



S. M. Mehta

SUBODHCHANDRA MANMUKHRAM MEHTA

(1902-1970)

Elected Fellow 1957

BIRTH & EDUCATION

PROFESSOR SUBODHCHANDRA MANMUKHRAM MEHTA was born in Surat (Gujarat) on May 4, 1902. He had three younger brothers named Mr Prabodhchandra, Mr Sanatkumar and Mr Mridukumar and a younger sister named Mrs Lilavatiben Kumudkant Mehta. His grandfather Mr Krishnamukhram Atmaram Metha was a lawyer and was on the bench of Small Causes Court, Bombay, eighty five years ago. His father Mr Manmukhram Krishnamukhram Mehta, who died in 1940, was also a lawyer and practiced as High Court Vakil on the Appellate side of the High Court, Bombay.

Professor Mehta was brought up and educated at Bombay. Nothing much is known about his childhood and school days except that he was more inclined towards science and particularly towards medicine. He studied at Elphinstone School and passed his matriculation examination of the University of Bombay at the first attempt in 1920 with english, mathematics, history and sanskrit. He immediately, thereafter, joined Elphinstone College and obtained in 1924 his BA degree in second class honours with english, physics and chemistry. In 1925, he passed his BSc examination in first class with chemistry and physics.

He could not take up medicine because of the family pressure, particularly from his mother who had misgivings about medicine. He therefore continued his studies in chemistry at the Royal Institute of Science (now known as Institute of Science), Bombay where he was appointed a Fellow for two years in succession (1925-27). Here he carried out research work in physical chemistry under the guidance of Principal Dr AM Meldrum and was awarded MSc degree by thesis in 1928.

SERVICE CAREER

In the same year he was appointed as Assistant Lecturer in Chemistry in the same Institute. He was in charge of intermediate class in the laboratory and was giving lectures on inorganic chemistry to the BSc students. He handled large classes with ease. He used to remember each and every student by name and was very popular with undergraduate students.



After obtaining his MSc degree, he could not go abroad to obtain his PhD degree due to circumstances beyond his control. However he continued his research work at the institute and was appointed a lecturer in 1941. Earlier on the strength of his research publications, he became ARIC (London) in 1937. Though he was only MSc his research work was of such high quality and quantity that he was recognised by the university of Bombay as a research guide both for MSc and PhD degrees in the physical and inorganic chemistry. It was in 1930 that his first student obtained MSc degree by research under his guidance; and likewise it was in 1942 that his first student was awarded PhD degree under his guidance. Though he had guided thereafter successfully MSc and PhD students, he could not be appointed as class—I, Professor of Chemistry, because Bombay Public Service Commission in their advertisements for these posts insisted PhD degree as a minimum qualification. Professor Mehta swallowed such bitter pills with magnanimity and continued his research work diligently and cheerfully. On such occasions, he used to remark jokingly *Amongst all Doctors, let there be one Mister Mehta who is Master of Science*. This anomaly was brought to the notice of the then Education Minister Mr Dinkarrao Desai who issued orders to rectify the same. Consequently, in a subsequent advertisement dated June 15, 1954 issued by Bombay Public Service Commission for Class I Post of Professor of inorganic chemistry this condition of having PhD degree was waived and he simply walked in as Professor of chemistry. He was immediately thereafter appointed at the Institute as Head of the Department of Chemistry which post he held with distinction till he retired in 1960. Looking to his ability both as an administrator and a research worker, he could have retired easily as Principal or Director of the Institute but for the bogey of requiring PhD degree!

Under his able guidance, 31 students obtained their MSc degrees and 10 students PhD degrees during his association with the institute extending over 30 years. One of his research students Dr SR Patel, the author of the present memoir, continued at the institute further research work and was awarded DSc degree by the University of Bombay in 1954.

RESEARCH CONTRIBUTIONS

Professor Mehta published more than 50 research papers along with his students on the problems of physical and inorganic chemistry in the Indian and foreign journals. A detailed bibliography of these papers is attached herewith. A mere look at the bibliography will at once reveal a striking feature that he has carried out research work on a large number of problems of different nature connected with physical and inorganic chemistry. This shows his profound study and deep knowledge of the subject coupled with penetrating insight which enabled him to tackle such problems of varying nature and that too when it was considered that research work in inorganic chemistry was very difficult. It is not possible here to survey his entire research work but in the



paragraphs that follow an attempt is made to give broad outlines of his research work connected with some important topics.

The outstanding original contribution which has been recognised in chemical world relates to the formation of new double sulphates of titanium and bivalent metals (*J Amer Chem Soc*, 1951, 73, 224-226 and 227-228). When the solutions of titanium dioxide in concentrated sulphuric acid were heated in the presence of sulphates of bivalent metals, such as Zn, Cu, Co, Mg, Mn, Ni, Cd, precipitates of the type $\text{RSO}_4 \cdot \text{Ti}(\text{SO}_4)_2$ were obtained having different colours depending on the nature of the bivalent metal present in the compound. The thermal decomposition of $\text{RSO}_4 \cdot \text{Ti}(\text{SO}_4)_2$ has been studied and found to be almost complete at 850° . The coloured residues left at this temperature were intimate mixtures of titanium and bivalent metallic oxides and may be used as paint materials. The yield of these double sulphates was quantitative. It is shown that from a sample of bauxite sludge, titania can be recovered by taking advantage of the formation of $\text{RSO}_4 \cdot \text{Ti}(\text{SO}_4)_2$ which either can be hydrolysed and then ignited to give pure titania or can be decomposed thermally into coloured residues which may be useful as paint materials (*J Amer Chem Soc* 1951, 73, 226-227).

The same method was applied for extraction of titania from titaniferous minerals such as ilmenite and rutile (*J Sc Ind Res*, 1951, 10B, 289). He extended this work further and obtained compounds $\text{RSO}_4 \cdot \text{TiOSO}_4$ by treating solutions of $\text{RSO}_4 \cdot \text{Ti}(\text{SO}_4)_2$ with a solution of hydrogen peroxide. An intermediate unstable oily liquid agreeing with the formula $\text{RSO}_4 \cdot \text{TiO}_2 \cdot \text{SO}_4$ was obtained which when heated to about $200\text{-}230^\circ$ give solid residue agreeing with the formula $\text{RSO}_4 \cdot \text{TiOSO}_4$ (*J Amer Chem Soc*, 1952, 74, 3469).

Sodium perborate which had received little or no attention as a reagent for organic oxidations was successfully utilised by him for oxidation of Aniline, Anisidine and series of para-substituted aromatic amines (*J Amer Chem Soc* 74, 563) and for graded oxidation of polyhydric Alcohols (*J Amer Chem Soc*, 1952, 74, 5541).

With a view to utilising, under Indian conditions, deposits of sodium sulphate at Didwana (Rajasthan) or byproduct sodium sulphate from various industries, he had undertaken the study of reaction between sodium sulphate and ammonium carbonate; and carbonation of sodium sulphate ammonia mixtures in an autoclave and in packed columns under varying conditions of temperature, molar ratio of reactants and dilutions (*J Sc Ind Res*, 1952, 11B, 431-434). This study showed that Didwana sodium sulphate could be utilised for the production of ammonium sulphate (artificial fertiliser) and soda ash.

It is well known that the selective dissolution of cuprous oxide from its mixture with metallic copper and cupric oxide is difficult and professor Mehta was in need of a simple method for quantitative analysis of such mixture in his investigation on the



corrosion of brass by alkalis. He did develop such simple method giving very satisfactory results. In this method advantage is taken of the solubility of cuprous oxide in hot saturated solution of potassium iodide in which metallic copper and cupric oxide are insoluble. The residual mixture of metallic copper and cupric oxide is then treated with acidified ferric chloride and the ferrous iron corresponding to the metallic copper titrated with dichromate (*Proc Ind Acad Sc*, 1953, **37A**, 29-32).

The interesting reaction between solution of mercuric chloride and sodium phosphate was not studied in details. He had undertaken such a study and found that solutions of mercuric chloride and disodium hydrogen phosphate react to give $3\text{HgO} \cdot \text{HgCl}_2$ at 60° and 80° and $2\text{HgO} \cdot \text{HgCl}_2$ at 30° and yellow substance formed soon after mixing the two solutions has been isolated by him and found to be a probable mixture of mercury phosphate with an oxychloride of mercury (*J Univ Bom* 1937, **6(2)**, 75-79; 1951, **20(3)** 61-65; 66-73).

He has also undertaken studies on the reaction between alkali hydroxide and zinc hydroxide and isolated sodium zincate (*J Univ Bom* 1949, **18(3)**, 54-57) and potassium zincate (*J Univ Bom*, 1950, **18 (5)**, 49-52).

During his study for hydrogen ion concentration he had found a useful buffer mixture in sodium borate solution having ratio $\text{Na}_2\text{O} : \text{B}_2\text{O}_3 = 1 : 2.425$. The pH = 8.91 of this mixture remains unaltered when diluted from 0.15N to 0.005 N (*Curr Sci*, 1946, **15**, 128).

Besides, he has carried out along with his research students, other researches on industrially important topics which are partly described in the papers published and partly in the theses submitted by his students under his guidance. These topics include: (a) A new process for the preparation of alkali chlorites; (b) Decomposition of gypsum and other alkaline earth sulphates by dry and wet methods; (c) Reaction between zinc sulphate and sodium chloride to get zinc chloride; (d) Studies in the preparation of ultramarine, and (e) Recovery of antimony from slags. It may be noted that though more than 50 research papers are published by him, many more remain to be published.

His research work was also recognised by the chemical world as is evident from the following references : (a) *The Progress of Science in India during the past twenty five years* published by Indian Science Congress Association 1938, p. 64; (b) *Annual Reports on the Progress of Chemistry* published by Chemical Society, London 1950, p. 100 (c) *Annual Reports on the Progress of Chemistry* published by Chemical Society, London 1952, p. 97 and (d) *Reports on the Progress of Applied Chemistry* published by Society of Chemical Industry, London. 1952, p. 502.

HONOURS

He was elected Member/Fellow of many scientific bodies such as Indian Chemical Society, Academy of Science, Bangalore and Royal Institute of Chemistry, London.



He was elected in 1957 Fellow of National Institute of Sciences of India (now Indian National Science Academy) New Delhi. Finally he presided over the Chemistry Section of the Indian Science Congress held in Calcutta in 1957 and delivered his presidential address entitled *India's contribution to Inorganic Chemistry*.

He was also taking active interest in promoting cause of science. He was Secretary-Treasurer of the Western India Section of the Royal Institute of Chemistry, London and was later on its Vice-Chairman. He was president of Bombay Branch of Indian Chemical Society and a member of Sectional Committee (Chemistry) of Indian Science Congress. He was also a member of committee on Heavy Chemicals, Indian Standard Institute. Besides, he was for a number of years a member of the council of management, Gujarat Research Society and Secretary of its standing committee on Physical Sciences.

INTEREST IN HOMOEOPATHY

But this is not all of which Professor Mehta was made up. Right from 1938, he started applying his knowledge of chemistry to Homoeopathy and had undertaken to relieve human sufferings. This was his part-time social work, mainly on sundays. While his research work at the Institute expanded, his selfless work of administering Homoeopathic medicines also increased so much so that on sundays he used to work at his residence single handedly from 6.00 am to 9 pm. attending patients numbering from 300 to 400. Such was his power, concentration and devotion to selfless service to mankind. Even after his retirement in 1960, he continued his noble work. He refused to accept any fee or even cost of medicines from his countless patients. He used to say that patients, when cured came to see him to express their joy and gratitude and the light on their smiling faces was his reward which gave him extra strength and added enthusiasm. In recognition of his outstanding public service and to help him to carry out systematic research in the cure of diseases known to be incurable or hard to cure, his admirers and beneficiaries founded a Trust in 1968 with a fund of Rs. 1,70,000 donated by the public. The Trust is named as "Dr Subodh Mehta Relief Trust" and situated at 16th Road, Khar, Bombay-400052 in the vicinity of his residence. The above trust is still continuing the noble work which Professor Mehta has started. Incidentally, it may be worthwhile noting that Professor Mehta has never obtained nor was awarded doctorate degree such as PhD or DSc but he was registered as a Homoeopathic practitioner and hence was addressed as Doctor by all his patients and admirers.

It is not out of place if it is mentioned that he had a burning desire to study medicine in his earlier days. But he could not pursue this profession through colleges and institutes but following footsteps of "Eklavya" of Mahabharat, he learnt medicine by himself and in last days of his life became an inspiring institute by himself in the cause of Homoeopathy. Thus in Professor Mehta, we find a true scientist who was not only devoted to the cause of science but also to its application to redress human sufferings.



PERSONAL LIFE

He was married at Surat in 1934. His wife Smt Kulina, came from a noble and educated family of very high social status. He had only one child, son, named Mr Deepak who was born in 1939 and is actively promoting the cause of Homoeopathy which Professor Mehta had started.

His was a large joint Hindu family and being the eldest member, he had to struggle very hard both emotionally and financially. But he had discharged his duties towards his family faithfully and cheerfully.

He died in Bombay on March 29, 1970. In his death, all those who were in his personal touch, lost a friend, a philosopher and a guide. His life which was full of determination, integrity and devotion to duty, leaves behind footprints on the sands of time for all us to follow.

ACKNOWLEDGEMENTS

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SR PATEL

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