Public Healthin Early Days of Independent India: The Calcutta School of Tropical Medicine

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Health services which were shaped on the western industrial model were available only to the ruling classes- namely the army, civil services and the European trading community and to the native gentry auxiliary to the ruling classes which constituted a very small fraction of the native population. In the post colonial period, in most of the colonial countries, a native western educated took over power from colonists. To retain power and further strengthen it the native elites actively became heavily dependent on the ex- colonial powers and the latter enthusiastically responded by providing aid of various measures and kind used it as a weapon to retain their control over political, economic and social life of these countries. These newly independent countries thus not only followed the old colonial pattern of health services, which sub served mostly small elite and urbanized classes but as a result of rapid increase in dependence and commercialization of medical establishment withinthe ex- colonial countries.[1] In the middle decades of the twentieth century, Asia was at the heart of international efforts to create a new utopia, a world free from disease.

The Second World War transformed a sense of the possible with the revolutionary new technologies of disease control that it produced. The promise of a world without a disease led directly to the establishment of the World Health Organization (WHO) as one of the number of agencies constituting the United Nations (UN) after 1945. Perhaps the most fundamental shift occurring during the war was the emergence of the notion that health was a responsibility of government and a right of citizenship. This was radically different from earlier approaches to public health in the colonized world, where the colonial states had never been more than 'fire fighters' preventing epidemics and ensuring the productivity of labour. Health, the WHO constitution declared was a 'fundamental human right.' The foundation of WHO coincided with the culmination of anti-colonial struggles in India, Indonesia, Burma and Indo- China. Looking beyond

the immediate crisis of war, mass migration and Partition, each of the newly independent countries made plans to develop state – run health services for their population. The onset of the Cold War intensified the need for a new basis for public health – a basis not overtly political and also one that moved away from an onerous specification of responsibilities of individual states. The global commitment to public health that had circulated so widely during and after the Second World War was mobilized in the new context of the Cold War, to serve a range of different agendas. The international health campaigns of the 1950's were founded on the assumption that poverty was amongst the 'natural' conditions that the new medical technologies of the age could circumvent.[2]

Techniques for mass production of anti- bio tics were refined in the 1940's. This made it possible for local elites to protect themselves from dying of communicable diseases without having to maintain rigorous environmental hygiene to prevent exposure to disease for rich and poor alike. The developed world also became better able to protect itself from the prospect of epidemics spreading from the developing world and the focus of medical research shifted away from finding new technologies for communicable disease control except when threatened by newly – emergent diseases against which they have no protection. The spread of democratic institutions also affected public health services, because electorates typically preferred public funds to be used to provide private goods such as medical care rather than public goods such as sanitary measures to protect health of the population as a whole.[3] During the early years of independence the new rulers were impelled to carry over some of the democratic processes in making decisions concerning health. Taken as a whole this decision gave a perspective to public health principles and practices in the country, which was markedly different from the ones preached in the conventional schools of public health in western countries or elsewhere. Despite considerable difficulties, India could develop an endogenous, alternative body of knowledge that was more suited to the social cultural, economic and epidemiological conditions prevailing in the country. This led to an emergence of an alternative approach to education, training, practice and research in public health.[4]

After independence the Congress Party proposed Dr. Bidhan Chandra Roy's name for Chief Minister ship of West Bengal. Bengal at that time had been devastated by famine, communal violence, shortage of food, unemployment and a large flow of refugees in the wake of creation of East Pakistan. Dr. Roy like Nehru took a lot of interest in the community development project under Nehru's inspiration. He thought to bring all development activities in rural India like

agriculture, industry, veteniery services and social development under the common umbrella of a Community Development Block, with a Block Development Officer in overall command. He revolutionized health services by creating the primary health centres in different *thana* and bringing modern medical health care to the rural community for the first time. The medical and public health services in the districts were integrated and revamped under a chief Medical officer of Health. There was attempt to eradicate malaria and small pox scourges which devastated the land in the past. He played a crucial role in establishing the Indian Institute of Mental Health, the Infectious Disease Hospital and even Kolkata's first ever post graduate medical college. He reinvigorated some of the leading medical institutions in Calcutta like R.G. Kar Medical College, Jadavpur T.B. Hospital, Chittaranjan Seva Sadan, Chittaranjan Cancer Hospital.[5] The Government under the leadership of Dr. Bidhan Chandra Roy suffered from certain limitations regarding their policy towards the public health services. The medical treatment and public health services did not receive importance in the then Government of West Bengal. Although in 1948-49 a sum of Rs 248,88000 was sanctioned in the budget of West Bengal, out of which only a sum Rs 6509,000 was sanctioned for public health. The Government had promised to spend one lakh three crores for public health. This money was spent in the health centres under different thanas. In these health centres there were departments of outdoor, maternity department and malaria eradication centres. Apart from these, Rs. 72 lakhs were spent on rural hospitals.[6]

Based on the above observations this chapter would critically analyze the public health condition in India in post independent period and also discuss the role of the Public Health institutions in combating deadly diseases.

Early Phase of development and the role of the institutions

The 1950's and 1960's saw a height of techno optimism in the imagination of healthy development. The orthodoxy in international public health by the early 1950s was that the radical new technologies would allow for the control or even eradication of 'tropical' diseases as a precondition for development.[7] In post Independence period the primary purpose of the School of Tropical Medicine was identified as research. In 1948 extensive chemotherapeutic studies with newer synthetic anti-malarial including indigenous drugs were carried out and their action on the Indian strain of malaria parasite and doses suitable for Indian patients were determined. Clinical features of typhus fever as commonly encountered in Calcutta among the civilian population were studied and published. The Microbiology Department of the All-India Institute of Hygiene and Public Health co-operated in this investigation.[8] The metabolic changes in this disease were also studied. The variation in level of plasma protein and glucose tolerance was determined. It was

noticed that a marked diminution of plasma proteins occurs at expense of albumin faction during the febrile course. In view of extensive protein destruction in this disease a diet suitable for Indian patients had been projected and published. Treatment with polypore, penicillin and sulphathiazole and auremycin was unsatisfactory. Chloromycetin became the new drug of choice. A few patients who were admitted in a toxic state late in the disease however died in spite of chloromycetin therapy. Relapses were also not infrequent.

For Epidemic Dropsy, a new simple test evolved for the detection of argemon oil in adulterated mustard oil. The method of early diagnosis of kala-azar by the complement fixation test using an antigen prepared locally was by this time well established and the technique was further improved. A detailed study of nutritional status of the patients suffering from kala-azar was investigated and was initiated with the help of Dr. N. Sanyal, one the medical officers to the out-patients' department of the school. Research on Non-Communicable diseases were also done. The efficacy of Folic acid in cases of nutritional macrocytic anaemia (N.M.A.) with megaloblastic marrow and in macrocytic anaemia of pregnancy was well established by research. Regarding the metabolism of human malaria parasites, studies had been commenced to culture them in synthetic media with a view to ascertain their growth factors and to develop a method of testing various drugs for anti-malarial activity in vitro. At the beginning many technical difficulties were experienced but some of these have been overcome.

The problem of insulin resistance in diabetes was studied, the factors of importance in causation of insulin resistance in a proportion of cases were (i) hyperthyroidism, (ii) lack of glutathione, (iii) acute or chronic infection, (iv) hepatic disorder and (v) allergy. Appropriate therapy for the above conditions led to marked lowering of insulin requirement and the apparent insulin resistance could be overcome. In early diabetis the glutathione content of blood was within normal range, but in advance cases it was invariably low, and it did not show any change with variation of blood sugar level.[9] Two indigenous drugs, aqueous extract of Portulaceccae(*Nonia*) and an alchoholic extract of Cephalandra indica(*Kundru*) were tried in with encouraging results.

Dr. S.C. Ghosal, M.B., D.P.H., D.Bact. (Lond.) the Professor of Bacteriology and Pathology researched on Correlation of severity of diphtheria cases with mitis type of infection and effect of treatment with Sulphaguanidine on the excretion of Vib. Cholerea.

The Professor of Protozoology Dr. S.Sen, M.B., D.T.M. carried research on Intestinal protozoa.[10] Spirillum minus infection in man following rat bite causing a relapsing fever in man. Infection is usually transmitted to man by the bite of naturally infected rats it is designated rat-bite fever.[11] Under Dr. S.M. Ghosh, M.B., the Professor of Medical Entomology research work was carried on the efficacy of Tetmosol supplied by Messrs. Imperial Chemical Industries (India) Ltd., in the treatment of scabies in tropical climates was studied in the laboratory. So far Dimethyl phthalate has been used as repellent. A 5% solution was prepared in the laboratory with ground-nut oil and 29 pure cases of scabies were treated. DDT on sandflies was carried out in Koarapukur, a village 11miles south of Calcutta and four other neighbouring villages. All these villages were hyperendemic for kala-azar and full of sandflies. Prevention of infestation of stored food grains by beetles, by using jute bags treated with insecticides were also experimented upon.[12]

The doctors of CSTM also enjoyed international exposure for research and knowledge. Dr. P.C. Sen Gupta, attended the Fourth International Congress on Tropical Medicine and Malaria held at Washington in 1948, and also visited certain research centres in the U.S.A. and U.K. Dr, Dharmendra was deputed to attend International Leprosy conference in the U.S.A., U.K. and Africa. Dr. C.R. Das Gupta attended the Haematology department at Cambridge in 1950, and also visited several institutions in the United Kingdom and the U.S.A. to study the haematological work in progress there. Messrs. Teddington Chemical Factory very kindly contributed to the School a sum of Rs. 10,000 to cover the expenditure on this account. With a Rockefeller Fellowship Dr. J.B. Chatterjee proceeded to the U.S.A. in October 1950 to study different aspects of modern Haematology.Dr. Himansu Chakraborti and J.B. Chatterjee were admitted to Doctorate of Medicine degree of the Calcutta University. Dr. R.N. Chaudhuri, Dr. J.P. Bose, Dr.Col. Greval and Dr. C.R. Das Gupta were elected Fellows of the National Institute of Sciences.[13]

Dr. J.C. Gupta, M.B., F.N.I. the Professor of Pharmacology carried out research on Indigenous drugs. The action of an alchoholic extract of Daemia extensa (Asclepiadaceae or *Akanda* in bengali) on the uterus had been under investigation. A hydrochloride of an alkaloid extracted from the stones of the fruits Zizyphus jujube (*China Khejur* in Bengali), was obtained through the courtesy of Astanga Ayurveda Vidyalaya Calcutta. Lippia nodiflora drug was obtained through the courtesy of Dr. B. Mukherjee, Director, Central Drug Laboratory.[14] Capt. G. K. Ray, Assistant Research Officer (Chemistry), Indigenous Drugs Enquiry, was awarded the degree of Doctor of Philosophy (Science) of the

Calcutta University and Dr. P.K. Roy, Assistant Research Officer (Pharmacologist), Indigenous Drugs Enquiry was recipient of the B.I. Research Gold Medal of the Calcutta University for their respective meritorious works.

Fourth International congress on Tropical Medicine and Malaria at Washington, D.C., May, 1948 was attended by Dr. P.C. Sen Gupta. A paper on kala-azar was read by the doctor.[15] This joint session of the International Congresses on Tropical Medicine and Malaria was held after a lapse of ten years, the last being held at Amsterdam in 1938. During the decade following the last meeting considerable advances made in various tropical diseases, the most important finding relating to malaria being that of the pre-erythrocyte form of the malaria parasite by Prof. H.E. Shortt and his co-workers. During the stay in USA Dr. Sen Gupta visited the centres of medical research in U.S.A. and England. He visited Mount Sinai Hospital, Rockefeller Institute of Medical Research, Sloane Kettering Institute of Cancer Research. The School of Public Health of the Faculty of Medicine, Columbia University, in New York, Department of Parasitology and Tropical Medicine, Tulane University Medical School, at New Orleans, The Communicable Diseases Center, Atlanta Ga., and the National Institute of Health at Bethesda, John Hopkins University School of Hygiene and Public Health at Baltimore and the Agricultural Research Center at Beltsville, Md. In England, the London School of Hygiene and Tropical Medicine, the Welcome Laboratories of Tropical Medicine, the National Institute of Medical Research at Hampstead, in London, the Liverpool School of Tropical Medicine, The Royal Infirmary at Manchester, and the research laboratories of Messrs. May and Baker. Ltd, at Dagenham was visited by him.

All these international exposure of the medical research of CSTM furthered its international reputation as a research institution.

The Indian Council of Medical Research revived the grants on Indigenous Drugs Enquiry from April 1948 shortly after independence, which was stopped two years before. A research fellowship has been offered by May & Baker, Ltd from March 1950 for carrying out investigation on Antihistaminic drugs.[16]

Dr. R. N. Chakravarty, D.Sc, F.R.I.C., the Professor of Chemistry also carried out research on Indian Medicinal Plants Cephalandra indica Nand (*Telakucha* in Bengali). This drug is said to be useful in the treatment of diabetes. Earlier workers examined the entire plant and sought for the antidiabetic principle.

The root is also said to be effective in diabetes. Fresh root was locally collected and expressed juice was subjected to preliminary examination.

Two varieties of Clitora ternatia Linn, (*Aparajita* in Bengali and Sanskrit)—white flowered and blue flowered, traditionally was used in indigenous medicine. The root, Diuretic, anthelmintic, laxative properties of the root and its usefulness in dysentery, bronchitis and asthma came under investigation in CSTM.

Enhydra fluctuans Lour, (*Hingcha* in Bengali), a marsh herb common in Bengal and Assam, whose slightly bitter leaves were used in the indigenous system of medicine as a cure of inflations, leucoderma, bronchitis, skin diseases, neuralgia and other nervous diseases and in torpidity of liver, was also investigated systematic examination of the dry plant gave 0.021% of an essential oil. 4.7% of a non-volatile non-saponifiable matter and a minute quantity of a bitter substance soluble in hydroxylic solvent. Quantitave determination of other inorganic consistent was carried out. A short account of the work appeared in the 1950 Abstracts of the Indian Science Congress.

Glycosmis Pentaphylla Correa (*Aashshaora* in Bengali) was traditionally regarded as a febrifuge and as an antihelmintic. Account of the work appeared in the Abstracts of the Indian Science Congress 1945. Active principle of the plant Andrographis paniculata Nees (*Kalmegh* in Bengali) was previously found by doctor Gorter. The work was being continued in collaboration with Mrs. D. Chakravarti, Professor of Chemistry, Bethune College.[17]

With the object of finding out a sapogenin suitable as starting material for the preparation of the cortisone, attempts are being made to isolate sapogenins from various Indian Dioscorea plants.

Suchikabharana an Ayurvedic preparation containing snake venom produces a progressively higher rise of blood pressure with increasing doses in contradistinction to the action of venom alone.

In the year 1951 investigations on the following drugs were in progress Securigera securidaca Linn. (*Absi-ul-mugha*)—Preliminary observations had been made on general pharmacological action of the drugs.

Rauwolfia serpentine Benth (*Sarpagandha*)—Attempts are being made to find out a suitable biological method of standardisation.

Daemia extensa Linn (*Chhagalbati*)—An injectable solution has been prepared which has been found to possess pituitrin-like action on the plain muscles of the gut and uterus. It is being given chemical trial.

Medico-legal work was the primary function of the department of Serology and the department worked as the Chemical Examiner to the Government. Blood stains on exhibits in criminal cases from all over India, Pakistan (up to November 1949) and Burma were submitted to the department for the determination of the origin of blood groups in cases, foe forensic purposes. Thus Chemistry was used in the service of law. Blood and C.S.F. specimens for complement fixation test for the serodiagnosis of syphilis were received in the department from most of the State Hospitals and Hospitals of teaching institutions to the State of West Bengal, besides the Carmichael Hospital for Tropical Diseases. Rh typing and tests for iso-haemagglutination in selected cases attending the Eden Hospital and certain other institutions were also done in the department.[18]

The Haematology Research Department under Dr. C.R.Dasgupta, M.B., D.T.M., F.N.I. carried on research work on anaemia regarding response to Vitamin B12 and Folic Acid. Research was also done on how anaemia patients responded to other Haematinics like refined liver extracts. An outdoor Anaemia clinic was also started.[19]

Role of Vitamin C in the utilisation of iron for Erythropoiesis was also studied. Vitamin C given along with small dose of iron (ferrous sulphate) was studied in a few cases of hypochromic and dimorphic anaemia with cellular normoblastic bone marrow. Studies of anaemia in pregnancy were also carried on woman and also the effect of treatment with proper haematinics according to the anaemia.[20]

Dermatological Research Department under Dr. D. Panja M.B. worked on Statistics of Incidence of skin diseases in Calcutta. The want of statistics as to the incidence of skin disease in India was long felt. A statistics of incidence of skin diseases with an analysis of 50,000 cases was published in 1948. Research workers and authors were often confronted with great difficulties for the want of reliable statistics. Misconceptions were often found about the occurrence of some diseases in certain parts of this country. An all-India record was badly needed. The analysis of 50,000 cases in this part of India was hoped to, serve as an impetus for publication of similar records, so that all India statistics could be prepared from the figures published from all other Provinces. The records published from here was exhaustive and contained the age, sex and percentage of each of the diseases with relation to the total figure. The number of cases being 50,000 and the period spread out over five years the publication of the report certainly claimed to be a useful one.[21]

Clinical Studies detected two cases of Madura foot in Bengal where diseases is not prevalent. The fungus was isolated from each cases and identified. These cultures were sent to Prof. J.T. Duncan of the London School of Hygiene and Tropical Medicine, who corroborated the identification of —Actinomyces madurae.[22]

Therapeutic Investigations included studies of amtithistaminic drugs to a series of cases of various allergic skin manifestations. A paper was published in the Journal of Medical Association.[23]

Improved therapy of Alopecia areata by whole milk injection (sterile) intradermally on alopecia patches was treated with success, More than 200 cases were treated and good results were obtained.[24] Dr. P.C. Sen Gupta, M.B. worked

on incidence of Kala-azar in Calcutta, especially the problem of drug resistant kala-azar. Biochemical investigations in kala-azar were also practiced. The work on hepatic and adreno-cortical functions in kala-azar was carried out during 1945-46 in collaboration with the workers of the Diabetes and Biochemistry Department. The result of these investigations was published.[25] The presence of symptoms and signs of avitaminosis was studied in patients suffering from kala-azar in the course of routine examination of the cases during the last ten years particularly since the Bengal famine of 1943.

Dr. B. Bhattacharyya, M.B. joined his duties as the Sir U.N. Brahmachari Research Fellow in March, 1950.Dr. Dharmendra, M.B.B.S. D.B carried Leprosy research which included investigation on the use of the sulphone drugs in leprosy, and use of PAS in the treatment of leprosy. His main work has been in connection with the therapeutic studies in leprosy with the sulphone drugs.

Chemoprophylactic trials were carried out in CSTM since 1948, the conclusion reached was that both chloroquine (0.2gm. base weekly) and camoquin 0.4gm. (base) fortnightly afford a high degree of protection from malaria and cause a marked reduction in spleen rate with consequent general improvement of health and working capacity of the villagers and that these two drugs are superior to paludrine. It was considered that where anti-mosquito measures are impracticable chemoprophylaxis should find an important place in the suppression of malaria fever in rural areas.

From a study of the historical changes in the spleen it appears that definite signs of hypersplenism are present in chronic and advanced stages of kala-azar. Persistence hypersplenism may be one of the factors responsible for drug resistance in kala-azar.

An epidemiological survey was carried out in Assam in 1951. It revealed that in spite of mass treatment kala-azar continues to be endemic and epidemic cycles are common. Antimony-resistant cases constitute a new problem. At the time of the survey there were indications of an increase in some of the endemic areas. It was noted that in the tea estates, the incidence of the kala-azar was lower than that in the adjoining endemic areas. This was probably due to the use of insecticides in addition to treatment of cases of kala-azar in these estates.[26]

In many tea districts of Assam, the Naga sore disease was endemic; occurring almost every year, sometimes it assumes such an epidemic form as to disable a large proportion of the labour population. It assumed importance during the last war when many troops suffered, During the Burma evacuation we had several cases admitted into this hospital. In 1943 the disease spread to Bengal where it had been unknown for many years and also to many provinces of India. During the period under review there was an outbreak of Naga sore in rural area in West Bengal near the Indo-Pakistan border. It was studied jointly by a team of workers of the School and a symposium was held which was also attended by many members of the medical profession.

In the year 1951, the School completed thirty years of its activities. when contributions of considerable importance to medical science were made, some of which were fundamental in character. Research workers from overseas countries interested in investigation of the diseases prevalent in the tropics were often deputed to carry out the researches at the School. Dr. William A. Sodeman, Professor of the Tropical Medicine, Tulane University Medical School, New Orleans, U.S.A., who came here on a Fulbright Scholarship, made a special study in "nutritional disorders" and on chemotherapy of amoebiasis. Dr. Mir Abu Torub from Afghanistan underwent special laboratory training under the Government of India's Cultural Scholarship Scheme.[27]

Dr. J.B. Chatterjee, who went to U.S.A. on a Rockefeller Fellowship to study different aspects of modern Haematology, under Professor Damshek.Dr. Himansu S. Chakravarti proceeded to U.S.A. in September 1951 on a Rockefellor Fellowship. Dr. M. Sen went to the United Kingdom on study leave.Dr, Dharmendra, Research Worker in charge of the Leprosy Department, was elected to the panel of Leprosy Experts, World Health Organisation. He was also deputed as a World Health Organisation consultant to the Government of Burma to advise on the planning of their anti-leprosy work.[28]

(B) The Endowment Fund of the School of Tropical Medicine was built up from the inception of the School out of the generous contribution received from the public, business communities of Calcutta and various organizations representing tea, jute, mining and other industries.

Contributions[29] made during the years to the Endowment Fund up to 1951 by different industries:

TABLE 1

Indian Tea Association	…	…	Rs. 25,500.00
Indian Jute Mill Association	…	…	Rs. 27,500.00
Calcutta Corporation	…	…	Rs. 10,000.00
Messrs. Tata Iron & Steel Co. Ltd.	…	…	Rs. 2,500.00
East Indian Railways	…	…	Rs. 6,000.00
Messrs. Dunlop Rubber Co. (India) Ltd.	…	…	Rs. 1,500.00
District Board, Jalpaiguri	…	…	Rs. 400.00
Messrs, Walford Transport, Ltd.	…	…	Rs. 100.00
Messrs. Burmah Shell, O2 Storage & DistributionCo. of India. Ltd.	…	…	Rs. 200.00
Messrs. Associated Cement Co. Ltd.	…	…	Rs. 500.00
Messrs. Sandoz Products, Ltd.	…	…	Rs. 1,000.00

Source: Annual Report of the Calcutta School of Tropical Medicine and the Carmichael Hospital for Tropical Diseases 1948-51, p.14

Research Fellowships and Scholarships and special grants were received from the following sources for carrying out special investigation or researches on particular subjects:

TABLE 2[30]

Organisation	**Research**
Teddington Chemical Factory	Blood diseases
May & Baker	Antihistaminics
Glaxo Laboratories	Vitamin B12
Bengal Chemical & Pharmaceutical Works	Chemotherapy

Source: Annual Report of the Calcutta School of Tropical Medicine and the Carmichael Hospital for Tropical Diseases 1948-51, p. 15

During 1951 the grants received from the Indian Council of Medical Research for research programmes totaled to Rs. 1,04,350.00. In addition, the Council provided for the posts of the head of the leprosy department and one for clerical assistance. The following table reflected the vast emphasis on indigenous drugs and apprehensions and attempt for combating leprosy.

TABLE 3[31]

1. Cholera	…	…	Rs. 380.00
2. Indigenous Drugs	…	…	Rs. 25,300.00
3. Haematological Unit	…	…	Rs. 16,465.00
4. Leprosy	…	…	Rs. 21,759.00
5. Filariasis	…	…	Rs. 9,450.00
6. Animal skin diseases communicable to man		…	Rs. 5,620.00
Rheumatic arthritis (Isolation of steroidal			
7.Sapogenis from India Dioscorea	…	…	Rs. 4,500.00
8. Extra-renal ureamia arising out of severe dehydration		…	Rs. 9,640.00
9. Malaria	…	…	Rs. 4,282.00
10. Epidemic Dropsy	…	…	Rs. 6,954.00

Source:Annual Report of the Calcutta School of Tropical Medicine and the Carmichael Hospital for Tropical Diseases 1948-51, p.14

A grant of Rs. 4,678 was received from the council of Scientific and Industrial Research for biological studies on malaria parasites.

With the close of the year 1956-57, the School of Tropical Medicine completed its thirty-sixth year. The School made significant progress with regard to research, post-graduate teaching and medical relief. It is a pleasure to report that some of the members of the staff were awarded distinctions during the year. Dr. H.N. Ray,

Professor of Protozoology was awarded the 'Joy Govind Law Memorial Medal' for Asiatic Research in Zoology in 1956; Dr. R. N. Ray, Demonstrator in Hematology and Dr. B. Chaudhuri, House Physician, were admitted to the degree of Doctor of Medicine of the Calcutta University; Shri B. Das Gupta, Chemist, was admitted to the degree of Doctor of Philosophy (Science) also of the Calcutta University; Dr. A.B. Chowdhury, Demonstrator in Heminthilogy, has been awarded the Rockefellor Foundation Fellowship for advanced study on parasitology at Cornell University.

On a special invitation, Dr. J.B. Chatterjee, Professor of Haematology, participated in the deliberations of the 6thCongress of the International Society of Haematology in Boston, U.S.A., in August-September, 1956 and read two papers. He also attended the International Congress on Blood Transfusion and visited the important Haematological Centres in Boston, New York and London.[32]

The existing posts of Research Workers under the Endowment Fund have been upgraded as Professors with higher scales of pay and non-practicing allowance; Dr. J. B. Chatterjee and P.C. SenGupta had been appointed as Professor of Hematology and Cytology respectively. The posts of five Assistance Research Workers have been renamed as the Assistant Professors in the respective subjects. Some new and additional posts have been created. These are: one Assistant Professor of Clinical Pathology for the D.C.P. class, one House Physician for the Hospital, one medical officer for the Central Stores, Dispensary and Practical class, one Special Officer in Entomology. A munificent grant of 25,000 dollars has been allotted by the Rockefeller Foundation for purchase of research equipments for the School.[33]

Research—Among the more important research contributions during the year 1956-57, the following may be mentioned: Progesterone, a female sex hormone, has been prepared for the first time in India from diosgenin isolated from roots of Indian jungle yams. A patent on the method of isolation of Diogenes has been applied for. An investigation on the virulence of variola virus and the state of immunity of the patients suffering from small-pox during the recent epidemic. Indicated that it was the lowered state of immunity rather than the virulence of virus, which was responsible for large morbidity and mortality. A case of histoplasmosis was diagnosed culturally reported from the School in 1953 for the first time in India. The incidence of kala-azar, has gone down very considerably in West Bengal.[34] In 1956-57 research had been made on Rauwolfia serpentine, which states, a 2% hydrochloric extract of alcoholic percolate of the non-resinous alkaloids

of Rauwolfia serpent (R.S.) has been fractionated by means of the counter current distribution techniques (C.C.D.).

With the help of electron and phase microscopy it was possible to identify cell membrance around the leprosy bacilli, evidences of the growth and multiplication of bacilli as well as the nature of their response to sulphone treatment. Cytochemical character of the bacilli as well as that of lepromatus lesions were determined by means of appropriate techniques. Resistance of different biting insects against various insecticides was investigated. Extensive histochemical studies were made on common helminthic parasites.

Two hundred patients with their families have been investigated since 1953 and majority of them represent Hb.E-thalassaemia disease. Preliminary studies indicated relative resistance of these patients to induced infection with P. vizax. In normal Bengalee population, Hb.-E, as also thalassaemia have been separately found in heterozygose state. Recently an instance of Hb.S.—thalassaemia desease has also been recorded.

Radiological analysis of a series of 88 unselected cases of duodenal ulcer showed evidence of parasite infection (hookworm and /or E.hystolytica) in more than third, thus indicating a possible association between duodenal ulcer and parasitic infection.

The Government of West Bengal continued to maintain the Hospital and bore most of the expenses of the School, in addition it provided a grants of Rs. 1,96,000 for the purchase of Electron Microscope and Freeze Drying Apparatus.[35] The outbreak of lathyrism, occurring on a fairly large scale in a rural area of West Bengal since 1957 was attributed to consumption of Khesary widely cultivated locally with seeds brought from Bihar, the known endemic area. Morphologically they were much larger size than the Bengal variety. The villagers have restored to Khesari cultivation as the heavy flood in 1955 turned most of the arable land unsuitable for rice crops. The pulse (de-husked) was consumed liberally for 3 to 5 months a year. The history revealed that symptomps usually appeared after two months of khesari consumption.

In the Bandipur Union of the Hoogly District a parasitological survey had been in progress to ascertain the prevalence of parasitic infections in the rural area and the morbidity attributed to them. Attempts had been also made to define epidemiologic background of the infections operating in the area in order to suggest suitable measures of control. This survey has been organized on the basis of appropriate population sampling procedures, qualitative and quantitative laboratory investigations, history taking and clinical examinations.[36]

Dr. T.K. Saha, Assistant Professor of Tropical Medicine received training at the Virus Research Centre, Poona. Dr. R.N. Chaudhury, Director has been elected a member of the sectional Committee for "Medical and Veterinary Sciences" of the

Council of National Institute of Sciences of India. Dr. R. N. Chakravarti, Professor of Chemistry has been elected a member of the Working Group on "Plant Drugs and Antibiotics" of the P&D Committee of the Council of Scientific and Industrial Research. Dr. J. B. Chatterjee, Professor of Haematology has been elected President of the Indian Society of Haematology.[37]

With the close of the year 1961-62 the School of Tropical Medicine steeped into 42nd year of its existence. At the invitation of the Science Council, United Arab Republic, Dr. R.N. Chaudhuri, Director attended the international Symposium on 'Bilharziasis' at Cairo in commemoration of the centenary of Dr. Theodor Bilharz as a delegate of Government of India. Dr. A.B. Chowdhury, Professor of Helminthology attended the International Conference on communicable disease held in Tashkent, U.S.S.R. as a delegate of the Government of India. Dr. H.N. Ray, Emirates Professor of Protozoology went on a lecture tour to the U.S.A. organized by the American Institute of Biological Sciences. A team of workers including Dr. T.K. Saha, Assistant Professor of Tropical Medicine and Dr. P.P. Mitra, formerly Assistance Research Officer under the Indian Council of Medical Research were deputed to Raghunathganj in the district of Murshidabad for investigation of lathyrism in November, 1961.[38] Lt. Col. S. C. Gallup, M.C. Preventive Medicine Officer of U.S.A. Medical Society, Okinawa worked at the School for two months from April, 1961 for clinical study of tropical diseases.

Under the mutual agreement a team workers of the John Hopkins University, Baltimore consisting of four officers took assignments on research problems in tropical diseases at the School from September, 1961[39] Prof. E.L.Schiller with the department of Heminthology actively participated in the parasitological survey at Bandipur and contributed towards its progress significantly.

In the Teaching Programme—Thirty-two students appeared in the D.T.M.&H examination held under the University of Calcutta amd 69% of them passed. Dr. Sisir Kumar Dutta who topped the list of successful candidates was awarded the "Lakshmimoni Gold Medal" and the "Chunilal Bose Medal", while Dr. Girish Nandan Prasad standing second in order of merit received the "Russomoy Silver Medal". Dr. Rama Prosad Chowdhury was awarded from the School "Dr. J. N. Chowdhury Gold Medal" for securing the highest mark in a special examination in Tropical Medicine. The D.C.P. course for one year was attended by ten students, and 80% of them passed the examination held under the Faculty of Tropical Medicine and Hygiene, West Bengal. Dr. Kanak Sankar Roy who topped the list of successful candidates was awarded the "Dr. J. N. Chowdhury Gold Medal" in Clinical Pathology from the School. In the supplementary examination held for all the unsuccessful students of the previous year's eight out of nine passed. The D.L.T. (Diplomas in Laboratory Technique) course for one

year was attended by twelve students and all of them passed the examination held under the Faculty of Tropical Medicine and Hygiene, West Bengal. The Leprosy Training course was attended by seventeen students. Seven students appeared at the examination and six were successful. Dr. B.C. Das was awarded the "Binodini Gold Medal" for standing first. Reciprocal participations of the staff of the School and that of All India Institute of Hygiene and Public Health in the teaching programme of both the institution continued as usual. Some members of the staff also took a few classes for the post-graduate students of the Calcutta University including those of the University College of Medicine. Facilities were also extended to medical personnel from different parts of India and to those deputed from foreign countries for special training and orientation in different subjects through variable lengths of time. Prof. Everett L. Schiller of Johns Hopkins University kindly undertook the teaching responsibilities in the Biostatistics course, organized for the benefit of the staff of the School for a period of about 3 months. The course consisted of eighteen one-hour didactic lectures and an equal number of two-hours practical classes. He also took an active part in the teaching programme of Helminthology for the D.T.M. and H. class.[40]

In order to facilitate research, clinical investigation and teaching the scheme for opening a Nutrition and Metabolic Disease Unit with provision of two medical officers, one chemist, one laboratory assistant and eight inferior staff was sanctioned by the Government of West Bengal. A grant of $15,000 was sanctioned by the Rockefeller Foundations New York for the supply of scientific equipment towards the development of the Development of Virology.[41]

The outbreak of a paralytic disease reported as 'mystery disease' in a rural area of Malda district, West Bengal, involving more than 400 individuals during the period, April-June, 1962, was investigated. Clinically diagnosed as lower motor neurone paralysis with a symmetrical peripheral distribution it raised the suspicion of tricresyl phosphate poisoning. Epidemiological studies traced the source of mischief to the imported wheat flour. From the surface of the bags the chemical had apparently soaked into the flour. Chapatis made out of it were said to taste somewhat bitter and caused initial gastro-intestonal upset in many cases. The flour in a local institution received as a free gift from a foreign organisation was the source of the outbreak, but how and where it got contaminated during its long transit from abroad to an inland part of the country was not known. The disease was investigated by a team of the School Comprising Dr. R. N. Chaudhuri, Director; R. N. Chakravarti, Professor of Chemistry; Dr. J.K. Sarkar, Professor of Virology; Dr. S.M. Ghosh, Professor of Entomology; Dr. K.K. Mukherjee, Epideomologist and other staff.

An outbreak of "gastro-enteritis" in Tamluk sub division (District Midnapore) was investigated, which proved to be caused by V. Cholerae (Inaba). Sixteen villages including an area of regular annual winter epidemics of cholera had been surveyed. Employing the principle of "Immuno-fluorescene" a quick and reliable method of diagnosing cholera was devised; which was likely to be particularly helpful for further investigation of any rural outbreak.

The affected areas were repeatedly visited by the Director, Associate Professor of Bacteriology and other staff of the School. It is of interest to note that the research collaboration between this institute and the John Hopkins University, U.S.A. throughout the year has been particularly fruitful.[42]

As an invitee from India Dr. R.N. Chaudhuri, Director of the School attended the Symposium on "Scientific knowledge of Tropical Parasites" held in Singapore which was organised by the UNESCO, South East Asia Science Co-operative Office. Indonesia. He was awarded by the Calcutta University "Nilmoney Brahmachari Gold Medal". He was appointed by the Ministry of Health, Government of India, a member of Reconstituted Indian Pharmacopoca Committee for a period of five years. Dr. P.C. Sen Gupta, Professor of Pathology was appointed a member of the W.H.O. Expert Advisory Panel on Parasitic Diseases for a further period of five years from 31st January, 1963.Dr. M.L. Chatterjee, Professor of Pharmacology has been appointed a member of the Development Council for Drugs and Pharmaceuticals under the Ministry of Commerce and Industry, Government of India, and also a member of the Drug Technical Advisory Board of the Indian Council of Medical Research.

Dr. S. N. Chatterjee, Biophysicist attended the Fifth International Congress of Electron Microscopy at Philadelphia and also visited centres of interest in the U.S.A. on a fellowship offered by the Rockefellor Foundation. The CSTM made remarkable progress in its development scheme during the Second and Third Five Year Plan period. Admittedly, it was great achievement that in the course of the Third Plan years as many as eight development projects including introduction of two post-graduate courses at an annual recurring expenditure of Rs.2,17,000.00 have become fructuous and they are—establishment of the departments of Virology, Mycology, Biophysics, Nutrition & Metabolic Diseases Unit, Field Research Unit; upgrading of Leprosy Research Department; introduction of D.C.P. (Diploma in Clinical Pathology) and D.L.T. (Diploma in Laboratory Technique) courses.

The clinical trial of the compound 377 prepared in the Chemistry Department had been carried out on more than 100 patients, consisting of both lepromatous and tuberculoid types of leprosy. Phosphates in some indigenous plants and vegetables were identified and their mechanism of action studied biochemically. In treatment and prevention of protein malnutrition in children the usefulness of vegetable protein as a substitute for milk which could not be procured owing to economic reasons was widely realized. In this connection the efficacy of Bengal gram flour mixture with green leaves and molasses (gur) was further confirmed by larger clinical trials. Its use was extended through community development projects.[43]

The useful collaboration between the School and the Johns Hopkins University, Baltimore, U.S.A. continued on a well co-ordinated research

programme. The association of Drs. C.C.J. Carpenter and B. Sack with the departments of Tropical Medicine and Bacteriology respectively had been remarkably productive.

Professor R. N. Chakravarti, Department of Chemistry[44]worked under the Glaxo Research Scheme and reported on a large number of plant specimens of different species as Apocynacea family were collected through the Conservators of Forests, Northern Circle, West Bengal and through the State Silviculturist, Madras. Where both aqueous and alchoholic extracts of root and bark of Carissa carandus(*Karomcha*) and root of Sarissa spinsrum(*Bainchi*) were found to have hypotensive properties. Herpestis monniera (*Brahmi)* was regarded as a remedy for insanity, epilepsy etc. and is also considered to be a nerve tonic. As observed by earlier workers it was found to yield considerable amounts of Manitol.[45]

Works were carried out under the Medical Plants Scheme of Government of West Bengal. Analysis of vegetable drugs received from the experimental cultivation at Rongpo Darjeeling was continued. Fifty-six samples of Ipecac (*Antomool)* were analysed. Enteric coated tablets of bismuth-iodide complex of the total alkaloids of ipecac roots were made with the help of Dr. D. Chakravarty of Messrs. Smith Stanistreet & Co. Ltd, Calcutta for clinical trial in the hospital under the Tropical Medicine Department.[46]

Professor S. M. Ghosh of Department of Medical Entomology work on Laboratory investigations on biological control of mosquitoes. Studies on Algea, Fungi, Protozoa and Anthropod predators living in natural breeding pools of mosquitoes, their life history, seasonal prevalence, parasitic habits and ability to destroy mosquito larva and pupa were continued, Besides the fungi belonging to families Aspergilliaceae (Soil Fungi), Coelomonmycetaceae and Cladosporium infected and destroyed mosquito larvae. A new fungus of the family Actimomycetes was discovered in a mosquito breeding pool in Calcutta. The fungus thrived well in the dead larvae and disseminated to others when degeneration proceeded. Encouraging findings on Lacotrephes maculates suggested strong possibility of using it as a weapon for biological control of mosquitoes in this country.

In connection with the outbreak of paralytic disease in Malda district which started in April 1962, investigations on the possibility of arbor virus playing a role in the epidemic and spread of the disease were undertaken along with the other lines of investigations carried out by different departments of this institution. For this, a team of workers under the active guidance of the Director, School of Tropical Medicine worked in Malda area. The survey was done in the village under police station Gazole, Bamangola, Habibpur and Malda proper.[47]

The Third Five Year plan launched in 1961 discussed the problems affecting the provision of PHC's and directed attention to the shortage of health personnel, delays in the construction of PHC's buildings and staff quarters and

inadequate training facilities for the different categories of staff required in the rural areas. The third five year plan highlighted the inadequacy of health care institutions doctors and other personnel in rural areas as being major shortcomings at the end of the second Five year Plan.[48]

In the meanwhile between 1961-64 interdisciplinary researches work done at National Tuberculosis Institute (NTI) received worldwide attention.[49] Also in between the Chadha Committee was constituted in 1963 under the chairmanship of Dr. M.S. Chadha to go into the details of the requirement related to planning and functioning of PHC and performance of National Malaria Eradication Programme. The committee recommended strengthening of rural health services, vigilance through medical institutions and developing multipurpose domiciliary health services for all health programmes.[50]

Among the important field investigation works carried out by the School in 1966 mention may be made of the outbreak of gastro-enteritis in certain areas in Assam; serological survey for chikungunia virus antibody in Purulia and Krishnagar; investigation of cases of suspected encephalitis in Kharagpur and continuance of field work at Bandipur (Hoogly District) in relation to the parasitological project in collaboration with the John Hopkins team. Studies on acute meningitis were undertaken by the John Hopkins team in collaboration with this institution and Infectious Diseases Hospital, Beliaghata.

W.H.O, Inter-Regional Training Courses on Cholera Control were held in May/June, 1965 and March/April, 1966 in collaboration with the Union Ministry of Health and Government of West Bengal. The courses were attended by participants from different countries abroad and from various States in India. Interested local and foreign workers also attended the courses.

A comprehensive programme was arranged for the W.H.O. Travelling Group comprising 20 senior Public Health Administrators from Eastern Mediterranean Region for discussion on epidemiology, pathogenesis, diagnosis and treatment of cholera. At the instance of Government of India, a training course in cholera was arranged for three medical officers of the Gujarat State, Dr. Sunthorn Thongkong and Sr. Jumnong Chimponth deputed by W.H.O. from Thailand attended a short course of lecture-demonstration in cholera.On an invitation from the Chairman of the National Organising Commmittee, London, Dr. P.C. Sen Gupta, Professor of Pathology, attended the Second International Conference on Protozoology held in London and presented a paper. He also presided over the Medical and Veterinary Section of the 53rd meeting of the Indian Science Congress held in Chandigarh.

Sponsored by the Council of Scientific and Industrial Research and under the auspices of Indo-Soviet Cultural Exchange Programme, Dr. R.N.Chakravarti, Professor of Chemistry visited different research institutions engaged in work on

the Chemistry of Plant Products in U.S.S.R.As a delegate of the Government of India, Dr. A.B. Chowdhury, Professor of Heminthology and Chairman, Division of Parasitology attended the W.H.O. Inter-regional Seminar on Filariasis held in Manila. He also attended the Second Medical Conference on Parasitic Diseases in Bangkok and presented a paper. He was also elected President of the Medical and Veterinary Section of the Indian Science Congress for its 54th session.

Invited by the University Grant Commission, Prof. R.N. Chaudhuri and Prof. J. B. Chatterjee participated in the teaching programme of the Summer Institute in "Physico-Physiological basis on Modern Medicine" held in All India Institute of Medical Sciences, New Delhi. Dr. J. K, Sarkar, Professor of Virology attended the meeting of the Pathology Expert Group of the Armed Forces Medical Research Committee held in New Delhi. Prof. J. B. Chatterjee and Dr. S. Swarup participated in the Seventh Annual Conference, Indian Society of Haematology held in Gwalior.On an invitation from W.H.O., Dr. N. C. Bhattacharya, and Assistant Professor of Entomology participated in the Inter-regional Seminar on Entomological Methods in Vector Control in U.S.S.R. and presented a paper.Dr. R. N. Chakravarti, Professor of Chemistry and Dr. R. L. Nath, Professor of Biochemistry attended the Joint Convention of the Indian Chemical Society and the Chemical Research Committee held at Aligarh.

Professor J.B. Chatterjee was elected (i) a Corresponding Fellow of the American College of Physicians, (ii) a member of Managing Board of the International Committee for Standardization in Haematology as organized by the European Society of Haematology, (iii) a member of the Expert Panel for International Haematological Documentation and (iv) a member of the Council of International Reticuloendothelial Society. He was also awarded the Lord Minto Research Gold Medal for the year 1965 in recognisation of his outstanding contributions to medical sciences. Dr. R. N. Chakravarti, Professor of Chemistry was nominated Principal Nominee of the National Institute of Sciences of India in the Chemical Division, Council of Indian Standards Institute.[51]

The limitations of the first three plans were used to push some chosen programmes in the next three. The fourth Plan which began in 1969 with a three-year plan holiday continued on the same line as the third plan. In the Fifth Plan the Minimum Needs Programme was used to strengthen nutritional programmes but at the same time integrated with Family Planning Services. The failure of Malaria Eradication Programme and the non- achievement of the Family Planning Programme then led both being integrated into the general health services. In the fifth plan the government acknowledged that the number of medical institutions, functionaries, beds, health facilities etc. were still inadequate in the rural areas.

In the Sixth plan the population coverage of primary health care institutions was expanded almost three times, while the memory of forced sterilization was countered by talking of Child Survival and Safe Motherhood. But structural integration was only up to the district level, above which the planning priorities are using the pooled resources of all other programmes. The external monetary, political and intellectual pressures, from institutions such as Rockefeller Foundation, USAID and the Ford Foundation played a key role in this transformation.

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(Endnotes)

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[42] Report of the Calcutta School of Tropical Medicine and the Carmichael Hospital for Tropical Diseases, 1966 p-69

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[44] *Ibid*

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