forms in the animate world as Galileo had in the inanimate. And Darwin did more than assert evolution: he provided a mechanism - natural selection - that destroyed the last justification for the Aristotelian category of final causes. No wonder the theologians whose whole world-picture was finalistic, repudiated it. Even more shocking was the idea that man himself - that unique end to creation - was nothing more than a remarkably successful ape. This seemed not only to shatter the doctrine of religion but also the eternal values of rational philosophy" (*Science in History*, Pelican, Vol.2, pp. 556-558).

We shall soon pass on to see how rational philosophy - specially British philosophy - tried to recover from the blow of Darwinism. We shall see how, mainly for this purpose, the British philosophers - temporarily at any rate - had to disown their own tradition of stubborn empiricism, the foundations of which were magnificently laid by Bacon and Locke, and to import from Germany a quasi-theological view of the spirit or Absolute, in short, the essentials of Hegelian Idealism. Green, Bradley, Bosanquet, the Caird brothers and in fact a whole generation of philosophers dominating the British scene for a fairly long time became the most eloquent preachers of this quasi-theology, until Moore, Russell and others felt fed up with it and prepared the way for reverting to the empirical tradition. By this time, however, the storm over Darwinism had already blown off and in France, Bergson showed the way of transforming Darwin's science into the fascinating poetry of creative evolution, the essential precondition for the acceptance of which was the total rejection of reason in favour of a hypothetical mystical faculty called intuition. But more of the philosophical reaction later. Before passing on to this, we may note a few other points. Darwin's own generalisation, as we have already emphasised, emerged from the accumulation of an enormous amount of observed facts. Darwinism could, therefore, be effectively refuted either by pointing to some real flaw in his observations or by evolving a more convincing counter-generalisation of these facts observed.

Apparently, this was beyond the depth of those who wanted only to ridicule Darwin. In other words, the best that most of his opponents hoped easily to achieve was only a refutation of some caricature of Darwinism.

The easiest caricature of his view was of course to depict it as man descending from the monkey. For all that we know, Darwin himself was reticent to enter into any debate with those who wanted only to refute his theory without either the capacity or patience to understand it. But some of his friends and followers moved forward to his defence. One of them was Thomas Henry Huxley. In 1860, i.e., the year following the publication of *The Origin of Species*, he had a famous debate with Samuel Wilberforce, Bishop of Oxford, who had somehow also the nickname "Soapy Sam". Here is a brief account of the debate: "The British Association for the Advancement of Science (known in our day as the 'British Aas') was meeting at Oxford, and Darwinism, though not on the program, was in the air. Huxley had gone down to protect it, and had, on June twenty-ninth, politely pulverized Sir Richard Owen, a then celebrated anatomist. Next day, the anti-evolution forces brought out Soapy Sam, who had spent the intervening hours getting coached by Owen. The Bishop, however, remained impenetrably ignorant, and Owen irremediably wrong. History was about to teach once more the lesson that hierarchs are loath to learn, this time with ridicule". (Dunham, 409)

"Soapy was at his most genial. Coruscations of wit and misrepresentations of data sped, with equal velocity, from his mouth. The seated clergy chuckled, the listening ladies smiled. He rose into his peroration, and, turning towards Huxley, 'begged to know, was it through his grandfather or his grandmother that he claimed descent from a monkey'. At that moment Huxley muttered to his next neighbor on the platform, 'The Lord hath delivered him into my hand.'

"It was so indeed, although in this regard Soapy had left little for the Lord to do. Huxley, called upon to speak, laid bare in a few sentences the Bishop's ignorance and the true content of Darwinian theory. Then, joining his peroration to the Bishop's, he said he would not be ashamed to have apes in his ancestry but would be ashamed 'to be connected with a man who used great gifts to obscure the truth'." (Dunham, 409-10)

Such caricature of Darwinism as the theory of man descending from the monkey had sometimes also a tragic touch. Notwithstanding the strong resistance against him, the stature of Darwin as a scientist could not be ignored and in 1877 Cambridge University conferred on him an honorary LL.D. "At the ceremony, where Darwin made one of his rare appearances in public, the undergraduates strung a line across the auditorium and dangled from it a monkey image and a large beribboned ring, which symbolized (so Mrs. Darwin thought) the missing link. Afterward, Darwin dined alone with Mrs. Darwin; he had sent Huxley to represent him at the official banquet." (Dunham, 413)

Darwinism, it is sometimes said, effected much more than a wrecking of theology. It led the Victorians to some kind of a naked realization of their own social and economic conditions. Bertrand Russell, in his *Religion and Science*, observes: "Darwin's theory was essentially an extension to the animal and vegetable world of *laissez-faire* economics, and was suggested by Malthus's theory of population. All living things reproduce themselves so fast that the greater part of each generation must die without having reached the age to leave descendants. There is, therefore, both within each species and as between different species, a constant competition, in which the penalty of defeat is death. It follows that, if some members of the species differ from others in any way which gives them an advantage, they are more likely to survive" (72-3). For all that we know, Bertrand Russell would not knowingly repeat Engels, the closest collaborator and ablest commentator of Karl Marx. It is nevertheless very interesting to note that already in his *Dialectics of Nature*, Engels expressed the same view, though perhaps much more sharply. As he put it, "Darwin did not know what a bitter satire he

wrote on mankind and especially on his fellow countrymen when he proved that free competition, the struggle for existence, which the economists praise as the greatest historical achievement, is the normal state of the *animal kingdom*'. Emphasis to the words *animal kingdom* was added by Engels himself. The comment of Burrows Dunham on this is worth quoting here : "No doubt all inferences from animal biology to human sociology are invalid, and 'social Darwinism' (which Darwin himself did not hold) is now as dead as any fossil. But the Victorians, who lived in the heyday of competitive capitalism, with heights of wealth and depths of poverty, with defeated competitors falling daily from height to depth, suddenly saw themselves as beasts in the primordial jungle" (411).

But let us leave sociology and turn to philosophy. Our main question is: What sort of impact did Darwinism have on the philosophical situation of his own country? We do not unfortunately have the scope here to go into much details of this question. For the fact is that a considerable number of philosophers moved forward to refute Darwinism – or at least to twist it into theistic lines – after the publication of *The Origin of Species*. Even a bare list of their names would be a long one. Fortunately, however, we have before us an authentic book by Rudolf Metz with the title *A Hundred Years of British Philosophy*. In this book is shown in much details how the long line of philosophers succeeding Darwin did their best to encounter Darwinism. Here is how Metz sums up the situation. Referring to Darwinism, he observes :

It roused interest in philosophical problems, carried the discussion of them away from purely professional circles, and provoked to party-strife, in particular mobilizing against itself all those who could see in it nothing but an enemy to religion and morals and all hitherto accepted values. That in Britain it rarely lapsed into crude materialism and had in general a less devastating effect than it had in other countries was due not merely to the conservative temper of the British but also and primarily to a strength and depth of religious tradition greater there perhaps than anywhere else. The Church raised a vehement opposition to the new doctrine, and the strife with it lasted for several decades. In the academic circles of philosophy also it received little welcome, was treated as an outsider, though one against which one had to measure oneself. But the strongest bulwark against the flood of Darwinism was erected by the new school of Idealism, which arose at the very time the flood was rising and gradually secured a dominating position in the universities. In its first stage the idealistic movement looked upon the defeat of Darwinism as its distinctive task; indeed, it often seems as though Kant and Hegel were called in for no other reason than to help the cause of religion in its fight against the new heresy.

We have in this a very useful clue to the rather sudden invasion of British philosophy by German Idealism – particularly by the Hegelian Idealism – in which the boundary between religion and philosophy is not always easy to demarcate, notwithstanding the great names like Bradley and others being associated with it. How British philosophy tried eventually to emancipate itself from the spell of this quasi-religious and essentially imported philosophical trend and wanted to revert to its own tradition of sound empiricism is, of course, another story and does not concern us here. By the time this happened, the British philosophical world perhaps felt that the danger of the heresy of Darwinism was no longer there and hence there was no longer any need for the gorgeous fable of the Absolute or Spirit of the Hegelian system.

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Pavlov and the Foundation of Behavior Therapy

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The foundation, achievements, and proliferation of behavior therapy have largely been fueled by the movement's foundation in behavioral principles and theories. Although behavioral accounts of the genesis and treatment of psychopathology differ in the extent to which they emphasize classical or operant conditioning, the mediation of cognitive factors, and the role of biological variables, Pavlov's discovery of conditioning principles was essential to the founding of behavior therapy in the 1950s, and continues to be central to modern behavior therapy. Pavlov's reliance on a physiological model of the nervous system, sensible in the context of an early science of neurology, has had an implication for behavior therapists interested in the context of an early science of neurology, has had an implication for behavior therapists interested in the study of personality types. However, Pavlov's major legacy to behavior therapy was his discovery of "experimental neuroses," shown by his students Erofeeva and Shengerkrestovnikova, to be produced and eliminated through the principles of conditioning and counter-conditioning. This discovery laid the foundation for the first empirically-validated behavior therapy procedure, systematic desensitization, pioneered by Wolpe. The Pavlovian origins of behavior therapy are analyzed in this paper, and the relevance of conditioning principles to modern behavior therapy is demonstrated. It is shown that Pavlovian conditioning represents far more than a systematic basic learning paradigm. It is also an essential theoretical foundation for the theory and practice of behavior therapy.

Keywords : behavior therapy, Pavlovian conditioning, personality types

Pavlov and Foundation of Behavior Therapy

Behavior therapy is a clinical application of the science of psychology that rests on empirically-validated principles and procedures (Plaud, 2001). Since the first behavior therapy alternatives to the psychoanalysis and related therapies were introduced almost fifty years ago (Wolpe, 1958), continued advancements in behavior therapy have largely been fueled by its foundation on conditioning principles and theories (Eifert & Plaud, 1998; Wolpe, 1990). In particular, behavior therapy rests solidly on the experimental methodology pioneered by Pavlov. Clinical applications of Pavlovian conditioning principles began as early as 1912, when Erofeeva, one of Pavlov's students, demonstrated the counter-conditioning effect in the laboratory for the first time (Erofeeva, 1912). Behavior therapy has significantly benefited from the methodologically sophisticated procedure for the conditioning of neurotic or anxiety reactions pioneered by Pavlov and his students. However, the mechanistic and speculative neural theory Pavlov employed to explain his results, a function of his physiological training under Tsion and his continued attempts to understand the problems of inhibition and excitation, has had little relevance in accounting for the genesis of persistent unadaptive habits. While Pavlov's focus on neural factors responsible for conditioning phenomena is less relevant to modern behavior therapy, his related emphasis on personality types has also contributed to the adoption of behavior therapy procedures designed to eliminate anxiety responses.

This chapter analyzes the origins of behavior therapy, a clinical extension of the discoveries of Pavlov and his students, and analyzes the relevance of conditioning principles to modern behavior therapy. It is shown that Pavlovian conditioning represents a systematic basic learning paradigm that was essential for the foundation of behavior therapy in the 1950s, and that Pavlov's theorizing about the neural basis of conditioning, adequate in the context of his times but not for modern science, has relevance for behavior therapists concerned with the study of personality types. The central thesis is that Pavlov and his students' discovery of the conditioning paradigm is his most enduring legacy for modern behavior therapy, as well as one of the foundations for the development and proliferation of behaviorally-based therapeutic procedures.

Behavior Therapy Begins with Pavlov

The discoveries of Pavlov and his students concerning conditioning principles took half a century to be known formally as behavior therapy in the 1950s, however, the foundations of the behavior therapy movement took place in the early part of the twentieth century. In defining the parameters of behavior therapy and formulating the first significant behavioral treatment approach for anxiety, systematic desensitization, Wolpe focused on Pavlov's experimentation in the areas of "experimental neuroses" and counter-conditioning. In 1912 one of Pavlov's students, Erofeeva, published an experiment related to Pavlov's ideas on psychopathology. Erofeeva applied mild electric shock to a dog's skin preceding food delivery, and found that as long as the aversive conditioned stimulus (CS) for food was applied to one part of the dog's body, defensive behaviors were eliminated and replaced by a conditioned salivary response. This effect was termed counter-conditioning, and it was demonstrated that conditioning methods could neutralize the effects of aversive stimulation when paired with an appetitive response. When the shock was later applied to other parts of the dog's body not conditioned in earlier training phases, there was no generalization of the salivary response, and the established conditioned response virtually disappeared, leading the animal to become very excited (Erofeeva, 1912). Given the significance of this finding, that an experimental conditioning procedure could not only *produce* behaviors described as neurotic through the use of conditioning principles, but also *eliminate* such behaviors through the systematic application of counter-conditioning measures, an experimentally-based paradigm for the study of anxiety responses appeared, laying the groundwork for the development of behavior therapy beginning in the 1950s.

Furthermore, an additional conditioning phenomenon emerged using a very different methodology than that employed by Erofeeva. Unlike Erofeeva's counter-conditioning experiment, which applied aversive stimulation directly in the form of mild shock, a study conducted by Shenger-Krestovnikova produced what has come to be known as "experimental neuroses." In this experiment, discrimination training produced excitatory salivary responding to a circular CS, and inhibitory conditioning to an ellipse. The ellipse was then progressively made more circular over successive trials, and when the ratio of the axes of the ellipse reached a value of 9:8, the dog showed great difficulties discriminating between the excitatory and inhibitory stimuli. After 3 weeks had elapsed, the dog was unable to respond correctly to this task or to stimuli that were obvious circles or ellipses. Additionally, it was noted that the dog began to show extreme levels of excitement, howling, and struggling in its apparatus (Shenger-Krestovnikova, 1921). Pavlov reasoned that the dog's "neurotic" performance was due to a "collision" between excitatory and inhibitory processes, producing a cerebral pathology (Wolpe, 1996). Important to note in this context is that while Pavlov, the physiologist, concentrated on a neural hypothesis, behavior therapists who followed focused on the experimental proce-

dures employed by Pavlov and his students in the conditioning and counter-conditioning of neurotic responses in the elaboration of the first principles of behavior therapy (Plaud & Vogelanz, 1991; Wolpe, 1958, 1989).

Pavlov (1927) later argued that "it becomes clear on considering all the pathological cases so far described, that the underlying cause of their development is in every instance the same. Broadly, we can regard these disturbances as due to a conflict between the processes of excitation and inhibition which the cortex finds difficult to resolve" (p.302). This supposed clash between excitation and inhibition was advanced by Pavlov as a viable explanation of the phenomenon which produced "neurotic" behavior. Although not yet named, behavior therapy was finding its definition as a clinical application of Pavlovian conditioning principles, although refinement in Pavlov's methodology would be required. Treatments for "experimental neuroses" derived from Pavlov's neural hypothesis using pharmacological agents, including bromide and caffeine, produced inconsistent or negligible results (Wolpe, 1996). As discussed by Wolpe and Plaud (1997), a central question concerning Pavlov's theoretical legacy to behavior therapy is why one of the most sophisticated experimentalists of modern science adopted a neural (rather than methodological) conceptualization of psychopathology? After all, Pavlov himself (1897) asked, "what is a pathological condition? Is it not the effect produced upon the organism by the *encouraging of an unusual condition, or more correctly said, an unusually intensified ordinary condition?*" (p. 166, italics added). It was Pavlov's medical training in the great tradition of Russian physiology that most probably accounted for why Pavlov resorted to a physiological, rather than an environmental, interpretation of the "experimental neuroses" data uncovered in his laboratory. For example, Pavlov (1930/1955) writes :

In the course of the past thirty years I, together with my numerous colleagues, *have been predominantly engaged in studying the activity of the higher parts of the brain, mainly the cerebral hemispheres*; this study has been carried out on the basis of a strictly objective method, the method of the so-called conditioned reflexes. We have collected very considerable material relating not only to the *above-mentioned parts of the brain, but to a certain degree also to their pathology and therapy*. We are now in a position to produce obvious experimental neuroses in our experimental animals (dogs) and to treat them; and it is not impossible, in our opinion, to produce in the same animals states somewhat analogous to the human psychoses. It was this that induced me to make closer acquaintance with psychiatry, of which almost no traces have remained in my memory since my student days in the medical faculty. (p. 509, italics added)

In syncretism with the Russian reflexology and physiology of his day, Pavlov sought to account for the *behavioral* phenomena he and his students were discovering in terms of neural processes.

Pavlov (1931/1955) was interested in basing "psychical activity on physiological facts, i.e., of uniting and identifying the physiological with the psychological, the subjective with the objective, which, I am convinced, is the most important scientific fact of our time" (p. 409). Even though Pavlov believed that the importance of his studies rested on an understanding of the nervous system, the rich experimental data Pavlov elucidated (i.e., the importance of environmentally-based conditioning procedures in producing and eliminating neurotic behavior patterns) stand out as his most significant contribution to the founding of behavior therapy. Pavlov's belief in excitatory and inhibitory processes irradiating from their initiating points in the cortex, and the physiological consequences of this interplay of excitatory and inhibitory neurochemical energies, has no major consequence for the later development of behavior therapy. Liddell (1966) provides interesting insight into this issue:

Consider the situation in Pavlov's and Freud's day. They were medical contemporaries.

They were raised in the old mechanistic physiology. Both of them could not get inside the human calvarium or the animal calvarium. The brain in those early days operated in secret within its skull. Now this has all changed. Whereas Pavlov was forced into a speculative neurology based on Sherrington's neurological doctrine of integrative action of the nervous system, Freud, who was a skilled neurophysiologist in his day, rejected this approach and invented psychodynamics. Today, both Pavlov's speculative neurology and Freud's purely speculative psychodynamics are passe: they are old-fashioned. Times have changed. We are in an era of objectivity. A real neurology is replacing the speculative. (p. 146)

The Emergence of a Conditioning-Based Behavior Therapy

As detailed by Wolpe and Plaud (1997), Wolpe's experimental studies focused on the significance of these early Pavlovian experiments by underscoring the importance of the conditioning procedures central to Pavlov's early studies of "experimental neuroses." For example, in defining the phenomenon, Wolpe (1952) proposed that "an animal is said to have an experimental neuroses if it displays unadaptive responses that are characterized by anxiety, that are persistent, and that are characterized by anxiety, that are persistent, and that have been produced experimentally by behavioral means (as opposed to direct assault on the nervous system by chemical or physical agencies such as poisonings or extirpations)" (p. 16). Wolpe's experiments in neurosis production were originally conducted with twelve domestic cats. The cats were each housed in a cage and presented with an auditory stimulus followed by a small number of high-voltage, low-amperage shocks from an induction coil. The cats showed a variety of negative responses, including clawing, crouching, trembling, howling, spitting, mydriasis, piloerection, and defecation or urination in some cases. Wolpe found that subsequent confinement to the cage did not lead to extinction, even over several days in the absence of shock and food-deprived, the cats would not eat meat dropped in front of the cages. Wolpe noted the effects of stimulus generalization, namely that the experimental laboratory and experimenter himself elicited the negative response patterns from the cats. All cats also showed some of these neurotic behaviors outside of the experimental cages.

Wolpe extended his analysis to account for the experimental phenomenon he was studying in his own laboratory. Given the nature and persistence of the neurotic responses Wolpe conditioned in his experimental subjects, it became clear to Wolpe that anxiety responses did not respond to the customary parameters of Pavlovian extinction. Wolpe settled upon feeding as a natural response which would be incompatible with anxiety. The neurotic animals were placed inside the experimental cage after a food deprivation schedule of 48 or 72 hours. When food pellets were dropped in front of them, as before, the cats did not commence eating. A hand-held four inch ebony rod was then introduced into the cages. The experimenter's hand, having previously been established as a conditioned food-approach stimulus, manipulated the rod and moved that flat end of the rod containing pellets of meat toward the cats' snouts. Wolpe found that in this condition some of the cats began to consume the food. For those animals who resisted eating, Wolpe utilized the principles of stimulus discrimination to feed the cats in situations which were sufficiently different from the original stimulus where the evocation of anxiety responses was not sufficient to inhibit eating. Through counter-conditioning the stimulus each day while the surroundings became progressively closer to the original laboratory setting, and maintaining the eating response, Wolpe found that the cats would eventually eat in the original cages themselves (but the neurotic responses could be evoked once again in the cages by presenting the auditory stimulus that had preceded the shocks in the original trials). Wolpe also employed Masserman's forced solution (Masserman, 1943) in three cats who did not encounter the hand technique. In this procedure, a movable barrier pushed the cats toward the

open food box containing the appetizing food. After a time, the cats snatched at the food in hurried gulps, and then engaged in more natural eating responses. In all these procedures that introduced and maintained eating responses in the presence of stimuli that originally elicited anxiety responses, the neurotic reactions were eliminated (Wolpe, 1952).

Using an experimentally rigorous approach, especially in the context of clinical investigations of the time, Wolpe had empirically confirmed that the experimental procedures pioneered by Pavlov and his students had produced neurotic responses, and through the implementation of counter conditioning procedures the conditioning methodology could also undo anxiety response. The results of these experiments led Wolpe the experimentalist to hypothesize, in line with the essential parameters of Pavlovian conditioning, that if a response incompatible with anxiety can be made to occur in the presence of anxiety-eliciting stimuli, the bond between the anxiety response and its eliciting stimuli will be weakened or eliminated. Wolpe termed this phenomenon the achievement of therapeutic effects by reciprocal inhibition, and the first behavior therapy procedure known as systematic desensitization was born (Wolpe, 1958). The results of Wolpe's experimental methodology and the use of counter-conditioning procedures for curative effects provided significant evidence in line with the experiments produced in Pavlov's laboratory earlier in the century. Wolpe also looked to the learning theory of Hull in order to understand the role of inhibitory processes in the maintenance of anxiety responses. Considering Hull's theorizing on the significance of reactive and conditioned inhibition in the computation of the effective momentary reaction potential, Wolpe reasoned that the process of elimination of learned behaviors involves the weakening of neural connections previously formed in learning trials. This process, Wolpe hypothesized, could be achieved by simple extinction or reciprocal inhibition, and in both instances drive reduction plays as important a role as in the acquisition of learned behavior. In the case of anxiety, where extinction does not provide a drive reduction mechanism, reciprocal inhibition allows for drive reduction of the excitation that would have led to the given response, and if the response that was dominant is rewarded, its own drive becomes reduced as well (Wolpe, 1952). The environmental situation had also led to a secondary or learned drive state, which caused the organism to engage in avoidance responses, negatively reinforcing the emission of anxiety responses. In his consideration of Hullian behavior theory, then, Wolpe had interlaced several of the major features of the Pavlovian methodology of conditioning with the operant behavioral aspects of the robustness and longevity of anxiety responses.

This combined approach to understanding the acquisition and subsequent maintenance of fear and avoidance behavior is tied to the anxiety-reduction theory of Mowrer's (1939) and Dollard and Miller's (1950) two-process (or two-factor) theory. According to this experimental model, for example, a picture of a spider elicits fear and leads to acquisition and maintenance of an avoidance response, through the mechanisms of negative reinforcement; i.e., an avoidance ritual reduces the intensity of the aversive stimulus and by definition will itself be strengthened as a response set (Levis, 1989). Avoidance behavior develops to reduce fear. According to two-process theory, because of extensive generalization caused by the severity or duration of the CS for fear, avoidance responses so common in the clinical presentation of phobia may remain robust and stable, such that the feared stimulus is almost completely avoided for a great amount of time.

The reliance Wolpe gave to a Pavlovian-based conditioning approach integrating Hullian behavior principles led to the first major non-psychoanalytic and empirically-validated behavior therapy, systematic desensitization (Wolpe, 1958; Wolpe & Plaud, 1997). As the procedure has evolved, the anxious patient is first trained in progressive muscle relaxation exercises, and then gradually exposed via imagery or in vivo to feared stimuli while simultaneously

relaxing (i.e., using the learned techniques of muscle relaxation – the mechanism of reciprocal inhibition or counter conditioning). The patient constructs a fear hierarchy, and commencing with the least feared item. In line with the theoretical rationale presented above, the anxious patient can not be simultaneously fearful and relaxed, therefore stimuli that are incompatible with the fear response will reciprocally inhibit anxiety responses, leading to their diminishment. Multiple studies over the past 35 years have supported its clinical efficacy as a main treatment for a variety of neurotic responses, including specific and social phobias (Plaud & Vavrovsky, 1998).

Pavlov and Personality Types : The Other Legacy for Behavior Therapy

Wolpe's work provided for a clinical extension of the basic procedures pioneered by Pavlov and his students. Most notably, Pavlov's discoveries of the principles of conditioning, especially in collaboration with his students Erofeeva and Shenger-Krestovnikova, laid the essential foundation for the emergence of behavior therapy in the 1950s, which was reflected in the first empirically-validated behavior therapy procedure, systematic desensitization. As the twentieth century gave way to the twenty first, it is clear that the principles of Pavlovian conditioning as well as operant conditioning continue to provide the necessary foundation for ongoing advancement of behavior therapy.

Pavlov's emphasis on a neural basis for conditioning has had impact on some behavior therapists interested in the study of personality types. One of the founders of behavior therapy, Eysenck, is representative of this tradition in behavior therapy. Pavlov (1927) drew significant attention to the study of factors relating to the anxious personality. Pavlov noted that the dogs in his and his students' experiments manifested very different personalities in terms of friendliness, aggressiveness and timidity (Hollandsworth, 1990). It did not take Pavlov long to theorize that these personality differences might have a human counterpart, which led him to formulate a theory of nervous types (Pavlov, 1927). According to Pavlov, individual nervous systems vary in their levels of excitation or inhibition. Additionally, he proposed that combinations of these two factors, which vary along physiological dimensions, determine various personality types. Pavlov argued that the strength of a particular nervous system is a function of balance or homeostasis of inhibitory and excitatory forces. He proposed that individuals whom he described as nervous types or weak systems would over-respond to mild stimuli and become exhausted quickly. Additionally, he proposed that the weak nervous system would respond with a reduction in strength when the individual was exposed to very high levels of stimulation. Pavlov hypothesized that a reduction in strength would further weaken the ability of the nervous system to defend against additional stimulation. He hypothesized that strong types (i.e., individuals with well-balanced nervous systems) would respond to powerful stimuli for prolonged time periods with no adverse results (Hollandsworth, 1990).

Eysenck (1967) was the clinical scientist to take the next logical step in this domain by developing a comprehensive theory of the biological basis of personality. Eysenck incorporated Pavlov's hypothesis concerning the excitatory and inhibitory forces of the nervous system, and hypothesized that individual differences in resting levels of cortical arousal are genetically influenced. He also hypothesized that cortical arousal was associated with different emotions : Moderate levels of arousal were associated with pleasant emotions, while extreme high or low arousal levels were associated with unpleasant or negative emotions. Based upon the equilibrium theory developed by Pavlov, Eysenck proposed that individuals attempt to bring their cortical arousal either up or down in order to achieve a moderate or homeostatic level of arousal. However, because predetermined, genetic individual differences exist in baseline levels of cortical arousal, stable behavioral differences may emerge throughout the life of the

individual. Physiological mechanisms implicated in Eysenck's theory appear to be found in the ascending reticular activating system (Eysenck, 1967).

Hypothesized differences in these levels of cortical arousal led Eysenck to differentiate between individuals who were extroverts (very low levels) and individuals who were introverts (very high levels). While extroverts strive to modulate their levels of arousal by seeking out stimulation, introverts attempt to moderate arousal by avoiding stimulation. Extroversion and introversion comprise one axis of Eysenck's theory of personality. The other axis of personality in Eysenck's theory is composed of the factors of neuroticism and stability. Eysenck proposed that the reactivity level of the autonomic nervous system feeding back to the limbic system is also a genetically determined trait. Individuals with high autonomic reactivity would be classified as neurotic and to have great difficulty in adjusting to novel stimulation. This combination of high baseline autonomic nervous system reactivity with high baseline levels of cortical arousal formed the basis of Eysenck's definition of the anxious personality type (i.e. the neurotic introvert).

With regard to behavior therapy, for better or worse, Pavlov's theory of personality types, especially reflected in the theoretical and scientific extensions of Eysenck, have led to a threshold model of neuroticism and therapy approaches to alleviating suffering. According to this model derived from Pavlovian personality types, genetic factors predispose individuals to react in certain ways to particular environmental stimuli. Far from downplaying the role of the environment, Eysenck (1987a) argues that differences in the acquisition and maintenance of neurotic behavior is an interplay between biological predisposition and environmental factors: "There are no fears that are completely inherited; genetic influences can only prepare the organism for the speedy conditioning or learning of specific fear stimuli and fear responses" (p. 396). Therefore, according to this theory based on Pavlovian personality variability, it also becomes important for behavior therapists to consider personality factors in devising specific therapeutic strategies: "It seems likely that if behavior therapists were to pay more attention to personality and individual differences in the treatment of neurotic disorders, they might be more successful than they are at present" (Eysenck, 1987a, p. 398).

Further, Eysenck questioned some of the traditional Pavlovian conditioning interpretations of one of the more popular studies cited in the behavioral literature to account for the conditioning of neurotic responses: Watson and Rayner's (1920) famous Little Albert B. experiment. In this experiment, Watson and Rayner paired a loud noise with a white rat that a child (Albert B.) previously had been playing with quite happily. After repeated presentations of the white rat with the unconditioned stimulus (UCS) for fear, the white rat became a CS for fear, and Albert B. became very upset at the sight of the white rat. Therefore, the basic Pavlovian paradigm was extended to the conditioning of emotive or neurotic responses. As such, utilizing the basic respondent conditioning paradigm, an indifferent (or neutral) stimulus becomes associated with fear by its being paired with an unconditioned stimulus for fear (such as a loud noise or an actual spider or snake). The neutral stimulus, after associative (or contingent) pairings, comes itself to elicit a fear response (conditioned response, CR) according to the principles of Pavlovian conditioning. After Watson and Rayner's early study, later experiments conducted by one of Watson's proteges, Jones (1924), showed that conditioning was essential to the production and elimination of neurosis.

Eysenck (1987b) has been critical of conceptualizing the conditioning of emotional responses such as fear in terms of Pavlovian type A conditioning (i.e., the basic respondent conditioning paradigm in which an indifferent stimulus becomes associated with a UCS). Rather, according to Eysenck, the conditioning to neurosis is best understood through the mechanisms of Pavlovian type B conditioning, in which the CS is closely related or part of

the UCS that elicits a complete unconditioned response (UCR), and may also intensify the original CS. For example, Campbell, Sanderson, and Laverty (1964, discussed in detail by Forsyth & Eifert, 1998) conditioned an intense fear response in human subjects to neutral tones in a single trial by using succinylcholine as the UCS, a preparation which produces immediate respiratory paralysis. Once injected, subjects could not breathe, and could not control other interoceptive effects produced by the drug resulting uniformly in subjects believing they were suffocating and dying. The principal factor that seems to account for rapid acquisition of conditioned fear responses in these patients is the strength and similarity between the nausea induced properties of the drug (UCS) and the intensity of the initial nausea response (UCR). Again, we see that it is the conditioning procedure itself and its unique stimulus and response properties that leads to the acquisition of fear responses.

In other studies, experimenters have found that many objects or situations did not easily serve as CS for fear, as did Watson's white rat. Seligman (1971) has proposed that humans are prewired or biologically prepared to fear certain stimuli (such as snakes, rats, etc.). Accordingly, some stimuli (such as ducklings, flowers) are extremely difficult to become conditioned stimuli for fear. Several researchers have questioned the validity of this hypothesis in favor of a modified view (refer to Ohman, Ericksson & Olofsson, 1975, for a thorough review). Wolpe (1990) points out that what is most probably responsible for this preparedness effect is the fact that in the normal course of life objects such as flowers and houses become strongly associated with pleasant or neutral responses; therefore, such experiences actually inoculate humans against developing anxiety responses to such stimuli.

Pavlov's Enduring Legacy to Behavior Therapy

Conditioning experiments conducted by Pavlov and his students in the early part of the last century continue to provide for a comprehensive database essential to modern scientific psychology in the present century, and the work of Pavlov has contributed enormously to the founding and advancement of behavior therapy. Eysenck and Wolpe, emphasize different elements of the Pavlovian paradigm, it is clear that the conceptualization and the treatment of psychopathology, especially in the area of anxiety responses, owes much to the systematic research in the Pavlovian conditioning tradition.

Pavlov's model of neural functioning, sensible in the context of the early science of neurology, has had little relevance for the foundation or advancement of behavior therapy. As Wolpe (1996) summarizes, "there is a chilling irony in Pavlov not realizing that experimental neuroses were a phenomenon within his very own territory - a function of conditioning" (p. 104). Nevertheless, Pavlov's related hypotheses concerning the importance of personality types has contributed to research on the interaction between biological and environmental factors in producing and eliminating conditioned responses. Further, Pavlov pioneered a set of experimental procedures, collectively known as conditioning, that allowed those who followed to apply the richness of the methodology to understanding the genesis of certain neurotic behavior patterns, and to design robust, empirically-validated behavior therapy regimens, such as systematic desensitization.

The applied legacy of Pavlov can be summarized by reviewing, as Eysenck (1988) has detailed, some of the major differences between Freudian psychotherapy and behavior therapy. In line with the rigor of Pavlov's experimental method, behavior therapy, according to Eysenck, is based on a consistent theory leading to testable deductions (some of which have been discussed in this paper); it is derived from experimental studies (such as Wolpe's experiments on conditioning and counter-conditioning); behavior therapists consider symptoms as unadaptive conditioned responses (similar to Wolpe's definition of "experimental neuroses"); behavior

therapists believe that symptomatology is determined in part by accidental environmental circumstances (as seen in the basic procedures employed by Pavlov and his students); all treatment of neurotic disorders is concerned with habits existing at present (as exemplified by our discussion of systematic desensitization); "cures" in behavior therapy are achieved by treating the symptom itself, that is, by extinguishing unadaptive CRs and establishing desirable CRs (again, exemplified by systematic desensitization); symptomatic treatment leads to permanent recovery provided autonomic as well as not essential for cures, although they may be useful (especially as a source of social reinforcement).

The debt that modern behavior therapy owes to the prolific and heuristic research paradigm generated by Pavlov, and extended by his students such as Erofeeva and Shenger Krestovnikova, is both significant and enduring. Not only did Pavlov provide much of the intellectual impetus for the founding of the behavior therapy movement, but the conditioning-based procedures he pioneered continue to provide a stimulus for theoretical and procedural refinements for modern behavior therapy. As Eifert and Plaud (1998) conclude in their analysis of the relevance of behavior theory for behavior therapy, while the behavior therapy movement has been a notable achievement in the history of psychological science, and the behaviorisms (such as Pavlovian behaviorism) have made important contributions to the growing success of behavior therapy, the field will ultimately be more successful if it continues to draw upon the Pavlovian paradigm offers the resources required to build conceptual, methodological, and practical bridges that help behavior therapists recognize the utility and potential of these new developments. To make advances in behavior theory relevant for behavior therapy, new theoretical concepts and findings need to be related to existing knowledge and clinical practice. Behavior therapists will undoubtedly continue to draw upon the methodologies pioneered by Pavlov, which will be required scholarship for the further development and advancement of behavior therapy. The work of Pavlov, therefore, far from being a thing of the past, will continue to be one of the major legacies for the future of behavior therapy. As we enter a new century devoted to psychological science (Plaud, 2001), it is time to reexamine the nature of our discipline as a behavioral science, a science whose foundation rests largely on the experimental achievements due to the legacy of Pavlov.

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Nationalism and the Search for Identity : Bengal 1857-1907?

Subhendu Sarkar

The settling down of Rammohun Roy (1774?-1833) in Calcutta (now Kolkata) in 1815 is an important event in the history of the Awakening in Bengal.¹ He played a monumental role in reform movements, both social and religious. Aware of the socio-political conditions in different Asian and European countries, Rammohun had a deep love of liberty which is reflected in his reactions against the Press Ordinance of 1823, July Act of 1827 and his agitation on the eve of the revision of the East India Company's charter in 1833 when he demanded abolition of the Company's trading rights and the removal of heavy export duties. Rammohun's political radicalism, however, had its limits. He remained, for a long time to come, the prototype of the Bengali intelligentsia. The Derozians, the Young Brahmos and the Moderates acted within the bounds set by Rammohun. Sharp criticism of the Company's (and later the Empire's) administrative practices was always combined with a basic loyalty to the British parliament and a belief in the beneficent 'objective role' of the British rule in India. A typical example of such ambivalent attitude of the Bengali intelligentsia is manifested by Ramgopal Ghosh (1815-68), a famous Derozian who was named 'Indian Demosthenes' by the contemporary British press. On the one hand, Ramgopal delivered eloquent lectures protesting against European pretensions in the 'black acts' controversy in 1849 and, on the other, moved a resolution at the first meeting of the Bengal British Indian Society (1843) emphasizing 'pure loyalty' and stating that he "desired nothing more sincerely than the perpetuity of the British sway in this country."²

Drunk with the ideas of bourgeois liberalism and fighting for limited objectives, the Bengali intelligentsia naturally could not sympathize with the Rebellion of 1857. Eager to view the uprising simply as a 'military insurrection', the educated middle-class Bengalis sided with the British exhibiting their utmost fidelity. Sambhuchandra Mukherjee (1839-94), the editor of the Mookerjee's Magazine from 1861 to 1882 and a founder member of the Indian League (1875) wrote a book under the name of 'A Hindu' in 1859 recording evidences showing Indian loyalty to the British.³ The British Indian Association (1851) published resolutions expressing abhorrence of the conduct of the rebels and also its allegiance to the Government. Dakshinaranjan Mukherjee (1812-87), a Derozian who donated the site for the Bethune College for women in Calcutta, tried his best to make the disgruntled Talukdars of Oudh conform to the path of fidelity and constitutional movement after the suppression of the rebellion.⁴ He received the title of 'Raja' for his loyalty.⁵ Harishchandra Mukherjee (1824-61), who took up the cause of the cultivators during the Indigo Rebellion (1859-60), made convincing protestations of his own fidelity. Even an eminent Bengali like Debendranath Tagore (1817-1905) wrote in his autobiography in 1895 that he felt uneasy at the outbreak of the rebellion while residing at Simla in April-May 1857.⁶ The rich Rajas of Bengal in an address to Lord Canning stated, "So entirely have they (the Bengalis) identified their interests with those of their Rulers that the natives of Bengal, men, women and children, have in every part of the scene of the mutinies been exposed to the same rancour and treated with the same cruelty, which the mutineers . . . have displayed towards the British within their reach."⁷ Sibnath Sastri (1847-1919) applauded the pro-British role of the Hindoo Patriot. He, however, did not forget to mention Dalhousie's annexation policy for the participation of the feudal Indian rulers in the rebellion.⁸ That the enlightened

Bengalis associated themselves with the British is further illustrated by Rajnarayan Basu (1826-1899)'s account of the Mutiny days.^{8a} The upsurge of 1857 ultimately meant for the contemporary Bengali intelligentsia a backward movement towards the dark feudal times of the 'tyrannical' Muslim rule. The new moneyed class, emerged out of Cornwallis's Permanent Settlement Act (1793), did not want to lose the privileges gifted by the British. It is, therefore, not surprising that there is no reference to the Rebellion in contemporary Bangla literature. There are, however, some notable exceptions to this rule. Kaliprasanna Sinha (1840-70) in *Hootum Pyanchar Naksha* (first published in c.1861 as *Hootum Pyanchar Kalikatar Naksha*) while presenting a satiric picture of the contemporary life in Calcutta refers to the mutiny days satirizing the loyalty and timidity of the Bengalis (though Kaliprasanna was himself present at the meeting held at Ramgopal Mullik's house where loyalty to the British government was declared). Krishnakamal Bhattacharya (1840-1932) too in his novel *Bichitrabirjya* (1862) lashed out at the Bengalis for their slavish attitude towards their rulers. The novel indirectly charts the consolidation of the British rule in India and calls upon the countrymen to fight for independence.

It has been regarded a 'contradiction' that the Bengali intelligentsia that remained little interested in the Rebellion of 1857 went all-out in support of the cultivators during the Indigo rebellion.⁹ But the stance of the educated Bengalis during the Indigo rebellion was neither anti-imperialistic nor revolutionary. Compulsory cultivation of indigo under the pressure of the planters was condemned by not only many Europeans but also by the Lieutenant-Governor, Sir James Peter Grant. The preface to the play *Nil Darpan* (1860) by Dinabandhu Mitra (1830-73), considered as a landmark in exhibiting Bengali intelligentsia's participation against the white planters, regarded the planters as oppressors but praised Governor General Canning and Lieutenant-Governor Grant. Another occasion when the 'split personality' of the Bengali bhadrolok became evident was during the struggle of the peasants in Pabna (1873) in defence of occupancy rights and against rent-enhancements. A generally pro-peasant weekly Somprakash (edited by Dwarkanath Vidyabhusan) and the author of *Bangadesher Krishak* advised Mir Musharraf Hussain (1867-1937) to withdraw his play, *Zamidar Darpan* (1873).¹⁰

Patriotic themes nevertheless started making way into Bangla literature since the 1850s. The new expression of this patriotism was first indirectly noticeable in the epic narrative poem, *Padmini Upakhyan* (1858) by Rangalal Banerjee (1826-95). Heavily inspired by James Tod (1782-1835)'s *Annals of Rajasthan* (1829/32), the Bengalis began to realize gradually the ignominy of living under the foreign yoke. As a result, Rangalal makes his hero, Bhim Sinha urge the Kshatriyas of Chitore by saying:

Swadhinata-hinatay ke banchite chay re ke banchite chay?

Dasatva srinkhal bolo ke paribe pay re ke paribe pay?

Sympathy for the invaded rulers may be found in Madhusudan Dutt (1824-73)'s *Meghnadavad Kavya* (1861) as well. It reflected the poet's own revolt against feudalism and his fascination for John Milton who portrayed Satan in the light of a defeated Cromwellian hero. But, as Gopal Haldar points out, the epic could not have been so much well received by the contemporary Bengalis had there not been in them a deep-rooted consciousness for socio-political revolt and a close relation with the defeated heroes like Ravana and his son Meghnad.¹¹ *Meghnadavad Kavya* is the first political protest registered by a Bengali poet.¹²

But the favourite theme of the patriotic writers, remained for a long time, the conflict between the Hindus and the Muslims. It was found convenient to use the Muslim rulers as whipping-boys for the British. Such an attitude was common not only to the Hindu revivalists but also to the enlightened section of the Bengalis. The very names of the 'Hindu College' (1817), the *Hindoo Patriot* (1853) and 'Hindu Mela' are enough to suggest the one-sided development of Indian

nationalism. Krishnakamal Bhattacharya's *Bichitrabirjya* too reflected similar approach. It is interesting to note that even Iswarchandra Vidyasagar (1820-91), the most secular personality of the nineteenth-century Bengal, could not think beyond the Hindu population. He opened the doors of Sanskrit College for the non-Brahmin Hindu students but not for the Muslims. Nationalism for the Bengali intelligentsia was purely Hindu nationalism. The Muslims, by and large, remained aloof from coming into contact with bourgeois liberalism that the Hindu middle-class imbibed through English education. The gap between the two communities widened.

The man who championed the cause of Hindu nationalism mostly in Bangla literature is Bankimchandra Chatterjee (1838-94). He is responsible for making Bangla prose a fine literary form. In *Mrinalini* (1869), his third Bangla novel (dedicated to his friend, Dinabandhu Mitra), Bankim deals with the conquest of Bengal by a few Turks under Bakhtiar Khilji and the subsequent sack of Nabadwip. Taking his cue from the victory of Robert Clive, with a handful of men, at the Battle of Plassey (1757) with the help of Mir Jafar, Bankim suggests: had people like Pashupati not betrayed, the Hindus would have successfully resisted the British. It is well to remember that Bankim was closely associated with the Hindu Mela. He, in fact, praised Satyendranath Tagore (1842-1923)'s song 'Mile sab Bharat-santan' that was sung at its second session (1868).¹³ Striving to establish the lost glory of the Hindus, Bankim used words like 'jaban' (a pejorative term for the Muslims) and 'Banga' in the first edition of *Mrinalini*. But with the intention to remain faithful to history, these were later replaced by 'turak' (Turk) and 'Gour', respectively.¹⁴ Bankim's successful treatment of historical events revealing Hindu patriotism against the Muslim rulers inspired other novelists like Pratapchandra Ghosh (*Bangadhipa Parajay*) and Rameshchandra Dutt (*Bangabijeta* (1874), *Madhabikankan* (1897), *Maharashtra Jiban Prabhat* (1878) and *Rajput Jibansandha* (1879)).

The most important novel of Bankim that upholds Hindu patriotism is *Anandamath* (1882) published serially in *Bangadarshan*, a periodical started by him in 1872, between 1880 and 1882. Based on the Sanyasi rebellion (1773) in North Bengal, *Anandamath* tells the story of national failure. It gave the novelist an opportunity to lay stress on the Hindu ideal of nishkama karma (non-attachment) and the need for celibacy for those dedicated to the service of the motherland. The patriotic protagonists' call to attack the 'English and Muslims' in the serialized version were modified to exclude the English in the first edition. As a government employee, Bankim was compelled to state that the British under Warren Hastings were not responsible for the famine that led to the Sanyasi rebellion. Instead, he propounded the theory that the spiritual weakness of the rebels, not the British prowess, caused their defeat. It was also the reason why the invitation to attack remained limited only to the Muslims. The British did not, however, fail to overlook the seditious nature of *Anandamath*. A high official, probably the Lieutenant-Governor himself, asked Bankim to secure a statement from Keshabchandra Sen (1838-84), a person trusted by the British, certifying the novel's unseditious intent.¹⁵ Bankim told Sureshchandra Bachaspati that he wanted to write a novel about the Rani of Jhansi whom he considered the noblest of women in history. But in view of the official reaction to *Anandamath*, he dared not.¹⁶

Anandamath is important for another reason too. It reflects Bankim's (and a section of the Bengali intelligentsia's) growing interest in the Rebellion of 1857. The concluding chapter of the novel refers to a future day when the santans' struggle for the liberation of the motherland was resumed is almost surely a reference to 1857.¹⁷ Besides the usual method of appealing to the good sense and justice of the English people by petitioning, the concept of militant nationalism was also gaining ground. In spite of having some contact with Surendranath Banerjee (1848-1925) and the British Indian Association, Bankim had no faith in the organized politics of his days. According to Tapan Raychaudhuri, "it is difficult to resist the conclusion that he [Bankim] put his faith ultimately in a violent revolution or at least the ability to threaten such a revolution."¹⁸

His comment that the meaning of the song 'Bande Mataram' would be fully understood only by a future generation indicates that he had little faith in constitutional politics. It is no wonder that Aurobindo Ghose (1871-1950), later known as Sri Aurobindo, hailed Bankim as the 'Prophet of Patriotism'¹⁹ and thought his contributions lied in shaping Bangla language and making the Bengalis a nation.²⁰ After 1905 'Bande Mataram' became the slogan of Indian nationalism and *Anandamath* the gospel or the *Swadeshi Gita* of the Extremist leaders and the revolutionaries. The Sedition Committee (1918) under Justice S.A.T. Rowlatt that was formed to inquire about the revolutionary activities of the early twentieth century reports:

A song, however, which was extracted from a popular Bengali novel [Anandamath], has since become famous as "Bande Mataram" ("Hail to thee, O Mother!" or as now generally translated, "Hail Motherland"). The novel had been written many years previously, and the song hitherto had excited no particular emotion, but now gradually it was raised to the rank of a national anthem.²¹

James Campbell Ker who was entrusted with the task of compiling information regarding Indian revolutionary movement in 1917 writes about the impact of *Anandamath*:

Many ideas were afterwards borrowed from this novel by the leaders of the Bengal revolutionary societies, and the special vow taken by the members of the Anusilan Samiti of Dacca was practically the same as that imposed upon the Children [santans]. The greeting "Bande Mataram" became the war-cry of the extremist party in Bengal; it was raised at political meetings to welcome popular leaders and to express approval of particularly exiting passages in their speeches, and also occasionally as a shout of defiance of Europeans in the streets. The *Bande Mataram* song was also very frequently sung at political gatherings.²²

It is, therefore, not surprising that Aurobindo would not only translate (he translated into English, besides the song 'Bande Mataram' both in prose and verse form, the first thirteen chapters of the novel) but also model his *Bhawani Mandir* (1905) on Bankim's *Anandamath*.

The belief in the beneficent British rule was also shaken by the Dramatic Performance Act (1876). Following the staging of two violently anti-British plays *Sarat-Sarojini* (1874) and *Surendra-Binodini* (1875) and two farces *Gajadananda O Jubaraj* [lampooning the well-known lawyer Jagadananda Mukherjee who entertained the Prince of Wales (later Edward VII) in late 1875 at his residence where the ladies welcomed the Prince in traditional Indian manner] and *The Police of Pig and Sheep* (ridiculing S.Hogg, the then Commissioner of Police) by Upendranath Das (B.S. 1255-1302), the director of the Great National Theatre (1875-76), the Government came down heavily on Bangla theatre. The Act was implemented in banning the performances of such plays that exposed colonial misrule and provoked nationalist sentiments of the people. The consequence was that Bangla theatre, for its survival as a commercial enterprise, took the same course as that of Bangla novel: it left out direct references to politics and remained content only with pseudo-historical, mythical and social themes. Hindu-Muslim conflict was also the pet theme of Bangla plays. Jyotirindranath Tagore (1849-1925)'s *Asrumati* (1879) and *Swapnamoyee* (1882), Girishchandra Ghosh (1844-1912)'s *Chhatrapati Sivaji* (1907), Dwijendralal Roy (1863-1913)'s *Pratapsingha* (1905) and *Mebar Patan* (1908) and Khirodeprasad Vidyabinode (1863-1927)'s *Pratapaditya* (1906) and *Padmini* (1906) are illustrative of the fact that Bangla theatre had to present anti-British feelings under the garb of anti-Muslim plays.

By the turn of the century, even the most Moderate of the politicians became aware of the close link between India's poverty and British economic exploitation through drain of wealth, destruction of indigenous manufactures and excessive revenue burdens. The studies made by Dadabhai Naoroji, Bholanath Chandra, Rameshchandra Dutt and Sakham Ganesh Deuskar helped the educated Indians understand, though slowly, the imperialist machinations of the

British. But it needed someone like Aurobindo to translate that understanding into political realization. The extremist faction of the Indian National Congress (1885), under his and Bipinchandra Pal (1858-1932)'s leadership, were soon dissatisfied with the 'mendicant' Moderate methods for attaining colonial self-government and began to propagate the idea of passive resistance and fight for swaraj, complete freedom from foreign control. A new lease of life was breathed into the Indian nationalistic movement. Soon after returning from England and settling down at Baroda, Aurobindo contributed anonymously to a Bombay-based journal, *Induprakash*. The publication of a series of articles entitled "New Lamps for Old" (1893) was the starting point of his career as a publicist. During the *Swadeshi* movement (1905-08), he shifted his base to Calcutta in 1906 and soon became the acknowledged leader of both the Extremists and the revolutionaries. The first Partition of Bengal (1905) generated tremendous patriotic feelings, which certainly helped the Extremist cause. The boycott of British goods became a crucial issue and the site of contention between the Moderates and the Extremists. It ultimately led to the split in the Indian National Congress in the Surat session in 1907. Anti-imperialist struggle was carried on two fronts: agitation against the British policy of 'divide and rule' that led to the Partition of Bengal and revolutionary movement that sought to overthrow the colonial government through armed uprising. Bangla literature too reflected this phenomenon.

Seeds of revolution were sowed through pamphlets, newspapers and periodicals. Besides *Bhawani Mandir*, pamphlets like *Raja Ke?* (1905), *Bartaman Rananiti* (1907) by Abinashchandra Bhattacharya, *Mukti Kon Pathe* (a collection of articles from the *Yugantar* brought out in 1907) and the *Sonar Bangla* leaflets continued an open struggle against the imperialists. The *Yugantar* (1906), the *Bande Mataram* (1906) and Brahmabandhab Upadhyay (1861-1907)'s *Sandhya* (1905) and a host of other newspapers and weeklies like *New India* and *Swaraj* (1907) appealed both to the educated readers (in chaste English) and the masses (in fluent colloquial Bangla). The relation between the writings that issued forth from the secret nationalist presses and the revolutionary activities had been observed by the Sedition Committee, though it turned the anti-imperialist attitude into an issue of racism:

The connection between this leaflet literature and the outrages has over and over again been accepted and dwelt upon by the courts. These leaflets embody a propaganda of bloodthirsty fanaticism directed against the Europeans and all who assist them.²³

The British reacted quickly by arresting people spreading such seditious propaganda and passing a number of repressive Acts like The Newspapers (Incitement to Offences) Act (1908) and Explosives Substances Act (1908). But the spate of revolutionary literature could not be stopped as the vision of independence had already gripped the minds of the young nationalists.

Literature played an important role among the techniques of mass contact during the *Swadeshi* days as well. In fact, according to Sumit Sarkar, the *Swadeshi* movement's greatest claim to immortality lies in the realm of patriotic poetry and song.²⁴ Rabindranath Tagore (1861-1941) had already started making his presence felt. The first Partition of Bengal inspired him not only to put forward the novel plan to observe rakhi-bandhan but also to compose some of his finest patriotic songs. Rabindranath's magnificent hymn to the motherland is intimately associated with the Partition Day (16.10.1905):

Banglar mati banglar jal
Banglar bayu banglar phal
Punya hayuk punya hayuk
Punya hayuk he bhagaban . . .

Rabindranath was, however, not the only one to compose such songs. Rajanikanta Sen (1865-1910), Kaliprasanna Kabyabisharod, Dwijendralal Roy, Satyendranath Dutta (1882-1922),

Mukunda Das (1878-1934) and many others also contributed to the body of patriotic Bangla songs. Swadeshi meetings were opened and closed with these songs. They were sung even in the streets to propagate Swadeshi cause and raise funds. Published versions of the collections of nationalist songs became very popular.²⁵

Though the emphasis on Hindu nationalism continued both in politics (Sivaji Utsav was being organized in Calcutta since 1902) and literature, efforts were made to find out solutions to communal problem and establish a Hindu-Muslim united front. In theatre, the search for Muslim (Indian) heroes was manifested in Girishchandra Ghosh's *Sirajuddoula* (1905) and *Mir Kasim* (1906). Plays dealing with the Partition and Swadeshi movement are, however, relatively few in number. Amarendranath Dutta (1876-1916)'s *Banger Angacched*, *The Partition of Bengal* (1905) and Amritalal Bose (1853-1929)'s *Sabash Bangali* (1905) are two memorable examples.

As the stage performances could reach only the urban audiences, the traditional open-air folk theatre (jatra) was exploited to address the masses in the villages. As far as Swadeshi jatra was concerned, Jogneswar De, better known as Mukunda Das is a name to reckon with. His *Matri Puja* (1906) was enacted in several villages and, as a result, the magistrate of Dacca ordered Mukunda Das to leave the district. The performances of his jatra were banned at Madaripur and Magura; he was even sentenced for a year's rigorous punishment in 1909.²⁶

In the changed circumstances, the Rebellion of 1857 appeared in an altogether new light. The concept of nationalism, for the Bengali intelligentsia, underwent an evolution in fifty years. Like Bankim, Rabindranath too expressed interest in some of the leaders of the Rebellion.²⁷ It came to be regarded as the First War of Indian independence in which, for the first time, an anti-imperialist front was formed.²⁷ The revolutionaries of the early twentieth-century Bengal saw themselves as soldiers engaged in the Second War of Independence. The rebels of 1857 and the early twentieth-century revolutionaries were not without weaknesses and limitations and their efforts too were finally repressed by the colonial power. But they nevertheless were sincere in their intentions, without even caring to lay down their lives for Indian freedom. The first and the second wars of independence are, without any doubt, two unforgettable episodes in our fight against British imperialism.

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Notes and References

1. I have taken the idea from Susobhan Sarkar. See *On the Bengal Renaissance*, Calcutta: Papyrus, 2002 (first published 1979), p.12.
2. Quoted in Sumit Sarkar, *Critique of Colonial India*, Calcutta: Papyrus, 2000 (first published 1985), p. 43.
3. See A Hindu, *The Mutinies and the People or Statements of Native Fidelity Exhibited During the Outbreak of 1857-58 (1859)*, intro. R.K.Chakrabarty, Calcutta: Sanskrit Pustak Bhandar, 1969
4. See R.K.Chakrabarty, intro, *ibid.*, p.xii.
5. See Gopal Haldar, *Bangla Sahityer Ruprekha*, Vol. 2, Kolkata: Aruna Prakashani, p.46.
6. See R.K.Chakrabarty, intro, *ibid.*, p.xiii.
7. See R.K.Chakrabarty, intro, *ibid.*, p.xii.
8. See Sibnath Sastri, *Ramtanu Lahiri O Tatkalin Bangsamaj* (1903), Kolkata: New Age Publishers, 2001 (first published 1955), pp.126-27.
- 8a See Rajnarayan Basu, *Atmacharit* (1909), Kolkata: Chirayata Prakashan, 2006, pp.73-74.
- 9 See Gopal Haldar, "Bengali Literature Before and After 1857 (1856-85)" in *Rebellion 1857*, ed. P.C.Joshi (1957), New Delhi: National Book Trust, 2007, p.280.
- 10 See Sumit Sarkar, op.cit., p.69.
- 11 See Gopal Haldar, *Bangla Sahityer Adhunik Yug*, Kolkata: Jijnasha, 1986, pp. 68-70. For a more or less similar view see Sukumar Sen, *Banglar Sahitya-Itihas*, New Delhi: Sahitya Akademi, 1993 (first published 1965), p. 196.
- 12 See Gopal Haldar, *Bangla Sahityer Adhunik Yug*, p.69.
- 13 See Gopal Haldar, *Bangla Sahityer Adhunik Yug*, p.100.

- 14 See Gopal Haldar, *Bangla Sahityer Adhunik Yug*, p.101.
- 15 See Tapan Raychurdhuri, *Europe Reconsidered: Perceptions of the West in Nineteenth-Century Bengal*, New Delhi: Oxford University Press, 2002 (first published 1988), p. 121.
- 16 See Gopal Haldar, *Bangla Sahityer Adhunik Yug*, p.119; Tapan Raychurdhuri, *ibid.*, p.121.
- 17 See Tapan Raychurdhuri, *ibid.*, p.133.
- 18 Tapan Raychurdhuri, *ibid.*, p. 134.
- 19 See Gopal Haldar, *Bangla Sahityer Adhunik Yug*, p.118.
- 20 See Sri Aurobindo, *Bankim Chandra Chatterjee* (1894), Pondicherry: Sri Aurobindo Ashram, 1965 (first published 1954), pp.30-35.
- 21 *Sedition Committee Report* (1918). New Delhi: New Age Publishers, 1973, p.19.
- 22 James Campbell Ker, *Political Trouble in India 1907-1917 (1917)*. Calcutta: Editions Indian, 1973, p. 30.
- 23 *Sedition Committee*, p.108.
- 24 Sumit Sarkar, *The Swadeshi Movement in Bengal 1903-1908*, New Delhi: People's Publishing House, 1994 (first published 1973), p.289.
- 25 See Sumit Sarkar, *ibid.*, p.290.
- 26 See Sumit Sarkar, *ibid.*, p.303.
- 27 In 1878 Rabindranath wrote, in admiration, about the leaders of the Rebellion. See Gopal Haldar, "Bengali Literature Before and After 1857 (1856-85)", p.290.
- 27 Bhupendranath Dutta, *Banglar Itihas*, Kalikata: Nababharat Publishers, 1383 B.S. (first published 1370 B.S.), p.194. It is here that he writes about the Rebellion of 1857 referring to it as Bengal's first war of independence (p. 191). The idea of the Rebellion of 1857 as the first war of Indian independence was first propounded by V.D.Savarkar (1883-1966). Bhupendranath accepted it. He wrote about the revolutionary activities of the early twentieth-century Bengal (in which he himself participated whole-heartedly) as the second Indian war of independence. See Bharater Dwitiya Swadhinatar Sangram, Kalikata: Nababharat Publishers, 1983. **P A S**

Cognition in the Context of Culture

Vladislav Lektorsky

In literature on the theory of culture, knowledge and culture are sometimes opposed to each other. The reasons given being roughly as follows: Knowledge is an object existing outside consciousness. The objective truth, the acquisition of which is the goal of cognitive activity represents a situation which exists regardless of man. Culture, however, expresses, according to the adherents of this view, a system of values orientating man within the world and characterises human possibilities and attainments, so that man is not only the subject of culture but also a direct object of the culture-creating activity.

Although this course of reasoning may appear convincing, it is actually based on a false premise: the opposition of cognitive reflection of objective reality and human creative activity oriented towards certain value systems. In fact, cognition as the highest form of the reflection of reality is mediated by historically evolving socio-cultural activity, underlying which is objective practice. This proposition, which is fundamental to the Marxist analysis of cognition, entails the need to study the cognitive role of man-made material objectifications of culture, beginning with labour implements and the methods and techniques of activity embodied in them, and ending with systems of everyday and specialised languages, scientific apparatus, etc.. Cognition in general, and scientific cognition in particular, must be regarded as a culture-forming and culture-creating activity, while "orientation towards truth", as impossible and inconceivable outside culture (this orientation does not exist where reflection of external reality is pre-human, that is, pre-cognitive).

Therefore, the development of scientific knowledge, for instance, not only characterises the level at which the human mind in grasping the external world and mastering it, but also, and to no lesser degree, the level of the development of culture. The physical conceptions of Aristotle, Newton and Einstein are not just differing conceptions of the structure of nature.

Each of them assumes varying cultural contexts necessarily including not only the image of nature but also the image of man.

A modern philosophical analysis of cognitive activity claiming to be an allround interpretation of the results of the specialised sciences concerned with knowledge is impossible without a study of culture-imposed and historically variable ideals and norms of cognition, without a study of a wide range of problems related to the socio-cultural determination of scientific knowledge. Such specific procedures in the assimilation of cultural objects as 'conception' and 'interpretation', which at one time appeared to have no direct relation to the analysis of the mechanisms of the development of science, have now proved to be of significance for the study of the interrelations between "scientific pictures of the world", global theories, styles of thinking, etc., succeeding each other in the development of science.

Epistemology, which endeavours to present knowledge as an integral phenomenon in all the diversity of its types and kinds, and at the same time to present it in its unity, historical development and continuity, must inevitably study it in a broad cultural context.

The above does not, however, exhaust the links between epistemology and the problems of culture. The point is that epistemology itself, the formulation of its problems and the methods of their solution, is included in a definite cultural context. Let us consider this in greater detail.

The historical development of epistemology has been accompanied by an increase in the complexity and concreteness of its problems and by the identification of its links not only with everyday knowledge but also with systems of specialised knowledge as represented by science. Questions directly concerned with an analysis of the logical structure of scientific theories and with working out a methodology of scientific research figure prominently in modern studies in epistemology.

The specialisation and differentiation of studies in epistemology may hinder the realisation of the following extremely important circumstance. Epistemology, as long as it remains philosophical research (rather than a "technical" study of the logical structures of everyday language or the language of science), is necessarily included in the integral system of philosophical knowledge and thus exists and develops in a definite cultural context. It is precisely in this context that the profound worldview significance of studies in this area can be appreciated.

The fact that epistemology is part of the cultural context is manifested in two ways. First, however invariant the basic problems of epistemology may be (the problem of truth and error, reliable and probabilistic knowledge, possibilities of cognition, etc.), the modes of formulating and ways of analysing it have a concrete historical character, bearing the imprint of a definite socio-cultural system. Second, epistemology itself, as an inalienable part of philosophy, performs a definite culture-creating function. Let us illustrate these two aspects.

Ancient philosophy shows clearly the links between epistemological constructions and general cultural attitudes.

In the ancient theory of knowledge, problems of distinguishing between truth and opinion was directly connected with the relation between being and non-being. This was an expression of the specifically "ontological" and cosmological orientation of ancient culture as a whole. In their discourse on knowledge, all thinkers of the ancient world assumed that knowledge cannot be other than of a piece with that of which it is knowledge. This assumption was accepted as something quite natural and was even left undiscussed, for the main interest of the discussion lay in elucidating quite natural and was even left undiscussed, for the main interest of the discussion lay in elucidating the process by which the object is transposed into the state of being knowledge. Specifically, the assertion of the unity of knowledge and its object was combined in ancient philosophy with a lack of understanding of the subject's activity in

obtaining knowledge and an inability to see the need for the subject's creative activity as a means of a genuine reconstruction of the object. From the standpoint of ancient philosophy, the genuine object can only be "given" to the knowing person; anything that is a product of his creativity, of his subjective cognitive activity, is merely opinion that is not true and does not accord with reality. This epistemological thesis expresses the specific orientation of ancient culture at "incorporating" man in cosmic order.

In post-mediaeval European philosophy, developing within the framework of a different type of culture and at the same time connected with the emergent natural science with also largely determined the specificity of a new cultural system, problems of epistemology occupied a focal position, being the basis for constructing philosophical systems (and at times coinciding with a system). Special importance was attached to establishing that absolutely reliable knowledge which could serve as the starting point and at the same time as the ultimate foundation for the rest of the body of knowledge, permitting an evaluation of this knowledge in terms of the degree of truth contained in it. A characteristic feature of epistemology at that time was the discussion of the problem of the connection between the subject and the material substance, between "I" and the external world, which followed from the sharp opposition of the subjective and the objective world. This opposition itself, most distinctly formulated precisely in epistemology, had at the same time deep roots in the specificity of the emergent bourgeois culture, in particular in the characteristic opposition of man and nature: the latter was viewed as an object of technical transformation and utilisation.

Attempts were made to sublimate the confrontation of subject and object in classical German philosophy, which expressed a new cultural orientation. In developing Kant's idea of the subject as self-activity, Hegel interpreted the latter as the subject's self-development. Hence the Hegelian thesis of the unity of subject and object, of the coincidence of epistemology and ontology. It is important to note that Hegel clearly understood the determining role of socially-created culture for the formation of individual consciousness, and the fact that the individual implementing an act of cognition derives from the social subject. The social spirit, Hegel believed, was the individual's substance, his "inorganic nature", which each individual faced as the externally given forms of culture.

Marxist-Leninist epistemology, which emerged within the framework of a philosophy expressing the worldview of a new social revolutionary force, the working class, and provided with an adequate socio-cultural basis under socialism, proceeds from the view of knowledge as that included in the historical development of socio-practical activity and formulates all other epistemological problems in the light of this fundamental concept. The dialectico-materialist conception of the cognitive relationship does more than provide answers to the questions, in which non-Marxist epistemology has become entangled, does more than offer a scientific explanation for the real facts of cognition which bourgeois philosophers have come across but which they find it impossible to explain. The Marxist-Leninist conception of knowledge opens up fundamentally new horizons in epistemological studies, setting before epistemology tasks and problems which are impossible in the theory of knowledge traditionally accepted by non-Marxist philosophy (e.g., the problem of the unity of reflective, objective-practical, and communicative activity, connections between various types of objective-practical and cognitive activity, the socio-cultural conditioning of cognition, the dialectico-materialist conception of truth as a process, etc.).

The incorporation of epistemological problems into a cultural context, and changes in the modes of formulation and methods of study of epistemological problems in connection with historical changes in the cultural field, do not mean that these problems are thereby relativised. "Orientation towards truth" remains invariant for philosophy and culture as a whole. The

cultural-historical conditionality of epistemological problems does not exclude a genuine development of the latter, the accumulation of certain facts and solutions, the extension of the range of these problems and, finally, the possibility of the emergence of a theory of knowledge which can be justifiably viewed as scientific.

The formulation of epistemological problems expresses not only the specificity of a definite historical system of culture. Epistemology itself is also a most important mode of cultural creativity, and in this capacity it is determined by the specificity of a given stage in the development of culture and also expresses the historical continuity of development as a whole.

It is by epistemological means that one or other piece of knowledge is substantiated as genuine and, consequently, a certain type of reality corresponding to that knowledge is singled out as true. This function of epistemology has a reverse side as well: it overthrows that which does not accord with true knowledge, presenting it as an illusion, an appearance, a delusive form, etc.. All of this obviously has great world-view significance and, moreover, leads to important practical consequences. Inasmuch as true and untrue knowledge, genuine and illusory reality are differently evaluated, practical behaviour will also be guided, in one way or another, by the first part of oppositions, while that which is interpreted as illusory, will be disregarded or evaluated negatively.

When science emerges as an independent subsystem of culture, the epistemological substantiation of knowledge becomes much more complicated. It is now a question not only of substantiating a more or less unified system of knowledge, but also of bringing into agreement two such different (and with time, increasingly divergent) systems as everyday and scientific knowledge. Inasmuch as science continually changes and develops, philosophy must undertake, first the epistemological analysis of science. And second, the task of bringing science within the system of culture as a whole, including such components as non-specialised pre-scientific knowledge, art, morality, etc..

Substantiation of knowledge in general and of scientific knowledge in particular, thus plays an important culture-creating role. And this reveals a number of important features of epistemology. In epistemology, the attempt to describe that which is genuine, true knowledge, is inseparably connected with the implicit or explicit prescription of a certain ideal of cognitive activity.

The formulation of an epistemological conception is always an attempt to change rather than simply describe the existing practice of cognition, an attempt to reject certain accepted canons of cognitive activity as leading cognition away from the attainment of its goals and at the same time an attempt to net up new standards for this activity. The overall image of cognition and science created by epistemology is itself included in the actual course of cognition and in some respects restructures it. Therefore, any influential epistemological conceptions are not only re-interpretations of the existing cognitive practice but also a critique of some aspects of this practice in the light of some ideal of knowledge and science.

The above does not mean that all epistemological systems (and there have been a great many of them in the history of philosophy) could affect the actual process of cognition. Nor should be thought, that in all cases where such an impact did occur it was beneficial. The history of philosophical and scientific thought has known instances when an epistemological conception set the reference points for the production of special scientific theories of a certain type and at the same time formulated an entirely erroneous conception of the nature of cognition, knowledge, and science as a whole, which resulted in insoluble conflicts in constructing a general epistemological conception, and at the same time essentially limited the possibilities of science itself. Not every image of science as specified by epistemology is acceptable to science itself.

Epistemological reflection can restructure its object, the system of scientific knowledge,

only to the extent to which this restructuring serves to reveal conceptual structures which express more precisely the real objective processes reproduced in scientific theory and at the same time correspond to the objective norms of the development of knowledge itself. Where this condition is not satisfied, the reflection proves to be false. In this case, the image of knowledge reconstructed in epistemology by reflection and the real knowledge itself may to some extent or other disagree. History provides numerous examples of this sort.

For instance, Francis Bacon's epistemological empiricism played a very progressive role at the time of the emergence of experimental science. However, even then it did not accord with the actual practice of natural science, and later it became a manifest obstacle in the way of its development. There are also well-known fundamental defects in Descartes' epistemological conception. However, one cannot ignore the fact that the Cartesian theory of knowledge underpinned his metaphysics, and the latter was the nucleus of a research programme in physics and psychology. Cartesian physics obtained certain historically important results. Considerable factual materials were accumulated in the framework of empirical psychology that proceeded from the Cartesian conception of consciousness. At the same time that psychology had outlived its usefulness by the beginning of the 20th century.

The epistemology of Immanuel Kant did not merely formulate the general strategy for the research in a number of theoretical disciplines (e.g., Kantian epistemology entails the impossibility of rationalist ontology, the special status of psychology as a science that cannot be mathematised, the need in biology to complement causal explanations with teleological ones, etc.).

The Kantian conception (along with Edmund Husserl's phenomenology) was used by L. Brauer and L. Heyting in constructing an intuitionist programme for the substantiation of mathematics. A number of important results were obtained within the framework of mathematical intuitionism, although on the whole this trend failed to solve the task it set for itself. It is well known, however, that Kant's apriorist interpretation of the main principles of classical science came into sharp conflict with the development of knowledge.

Epistemological conceptions can also affect the development of science in other ways. An epistemological system may be completely inadequate as a reflection of scientific knowledge, presenting science as a whole in a false light and being patently untenable on the general philosophical plane. Yet at the same time such a system may be used for the production of certain local concrete scientific theories which retain certain value even after their philosophical interpretation has been rejected. This is possible because some aspects of the cognitive process are usually grasped even in false epistemological structures. However, the special scientific theories produced in such cases have, as a rule, only very narrow significance. At the same time the main paths of development of scientific knowledge are obstructed by false epistemological conceptions, so that the development of theoretical thought in the given area of knowledge follows the wrong direction. Such was the case of the epistemology of operationalism and the physical theories formulated on the basis of operationalist conceptions.

A fruitful epistemology, on the other hand, can have a crucial impact on the development of science. This idea is borne out by the history of Marxist epistemology and its relations with the natural and social sciences. Marx's *Capital*, which contains a scientific theory of political economy, was written on the basis of the conscious application of dialectico-materialist epistemology and methodology of science.

Proceeding from a scientific conception of the nature of theoretical thought and consciously employing the philosophically substantiated method of ascending from the abstract to the concrete, Marx constructed a scientific economic theory. He gave a detailed formulation of the methodological problems arising in the course of theoretical research, providing consistent solutions for them on the basis of general epistemological principles. Marx did not criticise

bourgeois political economy by merely juxtaposing the content of his scientific theory with erroneous interpretations of the same subject-matter: he also always criticised fundamentally erroneous methodological approaches. As Marx showed, the main defect of bourgeois political economy, which predetermined its fundamentally unscientific character, and which is directly linked with its social function, is the false conception its representatives had of the nature of the object cognised and of the methods of scientific knowledge. Therefore a change in methodological, epistemological orientation is a necessary condition of creating a scientific political economy.

Epistemology thus functions as a powerful culture-creating factor, being included in the formation and development of scientific theories, directly affecting the construction of a scientific picture of the world and style of thinking, and offering a philosophical interpretation of scientific results.

Source : Lektorsky, Vladislav, "Cognition in the Context of Culture," in: *Civilisation, Science, Philosophy : Theme of the 17th World Congress of Philosophy (Montreal, August 1983)*, (Moscow: "Social Sciences Today" Editorial Board, USSR Academy of Sciences, 1983), pp. 117-126. (Problems of the Contemporary World; no. 111)

P A S

A Brief Historical Review of Early Weather Work in Kolkata

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The early history of human civilization is the history of man's attempts to know his environment which obviously includes weather and climate of a place. Weather is the state of the atmosphere at a given time at a given place while climate is a synthesis of weather over a specified interval of time, usually several decades. Weather and climate of a region determine its agriculture, water availability, health and sustenance of people, trade and culture of a society. Hence, weather observation, instrumental or non-instrumental, was inevitable from the very beginning of the civilization.

Around 4th century BC Kautilya in his *Arthashastra* outlined a broad-based climatic zonation of Northern and Central India on the basis of annual rainfall and described the amount of optimum rainfall suitable for germination and growth of different types of crops. This pragmatic agrometeorological planning based on the rainfall potential certainly grew up from the age-long climatic knowledge of the weather-conscious Indian farmers of the past. But so far it has not been possible to retrieve such a series of weather data from the historical past.

From the mid-seventeenth century the weather science began to develop in two complementary ways - by the growth of a more complete description of the atmosphere collected by newly-devised basic sensors (barometer, thermometer, hygrometer etc.) and side-by-side by the proper analyses of the collected weather data in terms of existing physical laws applicable to the atmosphere.

The first such network of observation was created by Ferdinand II of Tuscany (Italy) in

1653. His Accademia del Cimento (Academy of Experimentation) was possible because of the invention of the barometer by Evangelista Torricelli in 1643 and hermetically sealed liquid thermometer by Ferdinand Jean Fey around 1641. Both of these instruments were not properly calibrated at that time.

During 1780 the Societas Meteorologica Palatina (Meteorological Society of Mannheim) was established with a network of thirty-nine stations equipped with calibrated instruments. The first step towards scientific weather forecasting was attempted by H.W. Brandes in Leipzig in 1820 by utilising weather-data of these stations in 1783.

As the maritime trade of the European countries began to expand very rapidly by the mid-eighteenth Century along with their colonisation in Asia and Africa, the importance of weather science in various weather-oriented activities like navigation, climate-surveying of the occupied country etc. began to emerge out.

In the occupied India the first attempt towards such scientific activity began at Calcutta (Kolkata) by the European traders in 1774 - by setting up an astronomical observatory in the Fort William, Calcutta near its Treasury Gate. Here observations of Jupiter's satellites and meridian transits of stars were taken from 1774 to 1779 and again from 1781 to 1784 for determining latitudes and longitudes of important coastal places from Calcutta to Madras (Chennai). Accurate knowledge about geographical positions were considered necessary by the East India Company for their administrative and military purposes. Colonel T.D. Pearse of the Bengal Artillery took these astronomical observations along with a few meteorological observations spanning over a period from 6th March 1785 to Feb. 1786 only.

Just before this meteorological diary there was another weather-diary for a short period, kept by Henry Trail, an instrument dealer. This diary covers a period from 1 Feb. 1784 to 31st Dec. 1785. near Chowringhee.

A similar astronomical observatory was set up at Chennai in 1792 with Michael Topping a ship-captain at its helm. He was succeeded by J. Goldingham who kept a series of meteorological observations at Chennai from Sept. 1793 to 1830.

After the Mysore War (1799) when a big chunk of the Peninsular India came under British rule, Major William Lambton, who was in the siege of Sreerangapattanam, felt the urgent necessity of geodetic surveying of this vast occupied area from Madras to Malabar. He thus founded the basis for the Great Trigonometrical Survey of India in 1800, considering the longitude of the Madras observatory, founded earlier, as the prime meridian.

During 1818 George Everest, who had arrived in this country as a Bengal Artillery Cadet in 1806, joined the Survey of India under Lambton. After Lambton's death in 1823 he became the Surveyor General of the Survey of India and founded a meteorological observatory at the Surveyor General's Office at Park Street, Calcutta in the year 1829. The first European Supdt. in this well-equipped observatory was V.N. Rees who conducted the meteorological observations from 1829 to 1852. On his retirement in October 1852, Radhanath Sikdar took the charge of the observatory in addition to his own main responsibility as a Chief Computer in the Survey of India.

This new appointment of Radhanath was greeted with much enthusiasm by the then Calcutta dailies not because that he was the first Indian to occupy this responsible position but because Radhanath had already earned great fame in geodetic surveying work since his inception into the Survey of India in Dec., 1831 under George Everest. At the age of nineteen he accepted this job in the computing section of the Survey of India at the request of Dr. Tytler, Prof. of Mathematics, Hindu College. Dr. Tytler used to take great pride in Radhanath's mathematical proficiency and when Everest was searching for an energetic youth with investigative scientific mind for his surveying work, Dr. Tytler recommended Radhanath's name.

On his additional appointment as the Supdt. of the Meteorological Observatory, "Friend of

* (Retd.) Director, India Meteorological Department

India", a Calcutta English daily wrote on 11 Nov. 1852 - "His Services to the Great Trigonometrical Survey were prominently mentioned by Captain Thuillier and we have little doubt that he will ably fulfil his duties as the head of the office of which he has long been the soul."

Certainly, he was the "soul" of the computing section of the Survey of India as it is clearly reflected from a letter dated 25.4.1838 written by George Everest to the Military Dept., Govt. of India - "Computers comparable to Radhanath cannot be hired in England at a price less than a guinea per diem and if we were to search for persons who can understand and trace to their origin the various formulas used with an ability equal to that of Radhanath, the search would only end in the conclusion that persons so qualified would not undertake the business on any terms that could probably be offered to them."

The above excerpt of Everest's letter shows his deep appreciation of Radhanath's mathematical ability as well as a bit of commercialism also. Radhanath was employed at a very low pay of Rs. 30 per month and after thirty years of service it became Rs. 400 per month - much lower than those drawn by other European Superintendents. This disparity was maintained at that time until the scientist Jagadis Chandra Bose protested against it.

The person Col. H. Thuillier, mentioned in the newspaper was the then Deputy Surveyor General at Calcutta. Radhanath wrote a book on geodetic surveying which was published under the caption "Manual of Surveying for India" in 1851 by the Govt. of India, bearing the name of Thuillier and Colonel Smyth - both of them were superior to Radhanath in the Survey Dept. Radhanath's name appeared not as a co-author of the book but was mentioned only in the acknowledgement as "the distinguished head of the computing department" of the G.T.I. who contributed "Chapters 15, 17 to 21. inclusive, and 26 of Part-III and the whole of Part-V" of the book. But after Radhanath expired in 1870, the third edition of the book came out in 1875 without this acknowledgement. The omission in the preface of "Proper and respectful acknowledgement" to the 'best of the original authors of the book' was strongly criticised as "cowardly sin" and "robbery of the dead" by the then Deputy Surveyor General of the Survey of India Col. John Macdonald. His article under the caption "The Survey Department in India" came out in the "Friend of India" on 17 and 24 June 1876. In the editorial of the same paper of 26 August 1876 it was written : "had Radhanath Sikdar been alive we would have left him to fight his own battle." The serving officer Macdonald was suspended by H.L. Thuillier (the then Surveyor-General) and reduced in seniority by Govt's order in October 1876.

Unfortunately and coincidentally Radhanath's pioneering work in the field of meteorology has also been forgotten and thrown into complete oblivion after his death.

Radhanath revived the Surveyor's General Observatory in 1852 from its moribund state by introducing systematic hourly observations of all the principal weather elements and presented these precisely processed data in monthly abstracts showing daily and monthly means, ranges and extremes for future climatological work. The detailed hygrometrical computations were also introduced during his tenure.

Accurate and methodically processed weather data are the building material of the meteorological science and an essential role of any weather-service is to provide adequate and accurate weather statistics. Radhanath did this very job as soon as he took over the charge of the Surveyor-General's observatory. Before him there was no well-laid methodology for taking barometric observations and so at the very beginning he prepared a table for reducing barometric observations to 32°F by devising his own formula. This table with its method of formulation came out in the *Journal of Asiatic Society* in its 1852 issue. The article shows Radhanath's keen interest and perception in the meteorological work also.

H.F. Blanford, the prime mover of the India Meteorological Department used these long series of data (collected during Radhanath's tenure) in the preparation of his report on the

Calcutta Cyclone of the 5th October, 1864. The report was internationally circulated and was acclaimed in other countries. But it does not contain Radhanath's name.

Blanford used these ten years' data in his climatological work "On the Winds of Calcutta" which was published in the *Meteorological Memoir*, Vol I. But Radhanath's name was not mentioned.

The continuous hourly weather data from 1853 to 1877 which was published in the *Asiatic Society Journal* under the initiation of Radhanath was considered as the "the finest piece of our knowledge of Calcutta" by H.F. Blanford, the first Director General of the India Meteorological Dept, in his first Administration Report in 1875-76 - but Radhanath's name was forgotten.

V.V. Sohoni who was the Director General of the India Meteorological Dept. during 1950 to 1953 wrote an article entitled "Meteorological Normals of Calcutta" (vide : *Journal of the Asiatic Society* 1929). At the outset of the article he mentioned that - "In Calcutta, at the Survey office in Park St. systematic observations commenced in 1853." But he also forgot to mention Radhanath's name who initiated these systematic observations and paved the way to determine climate fluctuations of this region.

It is also wrongly stated in "Hundred Years' of Weather Service : 1875 - 1975" published by the India Meteorological Dept. in 1976 that hourly observations were started by Henry Piddington in 1856 (p. 13). The credit of hourly observation goes to Radhanath Sikdar and not to Piddington.

Radhanath became a member of the Asiatic Society in 1853 and was inducted in the Meteorology and Physical Science Committee in 1858 by Lt. Col. R. Strachey - who became the meteorological advisor to the Govt. of India later and gave his full support in developing India Meteorological Dept. One of the member of the Committee was H. Piddington who was a master-sailor and did commendable work on cyclone in Bay of Bengal. He did not deal with any such meteorological observations and observatory.

In 1857 H.F. Blanford became a member of the Asiatic Society as a geologist. When Blanford was in the Presidency College and became interested in meteorological science Radhanath was at the helm of the Govt. observatory. I wonder they must be knowing each other. Radhanath retired from the Service in 1862.

However, the fact is that after thirty years' of significant contribution in the Survey of India no honest and proper recognition of Radhanath's scientific work was given by the Survey of India and it is also very unfortunate that IMD has enlisted so many names in its Hundred Years Account but Radhanath's name, who did the pioneering work in this field passed into complete oblivion. Is this because the white forerunners of the Dept. tried to forget him for reasons better known to them?

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Radhanath Sikdar : Beef Steaks and Trigonometry

Ashish Lahiri

Ask any educated Bengali and you will learn that Radhanath Sikdar (1813-1870) was the man who first showed that the peak known as Mount Everest was the tallest in the world. And she or he would be absolutely right. But that is about all we tend to know about the man who was arguably the first Bengali, if not the first Indian, man of modern science. In this short article we shall try to have a brief overview of the life and activities of this remarkable man.

The Bengali word *Sikdar* literally means 'one who holds the stick'. True enough, the Sikdars of Jorasanko, Kolkata had long wielded their sticks as law keepers under the Nawabs of Bengal. As hereditary 'Police Commissioners', they traditionally headed a hierarchy of policemen. This was how this well-to-do Brahmin family acquired the title Sikdar. They were genetically endowed with a robust physique. People held them in awe. Legend has it that in the very early days of Company rule, even the British soldiers had to bare their heads while passing in front of their house at Sikdar Para, Jorasanko. As is to be expected, they made profuse misuse of this power, so that eventually the East India Company was obliged to relieve them of the responsibility of law keeping. Gradually they became impoverished, and when Radhanath was born in 1813, his humble father Tituram set his goal at no higher than making his son a petty clerk at a merchant house.

After a brief spell at 'Phiringi' Kamal Bose's school at Jorasanko, Radhanath along with his brother Srinath was sent to Hindu College in 1824. He was 11 years old at the time. His father's idea was to let the two boys have just a smattering of English before they would be put to serve as a junior clerk. And that is where history played its prank. Radhanath proved to be so exceptionally brilliant that his father was loth to take the boy away from the classes. He was awarded a scholarship of Rs.16 in the First Class. Radhanath studied at the Hindu College for more than seven years and eventually was to become one of the staunchest followers of Derozio. This is how he paid homage to his great teacher:

Mr. Derozio was [a] very kind and indulgent teacher; and though often vain of his attainments, was nevertheless a learned man. He first taught us (the whole class) the object and the end of knowledge, an information which cannot be too highly valued; and implanted that ambition and literary flame in my bosom which I am glad to affirm directs and actuates all my efforts even to this day. He first directed my metaphysical studies and gave those moral and liberal principles which I hope will ever influence my actions. Cut off in the prime of prime, amidst innumerable projects for the reformation of India, his untimely death must ever be a matter of regret; and it may be safely affirmed also that he has been the cause of that spirit of enquiry after truth, and that contempt of vice, which are so fashionable among the enlightened portion of the community, and which cannot but be beneficial to India. (1832)¹

No wonder he had refused to marry a girl of eight, despite the earnest pleadings of his mother, to whom he was totally devoted. As a matter of fact, he remained a lifelong celibate.

While at Hindu College, he had grown into a very strong youth, thanks to the genes of

his forefathers and foremothers. Raj Narayan Basu recounts how every now and then he would be embroiled in boxing bouts with tyrant Englishmen, mostly to their disadvantage. He believed that a people's diet accounted for its physical and moral strength and maintained that 'India would never become a great nation till the inhabitants made use of diet consisting extensively of beef, in which he largely indulged' (*Calcutta Review*, April 1881).²

But he certainly did not live by beef alone. He had learnt Greek and Latin, not to speak of his proficiency in English and philosophy. He also learnt Sanskrit and had started translating European science classics into Sanskrit, an undertaking that remained unfulfilled. But Mathematics was indeed his forte. He 'was the best mathematician in the group of Derozio's friends ...'. He himself has provided us with a list of the mathematical treatises he had studied by the time he was 19:

1828 Euclid Bk. I, propos. 29

1829 Euclid Bks I to IV and Algebra up to Quadratic Equations

1830 Euclid Bk. IV, Fluxions [i.e., calculus], Maxima and Minima, Tangenta, Rectifications, Quadrations

1831 Whole of Euclid's *Elements*, Spherical Trigonometry, Fluxions, Taylor's and Maclaurin's Theorems, Kepler's problems

1832 Windhouse's Analytical Trigonometry, Jephson's Fluxions, Lagrange's Theorem, Windhouse's Astronomy³

The full import of this will be apparent the moment we consider that those were the days before Vidyasagar, Akshay Datta and Rajendralal Mitra, when a systematic infrastructure for teaching science was simply non-existent. Books on science either were not available, or, if available fortuitously, were in the possession of this or that teacher who might or might not be kind-hearted enough to lend them to native greenhorns. Possibly this explains the fact that while Derozio's learned disciples were remarkable in many ways, virtually none of them took to studying or doing science. Radhanath was perhaps the only one among them to seriously take up science as a discipline and as a profession. In this he was rather atypical. He was fortunate in having Dr. John Tytler, a great mathematics teacher, as his fond tutor. The *Hindoo Patriot* noted in Sikdar's obituary that 'Dr. Tytler, Professor of Mathematics, thought highly of him, and he and Rajnarain Bysack were the first Hindu who received instruction from him in Newton's Principia.' Indeed, 'he was the first Bengali youth to have learnt the mathematics invented by Newton and Laplace and accomplished great things in science and astronomy.' (May 23, 1870).⁴

The Great Trigonometrical Survey of India

In the meantime, momentous things have been happening in the realm of geodetic surveying. In 1799, Col. William Lambton had proposed a plan of a 'Mathematical and Geographical Survey' right across the peninsula. Government approval was given in February 1800. In September 1800, Lambton did trial survey of a base line near Bangalore. The actual work of trigonometrical survey was commenced on 10th April 1802 by measurement of a base line near Madras. In 1818, George Everest joined Col. Lambton. After the sudden death of Col. Lambton on 20th January 1823, he assumed control of the Great Trigonometrical Survey. Initially chief assistant surveyor, Everest rose to become superintendent of the GTS and Surveyor-General of India, and became a Fellow of the Royal Society in 1827.

Everest selected 35 stations between Sironj and Dehradun for measurement. Base line of northernmost base of the Great Arc was measured in an area around Dehradun in 1834-35. An observatory was formed at Kaliana for making astronomical observations. Using innovative methods against great odds, the connection of the bases at Sironj and Dehradun was made.

Assisted by Andrew Waugh, Everest, by February 1837 connected the Dehradun base with that of Sironj, 13 years after the first measurement was made at Sironj. Everest retired in 1842.

The immediate task of the Great Trigonometrical Survey was the accurate determination of the position of important points over the country, which form the basis for geographical and other surveys and maps. Although GTS was supported as a great *scientific* endeavour, the Government of India had other pragmatic interests. The administration needed geographic information and small-scale maps for ruling and exploiting the country. For this purpose, in the 1820s Atlas of India project was established. The project aimed at compilation of maps at medium scale of four miles, which would bring together all the topographic surveys in order to create a definite cartographic representation of India. Map making was integral to British imperialism in India.⁵

Enter Sikdar

Let us now pick up the broken thread of our story in light of the above facts. We have seen that Everest had taken control of GTS in 1823 and had selected 35 stations between Sironj and Dehradun for measurement. In order to carry out this formidable task, in 1830 Everest was on the look out for talented natives proficient in Trigonometry, not an easy job in those days for obvious reasons. It was then that Dr. Tytler recommended Radhanath as eminently suited for the purpose. He used to take great pride in his student's mathematical proficiency. At the bidding of his mentor, as also to help his cash-strapped father, the brilliant 19 year old final year college student left his studies to join the Surveyor General's office in Calcutta at Rs. 30 per month. But as his "number crunching genius" became evident, he was soon sent to the Dehradun office to work as a "Computer", the first Indian "of rank" to be so inducted. He wrote in his diary :

On being employed as a Computer at the office of the Great Trigonometrical Survey of India, I started studying many other books on Mathematics [i.e., other than the ones mentioned above]. Now [7 October, 1832] I shall leave Calcutta on 15 October to work as a Surveyor at Serunge Base Line.⁶

We have seen that Seranj (Serunge) and Dehradun were among the bases chosen by Everest.

Radhanath proved to be an invaluable asset to the Survey of India. His investigative mind quickly grasped the astronomical methods required for geodetic surveying. He also devised his own working formulae from first principles, wherever required, and applied these in practice with admirable mathematical precision. His proficiency in geodetic surveying was so impressive that Everest, by all accounts a quintessential Victorian "sahib", was moved to comment in 1838 that "... there are few in India whether European or native that can at all compete with him. Even in Europe these mathematical attainments would rank very high". Everest had remarked in 1840 that "computers comparable to Radhanath cannot be hired in England at a price less than a guinea per diem..."⁷ He also observed that Sikdar was a "hardy, energetic young man, ready to undergo any fatigue, and acquire a practical knowledge of all parts of his profession. ... There are a few of my instruments that he cannot manage; and none of my computations of which he is not thoroughly master. He can not only apply formulae but investigate them."⁸ As a later chronicler had remarked, "Accolades so fulsome would rarely spill spontaneously from Everest's pen" to whom "giving credit to subordinates would not come naturally". British historian John Keay, author of two books on the subject, has observed that 'Mathematical skills were essential for Sickdhar's (Sikdar's) work and he was acknowledged by George Everest as a mathematician of rare genius'. It may be remembered that there was no institutional arrangement to teach advanced science and higher mathematics till the end of the 19th century in British India. Radhanath's mastery of higher mathematics and science

was achieved by his own "unremitting self-cultivation", as Andrew Waugh, Everest's successor as Surveyor General, put it. It is also a measure, indeed, of the strong foundation of basics he inculcated during his student days.

Scaling the Summit

Radhanath was elevated as Chief Computer in Survey of India in 1851, i.e., after a service of nearly twenty years, and posted back to Calcutta. The responsibility of this office was to derive the ground reality, from the raw geodetic survey data collected during fieldwork, by using complex equations. It was Waugh who had asked Radhanath to devise suitable formulae for computing geographical positions and altitudes of snow peaks observed from "distances of over 100 miles". His access to the peak was, however, limited, due to unclear border divides between Nepal and India around Peak XV. So, using a theodolite from 150 miles away, Sikdar was able to estimate Peak XV's height at exactly 29,000 feet. The height was publicised at 29,002 feet, so as to avoid implication of having only a rounded estimate. In 1855, a second Indian survey team did a second round of measurements, still using a theodolite, from closer to the base of the mountain and determined the mountain to be 29, 029 feet. Radhanath's computations provided the first clear proof that Peak XV, as it was known then, was higher than any other in the world hitherto measured. His conclusion was based on computations made from observations from six different stations.

John Keay writes, 'His greatest contribution to the computation was in working out and applying the allowance to be made for a phenomenon called refraction – the bending of straight lines by the density of the Earth's atmosphere.' Peak XV had been first identified as 'a possible contender for the world's highest peak in 1847 when surveyors glimpsed it from near Darjeeling. Different survey parties recorded several observations over the next three years. But the announcement that it was the highest – thanks to Sickdhar's [Sikdar's] efforts – was delayed until 1856 as calculations had to be checked repeatedly.'⁹ Keay seems eager to make amends here. For, in his book *The Great Arc*, 'Radhanath finds passing mention only thrice, although with the sobriquet – "mathematical genius" – every time.'¹⁰ In this context, it is interesting to note that Radhanath's mathematical expertise won him in 1864 a Corresponding Membership of the Society of Natural History, Bavaria – a rare honour in those days to be awarded to a foreigner by the highly conservative German Philosophical Society.¹¹ Not that Col. Waugh was not appreciative of Radhanath's ability. Talking of 'the loyal, zealous and energetic body of men ... forming the civil establishment of the Survey Department' he said: 'Among them may be mentioned, as most conspicuous for ability Babu Radhanath Sikdar, a native of Brahminical extraction whose mathematical acquirements are of high order.' (Report of the G. T. S. of India submitted to the House of Commons, 15th April 1851).¹² Ironically, this same Waugh, true to the imperial tradition of ignoring the scientific contribution of its subjects, proposed naming the peak Mount Everest after his illustrious predecessor.

The Naming Game

The naming story is also interesting. For fifteen years after the discovery of Peak XV's height, it remained merely a number, perhaps as a caution against being overzealous, in case a taller summit might be discovered. However, in 1865, Andrew Waugh decided that the time had come for this magnificent peak to have an official name. British custom, strictly enforced and followed by George Everest, was to name a mountain after a local name. However, Waugh said, in view of the on-going political border issues with Nepal and Tibet, it was impossible to get close enough to it to meet any of the locals to discover its 'original' name. He wrote: 'I was taught by my respected chief and predecessor, Colonel Sir George Everest to assign to every geographical

object its true local or native appellation. But here is a mountain, most probably the highest in the world, without any local name that we can discover, whose native appellation, if it has any, will not very likely be ascertained before we are allowed to penetrate into Nepal. In the meantime the privilege as well as the duty devolves on me to assign ... a name whereby it may be known among citizens and geographers and become a household word among civilized nations.' On the basis of this story, of doubtful merit, Waugh decided to name the mountain after his personal mentor, George Everest. The Asiatic Society did not agree with Waugh's suggested name, arguing that the search for a local name should continue. However, eventually he persuaded the Royal Geographical Society to name the peak 'Mount Everest'.

Other Scientific Achievements

It was Radhanath who laid the foundation for accurate and systematic meteorological observations, as well as their methodical processing, in the country. He was truly the pioneer Indian Meteorologist. Sporadic meteorological observations had started in India from 1785 as an adjunct to surveying. To give due importance of atmospheric conditions on surveying data, a full-fledged meteorological observatory was set up in the premises of the office of the Surveyor General at Calcutta under a superintendent in 1829. In November 1852, while still serving as Chief Computer at the Survey of India, Radhanath was given additional charge as superintendent of this observatory. On assuming charge, Radhanath lost no time in correcting everything. He immediately started reducing the raw barometer observations to a standard temperature. It may be mentioned here that temperature reducing has to be applied to barometer readings to assess the real changes in atmospheric pressure. Temperature affects barometer readings on two counts: the thermal expansion of the brass scale attached to the barometer and the dilation of the mercury column itself in the tube. Formulae for reducing barometric observations to 32° Fahrenheit, already in use in Europe, were not available to Radhanath. He had to build up his own reduction table from the first principles of physics.¹³ A note describing Sikdar's formula was communicated to the Journal of the Asiatic Society of Bengal by the Deputy Surveyor General, Col. H. L. Thuillier and it was published by the Journal in 1852 (Vol. 21, No. 4, pp. 329-332).¹⁴

He introduced the system of hourly observations right from December 1852. From 1853, he started regular compiling, and publishing, of abstracts of hourly, daily and monthly means of all the observed, as also the derived elements along with their extremes and monthly ranges. This series was the first ever scientifically recorded set of meteorological data and basis of the first ever work on the climatology of an Indian city, in this case Calcutta, then capital of British India. The prime mover of the India Meteorological Department, H. F. Blanford, wrote in his first Administration Report, that the 24 years' data from 1853 to 1877 of the Surveyor General's Observatory "are the finest piece of our knowledge of the climate of Calcutta."¹⁵

Attempts to Downplay

A complete grasp of the subject along with his unparalleled innovative ability had made Radhanath the most valuable asset of the Survey of India till he retired in 1862. Many publications, like Surveying Manuals, Computational Tables, etc. authored by him remained indispensable for Indian surveys throughout the 19th century. But after his retirement and subsequent death, there began conscious attempts to downplay, even deny, this Indian his contributions. So blatant were these machinations that even some British officers of the Survey of India openly voiced their revulsion, braving punishment, but to no effect. One example. Colonel Macdonald wrote, 'We feel quite certain that we shall command the sympathy of every highly educated native in India for our determination to rescue the name of one

of the greatest Mathematicians which has adorned the honourable list of those who measured and computed the great Indian arc from neglect by those who owe so much to his memory. (*Friend of India*, 24 June 1876). Lord Lytton immediately suspended Col. Macdonald from service. The relevant notice reads: 'The decision of the Government of India is that Lieutenant Colonel Macdonald shall be suspended from departmental duty on the receipt of these orders for a period of 3 months, on the expiration of which he will be placed in the 2nd grade of Deputy Superintendents of Revenue Survey immediately below Lieutenant Colonel Oakes on a salary of Rs.1327-14 per mensem. During the period of his suspension from duty Lieutenant Colonel will draw the pay of his rank as an officer of the staff corps. It is further the desire of the Governor-General in Council that Lieutenant Colonel Macdonald shall not be again employed at head-quarters without the special sanction of government.'¹⁶

An Upright Defender of Downtrodden Masses

In his report to the House of Commons in 1951, quoted above, Andrew Waugh had certainly exaggerated the bit about Sikdar's 'loyalty'. Facts testify to the exact opposite. Sivanath Shastri in his *Ramatanu Lahiri O Tatkalin Bangasamaj* writes:

That he was not a man to be easily snubbed is evident from the following incident, which happened when he was a surveyor at Dehradun. The District Magistrate, Mr. Vansittart, on one occasion, while on tour, forced some of Mr. Sikdar's men to work as his coolies. Mr. Sikdar, greatly offended at this, rushed out of his bungalow and brought the coolies back, with the Magistrate's things on their shoulders, protesting against the illegal proceedings of the latter. Mr. Vansittart was in a fury, and he prosecuted Mr. Sikdar for having obstructed a public servant in the discharge of his duties. The case came up before another magistrate, and fearful of the consequences, many of Mr. Sikdar's friends advised him to apologise; but he did not yield at all. He remained firm to the end; and, though he was fined 200 rupees for the offence, his resistance gave rise to a strong agitation, the result of which has been that the practice of forcing men to labour has died out among Government officials.¹⁷

This synoptic account fails to do justice to the enormity of the matter — both in terms of Radhanath's spirited defiance and of the anti-native bias of the British establishment, and what is more, Everest's possible complicity in the affair. A full report of the case was published in three issues of *The Bengal Spectator*, May 17, September 1 and September 16, 1843. The *Bengal Spectator* was the organ of the *Deshahitaishunee Subha*, formed in October 1841 by members of the Derozian Society for the Acquisition of General Knowledge (SAGK). 'A year later in April 1842 a bi-lingual monthly (Bengali and English) was brought out as their organ — *The Bengal Spectator*. Subsequently it became a fortnightly from September 1842 and a weekly from February-March, 1843. The journal ceased to exist after November 20, 1843.'¹⁸

The Bengal Spectator of May 17, 1843 reports: 'Six Paharis' in the employ of Sikdar and his fellow officers Clarkson and Keelan 'were on the 5th May forcibly and unjustly worked by a police Chaprasi. They were also ruthlessly caned ... for their reluctance to comply with his request. ... Baboo Radhanath caused them to deposit the contents of their heads in the house, in order to discover the author of this violence, who he thought must appear and claim his property.' The following morning two gentlemen came to Radhanath's chamber.

The Bengal Spectator of September 1, 1843 records Radhanath's own statement in this regard:

One of those gentlemen called out, "Who has detained my property?" I answered, "It has been detained by my orders." He continued, "What business had you to detain my property?" I replied, "Just as much as you had in pressing and maltreating my people

to convey your baggage; and I intend to take legal measures." He joined, "I certainly gave orders to my people to procure coolies, but not press private servants; and I shall discharge my whole set of Barkandazes." ... I then observed, "there is no regulation authorising the forcible seizure and employment of any body." Upon which the gentleman IN QUESTION in loud and authoritative tone said, "Do you know who I am?" At this moment the other gentleman who had hitherto remained silent sprang forward and questioned me: "Who the devil are you?" I answered, "A man and so are you." The first speaker then checking his companion resumed, "I am Mr. Vansitart, the magistrate of the place, and request you to deliver up my property." ... I observed to Mr. Vansitart, "As you are the magistrate as well as the owner of the property I shall refer the case to Saharanpur." But said Mr. Vansitart, "Will you deliver my property or not?" "Yes", said I, "upon your furnishing me with your parwana." "I will do no such thing," replied Mr. Vansitart. "My word is sufficient, as a magistrate I can have you seized." Here Captain Patterson [his companion] interfered, and made use of very insulting language. Mr. Vansitart checked him and said, "Stop, I will slouch the fellow well in my court." After this Vansitart ordered his jamadar to "apprehend" Sikdar but could not, because Sikdar retorted, "Recollect, Sir, that you are employing force."

Then Vansitart lowered his voice and asked, "Will you then give it (the property) to me as a private gentleman?" "Yes", said I, "upon your giving me a proper note." Mr. Vansitart rejoined, "I will do no such thing." and Captain Patterson added in the most offending manner, "Not to a damn fellow like you" and Mr. Vansitart said, "Don't you be talking to those fellows, damn them, come away, and let us go to Everest." When they were departing, I gave Captain Patterson to understand that I would hand him up to the Commanding Officer, and have him brought to a court martial for his insulting demeanour, whereupon he answered, "Do as you like and be damned."

The paper comments that 'The statement of Baboo Radhanauth Sikdar ... stands uncontradicted and it's accuracy cannot therefore be doubted.' The paper is 'surprised to find that Mr. Vansitart is still allowed to hold the high trust reposed in him.' The story, however, continues: "after leaving Baboo Radhanauth Mr. Vansitart sent at 10 A.M. a written order for delivery of the goods. Although it contained not his seal, it was however readily complied with. After 11 A.M. Mr. Vansitart took evidence of Lieut Patterson, Mr. Clarkson and Keelan in a room of *Mr. Everest's with closed doors*, to which Radhanauth could not have access." Sikdar was then asked to attend his camp the next day at Thana. After much harassment and shifting of places, the hearing finally took place at Dooban. Radhanath writes that :

in the hurry in which he conducted my examination he would often endeavour to put words in my mouth, and not give me time to reply to the whole of a question at a time. The upshot was that Sikdar, Clarkson and Keelan were each fined a sum of Rs.200/- for the "forcible and illegal detention of property belonging to Lieut Patterson and Mr. Vansitart and like sum for contempt and disobedience of Magistrate's orders."

Not a man to take it lying low, Radhanath 'appealed against the magistrate decision' and in due course the case was submitted to 'the sudder court of Allahabad.' He solicited redressal on seven counts, of which the 4th is of particular interest to us today:

The examination of witness in the private dwelling of Colonel Everest and in my absence by Mr. Vansitart, who was himself a party to the case.

The outcome was predictable. Sikdar was penalised for 'illegal detention and refusal to obey the magistrate's order.' He was however not penalised for 'contempt', because 'that was a separate case requiring a separate investigation and order...'¹⁹

Such, then, was the man; not exactly an archetype of pristine loyalty!

Literary Rebellion

The same defiant nature was manifest in his literary activities too. Having stayed away from his native place for a long time, he found that his command over Bengali had become rusted. He immediately started brushing up his mother tongue with the vigour typical of him. In the process he, himself quite proficient in Sanskrit, rebelled against the highly sanskritized Bengali style of Vidyasagar and Akshay Kumar Datta, the two stalwarts of Bengali prose in those days. 'Of what worth is a piece of writing, if it cannot be easily understood by every housewife?', he used to say. Along with his other Derozian friend Peary Chand Mitra, he founded and co-edited the *Masik Patrika* (Monthly Magazine) for women and wrote many articles in a simple lucid style. Prior to publication, Sikdar would read out his articles to his family womenfolk, even enquire from his friend Peary how the latter's wife had rated a particular piece of writing!

A lifelong celibate, he loved to live with his extended family and was very fond of children. Surrounded by many of his relatives' children, he would spend much time playing games and telling stories. Towards the end of his life, he bought a villa at Gondalpara in the French colony Chandan-nagar (Chandernagore) by the side the Ganga and it is there that he breathed his last on 17 May 1870.

Notes

1. Jogendranath Bandyopadhyay Vidyabhushan (ed.), *Arya Darshan*, Kolkata, 1884
2. *ibid*
3. *ibid*
4. *ibid*
5. See 'The Great Trigonometrical Survey of India', K. S. Sivasami, GIS@Development, September 2000.
6. *Arya Darshan*, *ibid*. Retranslated from the Bengali translation.
7. Ajana Chaudhury, R R Kelkar and A. K. Sen Sarma, 'Technology : Through the haze of time & neglect', *The Statesman*, 1 March 2009
8. BBC NEWS: http://news.bbc.co.uk/go/pr/fr//2/hi/south_asia/3193576.stm Published: 2003/10/20 02:09:46 GMT.
9. *ibid*
10. Ajana Chaudhury et al, *ibid*
11. Deepak Kumar, 'Patterns of Colonial Science in India', *Indian Journal of History of Science* 15(1), May, 1980
12. *Arya Darshan*, *ibid*
13. Ajana Chaudhury et al, *ibid*
14. R. R. Kelkar, *Radhanath Sikdar*, rrkelkar.wordpress.com/r-h-kelkar/, 13 May 2007
15. Ajana Chaudhury et al, *ibid*
16. *Arya Darshan*, *ibid*
17. Sivanath Sastri, *A History of the Renaissance in Bengal*, translated from the Bengali by Sir Roper Lethbridge, first published 1907, reissued 2002, Renaissance Publishers Pvt Ltd, Kolkata, pp. 175-176
18. Gautam Chattopadhyay, Editor, *Bengal: Early Nineteenth Century (Selected Documents)*, Research India Publications, Calcutta, 1978, p.181
19. For a full account, see Chattopadhyay, pp. 235-255. Italics added. **P A S**

Race, Genes, and IQ

Ned Block

According to *The Bell Curve* (New York : Free Press, 1994), Black Americans are genetically inferior to Whites. That's not the only point in Richard Herrnstein and Charles Murray's book. They also argue that there is something called "general intelligence" which is measured by IQ tests, socially important, and 60 percent "heritable" within Whites. (I'll explain heritability below.) But my target here is their claim about Black genetic inferiority. It has been subject to wide-ranging criticism since the book was first published last year. Those criticisms, however, have missed its deepest flaws. Indeed, the Herrnstein/Murray argument depends on conceptual confusions about the genetic determination of human behavior that have not been fully addressed – in fact, have been tacitly accepted to some degree – by many of the book's sharpest critics.

Before getting to the confusions, let's first be clear about the conclusion itself. In a recent article on "The Real Bell Curve," Charles Murray grumbles about critics, such as Stephen Jay Gould, who read the book as saying that racial differences in IQ are mostly genetic. Murray answers by quoting from the book :

If the reader is now convinced that either the genetic or environmental explanations have won out to the exclusion of the other, we have not done a sufficiently good job of presenting one side or the other. It seems highly likely to us that both genes and environment have something to do with racial differences. What might the mix be? We are resolutely agnostic on that issue; as far as we can determine, the evidence does not yet justify an estimate.

In this passage, Herrnstein and Murray are "resolutely agnostic" about whether bad environment or genetic endowment is *more* responsible for the lower IQs of Blacks. But they indicate no agnosticism at all about whether *part of the IQ difference* between Blacks and Whites is genetic; and given their way of thinking about the matter, this means that they are not at all agnostic about *some* Black genetic inferiority.

The Simple Argument

The Herrnstein-Murray argument for genetic IQ differences is based on two facts : IQ is 60 percent heritable within the White population; and there is a stable, 15 point difference between averages IQs of Whites and Blacks. With IQ largely genetic in Whites, it is natural to conclude – according to Herrnstein and Murray – that the Black-White difference, too, is at least partly genetic. Their argument has more to it; they raise issues about the pattern and the magnitude of the differences that I will get to later. But the most important flaws in the more complex version are fully visible in this simple argument.

Herrnstein's and Murray's argument depends on thinking of the 15 point IQ difference as divisible into a genetic chunk and an environmental chunk. This picture suggests the following three alternatives :

Extreme Environmentalism: Blacks are genetically on a par with Whites, so the IQ gap is all environmental.

Extreme Geneticism: Blacks are environmentally on a par with Whites, so the IQ gap is all genetic.

The Reasonable View : Blacks are worse off both genetically and environmentally, so

some of the gap is genetic, some environmental.

The 60 percent heritability of IQ is thought to exclude *Extreme Environmentalism*. Well-known environmental effects on IQ, together with differences between Black and White environments acknowledged by Herrnstein and Murray, exclude *Extreme Geneticism*. So we are left with *The Reasonable View* – which postulates some black genetic inferiority.

Notice, however, that the statement of alternatives blots out a crucial possibility: that Blacks are much worse off than Whites environmentally and better off genetically. Allowing this option, we get a different set of alternatives: genetically, Blacks are either worse off, or better off, or equal to Whites. I don't say that it is likely that Blacks are genetically better off than Whites, but it is possible, and – a very important point – what you consider possible affects what you think is an extremist position. Moreover, the critics of Herrnstein and Murray have tended to trip over this possibility. For example, in a *New York Times* op-ed critique that describes *The Bell Curve* as "bogus" and "nothing but a racial epithet," Bob Herbert insists that "the overwhelming consensus of experts in the field is that environmental conditions account for most of the disparity when the test results of large groups are compared." In effect, he uses known environmental effects on IQ to argue for a low degree of Black genetic inferiority: in effect, he accepts a version of *The Reasonable View*. Even Stephen Jay Gould, in his otherwise excellent article in *The New Yorker*, missteps here. Apparently accepting *The Bell Curve's* way of conceiving the issue, he complains that Herrnstein and Murray wrongly minimize the large environmental malleability of IQ. He says that they turn "every straw on their side into an oak, while mentioning but downplaying the strong circumstantial case for substantial malleability and little average genetic difference." Gould does not do enough to guard against the natural interpretation of "little average genetic difference" in the context of discussion of *The Bell Curve* as little average genetic inferiority of Blacks. Several critics in *The New Republic* (October 31, 1994), in turn, wonder about the size of the "genetic component of the Black-White difference," thereby buying into the same way of thinking.

If you accept *The Bell Curve's* way of putting the options, then the idea that environmental differences between Blacks and Whites are big enough to account for 15 IQ points looks like extremism. But given the actual alternatives – that Blacks are genetically on a par with Whites, or worse off, or better off – zero genetic difference doesn't seem extremist at all.

But isn't the idea of Black genetic superiority in IQ a desperate and pathetic attempt to exploit a mere logical possibility? Consider a parallel case. Toe number is genetic in sloths and humans, and humans are observed to have five toes whereas diurnal sloths are observed to have three. Is there any real possibility that the genetic toe difference between humans and sloths goes in the opposite direction from the observed toe-number gap? It could be that the three-toed sloth evolved six toes, but we observe only three because of a thalidomide-like chemical which has polluted their food during the years in which we have observed them. But this possibility is only worth mentioning as an example of something extremely unlikely. This example suggests a principle that, though never articulated, underlies all of Herrnstein's and Murray's thinking on genes and IQ:

Fundamental Principle: If a characteristic is largely genetic and there is an observed difference in that characteristic between two groups, then the genetic difference between the two groups is very likely to go in the same direction as the observed difference.

Applying this principle to the case of IQ: given the substantial heritability of IQ (recall, 60 percent within the White population), if East Asians are superior in measured IQ, then, according to the *Fundamental Principle*, they are highly likely to be genetically superior; and if blacks are inferior in measured IQ, then they are highly likely to be genetically inferior in IQ.

But while the *Fundamental Principle* seems intuitively plausible, it is either irrelevant to the Herrnstein-Murray argument, or simply false. To see the problem, we need first to understand

a crucial ambiguity in the term "genetic." That term has two senses, and in the next section, I describe those senses in some detail. To put the point schematically for now: the claim that a trait is "genetic" can mean either that *the trait itself* is fixed by a person's genes – the trait is genetically determined – or that differences in the trait in some populations can be traced to genes – the trait shows a high degree of *heritability*. Once that distinction is in place, the problems for the *Principle* follow. Again, to put the point schematically for now: if "genetic" is used to mean *genetically determined*, then IQ is not genetic because it is not fixed by a person's genes, and the *Principle* is therefore irrelevant. If "genetic" is used to mean *heritable*, then IQ is genetic but the *Principle* is false because heritability within one group implies nothing about the explanation of differences between groups. In neither case, however, does the *Principle* support *The Bell Curve's* claim about genetic differences in IQ.

Two Senses of "Genetic"

To understand *The Bell Curve's* fallacy, we need to distinguish the ordinary idea of genetic determination and the scientific concept of heritability, on which all Herrnstein's and Murray's data rely. Genetic determination is a matter of what causes a characteristic: number of toes is genetically determined because our genes cause us to have five toes. Heritability, by contrast, is a matter of what causes differences in a characteristic: heritability of number of toes is a matter of the extent to which genetic differences cause variation in number of toes (that some cats have five toes, and some have six). Heritability is, therefore, defined as a fraction: it is the ratio of genetically caused variation to total variation (including both environmental and genetic variation). Genetic determination, by contrast, is an informal and intuitive notion which lacks quantitative definition, and depends on the idea of a normal environment. A characteristic could be said to be genetically determined if it is coded in and caused by the genes and bound to develop in a normal environment. Consequently, whereas genetic determination in a single person makes sense – my brown hair color is genetically determined – heritability makes sense only relative to a population in which individuals differ from one another – you can't ask "What's the heritability of my IQ?"

For example, the number of fingers on a human hand or toes on a human foot is genetically determined: the genes code for five fingers and toes in almost every one, and five fingers and toes develop in any normal environment. But the heritability of number of fingers and toes in humans is almost certainly very low. That's because most of the variation in numbers of toes is environmentally caused, often by problems in fetal development. For example, when pregnant women took thalidomide some years ago, many babies had fewer than five fingers and toes. And if we look at numbers of fingers and toes in adults, we find many missing digits as a result of accidents. But genetic coding for six toes is rare in humans (though apparently not in cats). So genetically caused variation appears to be small compared to environmentally caused variation. If someone asks, then, whether number of toes is genetic or not, the right answer is: "it depends what you mean by *genetic*." The number of toes is genetically determined, but heritability is low because genes are not responsible for much of the variation.

Conversely, a characteristic can be highly heritable even if it is not genetically determined. Some years ago, when only women wore earrings, the heritability of having an earring was high because differences in whether a person had an earring were "due" to a genetic (chromosomal) difference. Now that earrings are less gender-specific, the heritability of having an earring has no doubt decreased. But neither then nor now was having earrings genetically determined in anything like the manner of having five fingers. The heritability literature is full of cases like this: high measured heritabilities for characteristics whose genetic determination is doubtful. For example, the same methodology that yields 60 percent heritability for IQ also yields 50 percent heritability of academic performance and 40 percent heritability of occupational status.

Obviously, occupational status is not genetically determined: genes do not code for working in a printed circuit factory. More significantly, a child's environment is often a heritable characteristic, strange as this may seem. If degree of musical talent is highly heritable and if variation in the number of music lessons a child gets depends on variation in musical talent, then the number of music lessons that a child gets may be heritable too, despite not being genetically determined. In fact, recent studies of heritabilities of various features of children's environments show substantial heritabilities for many environmental features – for example, the "warmth" of the parents' behavior toward the child. Even number of hours of TV watched and number and variety of a child's toys shows some heritability. If this seems unintelligible, think of it this way: variation in these environmental properties is in part due to variation in heritable characteristics of the child, and so the environmental characteristics themselves are heritable. Readers of *The Bell Curve* often suppose that a heritable characteristic is one that is passed down in the genes, but this identification is importantly flawed. The number and variety of a child's toys is not passed down in the genes. Heritability is a matter of the causation of differences, not what is "passed down".

The Case of IQ

I have given examples of traits that are genetically determined but not heritable and, conversely, traits that are heritable but not genetically determined. Do these weird examples have any relevance to the case of IQ? May be there is a range of normal cases, of which IQ is an example, for which the oddities that I've pointed to are simply irrelevant.

Not so! In fact IQ is a great example of a trait that is *highly heritable but not genetically determined*. Recall that what makes toe number genetically determined is that having five toes is coded in and caused by the genes so as to develop in any normal environment. By contrast, IQ is enormously affected by normal environmental variation, and in ways that are not well understood. As Herrnstein and Murray concede, children from very low socio-economic status backgrounds who are adopted into high socio-economic status backgrounds have IQs dramatically higher than their parents. The point is underscored by what Herrnstein and Murray call the "Flynn Effect:" IQ has been rising about 3 points every 10 years worldwide. Since World War II, IQ in many countries has gone up 15 points, about the same as the gap separating Blacks and Whites in this country. And in some countries, the rise has been even more dramatic. For example, average IQ in Holland rose 21 points between 1952 and 1982. In a species in which toe number reacted in this way with environment (imagine a centipede-like creature which added toes as it ate more) I doubt that we would think of number of toes as genetically determined.

It is worth emphasizing the solidity of the data about the large IQ increases in Holland. The 21 point increase reported by Flynn is based on comprehensive testing of all Dutch 18-year-olds who pass a medical exam (and there has been no change in the pass rate). The test used is Raven's Progressive Matrices, a widely respected "nonverbal test that is an especially good measure of g [general intelligence]." Even Richard Lynn, the arch-Jensenist who is the source of much of *The Bell Curve's* data on race concedes this point. He says, "The magnitude of the increase has generally been found to be about three IQ points per decade, making fifteen points over a fifty year period. There have, however, been some larger gains among 18-year-old conscripts in The Netherlands and Belgium amounting to seven IQ points per decade." Lynn also mentions that similar results have been found in France. Herrnstein and Murray concede that "In some countries, the upward drift since World War II has been as much as a point a year for some spans of years." In an area where the facts are often contested, it is notable that this set of facts seems to be accepted by both sides.

One very important conclusion from the Flynn data is that no one understands very much

about how environmental variation differentially affects IQ. The cause of the large increases in Holland is simply unknown. Even Herrnstein and Murray concede that “relatively little [of the environmental variation in IQ] can be traced to the shared environmental influences *mostly unknown at present*, that are experienced by individuals as individuals” (emphasis added). Indeed, the crucial factor that has enabled the research that Herrnstein and Murray report to exist at all is the fact that one can measure the heritability of a characteristic without having much of an idea of what the characteristic is. To calculate the heritability of IQ, we do not need to know what IQ tests measure; we need only be able to measure IQ – whatever it is – in various circumstances.

A few additional observations about heritability and IQ will underscore the need for great caution in drawing any inferences about the sources of differences in IQ. A common method for measuring heritability relies on comparisons of the correlations of IQ among one-egg twins raised by their biological parents compared with two-egg twins raised by their biological parents. Suppose you give IQ tests to two children and they get the same score. One has a one-egg (identical) twin, the other has a two-egg (fraternal) twin. Suppose that you can predict the score of the one-egg twin reliably, but that your prediction of the score of the two-egg twin is much less reliable. This difference would be an indication of high heritability of IQ because one-egg twins share all their genes whereas two-egg twins normally share half their genes.

Heritability studies of IQ within White populations in the US and northern Europe have tended to yield moderately high heritabilities: Herrnstein’s and Murray’s 60 percent is a reasonable figure. But it is important to note that no one would do one of these heritability studies in a mixed Black/White population. The reason is straightforward: if you place a pair of Black one-egg twins in different environments “at random,” you automatically fail to randomize environments. The Black twins will bring part of their environment with them; they are both Black and will be treated as Black.

Moreover, heritability – unlike genetic determination – can be very different in different populations. For example, the heritability of IQ could be decreased if half the population were chosen at random to receive IQ lowering brain damage: by damaging the brains of some people, you make the environmentally caused variation larger. Or suppose we could make a million clones of Newt Gingrich, raising them in very different environments so there would be some variation in IQ, all of it environmentally caused. So heritability in that population would be zero because the ratio of genetic variation is zero. To take a real example, the heritability of IQ increases throughout childhood into adulthood. One study gives heritability figures of under 20 percent in infancy, about 30 percent in childhood, 50 percent in adolescence, and a bit higher in adult life. Studies of older twins in Sweden report an 80 percent heritability figure for adults by age 50 as compared to a 50 percent heritability for children. One possible reason for the rise in heritability is that although the genetic variation remains the same, environmental variation decreases with age. Children have very different environments; some parents don’t speak to their children, others are ever verbally probing and jousting. Adults in industrialized countries, by contrast, are to a greater degree immersed in the same culture (e.g., the same TV programs). With more uniform environments, the heritability goes up. I hope these points remove the temptation (exhibited in *The Bell Curve*) to think of the heritability of IQ as a constant (like the speed of light). Heritability is a population statistic just like birth rate or number of TVs and can be expected to change with changing circumstances. There is no reason to expect the heritability of IQ in India to be close to the heritability of IQ in Korea.

These issues are pathetically misunderstood by Charles Murray. In a CNN interview reported in *The New Republic* (January 2, 1995), Murray declared “When I – when we – say 60 percent heritability, it’s not 60 percent of the variation. It is 60 percent of the IQ in any given person.” Later, he repeated that for the average person, “60 percent of the intelligence comes

from heredity” and added that this was true of the “human species,” missing the point that heritability makes no sense for an individual and that heritability statistics are population-relative. In a letter to the editor in which Murray complains about being quoted out of context (January 30, 1995), Murray quotes more of what he had said: “... your IQ may have been determined overwhelmingly by genes or it may have been – yours personally – or overwhelmingly by environment. That can vary a lot from individual to individual. In the human species as a whole, you have a large genetic component.” *The Bell Curve* itself does not make these embarrassing mistakes. Herrnstein, the late co-author, was a professional on these topics. But the upshot of part of this essay is that the book’s main argument depends for some of its persuasive force on a more subtle conflation of heritability and genetic determination. And Murray’s confusion serves to underscore just how difficult these concepts can be, even for someone so numerate as Murray.

What’s the upshot of the distinction between genetic determination and heritability for the argument of *The Bell Curve*? Recall the sloth example: Toe number is genetic in sloths and in humans; there is a difference in toe number; so the toe-number difference is genetic. This is a good argument: it strains the imagination to suppose that the genetic toe difference between sloths and humans goes in the opposite direction from the observed toe difference. It is ludicrous to suppose that our genes code for two, despite the five we see at the beach. So in this sense the Herrnstein and Murray argument works for the concept of genetic determination. But the data on genes and IQ are about heritability, not genetic determination.

Is IQ genetically determined as well as heritable? No! As I already pointed out, IQ is very reactive to changes in environments in the normal range. Recall the example of the large rise in Holland. Further, the claim that IQ is genetically determined is not the kind of quantitative claim on which Herrnstein and Murray would want to base their claims about genes and race.

If “genetic” means genetically determined, then, IQ is not genetic in Whites or anyone else (and in any case the issue is not quantitative), so the *Fundamental Principle* is irrelevant. If “genetic” means heritable, however, then IQ is largely genetic (among Whites in the US at least). But in the next section I will show that in this sense of “genetic,” the argument does not work because the *Fundamental Principle* is false.

Heritability and Race Differences

In a 1969 article in the *Harvard Educational Review*, Arthur Jensen started off the current controversy by arguing from heritability within Whites to genetic differences between Whites and Blacks. Richard Lewontin responded a year later with a graphic illustration of why this is a mistake. Suppose you buy a bag of ordinary seed corn from a hardware store. Grow one handful of it in a carefully controlled environment in which the seeds get uniform illumination and uniform nutrient solution. The corn plants will vary in *height*, and because the environment is uniform, the heritability of *height* will be 100 percent. Now take another handful of corn the same bag, and grow it in a similarly uniform environment but with a uniformly *poor* nutrient solution. Again, the plants will vary in height, but all will be stunted. Once more the heritability of height is 100 percent. Despite the 100 percent heritabilities of height within each group, the difference in *height* between the groups is entirely environmentally caused. So we can have total heritability within groups, substantial variation between groups, but no genetic difference between the groups.

The application to race is obvious : heritability is high within Whites. But as Lewontin’s example shows, high heritability within groups licenses no conclusion about how to explain difference between groups – none, in particular, about genetic explanations of the differences. Nor does it dictate the direction of any genetic difference between groups. The stunted corn could have been genetically taller, with the genetic advantage outweighed by the environmental

deprivation.

In Lewontin's example, it is assumed that there is no genetic difference between the two groups of corn. But suppose we knew nothing about two groups except that they differed by 15 points in IQ and that IQ had some heritability in both, and we had to guess the causes. For all I've said so far, it would make sense to guess that the lower scoring group was disadvantaged both genetically and environmentally. In the next section, I'll show that even this weak principle is wrong. However, the principle has no application to the racial question because we know lots more than nothing: we know that the environment can have huge effects on IQ (e. g., the Flynn Effect of 3 points per decade and the 21 point increase in Holland), and that Blacks of 3 points per decade and the 21 point increase in Holland), and that Blacks are environmentally disadvantaged in a way that has been shown to count. But without being able to measure the effect of being treated as sub-normal, and of an historical legacy of slavery and discrimination, how do we know whether its average effect is sufficient to lower Black IQ 15 points, or less than that – or more than that? Given the social importance of this issue, guessing is not appropriate.

Herrnstein and Murray have heard appeals to the legacy of slavery and discrimination. And they have a response which appeals both to the pattern of racial differences and their magnitude.

First, the pattern. They remind us that the Black/White IQ difference is smallest at the lowest socioeconomic levels. And this leads them to ask: "Why, if the Black/White difference is entirely environmental, should the advantage of the 'White' environment compared to the 'Black' be greater among the better off and better educated Blacks and Whites? We have not been able to think of a plausible reason. An appeal to the effects of racism to explain ethnic differences also requires explaining why environments poisoned by discrimination and racism for some other groups – against the Chinese or the Jews in some regions of America, for example – have left them with higher scores than the national average."

But these facts are not hard to understand. Blacks and Whites are to some extent separate cultural groups, and there is no reason to think that a measure like socio-economic status means the same thing for every culture. Herrnstein and Murray mention the work of John Ogbu, an anthropologist who has distinguished a number of types of oppressed minorities. A key category is that of "caste-like" minorities who are regarded by themselves and others as inferior, and who, if they are immigrants, are not voluntary immigrants. This category includes the harijans in India, the Buraku and Koreans in Japan, and the Maori in New Zealand. He distinguishes them from groups like Chinese and Jews who are voluntary immigrants and have a culture of self-respect. If higher socio-economic status Blacks still are to some extent part of a caste-like minority, then they will be at an environmental disadvantage relative to higher socio-economic status Whites. But low status Blacks and Whites are more likely to share a caste background. As Henry Louis Gates, Jr., points out (New Republic, October 31, 1994), affirmative action has had the effect of quadrupling the size of the Black middle class since 1967. Most middle class Blacks have arrived in the middle classes relatively recently, many of them under less than ideal conditions for the development of self-respect. It would be surprising if children of these newly middle-class Blacks were to have fully escaped their caste background in so short a time.

Ogbu notes that where IQ tests have been given, "the children of these castelike minorities score about 10-15 points ... lower than dominant group children." He notes further that differences remain "when minority and dominant group members are of similar socio-economic background." But when "members of a caste-like minority group emigrate to another society, the twin problem of low IQ test scores and low academic achievement appears to disappear." Data suggest that the Buraku who have emigrated to this country do "at least as well at school and the work place" as other Japanese.

As to the magnitude : Herrnstein and Murray calculate that "the average environment of blacks would have to be at the sixth percentile of the distribution of environments among whites ... for the racial differences to be entirely environmental." And they believe that "differences of this magnitude and pattern are implausible." That is, 94 percent of Whites would have to have an environment that is better for the development of IQ than the environment of the average Black – if the 15 point difference is to be explained environmentally. Herrnstein and Murray think this is implausible because when you look at environmental measures – for example, parental income, school quality – you do not find that 94 percent of Whites have a better environment than the average Black. But this calculation ignores the effect of being in Ogbu's category of a caste-like minority. Compare the Dutch 18 year-olds of 1982 with their fathers' cohort, the 18-year olds of 1952. The difference is entirely environmental despite the probable substantial heritability within each group. Using the same procedures as Herrnstein and Murray, Flynn calculates that 99 percent of the 1982 group had to have a better environment for the development of IQ than the average member of the 1952 group. Given differences of this magnitude among people of a uniform culture who are separated by only a single generation, is it really so implausible that 94 percent of Whites have an environment better than a Black at the 50th percentile?

Environmental differences, then, including the sort that affect Black Americans, are known to have large effects on IQ. Moreover, we currently have no way to quantify these effects. So we should draw no conclusion about the probability of any Black genetic IQ advantage or disadvantage. As applied to the case of IQ, then, the Fundamental Principle is false: the combination of high heritability within the White population, and persistent Black-White differences, does not support a case for genetic differences.

Indirect Heritability

Earlier, I commented that if we knew nothing at all about two groups except that they differed by 15 points in IQ and that IQ is heritable in both, and we had to guess the causes, it might seem sensible to guess that the lower scoring group was disadvantaged both genetically and environmentally. I have been emphasizing that in the case of Black-White IQ differences, we know much more than "nothing at all." I want now to show that even if we knew nothing, any such guess would be misguided, for reasons that go to the heart of the notion of heritability.

Let's start with an example. Consider a culture in which red-haired children are beaten over the head regularly, but all other children are treated well. This effect will increase the measured heritability of IQ because red-haired identical twins will tend to resemble one another in IQ (because they will both have low IQs) no matter what the social class of the family in which they are raised. The effect of a red-hair gene on red hair is a "direct" genetic effect because the gene affects the color via an internal biochemical process. By contrast, a gene affects a characteristic indirectly by producing a direct effect which interacts with the environment so as to affect the characteristic. In the hypothetical example, the red-hair genes affect IQ indirectly. In the case of IQ, no one has any idea how to separate out direct from indirect genetic effects because no one has much of an idea how genes and environment affect IQ. For that reason, we don't know whether or to what extent the roughly 60 percent heritability of IQ found in White populations is indirect heritability as opposed to direct heritability.

The methodology used to measure heritability obscures this ignorance by counting differences in characteristics as caused by genetic differences whenever there is a genetic difference, even if there is also an environmental difference. This distorts the ways we normally think about causation. For instance, the heritability methodology focuses on the difference between the red-hair genes and genes for other hair colors, not on the fact that red-haired children—unlike blond children – are beaten.

Earlier I said that wearing earrings used to be highly heritable because differences were “due” to the XY/XX difference. I put quotes around “due” because it is a by-product of the methodology for measuring heritability to adopt a tacit convention that genes are taken to dominate environment. When virtually only women were wearing earrings, variation in earrings was as much social as genetic, but counted as highly heritable. If there is a genetic difference in the causal chains that lead to different characteristics, the difference counts as genetically caused even if the environmental differences are just as important. If we adopted the opposite convention – concluding from any environmental difference in two causal chains that the differences are environmentally caused – then we could not use current methodology for measuring heritability, because we have no general method of detecting indirect genetic effects using current techniques. Heritabilities using the two different conventions would be radically different if there are substantial indirect genetic effects.

Recall the examples mentioned earlier about the measured heritabilities of such quantities as number of hours of watching TV. No one should suppose that there is variation in genes for watching TV; this is a case of indirect effects. Consider further the fact that no one would do a heritability study on a mixed Black/White population. I mentioned earlier that if you place a pair of Black one-egg twins in different homes, you automatically fail to randomize environments, because the Black twins will bring part of their environment with them; they are both Black and will be treated as Black. This is an indirect genetic effect *par excellence*. Implicitly, everyone in this field recognizes that, yet more subtle possibilities of indirect effects are typically ignored.

Recall that heritability is defined as a fraction: variation due to genetic differences divided by total variation. The measure of variation that is always used (though alternatives are available) is a statistical quantity known as variance. One factor that raises variance is a positive correlation between genetic and environmental variables. Suppose that children whose genes give them an advantage in musical talent tend to have parents who provide them with an environment conducive to developing that talent – music lessons, concerts, a great CD collection, musical discussion over dinner, etc.. Suppose further that other children who have a genetic disadvantage also have an environment that stultifies their musical talents. The correlation between genes and environment will move children towards the extremes of the distribution, increasing the variance in musical skills.

Variance due to gene/environment correlation (gene/environment “covariance”) should not be counted in the genetic component of the variance, and there are a variety of methods of separating out such variance. It is common in behavior genetics to distinguish among a number of different types of covariance. The kind just mentioned, in which parents provide genes for musical talent and an environment that develops it, is called “passive” covariance because it doesn’t depend on what the child does. Reactive covariance is a matter of the environment reacting to the child’s qualities, as when a school gives extra music classes to children who exhibit musical talent. With active covariance, the child creates a gene-environment correlation, as when a musically talented child creates a gene-environment correlation, as when a school gives extra music classes to children who exhibit musical talent. With active covariance, the child practices musical themes in the imagination or pays attention to the musical environment. Passive covariance can be controlled in heritability calculations by attention to adoption studies in which the double-advantage/double-disadvantage does not exist. But reactive and active covariance cannot be measured without specific hypotheses about how the environment affects IQ. And as I observed little is known – as all parties to the disagreements about genetics and IQ agree – about how the environment affects IQ. So distinguishing reactive and active covariance is, on the whole, beyond the reach of the empirical methods of our era’s “behavior genetics,” for those methods do not include an

understanding of what IQ is – whether it is information-processing capacity, or whether it has more to do with how information-processing capacity is deployed, e.g. whether it is mainly attention – or how the environment affects it.

These points about covariance assume that there are genes for IQ and that these genes may affect the environment so as to produce effects on IQ that are correlated with the ones that the genes themselves produce. But this way of presenting the issue seriously underestimates its significance. For as the red hair example illustrates, indirect genetic effects needn’t work through anything that should be thought of as “IQ genes.”

Because we don’t know much about how variation in environment differentially affects IQ, we can only guess about how variation in genes differentially affects IQ indirectly, via the environment. Suppose that a child’s perceived attractiveness and self-confidence strongly affects how adults interact with children in a way that largely accounts for the variation in IQ. Of course, adults could give some children more attention than others without producing IQ difference, but differences might result from variations in adult attention. Suppose further that personal attractiveness and self-confidence are highly heritable. Then we would have an indirect effect *par excellence*, and such an effect could, for all we know, largely account for the heritability of IQ. Without an understanding of how the environment affects IQ, we simply have no way of determining how much of the variance in IQ is indirect genetic variance of this sort. Of course, if we knew that some specific adult behavior that is triggered by some specific heritable property of children was responsible for a large component IQ variation, then we could measure that behavior. But there is no theory of intelligence or IQ that would allow us to have any synoptic grip on such factors.

The upshot is that there may be a large component of heritability due to indirect genetic effects, including (but not limited to) gene-environment correlation, that is outside the boundaries of what can be measured given the mainly atheoretical approach available today. Where does the “gene-environment covariance” show up in heritability calculations? Answer: active and reactive effects that we don’t know how to measure *inevitably are included in the genetic component*. This is often regarded by behavior geneticists as perfectly OK. In practice, if researchers were to actually identify an “un-meritocratic” effect such as the red-hair indirect effect mentioned earlier, they would undoubtedly count the variance produced by the effect as covariance rather than genetic variance. But we have no idea how much of the 60 percent of the variance in IQ that is said to be genetic is of this sort. So in practice, covariance due to indirect effects that people know how to measure – at least if it is flagrantly non-meritocratic – is not counted in the heritability; but other indirect effects are counted as genetic. So what counts as genetic variance (inflating heritability) is a matter of *value judgments* and of what effects we know about. Surely this makes heritability a lousy scientific concept.

In effect, the field has adopted as an axiom that *heritability of IQ can be measured by current methods*. Without this assumption, the right conclusion would be that since we cannot separate indirect genetic effects (including certain kinds of gene/environment covariance) from pure genetic variance, no heritability estimate can be made. Why does the field adopt this axiom? I cannot help thinking that part of the explanation is that behavior genetics is a young field, struggling for acceptance and funding, and heritability is a flag that attracts attention to it. Let us return to the speculation that the 60 percent heritability of IQ (within Whites) is entirely indirect and due to differential treatment of children on the basis of heritable characteristics. Then the direct heritability of IQ would be zero and we would have no reason to think that anything that could be called genes for IQ (e.g., genes for information-processing capacity) vary in the White population, and no reason to look for genetic differences to explain the 15-point difference between Blacks and Whites. Instead, we would have reason to look for differences in the ways adults interact with children to explain the Black-White IQ difference.

So indirect heritability suggests an environmental hypothesis about the measured Black-White IQ difference, one that could perhaps be the object of social policy. Are there reasons to expect indirect genetic effects in the Black-White difference? I mentioned the obvious example of genes for skin color above. But there may be less obvious indirect effects as well. There are many more low-birth-weight Black babies than White babies. Nothing known appears to rule out a genetic explanation. If Blacks are more likely to have genes for low-birth-weight babies, perhaps the effect could be neutralized by diet or by drug intervention in pregnancy. Certainly, no one should think of genes for low birth weight as "IQ genes".

The points I've just made about indirect heritability show why, as I said at the beginning of this section, any inferences from heritability statistics to genetic disadvantage would be misguided. Such inferences seem plausible if we assume that the heritability of IQ within Whites reflects differences in IQ caused by differences in IQ genes. But the points about indirect heritability show that we don't know whether any of the variation within Whites is due to variation in IQ genes. If we have no real grip on the kinds of causal mechanisms that produce the 60 per-cent heritability within Whites, we can have no confidence in any extrapolation to blacks.

Let's call a person's genome (his total set of genes) genetically inferior with respect to IQ if that genome yields low IQ in any normal environment. But what is to count as a normal environment? In the example discussed earlier, genes for red hair yield low IQ within environments that are normal in the environment of the hypothetical society, but in environments that we would consider normal, the red-hair genes are irrelevant to IQ. What if the heritabilities observed for IQ are a result of indirect effects that can be changed by changing social practice? Then phrases like "genetically inferior in IQ" and "genetic disadvantage in IQ" will only apply to genomes such as that of Down's Syndrome that yield low IQ no matter what the social practices.

The same points apply to recent reports of a gene for homosexuality – for example, a *New York Times* article headlined "New Evidence of a Gay Gene." Brothers who are both gay turn out to be more likely to share some genetic material on their X chromosomes. But the shared genetic material could code for physical or psychological characteristics that interact with our highly contingent social structures in a way that increases the probability that its possessor will be gay. Perhaps the shared material makes both brothers more attractive to gays, or perhaps it increases their interest in bodily fitness, which puts them in contact with a gay culture that also value fitness. Or perhaps it is a gene for early puberty causing boys to mature at an age at which it happens to be socially acceptable for boys to be friends with other boys but not with girls. If the effect is indirect, it might disappear in another cultural setting.

The point about indirect heritability also casts doubt on Herrnstein's Murray's ideas about genetic social stratification among Whites. If the 60 percent heritability does not reflect IQ genes, then there is no reason to suppose that social classes differ at all in IQ genes. Herrnstein and Murray worry about pollution of the gene pool by immigrants and by large numbers of children of low IQ parents. But if the heritability of IQ is mainly indirect, their emphasis on genes is misdirected. If we lived in a culture that damaged the brains of red-haired children, it would be perverse to complain about genetic pollution when large numbers of red-haired immigrants arrived. Instead, we should try to change the social practices that deprive those with certain genes of an equal chance.

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P A S

From the desk of the mind-painter

Triangular distress

"I feel a throbbing till in my heart, when I remember that very night! Doctor, the bridal bed night appear once in a lifetime. I was a newly married wife, couldn't speak out in my own. Simply sat idly beside the window, almost for whole the night you may say, staring at outside. Tumult of wedding-house was over. Guests left away. A few relatives instructed us to close the door.

It was midnight. At intervals he smoked, gulped water or went through the stale newspaper just and oftenly checked the outside. The door was partially opened and night wasn't young. I was just pondering why he didn't shut the door at that dead of night?

I realised his mom's presence in the adjacent room, as she asked frequently whether 'Bubun' was having drinking water in the room, but she never advised to close the door. Once again she came and instructed him to place the bed-switch close to his reach. Oh!"

Konika disclosed all these without a bated breath and picked up a water bottle from the bag beside. "Doctor let me have some water." Anirban, husband of Kanika, was under my treatment and seated beside. He was picking his nails bowed headed.

"I couldn't endure much while almost the entire night passed away and said - I feel drowsy, unable to sit any more, unless the door is closed . . . he proceeded towards the door in a hurry scurry, simply pushed it a little with his utmost effort, but couldn't close it completely. Till today, being afraid of mom he never allowed me to close the door fully. Now a days I can't consider him as a masculine. I suppose I am a third party in this house."

Konika, with bowed head tried to suppress weeping with her lips pressed but tears in her eyes, full of individuality. Anirban, being more embarrassed, remained bowed headed, I asked Kanika to stay outside for having conversation with Anirban.

Anirban first came alone, with his problems of anxieties. Always tensed, afraid of crowd and going alone to distant places. Frightened of noisy people, alarmed of anyone's loud call. He perspires, his limbs trembles and heart palpitates in case of dissension with anyone. His entire body trembles violently within, while having conversation with the office boss. His face is impressive though, with signs of intellect but movement appear with full of hesitation and dilemma. Courteous enough, perhaps too much, and this is the door-stead of his disease just.

The detailed case history of Anirban was taken on the previous day. There was no speaking terms even between his mom and wife. They used to communicate each other indirectly or through mediators, for the urgent needfull domestic affairs. An ice-cool silence existed all over the house. Often it discharged sperks but went out on the ice.

"Anirban, do you think Kanika is somewhat answerable at least for all these matters going on? Would she expected to be more tolerant?"

Anirban moved his head instantly - "How can I blame her? She never enjoyed the usual environs after marriage." He reacted so promptly that indicated he feels guilty inwardly to find any fault with Kanika.

"Then is it your mom behind all these?"

Anirban is reluctant yet - "In fact, due to widowhood at a very early stage, my mom was dependent on me for whole the life. I was her's all. She used to accompany me to the school and back in my matured age even. For this, I was an object of mockery to my friends and all. Oftenly I became angry with my mom. She appeared indifferent then. Thus, slowly and gradually, everything turned eccentric, I couldn't stay without my mom. As I was always uneasy with others, I felt much more secured with mom. I sensed it won't proper. Never I was able to shut the door at night, as I felt mom would be left alone outside for the rest of life.

I considered myself as a selfish one to stay with my wife only, a sense of guilt overwhelmed me always."

"But what was your mom's view in the matter?"

"I realised mom's restlessness and queerish observance whenever I was intimate with Kanika. She used to move around us frequently on the trifling grounds. It was reasonable for Konika to be hurt for this?"

"Well, have you resolved it properly from your part?"

He instantly replied, "Had they adjusted it a little!"

"Don't you think it was right to be strict beside, rather to give indulgence to your mom's blunder?"

"Not that I haven't approached. In fact mom felt so helpless then, and I recollected the acts one by one that mom did for me all along, I was really unable to speak out on mom's face."

I had a discourse with Anirban's mother in the next sitting. She was having a well-shaped figure in that matured age even. Refined, neat dress represented her structure full of personality, bit angularly. Enough smart in conversation. Sign of preoccupied age with a little grey hair.

I asked - "What is your findings about a solution of this problem?"

"I have to go somewhere else, that's the only solution."

"No, then their relation will be bitter for ever. Besides, it's your incidental remark only, not a matter of importance. Living under the same roof, no means are there but to improve the relation as fair and normal between you three."

"Tell me, what I have to do?"

"See, Kanika is an outsider and now appeared between you. It's your responsibility to accept her as your's own."

Anirban's mother sprang up in fear - "oh my god! that lady! See doctor, Anirban is very much dependent all along. He can't do without me, a moment. Our married lady don't want to realize it just. She don't understand Anirban even. From the very beginning she wanted to settle for all the act of possession and dues as her right of being a wife, without any feeling for the man?"

"The gravity of affinity between Anirban and you both varies in a different manner. His wife never desired affectionate dependence from him, but manliness and that diversification integrates a man's individuality. Your feeling of loneliness has been shaped up through the cycle of events in your lifetime. Perhaps you aren't entirely answerable for that but the fact is you have subdued Anirban for fulfilment of that loneliness. That very youngest Anirban particularly as someone's husband, should be revealed with a husband-like manliness and all other matured virtues and defects also. You haven't allowed Anirban to be complete man, full of individuality and shaped with various diversified qualities. The only characteristic you have administered within him is dependence."

"I admit my connivance into this. But he had no resort after losing his dad at an early age except me and I also had nothing but him. He cannot pour his own drinking water even. His wife could have considered all these. See, how love may develop between them if she demands everything as ready-made one, without perceiving her husband?"

"One lady always wants to understand her newly married person, but never desires to accept a child-like person as her husband. For shaping up love within a couple, the primary proviso is both are matured human and none is childish. You just think, haven't you felt deprived yourself if you had experienced no virility within your husband? Now Anirban is a patient suffering from anxieties, simply became a unripened plant, because his branches and twigs couldn't grow under your great shadow. For you vainglorious lady, dreadful days are awaiting for giving shelter. That Anirban will hint with finger, for your misdeeds. Had he succeeded in conjugal relation, just your effectiveness might have reflected through him. His futility is nothing but alienation of your failure just."

I informed her, "Well, I will advise them. But I like to knock at you beforehand as the problem initiated from your part, so the efforts for execution should also be followed from that point. Anirban must come out from your shadow for shaping up mutual reliance between them. Once they develop a graceful relation among them, you wouldn't be treated as a third party, rather you will be a support for the entire relation but Anirban only. You will receive regard and acceptance afresh from their conjugal happiness. Oftenly their disagreements and various conflicts would be softened under the shadow of guardianship of an adult person like you. They will receive you afresh in their new chapter of life. This is your dignified role just. Otherwise really you would be lost to them gradually."

I had a conversation with Anirban - "Now the settlement is easier ever, as you have already perceived the source of your anxieties and want of self-confidence. You are diffident to shut the door of your room - it's your serious blunder. No one is inaccessible, simply for staying in other rooms. Infants are having one-sided dependence to their parents and the style just changes after their maturity and mutual dependence shapes up. Konika wants to depend on you just, so why should you behave like an infant then? It's nothing but your ignominy. You are having courage but simply arrested by your feelings of illogical sense of guilt. You should be strict with the mistakes of your mom, because however you are compassionate to her except those improper views only. You may be a goodboy to your mom if you are reluctant to be strict or give indulgence to her blunders, but that wouldn't be any act of saving her from the blunders. That would be a great misdeed with your mom. You, along with your mom, would be able to form nothing but an illusion for whole the life."

I persuaded Konika - "I feel your mental state. Your married life commenced through a conflict. There are some sort of things among them, which is not normal, rather it may be defined as incongruities. But they are the victims of circumstances merely. The child-widows of former days in a joint family had to face these problems a little. Women subsist with nothing but children after losing their husband in the era of nuclear families and that's the reason for so much unusual dependence on their children only. A long lasting gravity of reminiscence for years ago are active behind Anirban's diffidence. They should be allowed an opportunity and you have to be patient. I am confident about reshaping the situation. Not a triangular, try to cherish it from your heart as a triangular family from your part. You will find their change for your cooperative behaviour and the disintegration of the insignificant boundary of their long practised own two-sided world. The duo would be reshaped as a trio beyond your knowledge ever. When Anirban's mother will realise the fact that you are not related to snatch Anirban from her own, all the remoteness and rivalry would be as meaningless to her from that time on."

In these cases, distinctly we advise all for cooperative conduct from their own position and to wait for the result. Naturally the long-cherished common humane needs of someone finds a way out of conduct for fulfilment virtually for in effect of the friendly conduct of another. An assisting conduct starts from that side also. Eventually, the previous one become much more enthusiastic for friendly conduct. A positive vicious cycle forms for this reciprocal approach and the relation develops gradually. Since reliance to the act of motherly individuality is eternal, definitely Konika cherishes it deep in her heart.

It cannot be said that Anirban's mother wasn't having any need for liability and parental affection for a daughterly girl. Anirban was also having an urge for displaying a matured manliness through the friendship with Konika. I expect all their captured needs will be released within the new circle of conduct. Anirban turned up a day or two hereafter. The situation improved than stated previously. I have no information onwards. Perhaps that wasn't needed or they have lost their faith in treatment being obstructed at any point.

Now a days, widely it is observed everywhere that mothers are accompanying their grown-up children to their school and back, which strikes me dismayed for such a pathetic future, may be they are awaiting.