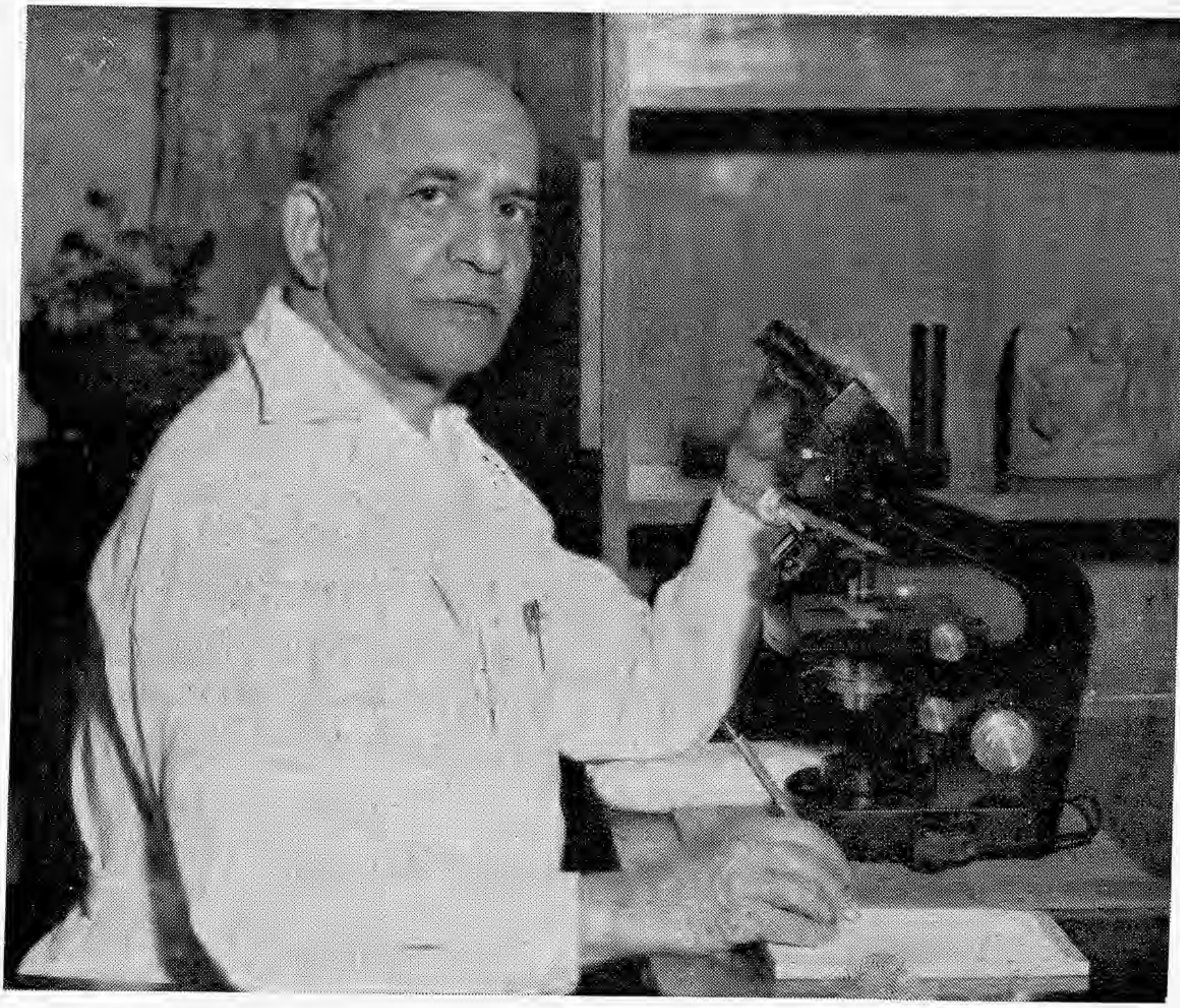

V. R. Khanolkar

INDIAN NATIONAL SCIENCE ACADEMY

VASANT RAMJI KHANOLKAR

(1895–1978)

Elected Fellow 1946

VASANT RAMJI KHANOLKAR was an outstanding research worker and a unique personality. Highly educated abroad and experienced in Medical research, he had long realised the value of basic sciences and advanced research for progress in medicine. To him and his two close contemporaries, Dr CG Pandit and late Dr BB Dikshit—to this trinity—we owe the beginning of multidisciplinary medical research in the country. As a distinguished pathologist and doyen of research, Professor Khanolkar's major contributions have been in the field of Cancer, Leprosy, Physiology of Reproduction and Medical Education. He was a linguist who could read and speak fluently six Indian and four European languages. He was the recipient of several national and international awards and honorary degrees. Above all he was a great humanist and a father figure to innumerable young scientists whose scientific career he moulded to perfection, with careful thought and planning.

PARENTAGE, EARLY LIFE AND EDUCATION

Vasant Ramji Khanolkar was born on April 13, 1895 at a small village on the coastal strip of Konkan in a scholarly family. His father, Dr Ramji Dhondji Khanokar was almost a legendary figure. Ramji Khanokar started his career as a sub-assistant Surgeon. He was in Lord Robert's army in its historic march to Kandahar. When the victorious army returned and paused for a while at Quetta, his imagination was caught by the wild grandeur of the setting, the climate of Quetta and its people. He liked Quetta so much that he decided to settle at there. As destiny would have it, it is here that this most renowned popular medical practitioner of Quetta, senior Dr Khanolkar, and fourteen other members of his family met with tragic death in the Quetta earthquake of May 1935. Dr Khanolkar, besides being an able medical practitioner, was a profound scholar of sanskrit and a great man of wisdom, who possessed a library of rare books. His son, young Vasant Ramji Khanolkar evidently inherited from his father his rare medical acumen as well as aptitude for languages.

Born and brought up in such well educated progressive family, Vansant's early life has been one of 'lush plentitude and of colourful abandon'. Since early school days, he was marked to take up medical career. In 1912, when his parents and rest of the family were living in Quetta, he joined the Grant

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Medical College, Bombay at the early age of seventeen. It is this year at the Grant Medical College, he first met his life time's friend and contemporary man of wisdom, Dr CG Pandit. The same year this young student of medicine proceeded to England for further studies. There at the University of London he first obtained Bachelor's degree in Science in 1916, then graduated in medicine in 1918 and finally secured MD in Pathology in 1923. During these years (1922-24), he also got very valuable experience in basic and medical research as one of the youngest Graham Research Scholar at the University of London. He returned to India in 1924 as a well trained pathologist from London University and took his first appointment in Bombay as Professor of Pathology at the Grant Medical College.

Professional Career

It is indeed difficult to do justice to this great scholar's kaleidoscopic career. From the beginning to the end of his professional career as National Research Professor in Medicine, he remained academician with unparalled capacity for disciplined dedication to science. His professional career and his contribution to science may be divided in three parts : **I.** His contribution as teacher in pathology—bringing up new awakening in pathology, giving the discipline new look for (*a*) research in medicine and (*b*) medical education. **II.** Initation and development of advanced research in (*a*) Cancer, (*b*) Leprosy, (*c*) Physiology of reproduction and (*d*) Human genetics etc. and (*e*) Improvements in university education-encouregment to start new combination disciplines, e.g. Applied Biology and Biophysics. **III.** International career : Achievements at international level—assignments and awards, UICC (Union International Contre Cancrum) work etc.

I. During 15 years of undergraduate and postgraduate teaching in pathology at two main medical college in Bombay, Professor Khanolkar displayed outstanding capacity as a teacher of modern pathology and able organizer of all activities connected with pathology teaching, like setting up Museum of educative specimens, starting of Indian Association of Pathologists and Bacteriologists etc. He developed his department in the GS Medical College and KEM Hospital with such thoroughness that in no time it acquired reputation as one of the foremost schools of pathology in the country. He organized methodical teaching of pathology. A large number of pathologists trained under him have devoted themselves to teaching and research in several medical colleges of the country. With great pains and unique perspective, he organized the pathology museum of the GS Medical College with rare specimens ; several foreign scientists and medical experts from England have applaued the effort. A new building was constructed from the donations received to house this precious pathology museum. He also creditably organized the Central Clinical Laboratory at the KEM Hospital with facilities for experimental studies and a very well equipped Artists' Department in the college, for proper

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illustrations of patients' ailments. He was the moving spirit behind all research activities started at the GS Medical College and the hospital in those early years. During his career as Professor of Pathology, he initiated clinical and pathology research at these institutions on the grants procured from IRFA (Indian Research Funds Association), later designated Indian Council of Medical Research, in whose development he took prominent part all through. He tried his level best to change syllabus of medical education laid down by the medical faculty at the University of Bombay to keep pace with teaching of medicine abroad, with special stress on basic sciences. He was not a specialist who confines himself to a narrow groove. He had long realised the value of all basic sciences and their combinations, experimental biology, biochemistry, biophysics even statistics in the study of medicine that would enable men of medicine to enter medical research. He tried to spread this philosophy amongst his undergraduate and post-graduate students at the medical college. As a strict disciplenarian with dedication to science, Professor Khanolkar established high traditions in the work of the Seth Govardhandas Medical College and the associated King Edwards Memorial Hospital. This helped the institution in achieving a reputation as one of the foremost medical institutions in the country evoking admiration from various quarters—national and international.

It is during these years of undergaduate and postgraduate teaching and research in pathology at the medical college that Professor Khanolkar developed special interest in the study of most complex but fascinating and challenging areas of work—cancer and leprosy. When he decided to leave the medical college and take up the pivotal position as Chief Pathologist at the Laboratories of the Tata Memorial Hospital in the year 1941, he had decided to concentrate attention on basic questions in the fields of cancer and leprosy—how and why of cancer and pathogenesis of leprosy!

Cancer Research

From 1941 to 1951 as Chief Pathologist at the Tata Memorial Hospital, Professor Khanolkar was apparently busy with routine tumor pathology work of the patients admitted at the hospital, but his major attention was on training a group of young scientists in multidisciplenary sciences to attack basic questions on the problem of cancer.

Early in this period, to be precise June 15, 1943, on a morning of heavy Bombay rains, that the author happened to wade through knee deep Parel water, to have her first glimpse of this great man, in his office on the third floor of the Tata Memorial Hospital. The office was lighted because of the cloudy morning; all walls were decorated with large size pictures of great scientists from abroad. Several large bound volumes and two huge binocular microscopes were neatly placed on the working bench ... Professor Khanolkar in his usual white laboratory dress was busy discussing that

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morning's post-mortem of a cancer patient with his young assistant. I entered the office with the hospital biochemist, Dr Chitre—full of awe and fear for the great personality. Sitting on a side chair I was listening to the discussion he was having about the post-mortem which ended with a remark from Professor Khanolkar—*Young man, you have to treat every cancer case as a topic for research if we hope to make progress in understanding this dreadful disease..... must develop research attitude towards every precise observation.* This was the beginning of my training in cancer work. After forty years to that event I still project that quotation as my first slide at any general presentation on the problem of cancer.

In a few minutes, started my first interview at the Tata Memorial Hospital, enquiring informally how I could wade through water to reach Parel on such wet morning ! He made me comfortable in no time ; explaining to me how I can take up some experimental work on breast cancer on his precious strain of mice. He dissected a mouse for me right there to demonstrate five pairs of overlapping mammary glands that mouse has. In couple of hours, ready to leave the laboratory after my interview I felt I belonged there all my life. He had that very special nack of making a frightened young person very comfortable in his presence. With this nack of inspiring confidence in deserving young men and women, he was able to collect a groups of inspired youngsters around him who would happily work for 8-10 hours a day, learn a lot, enjoying every minute of the hard, exasperating work on the difficult problem in hand. Burning mid-night oil at the Tata Memorial Hospital laboratories and later at the Indian Cancer Research Centre was lovable routine. We never had any time keeper or any register to sign 'in and out'. He gave his students and colleagues an atmospher to work in which everybody relaxed and worked very hard to one's utmost capacity, following his philosophy—*work never kills a man.* He always professed *be precise and correct in your observations and in your writings. Do not forget you are dealing with a problem which needs multiaspect, multidisciplenary attack, which no one individual can give. It has to be a team work, one has to learn to work amiably in a group and respect each other's contribution.*

Duriug Dr Khanolkar's first decade of work (1941-51) at the Tata Memorial Hospital laboratories, besides rare tumor pathology problems, his research was mainly on cancer in India. The questions he tried to answer (i) Is there cancer in India ? What are the main cancer types ? He studied hospital statistics and cancer types specific to the country ; (ii) Habits and usages related to cancer problems, epidemiology. His most valuable contribution to these questions are published in a series of papers in national and international journals. This pioneering work on cancer in India received international recognition and he was awarded membership of the International Union against Cancer (UICC) along with Professor Maisin and others since its inception in the year 1947.

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II. Indian Cancer Research Centre

To dream is given to many but to have a vast vision and translate into actual reality by one's own efforts is the previlage of a fortunate few. Professor Khanolkar was one of the fortunate few. He had long realized the importance of multiaspect basic research to ellucidate the problem of cancer ; he dreamt all along to organize cancer research facilities in India before it was too late. His ten years' cancer work at the Pathology laboratories of the Tata Memorial Hospital received recognition of the Health Ministry when Rajkumari Amrit Kaur was the Health Minister and KCKE Raja, the Director General of Health Services. A committee was appointed to review this small research group's contribution to cancer research. Professor EV Cowdry of USA State Department also was invited to review the work as consultant. Unanimous decision was taken to give Professor Khanolkar a national laboratory for cancer research which was named as Indian Cancer Research Centre. It was inaugurated on December 30, 1952 in the presence of members of International Cancer Research Commision which met in Bombay the same week, with Professor Khanolkar as Chairman of the Commission. The Centre had only modest two storied building built at very reasonable cost, but had most sophisticated equipment, much of it purchased on financial support from several international organizations e.g., Rockefeller Foundation, World Health Organization etc., through Professor Khanolkar's close connections with these organizations. Into this building moved Professor Khanolkar's small research group of some six scientists from the Pathology Laboratories of TMH specifically trained over the years to shoulder responsibility of different departments at the new center. Within the next six months the buildings were humming with activity, hardly any laboratory space left vacant. His name, his reputation and his charming way of inspiring confidence in youngsters always attracted cream of the university graduates as postgraduate students to this institute. Cancer being low down the list of public health problems in the country, he had no funds, no scholarships to offer to begin with ; but they all came to work, to learn at the feet of this great master. It used to be dificult to refuse admissions to this institute which is affiliated to the Universites of Bombay, Poona and Kerala as postgraduate training centre.

It is here that Professor Khanolkar fulfilled his dreams of organizing multifaceted attack on the basic questions of etiology and mechanism of carcinogenesis. In consultation with colleagues he organized the various departmental laboratories—Experimental Biology including Tissue Culture, Biochemistry, Enzyme Chemistry, Microbiology, Ultrastructure, Endocrinology, Embryology, Biophysics, Human Variation including Epidemiology and Statistics and services like Animal House, Artist's Department, Common facilities etc. Over the years, it is the Experimental Biology that became Applied Biology and developed further sub-disciplines like Cell Biology Tissue, Organ and Cell Culture, Immunobiology, Hybridoma Unit,

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Carcinogenesis etc. Biochemistry developed Chemotherapy Laboratory. Each deparment was headed by suitably trained and carefully selected young scientists. Hardly anybody ever left Professor Khanolkar's laboratory. This entire core of young scientists happily worked till the retiring age and further even as emeritus scientists under Professor Khanolkar's remarkable guidance, basking and blooming in that free and friendly atmosphere. This multidisciplinary attack on cancer problem at molecular, cell and systemic level in animal experiments and '*in vitro*' studies and epidemiological studies in the field on cancers specific to India yielded valuable contribution to the understanding of the dreaded disease. Multiple factor mechanism of action, genetic, virus and hormonal factor of mammary carcinogenesis was elucidated greatly. Many new human sarcoma cell lines and mouse sarcoma cell strains were developed which were used as standard biological material at Indian and some Western laboratories. New biological material of Indian origin developed for cancer research by the Biology Division of the Center are greatly valued by the world laboratories eg. ICRC mouse susceptible to both breast cancer and leukemia, ICRC bacillus isolated *in vitro* from human lepromatous leprosy and many standard transplantable mouse and human tumors are profitably used for wide range of biological research. The 'ICRC' bacillus is considered a very worth while candidate for developing vaccine against leprosy. Epidemiology and experimental work on oral cacer specific to India has made valuable contribution in confirming factors of habits and usages eg. chewing tobacco, pan, particularly tobacco combination with beetle nut and lime as major causative and contributory factors of oral cancer so rampant in India. The experimental work on chinar and 'Kangri cancer' in Kashmiris has also helped prevention of the disease. The first decade of ICRC under direct supervision and guidance of late Professor Khanolkar besides contributing to scientific work on cancer, leprosy and reproductive physiology, established many principles in good science administration. Here was a center with hardly enough finances to run an extensive multidisciplinary program of research, was able to make major contribution to wide range of topics setting high standards of work by personal example. He was a shrewd judge of man—possessing that intellect which puts in motion the intellect of others. He could give impetus to the best in young women and men. At one time the Center was working on many projects generally funded by ICMR, CSIR, UGC etc. with the help of young talented students under training, who would happily work hard round the clock because they were happy and relaxed, enjoying their work. Their merit always received due recognition !

The manner in which Khanolkar developed the basic sciences at the Institute bears testimony to his progressive and revolutionary outlook on medical research. All along he selected deserving young trainees to form core of Center's staff. His policy was to send them for training and retraining abroad to mould them to perfection. His philosophy and policy

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was naturally followed by some of his senior colleagues–first generation students—building the core of the Center staffed by the right type women and men scientists. His motto for the walls of the Center was"..... Within these walls a few work unceasingly so that many may live.....". A Series of papers published by Khanolkar and his groups working at the Indian Cancer Research Center runs into hundreds. His degrees, titles and honors are many ; some of those are as follows :

Professor VR Khanolkar, BSc (Lond.) MD (Lond) FRCP (Edin) Hon. LLD (Melbourne), Hon. DMS (Perugia) FASc, FNI Padma Bhushan. etc.

International Activities

Professor Khanolkar was at the helm of international cancer activities since the inception of International Union against Cancer (UICC) in Paris in the year 1947. He believed that in the world of science there should be no boundaries ; the problems in the field of scientific research are the same all over. Cancer is a disease of the human race, the types varying in different geographical areas. It is therefore most essential that scientists of the world should join hands in their fight against cancer. In 1947, Professor Khanolkar participated in the IV International Cancer Congress at St. Louise as representative of India, when he presented a paper on the authors doctoral thesis–*Experimental Studies on Breast Cancer*. At this meeting he was made Charter Member of the International Cancer Research Commission. Before adjourning the Congress he was already made not only the representative of India but of all Asia in the UICC five man Executive Committee. From 1950-54, he was the Chairman of the International Cancer Research Commission of UICC. In 1958 he was honoured as President of International Union against Cancer. His presidential speech at the London International Cancer Congress reviewing progress of cancer epidemiology and cancer research work at the Center was very well received Five of us, his colleagues at the Hospital and research centre, were amongst the audience to witness our Director being honoured by the international committee and world cancer experts. What Professor Khanolkar accomplished in India in cancer work under difficult conditions inspired starting of cancer work in many other developing lands. He fruitfully shared interest in the development of cancer research throughout the world. His international work on cancer has bought his way many honorary degrees and international honours from countries like France, England, Italy, Australia, Japan and Indonesia.

Research in Leprosy

Professor Khanolkar's work on pathogeneis of leprosy has long received national and international recognition. Over the years he along with his

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friend, another great scientist and philosopher, Dr Pandit, had participated actively in conducting and organizing research in leprosy all over India. He was a member of several national committees, monitoring researches on leprosy ; as also a member, WHO Expert Panel on Leprosy. His precise work on contacts of leprosy cases, laboratory investigations and epidemiological work has been very fruitful. His compilation of research results in *Perspectives on Leprosy* is still very widely read. It is his theory on possible specific nerve affinity of *Lepra bacillus* that initiated the author to test his hypothesis using hanging drop cultures of human foetal spinal ganglion and fresh lepromatous tissue swarming with organisms. Isolation of ICRC bacillus is the ultimate outcome of this work. His interest in pathogenesis of leprosy, clinico-pathological work and later experimental work on leprosy in animals and tissue culture at the Biology Laboratory was ever lasting. His bibliography in leprosy is quite impressive. It is because of his knowledge, experience and interest in leprosy research that at the center with no financial support of any kind, in a small group we did continue research on leprosy, which is now receiving recognition. On the merit of results of this work, WHO offered a small grant in US$ to continue this work. This permitted starting of time-lapse cinematography of ICRC bacillus and of many experiments on cancer cells.

Physiology of Reproduction

Professor Khanolkar with his staunch national outlook, was always interested in using the laboratories of the center for working on problems specific to India. That is how we worked on topics related to cancer, leprosy and physiology of reproduction as problems specific to India. It was at his initiative, ICMR started the Advisory Committee on scientific aspects of family planning, of which he was chairman for seven years. It is at the Indian Cancer Research Center the first contraceptive testing unit was set up. The Center also set up the first socio-clinical unit for family planning at Parel chawls, and undertook clinical research in the laboratory in early fifties. Later for want of space, the unit was transferred to GS Medical College. The Institute for Research in Reproduction is the culmination of Professor Khanolkar's foresight and vision for researches on physiology of reproduction.

Parel Complex

A glimpse of the Parel complex of institutions on the hospital avenue today tells the story of Professor Khanolkar's developmental activities, his foresight and vision in medical research. The GS Medical College and KEM Hospital, the Institute for Research in Reproduction, the Cancer Research Institute, the laboratories of Tata Memorial Hospital, the Institute for Immuno-haematology (former BGRC) and the new Human Genetics set up that is just started at the Wadia Childrens' Hospital ; all these centers

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of medical research at Parel have Khanolkar's exclusive stamp. It's he who has contributed towards its foundation—thinking. planning, actually training of young women and men to staff such laboratories. He was a man of vision, he knew in which direction to move. In science, as in ordinary life, speed is only effective when one knows in what direction to proceed. He had exceptionally wide range of interests. He did not belong to just one discipline. At best he was a human biologist, natural historian and philosopher par excellencet with the result he knew what topical work must be started and when. The result is today we see his stamp on many important medical research activities in Parel complex and all over India, wherever there is good work in progress. In my memory as young scientist working with Khanolkar, planning of All India Institute of Medical Sciences, New Delhi was continuously being discussed at the pathology laboratories of the TMH and the ICRC. The blue prints of Bhabha Atomic Research Center—planning of their nodular laboratories have been in and out of Khanolkar's office at the Center. He was closely connected with organization of postgraduate Institute of Medical Research at Chandigarh. He was advising to set up work at Trivandrum, Madras, Hyderabad and even at Ceylon. In our active years we had seen directors of medical research laboratories all over the country visiting the office of late Dr Khanolkar. National and international experts in various science disciplines have been our uninivited guests for pot luck lunch' at the cafetaria run by staff committee of the ICRC, where Khanolkar was trying to change the eating habits of his staff, giving them more nutritious food at reasonable cost.

Animal House and Poultry was another favourite place of his ..... very special arrangements for cleanliness, sterilization, animal foods, everything was being experimented with. We established new animal and poultry food formulae under his guidance and supervision. Sometimes it was felt that he loved his mice, rats, guineapigs, hamsters and poultry more than anything else. There was all pervading warmth, special warmth, for animal house staff.

This was one institute from where some matriculates have gone out to international conferences as postdoctoral fellows. There was full freedom and all facilities available for anybody from helper to technician to laboratory assistants to learn whatever they wanted. If they had the will and urge to work hard they could go very high. The Centre was proud that their matriculates have today become professors in well recognised American universities. There are others whose work is referred in text books at international levels. As a founder Director of the Indian Cancer Research Center, he did establish a place where free thinking, free learning and freedom to make innocent mistakes was permitted. What was not permitted was 'lazy mediocracy' ; his trust in young minds continued to be a consuming passion till his last day. At national and international levels also he

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influenced people with his philosophy of life from which every association has benefited.

Positions held, Membership of Scientific and Academic Bodies

Professor Khanolkar was the Assistant Bacteriologist, University College Medical School, London (1920-23) ; Graham Research Scholar, University of London (1922-24) ; Professor of Pathology, Grant Medical College, Bombay (1924-26) ; Professor of Pathology and Bacteriology, Seth GS Medical Colloge, Bombay (1926-41) ; Pathologist, King Edward VII Memorial Hospital, Bombay (1926-41) ; Director of Laboratories and Research, Tata Memorial Hospital, Bombay (1951-63) ; Director, Indian Cancer Research Centre, Bombay (1952-63) ; Vice-Chancellor, University of Bombay, Bombay (1960-63) ; National Research Professor in Medicaine, Indian Cancer Research Centre, Bombay (1963-73).

He was the Fellow (President, 1965-66), National Institute of Sciences of India (1946, now Indian National Science Academy) ; Member, Patholo logical Society of Great Britain and Ireland (1921) ; Member, Medical Council of India (1947-59) ; Member, Scientific Advisory Board, Indian Council of Medical Research (1947-49) ; Honorary Member, American Association for Cancer Research (1948) ; Fellow, Indian Academy of Sciences (1949) ; Member, All Indian Council of Post-graduate Medical Education (1949-55) ; Founder and First President, Indian Association of Pathologists ; President, International Cancer Research Commission (1950-54) ; Adviser on Medical Education to the University of Kabul, Afghanistan (1951) ; Member, Panel of Health Programmes, Planning Commission, Government of India (1951-52) ; Member, Institute of Biology, London (1952) ; President, Medical and Veterinary Section, Indian Science Congress Association (1952) ; Adviser to the Indonesian Government on Medical Education (1952) ; Member, WRO Expert Panel on Cancer (1955) ; Chairman, Advisory Committee on Scientific Aspects of Family Planning Programmes, Indian Council of Medical Research (1956-63) WHO Consultant to assist Ceylon Cancer Institute in its development (1956-58) ; Honorary Life Member, New York Academy of Sciences (1956).; WHO Expert Committee on Professional and Technical Educatoin in Radiation Medicine ; Member, International Academy of Pathology (1957) ; Chairman, Pathology and Bacteriology Committee (1958) ; Study Group on Liver Diseases (1958) ; ICMR ; Vice-Chairman, UN Scientific Committee on Effects of Atomic Radiation (1958-59) ; President, International Union against Cancer (1958-62) ; Member, WHO Advisory Committee on Medical Research (1959-63) ; Honorary Member, Austrial Cancer Society (1960) ; President, Society of Biological Chamists, India (1960-61) ; Honorary Fellow, Royal College of Physicians, Edioburgh (1960) ; Foreign Member, Academy of Medical Sciences, USSR, (1961) ; Fellow and President, Indian Academy

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of Medical Sciences (1962-63) ; Honorary Fellow, Royal Society of Medicine (1963).

KHANOLKAR—THE GREAT HUMANIST

He was no doubt a great scientist and greater man of medicine but above all he was finest of human beings. Those who had the good fortune of coming in close contact with him, working with him, have been most fortunate. He had a sharp intellect tempered by humility and a keen sense of humour. Along with outstanding intellectual equipment and temperament he had impressive width of interests. He was a stimulating conversationalist and pleasant company. He always cared for other person's feelings ; hence even his corrections of one's mistake would be very gentle. He would never hurt a subordinate.

At home Professor Khanolkar was a very loving father to both his children—daughter Shakuntala and son late Master Mahesh. Although his family had to stay away from him for many years since his wife, a very charming French woman accompanied children who emigrated to Europe for studies as youngsters—he always made it a point to meet them as often as possible. Mrs Marsel Khanolkar is a very fine friendly person, a loving wife and good mother. She always tried her best to take care of her husband by frequent visits home and continuous communication.

Last few years of his life he was ailing ; mostly of old age. In his prime of life he never knew rest.... He passed away peacefully at the KEM Hospital of his own making on 29th October, 1978. That was the end of an era. A personality lost to the world whose work will be remembered by scientists and common man here and abroad for ever and ever.

KAMAL J RANADIVE

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