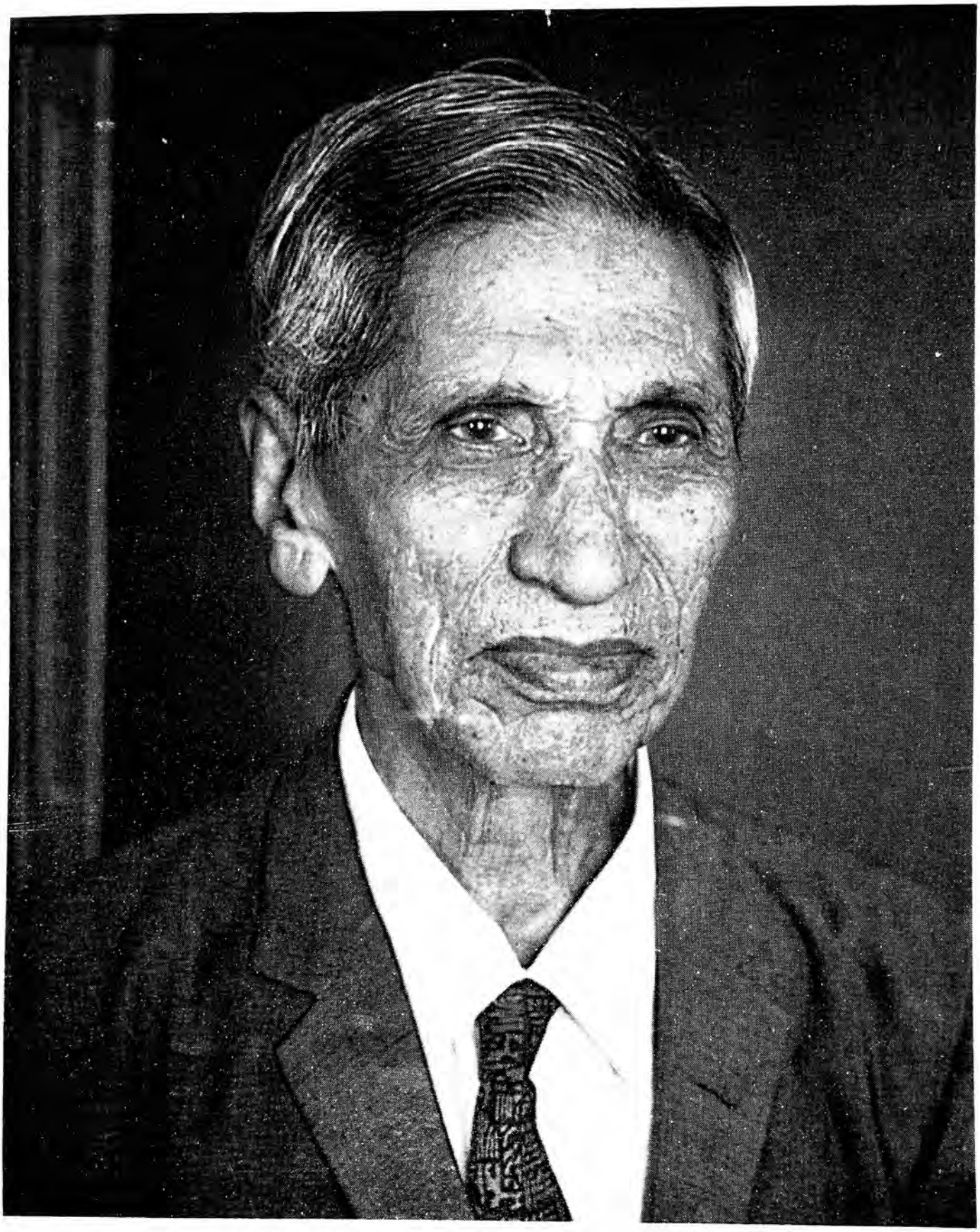

R D Desai

RANCHHODJI DAJIBHAI DESAI

(1897-1991)

Elected Fellow 1942

PROFESSOR RANCHHODJI DAJIBHAI DESAI was born in a middle class Anavil Brahmin family on 4th May, 1897 at Village Umersadi nestling among Alfonso and Chicoo orchards, about 3 kms from the Railway Station Pardi in the District of Valsad in South Gujarat. He was number four among six brothers and four sisters. After primary school education at Umersadi, Professor Desai joined the prestigeous Bhai Avabi High School at Valsad in November 1911 and passed the matriculation examination in March 1916 obtaining 1st class and 26th rank in whole of Bombay presidency. The author knew Dr Desai personally almost for over 60 years when he took his admission to the MSc previous class of the Aligarh University in 1933; Dr Desai was the first man to guide him to meet the then Head of the Deptt of Chemistry, Professor RF Hunter. Later on, the author came to know that he was Professor RD Desai.

For his college education, Professor Desai had to depend on free studentship, merit scholarship and such other financial help from other sources. In 1916 he joined the Elphinstone College, Bombay and as he was the son of a poor man, he was granted exemption from fees. He got the Anavil Samaj Scholarship of Rs 10.00 per month for 2 years. He also earned the Elphinstone College Merit Scholarship of Rs 10.00 per month in the first year and Rs. 15.00 during the 2nd year. Because of his sudden illness he could not get the college merit scholarship. He decided to join Wilson College and with the change of college, Professor Desai changed the subject of his study from BA Degree to Chemistry principal and Physics subsidiary. In January and Feburary 1919 due to influenza, cholera and plague the studies of most of the students were disturbed, but he continued and got the merit scholarships of Rs 15.00 and Rs 10.00 from two different Institutions. In May 1920, he passed the BA Degree Examination of the Bombay University with 1st class Hons and this led him to get the Dakshina Fellowship of Rs 50.00 per month with an exemption from fees for the study of BSc. The BSc year was a paradise for him because for the first time in his educational career he was free from the financial worries. Taking example of Acharya Prafull Chand Ray, Professor and University Head of Calcutta University, he decided to adopt Chemistry as his subject of study, research and professional career. In April 1921, he passed BSc Examination from the University of Bombay securing 1st class with distinction and obtaining 2nd rank in the whole University and this earned him Thakersay Chemistry Scholarship of Rs 30.00 per month.

He was very fortunate to manage his postgraduation studies in chemistry and luckily he was awarded scholarship of Rs 75.00 per month for 1st year and Rs 85.00 per month for 2nd year with exemption of 3rd year also. This enabled him to pursue technical research work at the Indian Institute of Science, Bangalore under the guidance of Professor JJ Sudborough for organic chemistry and Professor HE Watson for inorganic and physical chemistry. Professor Desai stayed at Bangalore for over 3 years and wrote 2 essays of about 3000 lines each on power and coal industry in Western India and on application of western science to the improvement of domestic hygiene in India and submitted this to the University of Bombay for which he was awarded the prestigious Homji Daji award for the first and Manakji Limji Gold Medal and handsome prize in cash and books for the excellent quality of these thesis. These awards led him to secure Sir Mangal Dass Nathu Bhai Technical Scholarship of the value of Rs. 2,000.00 per annum and this enabled him to proceed for his higher studies at the Imperial College of Science and Technology at London.

While at Bangalore, his studies were concentrated to determine:

1. Chemistry of Hongay or Karanjay oil.
2. In the reactions involving elimination of hydrogen halides.
3. Relationship between property and chemical constituion.

He submitted this work to the University of Bombay in 1926 and was awarded the Degree of MSc with distinction. This thesis was adjudged the best and was awarded RR Desai Gold Medal of the University of Bombay.

Mr Desai left Bangalore in October, 1924 and the same year he was admitted to the Associate membership of Indian Institute of Science when he was granted Sir Mangal Dass Nathu Bhai Technical Award for studies in London. His subject of research with Sir JF Thrope at Imperial College of Science and Technology consisted of the studies:

1. The effect of alkyl cyclohexane and alkyl cyclopentane rings on the carbon tetrahedral angle.
2. Tautomerism in dihydroresorcinols.
3. Geometric Isomerism of aconitic acids.

Mr Desai put very hard work and on completion of research work, he was awarded the DSc Degree of the London University in 1931. During his stay Professor Desai became famous among his British co-workers for his wonderful retentive memory which enabled him to quote exact paragraphs of chemical literature.

There were many other Indians who were working in the British chemical laboratories and on return to India they established their schools and occupied key positions in different centres. In fact most of our Indian organic chemists either worked under Sir JF Thrope at Imperial College or Sir Robert Robinson in Dyson Parris laboratory at Oxford. Many of our Indian students in organic and physical chemistry were students of FG Donnon at the University College, London.

After successfully completing his research at the Indian Institute of Sciences, Bangalore in 1924, Mr Desai joined Wilson College, Bombay as Asstt Professor of Chemistry. This was his first tenure in teaching profession. While at Wilson College, he had also joined Institute of Science at Bombay for carrying out Research work as a Research Assistant to Dr AN Meldrum who was Head of the Deptt of Chemistry and had started teaching of science for BSc and MSc exams by research. Dr KG Naik, DSc (London) who was Professor and Head of the Deptt of Chemistry in Baroda College invited Professor Desai to join as Junior Professor of Chemistry. In 1931 there were limited number of universities in India and unemployment of the educated was very common with rare career openings even for the qualified.

The erstwhile Bombay presidency had only one University with limited number of colleges affiliated to it. Dr Desai was very apprehensive in respect of a suitable employment in India after getting the DSc Degree from London. However, he was not so unlucky in this respect and on return to Bombay his selection was made in London itself by a committee consisting of Sir JF Thrope, Professor RF Hunter, Head of Chemistry Deptt. Aligarh University and Sir Ross Masood, Vice Chancellor, Aligarh University — the grandson of Sir Syed Ahmed Khan — the founder of the University, where he was appointed as Reader in Organic Chemistry on December 1, 1931. Dr Desai worked in the University till August, 1938. His life at Aligarh University was very happy as he got very intelligent and painstaking students under him. The laboratory and library facilities were excellent and Professor RF Hunter a past student of Sir JF Thrope was very cordial and friendly with him in research collaboration. The group of these two built up a research school in no time and during the period of seven years he published some 50 research papers of excellent research work. Professor RF Hunter left Aligarh in 1935 and Dr Desai was sole Incharge of Organic Chemistry section and had established cordial relations with his senior as well as junior staff members. Some of the junior staff who worked under him also got their PhD degrees as Dr Desai had concentrated on research and academic work only and avoided dealing in the dirty and soul killing politics of university; the students accorded full cooperation, cordiality, loyality and affection to him. When he finally left Aligarh, the teachers and students lavishly showered on him emotional feelings for his humanitarian, cordial and adademic approach. At the farewell function, they placed his portrait in the university and gave him the affectionate

sobriquet of Maulana RD Desai. It may not be out of place to mention that the newly appointed Vice Chancellor believed in research work and was the Chief Justice of Allahabad High Court and was later appointed as Judge of Supreme Court. He once came to visit the Chemistry Deptt. All the research students and teachers referred Dr Desai's case and requested that he may he allowed to continue even after completion of his 6 years term. Although the Vice Chancellor, besides his profession as a lawyer, was carrying out research work in mathematical physics, he did not listen to the request made to him for retaining Dr Desai as he thought that he could not go against the rules.

Out of the sheer sense of appreciation, affection and encouragement Mrs Coorvai Bharada, a pious lady gave a gift for Rs. 3,000.00 towards the expenses of Mr Desai for his stay at London. This was the only financial strength on which Mr Desai undertook the risk of 3 years study in London. One can imagine what a burning passion for knowledge and learning and unique combination of determination, faith, devotion, ambition and steel nerves must have pushed Dr Desai to undertake the job. Further, the young Desai had faith in the prophecies, the earliest being when the child RD Desai was studying in the 3rd class at his native place Umersadi. Dy Education Inspector came to examine the 3rd class students and enquired the Head Master whether he had given the ranks to the students from the top to bottom or bottom to the top. The Head Master explained that the boy occupying the last rank is the jewel of his school and because he was away from the class for one week in connection with his sacred thread ceremony, hence he was given the last rank. The Education Inspector was very much impressed by the answers given by the child of 9 years and he wanted to know more about the student's parents and further plan of his studies. During the interval, he called the father of the student who explained to him that as he was a poor farmer, he would be satisfied if he could become a trained teacher which would ensure him a job of primary school teacher, whose monthly salary during those days was Rs 25.00. The kind hearted Dy Inspector explained to the humble father of the student that the boy would be a great man and if the money was the only hurdle, he could sell some of his own land for creating education facility for such a brilliant child.

Later, the teachers who taught the young RD at High School, were also of the opinion that if he is provided with educational facility, the boy would reach greatest heights and would be a top class scientist and educationist of the country. When RD Desai was barely 10 years old, someone had predicted that the boy will cross seven seas in pursuit of education, knowledge and would bring glory and honour to the family and to the country. All the prophecies and blessings of teachers and well wishers worked powerfully on Mr Desai in his school days. His faith in the prophecies gave an instant courage and inspiration which continued to push him forward. He never

looked back. When one looks back to observe that on one side Mr Desai had completed all formalities to catch the steamship from Ballard Pier, Bombay for 3 years study in London, he, on the other hand got a heart rending news that his only son, a four month old child had passed away. Just a few months back his eldest brother Mr Khandubhai Desai - a trained primary school teacher and the only bread earning member of the family fell victim to the cancer of larynx and died leaving his widow and five children. Another cruel storke of destiny came when his eldest sister's husband passed away leaving behind his widow with 4 sons. Any other person in place of Mr RD Desai would have taken the incidents as bad omens and may have given up the idea of obtaining DSc degree from London. But here was RD a man of indomitable will-power and courage who was pitted against the situation and the word "never" was not in his dictionary. With true spirit of Karam Yogi of Shrimad Bhagawat Geeta prevailing over his harshest circumstances, he completed his studies in London and returned to India in November 1931. In October, 1931 just a month before his arrival, he lost his mother, who had made many noble sacrifices for the education of her brave son and who was eagerly awaiting the return of her son with DSc Degree. Dr Desai lost his father exactly one year after, on the same day, his mother had died.

After leaving Aligarh, Dr Desai joined Victoria Jubilee Technical Institute at Bombay in November, 1943 and remained there for 5 years as Professor of Chemistry where he taught oil technology and fundamental organic chemistry of the standard of junior BSc. However, in the evenings after 5 pm, he used to go to St Xavier's College and would remain there upto 9 pm, guiding research work of PhD students. During these 5 years he rarely got a chance to dine with his children as they used to go to bed before his return. This devotion to work succeeded in producing about 50 papers of good quality research work and two students under him earned the PhD Degree and nearly 20 students earned MSc degree by research. In November, 1943 Dr Desai joined the Department of Chemical Technology at Bombay. There were superb facilities for research and the library facilities were excellent. In August 1948 a post of Professor of Dyes Technology was created and Dr RD Desai was selected. One of the members of the selection committee politely said that with a little good Dr Desai should have been on the selection committee itself instead of being a candidate for the interview for the post and he was honourably appointed as Professor of Dyestuff Technology in November the same year.

In June 1950, the Gujarat University was created at Ahmedabad. Dr KG Naik who was the joint Principal of LD Arts College and MG Science Institute, Ahmedabad, left this post to become the Rector of the University and he strongly recommended the name of Professor RD Desai for the joint Principalship to the President and Secretary of the Ahmedabad Educational Society. On being invited Dr Desai had two minds as his relationship with the Gujarati was to help the students from Gujarat.

Justice NH Bhagawati, the Vice Chancellor of Bombay University and Dr K Venkatraman requested Dr Desai to discuss the matter of the resignation and advised Dr Desai not to resign but take leave and keep his lien for two years. Dr Desai then replied that he was not accustomed to look back. Justice Bhagawati was very touching and said "Dr Desai I write to you and give you my blessings and how I wish I had your desperate urge as a Gujarati". So he left the UDCT and joined services of Ahmedabad Educational Society on 13th October, 1950 and retired as Principal of the MG Science Institute. It did not take much time for him to feel at home with administrative work of both the colleges as the Ex-Principal Dr KG Naik and Senior Professors of Arts College, Heads of the Departments of Chemistry, Physics, Biology, Geology and Mathematics were very cooperative with him. With the consent of the members of the staff and the office, he requested Seth Kasturbhai, Chairman of the managing committee to give permission to arrange the working of LD Arts College in the morning with the noble intention of helping the poor students for study and to build up their careers. Thus, from June 1951 the LD Arts College started working in the morning from 8 am to 11 am and retained the time of MG Science Institute from 11 am. to 5 pm. Although work had immensely increased, Dr Desai had the satisfaction that he would make learning and earning possible for poor and needy students, thereby improving their future. There was a rush of students for admission to the various classes and hence the level of SSC marks (qualifying criteria for admission) had to be raised. All the students who appeared for BA examination in 1955 had passed and most of them topped the rank list. The number of students increased from 1950 to 3500 and the combined unit of LD Arts College and MG Science Institute with its strength of 3500 students became the biggest unit in the entire Bombay State. The University passed the rule not to have more than 1500 students plus 25% extra for each class in one college. It is to be noted that the Managing Committee of the Ahmedabad Education Society was highly pleased for the record growth of Arts and Science Colleges during the 7th year. For doing the job of Principal of two colleges, Dr Desai did not get a single paisa more for his additional work. Dr Desai did not mind this as he had done it voluntarily and purposely; this extra work no doubt diminished his research activity. The colleges, however, had to be bifurcated from June, 1958 and Dr Desai became the Principal of MG Science Institute as a single unit and continued to serve in this capacity till June 1969. During his professional career Dr Desai came in contact with large number of distinguished academic persons and scientists of international fame like Sir CV Raman, Dr Vikrambhai Sara Bhai, Professor JJ Chinoy and others. Because of his transparent, personal and straight forward dealings with others Dr Desai was in fondness given sobriquet of Ajat-Shatru" by some eminent old friends and vast student community of Ahmedabad and members of the staff, out of love, affection and respect called him "RD Kaka". In February 1969 a farewell cum Dr RD Desai's 70th birthday celebration

function was arranged by the members of the staff of MG Science Institute under the chairmanship of Shri Govardhandas Chokawala, the then Education Minister of Gujarat State and a handsome purse of Rs. 70,000.00 (a record sum in those days) was presented to Dr RD Desai. A trust known as "Dr RD Desai Charitable Trust" was formed under the Chairmanship of Seth Ramanbhai Mathurbhai Patel of Bansidhar Pvt Co Ltd, Ahmedabad with Professor BM Desai and Shri HS Bhavsar of MG Science Institute as Secretaries and Shri KK Shah of the Association of Chemical Technologists (India) (ACTI) Ahmedabad and others as members of the Trust to manage the funds and this trust has done very useful work for furthering the cause of education in the Gujarat State.

During his research career of over 45 years Dr RD Desai and his co-workers investigated different areas of chemistry accumulating wealth of new knowledge out of which over 217 publications in scientific journals and eight patents have become available. In the process of development, about 30 students earned their PhD Degree and over 60 students earned their MSc Degree.

Spectrum of research work of Dr RD Desai covers the following:

1. The valency Deflextion Hypothesis of CK Ingold and JF Thrope rests on the strained or uniplanar character of the cyclohexane ring. Dr RD Desai showed that on the same hypothesis, the methyl and dimethyl cyclohexane rings were strainless or multiplanar.

2. An exhaustive study of the derivatives of methyl and dimethyl cyclohexanes showed that they were not the conformers derived from the boat and arm chair forms of the multiplanar rings, but the *cis*- and *trans*-forms of the stable multiplanar chair form. The evidence of NMR spectra was conclusive on this matter.

3. An exhaustive study of coumarins from cyclic ketonic esters and polyhydric phenols and their derivatives showed that these esters were more reactive than their open chain analogues. Phosphorus oxychloride was more efficient as condensing agent than concentrated sulphuric acid. Thus, resacetophenone, 4-benzoyl resorcinol, gallacetophenone underwent coumarin condensation in presence of phosphorus oxychloride instead of concentrated sulphuric acid. The SS Kostanecki Acylation of orcacetophenone and orcbutyrophenone gave exclusively the chromones, while the isomeric orcacetophenone gave exclusively the coumarins. This observation facilitated the synthesis of some inaccessible 5-hydroxy chromones. The cyclic ketonic esters reacted with aromatic amines at low temperatures giving products which could be cyclised to tetrahydroacridones. A new synthesis of naturally occurring 4-methylscopoletin, 4-methylfraxetin and other partially methylated ethers of coumarins was worked out. Polyphosphoric acid proved to be an elegant

condensing agent for the synthesis of polyhydroxyxanthones from polyhydric phenols and o-hydroxy carboxylic acids.

4. Resacetophenone, 4-benzoylresorcinol etc underwent Friedel Crafts reaçtion with the simultaneous formation of p-and r-substituted resorcinol derivatives. Orcinol, B-orcacetophenone, 7-hydroxy 4-methylcoumarin behaved similarly. This observation provided a very convenient method of preparing some rare o-hydroxyketones. This type of substitution also takes place when phenylisocyanate or isothiocyanate was condensed with the above compounds in presence of anhydrous aluminium chloride with the insertion of phenyl-carbamido group. Malonic acid ester chloride when condensed with resorcinol and its derivatives in presence of anhydrous aluminium chloride give 4, 7-dihydroxycoumarin derivatives.

5. The synthesis of a number of 2-acyl, 4-acryl-I-naphthols and I-acyl, 6-acyl-2-naphthols was carried out to study them as coupling components for azo dyes. The comparative liability of the acyl groups in these monoacyl-naphthols as well as their diacyl derivaties were studied. They were reduced by Clemensen method to the mono and di-alkyl derivatives which showed antiseptic properties. Interesting chemical differences were observed between the derivatives containting long chain alkyl groups and their lower homologues.

6. A systematic study of the mono and diacyl derivatives of di-and tri-hydric phenols, salicylic acid, 4-methylhydroxy coumarin was made to ascertain the mechanism of the reaction. The aryl esters of aromatic sulphonic acids also underwent this migration giving a convenient method for the synthesis of hydroxy sulphones.

7. The alkylation of a number of dihydroresorcinols showed that those cyclic B-diketons exhibited keto-enol tautomerism. Dialkylated dihydroresorcinols underwent alkaline hydrolysis giving y-isobutyryl-butyric acids, which on Clemmensen reduction gave the corresponding long chain fatty acids. The tautomeric mobility of 2-aminobenzthiazole, 2-aminobenzoxaxole, 2-amino benzimidazole and their hydroxy analogues was also established.

8. Vat dyes from mono and di-aminophenanthraquinones were studied extensively to compare them with their analogues of anthraquinone in fastness, brightness and variety of shades but proved to be inferior to them in these respects. The long chain acyl derivatives of mono and diaminoanthraquinones, though very bright yellow in colour were useless as vat dyes due to their unvatability. As they were soluble in fatty oils, they might be useful as oil pigments or disperse dyes for hydrophobic fibres like nylon or terylene. A number of phenylanthraquinoyl ureas and thioureas were found to be promising dyes as far as shades and their fastness

to light and bleaching agents were concerned. The acylamides of Schaffer's acid proved to be interesting as coupling components for dyes for cotton, wool and silk.

9. The symmetrical derivatives of 4, 4-diaminostilbene-2, 2-disulphonic acid have proved to be important fluorescent brightening agents. The investigations of various unsymmetrical derivatives of the same acid showed that some of them were equally or more efficient for paper, cotton and soap in this respect.

10. New types of Parachors, S Sugden's Parachor is based on the fundamental properties of surface tension, density and molecular weight. Based on other fundamental properties like total heat of vapourisation, internal heat of vapourisation, refractive index for the sodium line and ultrasonic velocity of sound in liquids, Parachors have been suggested and found to be equally interesting. Of all these, the Refractor and Sonochor are very interesting owing to their constitutive effects.

AWARDS, HONOURS AND DISTINCTION

Early successes of Dr RD Desai, beginning with his college carrer, in the form of Dakshina Fellowship of Wilson College, Bombay, Pragji Mulji Thakersey Science Scholarship, Technical Research Scholarship of Government of Bombay, Homji Daji Prize, Maneckji Limji Gold Medal, RR Desai Gold Medal and Sir Mangaldas Nathoobhai Technical Research Foreign Scholarship of the University of Bombay provided him a spring-board for outstanding successes that followed. Honours came to him in abundance and in quick succession. He was admitted to Associate Membership of the Indian Institute of Science, Bangalore (AIISc) in 1924. He was elected Fellow of the Royal Institute of Chemistry, London (FRIC) in 1932; Fellow of the Indian Institute of Science, Bangalore (FIISc) in 1938 and Fellow of the National Institute of Science (now called Indian National Science Academy) Delhi (FNI now FNA) in 1942. Dr RD Desai was elected Fellow of the Indian Chemical Society in 1925 and the President of the Society for two years (1967 and 1968). He was President of Chemistry Section of the Indian Science Congress held in Calcutta in 1952. He was Sir PC Ray Memorial Lecturer of the Indian Chemical Society in 1964 and was also awarded Sir PC Ray Medal. He was awarded the Cooper Gold Medal of Institution of Chemists (India) in 1973 for the best research paper in their journal. He was awarded Dr KG Naik Research Gold Medal in 1958 for best research carried out by the teachers of Gujarat University. He was awarded INSA Jubilee Medal (given to Fellows of more than 40 years of standing) in 1985. Dr RD Desai was Professor HK Sen Memorial Lecturer of the Institution of Chemists (India) in 1985 and was also awarded Professor HK Sen Medal. He was the President of the Association of Chemical Technologist (India). This Association popularly known

as ACTI established in 1962, has been doing excellent work in sponsoring seminars, symposia, lectures and in arranging exhibition on the most outstanding subjects of chemical technology. During the period 1948-50. Dr Desai was a member of the Technical Advisory Board of the Director of Industries of the Government of Bombay. He was also a member of the Chemical Technology Manpower Committee nominated by the Central Government. For the period 1961-63, he was member of the Central Committee of the Central Salt and Marine Chemicals Research Institute (CSMCRI) Bhavnagar. During these years he was also a member of the Advisory Board of Director of Industries, Government of Gujarat. During the year 1968, Dr Desai was a member of the Committee for the Chemical Department of Government of Gujarat.

During his tenure as Principal of LD Arts College and MG Science Institute, Ahmedabad, he was an *Ex-Officio* member of the Senate and the Faculty of Science of Gujarat University for 19 years from 1950 to 1969. Elected in 1951, he was the first Dean of the Faculty of Science of Gujarat University. As Principal, he scrupulously kept himself away from the internal politics, polemics and unhealthy rivalaries of college teachers and principals of affiliated colleges for election to authorities of the University and to various Boards and Committees. Though he was elected as Chairman of the Board of Studies in Chemistry for a period of six years, (1950-56) and also to a seat on the Academic Council and the Board of University Teaching, this was purely on his merit as a scientist and scholar. He did not like selfish schemers and mischievous elements in academic world.

PURSUITS IN THE FIELD OF POPULARISATION OF SCIENCE AND LITERATURE

Though throughout his career Chemistry had always remained in the centre of all activities of Dr Desai, it was not his first love. His first love was Sanskrit and English literature. His love for Sanskrit and English has given him balanced outlook, youthful vigour, the charm in life and his humanistic approach to all problems of man and society. Those who know Dr Desai also know fully well that all his lectures-either pertaining to a scientific theme or some other one, would be heavily studded with quotations from either Kalidasa, Bhasa, Shakespeare, Lord Byron, HW Longfellow, Keats, Shelly, Wordsworth, Oliver Goldsmith or Lord Tennyson. Most of the students in LD Arts College, Ahmedabad used to attend his popular lectures on Sanskrit literature and admired him lavishly. Likewise, his popular lectures on scientific topics were also a great success.

APPRAISAL OF DR RD DESAI AS A MAN

In evaluating Dr RD Desai as a man and a member of the teaching and research profession, one can say that here is a perfect gentleman according to the definition of Cardinal Newman. In his life time he never hurt the feelings of others and never hit

anybody below the belt. He has always been an ideal son, brother, husband, father and the member of the society. He was an embodiment of humanity among humans and has never avoided the occasion of playing a good samaritan, when necessary. Anybody who went to him for any work, hardly returned disappointed. To them he has always been their "Dear RD Kaka" and to the members of the staff of the college, a warm hearted, a generous and sympathetic colleague. He was an ideal teacher and upto date and ever green researcher. The coming generations will perhaps have more qualified and learned teachers and researchers, but the man in Dr RD Desai will be difficult to find in them. Whosoever wrote to him surely received the reply by the return of post—the reply with full details, his own suggestions and sympathies. He might have had his faults and failings, but these are insignificant in comparison to the virtues and accomplishments he had. It may be that conceited self seekers and nagging persons may not covertly like him, but covertly they are also compelled to give him their need of praise.

In writing the above account, the author had the unique and immense benefit of seeking interview of "Dadaji" as frequently as he found it necessary for which he has no words to express adequately and his deep debt of gratitude to him for enabling the author to bring forth the truth without a trace of doubt.

Professor Desai was the happiest man when he learnt about an award to the author which was given on submission of his work for DSc degree of the Aligarh Muslim University. The Vice-Chancellor of the Delhi University also congratulated Dr. Desai on the award. It may not be out of place to add that the author has not seen any Department of Chemistry in India so nicely laid out by the joint efforts of Professor RF Hunter and Professor RD Desai. Professor Desai, was not only an outstanding personality in the field of Chemistry but also a scientist so well versed in Sanskrit and delivered lectures on Kali Das and Bhuvabhti in the Sanskrit Deptt of the University of Delhi. In Aligarh Muslim University a hostel has been named after him and is called RD Desai Hostel. His photo with the title Maulana RD Desai has been placed in the library of the Chemistry Department of Aligarh University.

To end up, the author would like to add his personal views about the greatness of this person. After passing his BSc examination from the Agra College of Agra University in 1933, the author joined the MSc classes of the Aligarh Muslim University. In the previous class, author's father got seriously ill on account of the cancer of the nose and he told Dr RD Desai that he might get short of attendance. Dr Desai, on hearing this, came to see father twice at their residence and his father requested him to look after his son after his death. The author's father lost his life on 9th April 1934 and he is proud to say that Dr Desai not only took care of him until he was in the

Deptt. of Chemistry but kept his relationship as a father would do, almost until the last day of life even after retirement from his active service at Ahmedabad. Dr Desai had a fall in his own house on 6th November, 1991, fractured his hip bone and was shifted to his son Dr Kirti Bhai's nursing home at Umersadi, his home town where he breathed his last on 16th November, 1991, after staying at the hospital for ten days at a ripe age of about 94 years. Until his last day he looked after the author like his son as he had given an assurance to his father. Not only this, his family members, daughters and their husbands and Mr Kirti Bhai, his wife Raksha, his son Prashant and daughter Meenal are still in correspondence and they treat the author the way Professor RD Desai used to. It may be worth adding that until his retirement, the author worked in the Department of Chemistry, University of Delhi as Professor of Chemistry and kept himself busy with the research work.

GS SAHARIA
"SAHARIA SADAN"
43, Vaishali, Pitampura,
Delhi-110 034

BIBLIOGRAPHY

1923 (With SUDBOROUGH, JJ AND WATSON, HE) The Chemistry of Hongay Oil. *J. Indian Inst. Sc* (Bangalore) **6,** 93.

1925 Iodine as a catalyst in reactions involving elimination of halogen halides. *J. Indian Inst. Sc.* (Bangalore) **8,** 125.

1928 Nitro derivatives of Dibenzylaniline. *J. Indian Chem. Soc.*, **5,** 426.

— (With NAIK, KG AND TRIVEDI, RK) Phosphorus Oxyhalide as condensing agent in the synthesis of coumarins. *J. Indian Chem. Soc.*, **5,** 801.

1929 (With DESAI, HR, AND NAIK, KG) Courmarin condensation. Part *I. J. Indian Chem. Soc.*, **6,** 83.

1930 (With NAIK, KG AND PAREKH, MM) The formation of sulphoxides, *J. Indian Chem. Soc.*, **7,** 137.

1931 The chemistry of alkylcyclopentanones. Part I. Derivatives of 3-methylcyclo-pentanone, *J. Chem. Soc. (London),* 1216.

— As above. Part II. The effect of the methylcyclopentane ring on the carbon tetrahedral angle. *J. Chem. Soc. (London),* 1065.

1932 The formation and stability of spiro compounds, Part XIV. The effect of methylcyclohexane ring on the carbon tetrahedral angle. *J. Chem. Soc. (London),* 1047.

— Dihydroresorcinols. Part I. The alkylation of dihydroresorcinol *J. Chem. Soc. (London),* 1079.

— Investigations on alkylaconitic acids. *J. Chem. Soc. (London),* 1088.

1933 Dihydroresorcinols. Part II. The condensation of aldehydes with dihydro-resorcinols. *J. Indian Chem. Soc.*, **10,** 663.

— As above. Part III. The condesation of aldehydes with dihydroresorcinols. *J. Univ. Bomb.* **2,** Part II, 62.

— The Chemistry of alkylcyclopentanones. Part III. Synthesis of 3-methylcyclopentane-Spiro-Cyclohexane-3, 5-dione, *J. Indian Chem. Soc.*, **10,** 257.

— (With CHOWDHURY, MR AND HUNTER, RF) Studies in the naphthathiazole series. Part II. The methylation of 1-anilino-α-naphthathiazole and of 1-p-bromoanilino α-naphthathiazole. The aromatic character of the heterocyclic nucleus in α-naphthathiazoles. *J. Indian Chem. Soc.* **10,** 637.

— (With CHOWDHURY, MR, HUNTER, RF, AND SOLANGI, FMK) The effect of substituents on the bromination of diaryl-ψ-thiohydantoins. An application of the theory of singlet linkages to the formation of polybromide complexes by hetero-cyclic compounds. *Rec. Trav. Chim,* 853.

1934 (With ALIAZAM, M AND HUNTER, RF) The nature of the bromo addition compounds of dehydrothio-p-toluidine and its acetyl derivative and the synthesis of 4′-acetylamino-l-phenyl-5-methylbenzthiazole and of 3′-bromo-4′-acetylamino-l-phenyl-5-methyl benzthiazole. *Rec. Trav. Chim.* 7.

— The spatial configuration of cyclohexane and its derivaties. *J. Univ. Bom.*, **3,** Part II, 219.

— (With CHOWDHURY, MAS, AND HUNTER, RF) The formation and stability of polybromide derivatives of heterocyclic compounds. Part III. The bromination of some μ-substituted benzthiazoles. *J. Indian Chem. Soc.*, **11,** 249.

— (With BUKHSH, MW, AND HUNTER, RF) As above, Part IV. The hydrodibromides and hydrotetrabromides of some 1-dimethyl-aminobenzthiazoles. *J. Indian Chem. Soc.* **11,** 853.

— (With HUNTER, RF AND KHALIDI, ARK) The unsaturation and tautomeric mobility of heterocyclic compounds. Part V. Benzoxazoles. *J. Chem. Soc. (London),* 1186.

1935 (With HUNTER, RF, AND KOPPAR, LG) The condensation of thiocarbamides with Monochloroacetic acid and the conversion of arylformamidinethiolacetic acids into ψ-thiohydantoin derivatives. *Rec. Trav. Chim.*, 118.

— (With BASHIR AHMAD, AND HUNTER, RF) The formation and stability of polybromide derivaties of heterocylic compounds, Part V. The bromination of some 1-arylimino-3-aryl-4-keto-5-methyltetrahydrothizoles and their 5, 5-dimethyl homologues and some remark on the theory of singlet linkages. *J. Indian Chem. Soc.*, **12,** 237.

— A critical survey of valency-deflexion hypothesis. *J. Univ. Bom.*, **4,** Part II, 206.

1936 (With SAHARIA, GS) The synthesis of 4-methylcyclohexane-spiro-cyclopentane. *J. Ben. Hindu Univ.*, **1** 1.

— (With WALI, MA) A new synthesis of Cyclohexane-spiro-cyclopentane. *J. Univ. Bom.* **5,** Part II, 69.

— (With WALI, MA) The condensation of succinic anhydride with α-and β-Naphthyl methyl ethers. *J. Univ. Bom.*, **5,** Part II, 73.

— (With HUNTER, RF, AND KUREISHY, MA) The unsaturation and tautomeric mobility of heterocyclic compounds. Part VIII. β-naphthathiazole, 5, 6, 7, 8-tetrahydro-β-naphthathiazole, and 5-phenylbenzthiazole derivatives. *J. Chem. Soc. (London),* 1668.

— (With HUNTER, RF, AND MEHDI HUSSAIN) Isomeric 2-arylamino-2-cyano-trans-decahydronaphthalenes, and the condensation of the cyanohydrin of 3-methylcyclopentanone with aniline. *J. Chem. Soc. (London),* 1675.

— (With HUNTER, RF GHULAM KHAN, AND SAHARIA, GS) Studies in cyclohexane series. Part I. The isomeric 1-carboxy-4-, 3-, and 2-methylcyclohexane-1-acetic acids. *J. Chem. Soc. (London),* 416.

— (With BUKHSH, MW, HUNTER, RF, AND MEHDI HUSSAIN) As above. Part II. The formation of isomeric arylaminocyanomethylcyclohexanes in the condensation of the cyanohydrins of the methylcyclohexanones with arylamines. *J. Chem. Soc. (London)*, 1159.

— (With FAROOQ, MO AND HUNTER, RF) As above. Part III, 1-carboxy-3-3-dimethylcyclohexane-l-acetic acid. *J. Chem. Soc. (London)*, 1162.

— (With WALI, MA) Dihydroresorcinols. Part IV. The condensation of phenyl-dihydroresorcinol with aromatic aldehydes. *J. Indian Chem. Soc.*, **13,** 735.

1937 (With AHMAD, SZ) Heterocyclic Compounds, Part I. Coumarins from cyclopentanone-2-carboxylate and 4-methylcyclopentanone-2-carboxylate. *Proc. Indian Acad. Sci.*, **5,** Sec. A, 277.

— (With AHMAD, SZ) As above. Part-II. The synthesis of cyclopenteno-(1′, 2′, 4, 3)-carbostyril derivatives. *Proc. Indian Acad. Sci.* **5,** Sec. A, 543.

— (With AHMAD, SZ) As above, Part III. The synthesis of cyclopenteno-(1′,2′,2,3)-chromones, and a discussion on the mechanism of the pechmann and the simonis reaction. *Proc. Indian Acad. Sci.* **6,** Sec. A, 6.

— (With HAMID, SA) As above, Part IV. Coumarins from resacetophenone and ethylacetoacetate and synthesis of coumarino-γ-pyrones. *Proc. Indian Acad. Sci.* **6,** Sec. A, 185.

— (With HAMID, SA) As above. Part V. synthesis of 2-methyl-6-ethyl-7-hydroxy-chromone and its derivatives. *Proc. Indian Acad. Sci.* 6, Sec. A, 287.

— (With AHMAD, SZ) As above, Part VI. Coumarins from ethyl-β-chloropropyl-acetoacetate and the mercuration of coumarins from ethylcyclohexanone-2-carboxylate. *J. Univ. Bom.* **6,** Part II, 89.

— (With AHMAD ALI, HUNTER, RF, AND MUHAMMAD, SMM) The Friedel-Crafts condensation of substituted glutaric anhydrides with benzene and the formation of isomeric benzoylphenylpropionic acids in the reaction between phenylsuccinic anhydride and benzene. *J. Chem. Soc. (London)*, 1013.

— (With WALI, MA) Studies in the Friedel-Crafts reaction. Part II. The condensation of the anhydrides of an disubstituted succinic acids with benzene and toluene. *Proc. Indian Acad. Sci.*, 6 Sec. A. 135.

— (With WALI, MA) As above. Part III. The condensation of succinic anhydride with the methyl ethers of the phenol and the cresols. *Proc. Indian Acad. Sci.*, **6,** Sec. A, 144.

— (With HAMID, SA) The condensation of resacetophenone with open-chain and cyclic β-ketonic Esters. *Curr. Sci.*, **6,** 56.

— (With KAMAL, A, AND MOMIN, SA) The condensation of arylamines with the cyanohydrine of γ-camphor and 3-methylcyclopentanone. *J. Univ. Bom.* **6,** Part II, 85.

1938 (With CHOWDHRY, NA) Heterocyclic compounds. Part VII. Coumarines from resacetophenone and cyclic-β-ketonic esters. *Proc. Indian Acad. Sci.*, **8,** Sec. A, 1.

— (With CHOWDHRY, NA) As above, Part VIII. Coumarins from alkylcyclohexanone-2-carboxylates and trans-β-decalone-3-carboxylate. *Proc. Indian Acad. Sci.*, **8,** Sec. A, 12.

— (With EKHLAS, M) As above. Part IX. Coumarins from substituted resacetophenones and ethylacetoacetate *Proc. Indian Acad. Sci.*, **8,** Sec. A, 567.

— (With EKHLAS, M) Studies in the Friedel-Crafts reaction. Part IV. The action of acetylchloride and acetic anhydride on resorcinol and its derivatives. An evidence for γ-substitution in the resorcinol nucleus. *Proc. Indian Acad. Sci.*, **8,** Sec. A, 194.

— (With HUNTER, RF, AND KHALIDI, ARK) The unsaturation and tautomeric mobility of heterocyclic compounds. Part XI. α-and β-naphthoxazole and 5-bromobenzoxazle derivatives.

The ultra-violet absorption spectra of some tautomeric selenazoles, *J. Chem. Soc. (London)*, 321.

— (With EKHLAS, M) A new method for the synthesis of coumarins. *Sci. & Cult.*, **4**, 64.

— Distinction between coumarins and chromones. New methods for the synthesis of coumarins. *Rasayanam*, **3**, 155.

1939 (With HUNTER, RF AND SAHARIA, GS) Multiplanar Cyclohexane rings. *Nature* **142** 798.

— (With BUKHSH, W) Heterocyclic compounds. Part X. The synthesis of substituted 1, 2, 3, 4-tetrahydroacridones. *Proc. Indian Acad. Sci.*, **10**, Sec. A, 262.

— (With HUNTER, RF AND SAHARIA, GS) Studies in cyclohexane series. Part IV. The isomeric 1-carboxy-4-, -3-, and- 2-methylcyclohexane-1-succinic acids. *J. Chem. Soc. (London)*, 84.

— (With SAHARIA GS) The methylation of ethyl methylcyclohexylidene cyano-acetates and reduction of ethyl 2-methylcyclo-hexylidene cyanoacetate, *J. Univ. Bom.*, **8**, Part III, 3.

— (With SAHARIA, GS) The synthesis of α, α, dimethyltricarballylic and 1-carboxycyclopentane-1-α-succinic and 1-carboxy-3-methylcyclopentane-1-α-succinic acids. *J. Univ. Bom.* **8**, Part III, 3.

— The Isomers of 1-carboxy-4-, 3-, and -2-methylcyclohexane-1-succinic acids. *Sci. & Cult.*, **4**, 524.

— (With AHMAD, Z) The colouring matter of the yellow flowers of thevetia nerifolia (*Apocyanaceae*). *Proc. Nat. Inst. Sci.*, **5**, 261.

1940 (With AKRAM, M, AND KAMAL, A) Studies in naphthalene series. Part I. Some properties of 2-acetyl-1-naphthol and the Synthesis of 2-Ethyl-1-naphthol. *Proc. Indian Acad. Sci.* **11**, Sec A, 139.

— (With CHAUDHRY, NA, AND SAHARIA, GS). As above. Part-II, The synthesis of the trans-form of trans-decalin-2-carboxy-3-acetic acid. *Proc. Indian Acad. Sci.* **11**, Sec. A, 145.

— (With AKRAM, M) As above. Part III. Properties of 4-acetyl-1-naphthol and the preparation of 4-ethyl-1-naphthol. *Proc. Indian Acad. Sci.*, **11**, Sec, A, 149.

— (With AKRAM, M) As above. Part IV. The preparation and properties of 2, 4-diacetyl-1-naphthol and 2-Acetyl-4-propionyl-1-naphthol. *Proc. Indian Acad. Sci.* **11**, Sec. A, 156.

— (With WARAVDEKAR, WS) As above. Part V. Properties of 2-stearyl-, 2-Palmityl-, and 2-Lauryl-1-naphthols and synthesis of 2-octadecyl-, 2-hexadecyl- and 2-dodecyl-1-naphtols. *Proc. Indian Acad. Sci.*, **12**, Sec. A, 597.

— (With VAKIL, (Miss) VM) Heterocyclic compounds. Part XI. The application of the Pechmann and the Kostanecki reactions of γ-orcacetophenone. *Proc. Indian Acad. Sci.*, **12**, Sec. A, 357.

— (With RADHA, (Miss) KS) Studies in the Friedel-Crafts reaction. Part V. The action of acetic anhydride and benzoyl chloride on β-methyl resorcylate. *Proc. Indian Acad. Sci.*, **12**, Sec. A, 46.

— (With VAKIL, (Miss) VM) As above. Part VI. Further evidence for γ-substitution in the resorcinol and orcinol derivatives. *Proc. Indian Acad. Sci.*, **12**, Sec. A, 391.

— (With SAHARIA, GS) Some derivatives of cyclohexane. The synthesis of 1-carboxy cyclohexane-1-α-succinic, -1-α-propionic, and-1-α-benzylacetic acids and of ∝-cyclohexyl-succinic acids. *J. Univ. Bom.*, **9**, 107.

— (With RADHA, (Miss) KS) The action of hexamethylenetetramine on the methyl esters of phenolcarboxylic acids. Part I. The synthesis of 2, 4-dihydroxy-5-formyl-benzoic acid. *Proc. Indian Acad. Sci.*, **11**, Sec. A, 422.

1941 (With SAHARIA, GS) The chemistry of alkylcyclopentanones. Part IV. The synthesis of 1-carboxy-3-methyl-cyclopentane-1α-penzylacetic, 1-carboxy-cyclopentane-1-α-benzylacetic and 1-carboxy-cyclopentane l-α-propionic acids. *J. Univ. Bom.*, **10**, Part III, 93.

— (With ABDUL HAMID AND SHROFF, HP) Studies in naphthalene series. Part VI. synthesis of 2-propyl-1-naphthol and properties of 2-propionyl-1-naphthol. *Proc. Indian Acad. Sci.*, **13,** Sec. A, 33.

— (With WARAVDEKAR, WS) As above, Part VIII. Attempted synthesis of 4-stearyl-, 4-palmityl, and 4-lauryl-1-naphthols. *Proc. Indian Acad. Sci.*, **13,** Sec. A, 39.

— (With ABDUL HAMID) As above. Part VIII. The preparation and properties of 2, 4-dipropionyl-1-naphthol and 4-acetyl-2-propionyl-1-naphthol. *Proc Indian Acad. Sci.* **13** Sec. A 126.

— (With ABDUL HAMID) As above. Part IX. properties of 4-propionyl-1-naphthol and the preparation of 4-propyl-1-naphthol. *Proc. Indian Acad. Sci.*, **13**, Sec, A, 132.

— (With WARAVDEKAR, WS) Heterocyclic compounds. Part XII. Chromones from resacyl and gallacylphenones containing long-chain acyl groups, and some chemical properties of these hydroxy-ketones. *Proc. Indian Acad. Sci.*, **13,** Sec. A, 177.

— (With ALI, SA, AND SHROFF, HP) As above, Part XIII. Abnormal alkaline hydrolysis of some 4-isopropyl-1, 2-α-naphtha-pyrones. *Proc. Indian Acad. Sci.*, **13,** Sec. A, 184.

— (With MAVANI, CK) As above, Part XIV. Coumarins from 4-ethyl-2-acetylresorcinol and β-ketonic esters. *Proc. Indian Acad. Sci.*, **14**, Sec, A, 100.

— (With FIGUEREDO, F) Studies in the Friedel-Crafts reaction. Part VII. The action of phthalic and succinic anhydrides on resorcinol derivatives. *Proc. Indian Acad. Sci.*, **14** Sec. A, 605.

— (With HUNTER, RF, AND SAHARIA, GS) Studies in the cyclohexane series. Part V. The isomeric 1-carboxy-4-, and 3-methylcyclohexane-1-α-benzylacetic acids. *Proc. Indian Acad. Sci.*, **14,** Sec. A, 516.

— (With SHROFF, (Mrs) VH) The condensation of succine anhydride with resorcinol and orcinol-another case of γ-substitution in orcinol. *J. Univ. Bom.*, **10,** Part III, 97.

— Newer outlets for Oils and Fats, *Sci. & Cult.*, **7,** 295.

— (With JOSHI, PN) The quinonoid theory of the substantivity of naphthol AS and related compounds, *Sci. & Cult.* **6,** 550.

1942 (With MAVANI, CK) Heterocyclic compounds, Part XV. Coumarins from pyrogallol derivatives. *Proc. Indian Acad. Sci.*, **15,** Sec. A, 1.

— (With MAVANI, CK) As above, Part XVI. Coumarins from hydroquinone derivatives, *Proc. Indian Acad. Sci.*, **15,** Sec. A, 11.

— (With HUNTER, RF, AND SAHARIA, GS) Studies in cyclohexane series. Part VI. The stereoisomeric forms of 4-methyl-, and 3-methylcyclohexane-1, 1-dicarboxylic acids and a conclusive chemical evidence for the multiplanar cyclo-hexane ring, *Proc. Indian Acad. Sci.*, **15,** Sec. A, 168.

1945 (With PEERMAHOMED, FR) Recovery of alumia and titania from bauxite sludge. *J. Indian Chem. Soc. Ind. & News Ed.*, **8,** 9.

1946 (With WARAVDEKAR, WS) Studies in naphthalene series, Part X. The preparation and the properties of 1-stearyl-, 1-palmityl-and 1-lauryl-2-naphthols, *Proc. Indian Acad, Sci.*, **23,** 41.

— (With WARAVDEKAR, WS) As above. Part XI. The condensation of 2-acetyl-1-naphthol and methyl 1-hydroxy-2-naphthoate with stearyl, palmityl and lauryl Chlorides, *Proc. Indian Acad. Sci.*, **24**, Sec. A, 332.

— (With WARAVDEKAR, WS) As above. Part XII. The preparation and properties of 4-stearyl, palmityl- and 4-lauryl-1-naphthols, *Proc. Indian Acad. Sci.*, **24,** Sec. A, 338.

— (With WARAVDEKAR, WS) As above. Part XIII. The preparation and properties of 6-acyl-2-naphthols containing short and long chain alkyl groups, *Proc. Indian Acad, Sci.*, **24,** Sec. A, 382.

— (With WARAVDEKAR, WS) As above. Part XIV. The preparation and properties of 2, 4-dipalmityl, and 2, 4-dilauryl-1-naphtholds, *Proc. Indian Acad, Sci.*, **24,** Sec. A, 389.

— (With RADHA, (Miss) KS AND SHAH, RC) Studies in the Friedel-Crafts reaction. Part VIII. The action of acetic anhydride on methyl-γ-resorcylate. *Proc. Indian Acad. Sci.*, **23,** Sec. A, 305.

— (With RADHA, (Miss) KS AND SHAH, RC) The action of hexamethylenetetramine on phenols and the methyl esters of phenol carboxylic acids. Part II. The synthesis and study of methyl-1, 3, 4-trihydroxy-5-formyl-benzoate. *Proc. Indian Acad. Sci.* **23,** Sec. A, 179.

— (With RADHA, (Miss) KS, AND SHAH, RC) As above, Part III. The synthesis and study of methyl-2-hydroxy-l-formyl-3-naphthoate. *Proc. Indian Acad. Sec.* A, 182.

— (With RADHA, (Miss) KS, AND SHAH, RC) As above. Part IV. The synthesis and study of methyl-1-hydroxy-4-formyl-2-naphthoate and 2-acetyl-4-formyl-α-naphthol. *Proc. Indian Acad. Sci.* **23,** Sec. A, 187.

— (With RADHA, (Miss) KS, AND SHAH, RC) As above. Part V. The derivaties of 2, 4-dihydroxy-5-formylbenzoic acid. *Proc. Indian Acad. Sci.*, **23,** Sec. A. 338.

1947 (With BHUMGARA, KS AND WARAVDEKAR, WS) As above. Part XV. The preparation and properties of 4-phenylacetyl-l-naphthol and 2-phenylacetyl-1-naphthol. *Proc. Indian Acad. Sci.*, **25,** Sec. A, 359.

— (With MAVANI, CK) Heterocyclic compounds. Part XVII. Coumarins from β-ketonic esters and 5-methyl-2-ethyl, 5-methyl-2-propyl, 5-methyl-2-, 4-diethyl-4-ethyl-2-benzoyl-resorcinols, and phlorobenzophenone, *Proc. Indian Acad. Sci.*, **25,** Sec. A, 341.

— (With GAITONDE, MM, HASAN, SM AND SHAH, RC) As above. Part XVIII. Condensation of cyclic-β-ketonic esters with methyl-β-resorcylate and resace-tophenone in presence of anhydrous aluminium chloride. *Proc. Indian Acad. Sci.*, **25,** Sec. A, 345.

— (With GAITONDE, MM) As above. Part XIX. The Kostanecki acetylation of γ-orcpropiophenone and γ-orcbutyrophenone and formation of 5-hydroxy-2, 3, 7-trimethylchromone and 5-hydroxy-2, 7-dimethyl-3-ethyl-chromone. *Proc. Indian Acad. Sci.*, **25,** Sec. A, 351.

— (With MAVANI, CK) As above. Part XX. The Kostanecki acylation of quinacetophenone, quinbenzophenone and γ-orcacetophnone, and synthesis of 6-hydroxy and 5-hydroxy chromones and coumarins, *Proc. Indian Acad. Sci.* **25,** Sec. A, 353.

— (With GAITONDE, MM) Friedel Crafts-reaction. Part IX. The action of propionic and butyric anhydrides on orcinol and further evidence of γ-substitution in resorcinol derivatives, *Proc. Indian Acad, Sci.*, **25,** Sec. A, 364.

— (With BHUMGARA, KS, AND WARAVDEKAR. WS) The preparation and properties of 4-phyenlacetyl-resorinol and 4-phenylacetyl-pyrogallol. *Proc. Indian Acad. Sci.* **25,** Sec. A, 322.

— (With MAVANI, CK) The Fries reaction. Part I. The rearrangement of the estern of hydroxy-coumarins, *Proc, Indian Acad, Sci.*, **25,** Sec. A, 327.

1949 (With MAVANI, CK) As above. Part II. The rearrangement of the esters of dihydroxyphenols, *Proc, Indian Acad. Sci.*, **29**, Sec. A, 269.

1951 (With BHAVSAR, (Miss) MD) Heterocylic compounds. Part XXIII. The nuclear oxidation of coumarin and its derivatives. *Indian J. of Pharm*, **13,** 200.

— (With CHOUBAL, VG, DESAI, BM, AND DESAI, SC) The action of hexamethylene-tetramine on phenols and the methyl esters of phenol carboxylic acids, Part VI. The synthesis and study of the arylamides of 1-formyl-2-hydroxy-3-naphthoic acid, *J. Indian Chem. Soc.*, **35,** 860.

— (With BHAVSAR, (Miss) M.D.) Synthesis of 4-methylscopoletion and scopoletion. *Curr. Sci.* **23,** 325.

— (With MEHTA, CV) Studies in sulphanilamide and allied compounds, Part I. The synthesis of sulphanilamide derivaties of some benzthiazoles and naphthiazoles. *Indian J. Pharm.*, **13,** 205.

— (With MEHTA, CV) As above. Part II. The preparation of sulphanilamide and its chloramines. *Indian J. Pharm.*, **13,** 208.

— (With MEHTA, CV) As above. Part III. The synthesis of substituted sulphanilamides of azo-benzene. *Indian J. Pharm,* **13,** 211.

1952 (With ALI, SA, DESAI, DN, AND SHROFF, HP) Studies in naphthalene series. part XVI. 2-butyryl-1-naphthol and 2-isobutyryl-2-naphthol. *J. Sci. Ind. Res.*, **IIB,** 286.

— (With CHOUBAL, VG) As above. Part XVII. Synthesis of diarylamidines of 2-hydroxy-3-naphthoic acid. *J. Sci. Ind. Res.*, **IIB,** 290.

— (With BYATNAL, VN, AND MARABALLI, MS) Heterocyclic compounds. Part XXI. Coumarins from arylamides of β-resorcylic acid. *J. Indian Chem. Soc.*, **29,** 443.

— (With SHROFF, HP) As above, Part XXII. The action of bromine on some naphtha-chromones, *J. Indian Chem. Soc.*, **29,** 447.

— (With MARBALLI, MS) As above. Part XXIV. Coumarins from arylamides of γ-resorcylic acid, *J. Sci. Ind. Res.* **IIB,** 292.

— (With BYATNAL, VN) Studies in the Friedel-Crafts reaction. Part X. The action of acetic anhydride on the arylamides of β-resorcylic acid. *J. Indian Chem. Soc.*, **29,** 555.

— Baeyer's Strain Theory and its aftermath—Presidential address section of chemistry, 39th Indian Science Congres, Calcutta, 1952. *Proc. 39th Ind. Sc. Con.* Part III.

— (With KUMTA, NS) Studies in at Dyes. Part I. The acyl and Aroyl derivatives of 2-aminophenanthropquinone. *J. Sci. Ind. Resi.*, **IIB,** 282.

— (With KUMTA, NS) As above. Part II. Some phenanthrenequinonyl anthraquinonylimines and their dyeing properties. *J. Sci. Ind. Res.*, **IIB,** 284.

— (With KUNDEL, RH) As above. Part IV. The diimines from 2, 7-dibromophenan-thraquinone and their dyeing properties. *J. Indian Chem. Soc.*, **29,** 238.

1953 (With MAVANI, CK) The Fries Reaction. Part III. The rearrangement of the esters of trihydricphenols and the mechanism of Fries reaction. *J. Sci. Ind. Res.* **12B**, 236.

— (With KUNDEL, RH) Studies in vat dyes. Part III. The acyl and aroyl derivatives of 2, 7-diamino-phenanthrene quinone. *J. Sci. Ind. Res.*, **12B**, 234.

1954 (With BHAVSAR, (Miss) MD) Heterocyclic compounds. Part XXV. The persulphate oxidation of coumarinyl p-toluenesulphonates. *J. Indian Chem. Soc.*, **31**, 8.

— (With DESAI, BM) As above. Part XXVI. The bromination of 7-hydroxychromones and synthesis of 7-hydroxy-6-alkylchromones and their bromination. *J. Sci. Ind. Res.*, **13B,** 249.

— (With TRIVEDI, JJ, AND TRIVEDI, JP) As above. Part XXVII. The bromination and nitration of 6-Hydroxy-2-methylchromone. *J. Sci, Ind. Res.*, **13B,** 328.

— (With TRIVEDI, JJ AND TRIVEDI, JP) As above. Part XXVIII. Bromination and nitration of 7-hydroxy-2, 3-dimethylchromone and 7-hydroxy-2-methyl-3-ethylchromone, *J. Indian Chem. Soc.*, **31,** 145.

— (With AMIN, JH) The Fries Reaction. Part IV. The rearrangement of the derivatives of salicylic acid and substituted benzoic acids. *J. Sci.Ind. Res.*, **13B,** 178.

— (With BHAVSAR, (Miss) MD) As above. Part V. The rearrangement of coumarinyl sulphonates. *J. Indian Chem. Soc.* **31,** 167.

— (With AMIN, JH, AND PAREKH, (Mrs) K) As above. Part VI. The rearrangement of Aryl p-toluene sulphonates and a convenient method for the synthesis of hydroxy-diarylsulphones. *J. Sci. Ind. Res.*, **13B,** 181.

1955 (With DESAI, RM) Studies in the naphthalene series. Part XVIII. Preparation of aroyl-1-naphthols and the use of acyl and aroyl-1-naphthols as coupling components. *J. Sci. Ind. Res.*, **14B,** 498.

— (With DESAI, RM) As above. Part XIX. Preparation and use of the hydroxy ketones of β-naphthol as coupling components. *J. Sci. Ind. Res.*, **14B,** 505.

— (With DESAI, RM) As above. Part XX. Preparation and use of arylamides of Schaeffer's Acid as coupling components. *J. Sci. Ind. Res.*, **14B,** 509.

1956 (With SHINTRE, DV) Heterocyclic compounds. Part XXIX. The synthesis of substituted 1-methyl- and 3-methyl-1, 2, 3, 4-tetrahydroacridones. *J. Indian Chem. Soc.*, **33,** 425.

— (With PARGHI, (Miss) JV) As above. Part XXX. New synthesis of 4-methylscopletin and 4-methyl-fraxetin. *J. Indian Chem. Soc.* **33,** 483.

— (With PARGHI, (Miss) JV) As above, XXXI. The synthesis of partially methylated ethers of polyhydroxy coumarins. *J. Indian Chem. Soc.*, **33,** 661.

— (With DESAI, RN) Studies in vat dyes. Part V. The acyl derivatives of mono and diaminoanthraquinones using longchain fatty acids. *J. Indian Chem. Soc.*, **33,** 559.

— The Present position of Indian dyestuff industry. The Perkin centenary celebrations at MS University, Baroda. *The Indian Textile Journal,* November Issue, 1.

1958 (With DESAI BM AND NAIK, NN) Heterocyclic compounds. Part XXXII. Nitration and bromination of 1-methyl-and 3-methyl-1, 2, 3, 4-tetrahydro-5-acridones. *J. Indian Chem. Soc.*, **35,** 88.

— (With CHOUBAL, VG, DESAI BM AND DESAI SC) The action of hexamethylenetetramine on phenols and the methyl esters of phenolcarboxylic acids. Part VI. The synthesis and study of the arylamides of 1-formyl-2-hydroxy-3-naphthoic acid. *J. Indian Chem.* Soc., **35,** 860.

1960 (With DESAI BM, AND DESAI (Miss) PR) Heterocyclic compounds. Part XXXIII. A new synthesis of xanthones. *J. Indian Chem. Soc.*, **37,** 53.

— (With DESAI, BM, AND DESAI, (Miss) PR) Heterocyclic compounds. Part XXXIII. A new synthesis of xanthones. *J. Indian Chem. Soc.*, **37,** 53.

— (With DESAI, B.M., AND DESAI, (Miss) PR) As above. Part XXXIV. Bromination and nitration of 4-keto-1, 4-dihydro-2-3-poly-methylenequinolines. *J. Indian Chem Soc.*, **37,** 553.

— (With DESAI, BM AND DESAI, JI) As above. Part XXXV. Kostanecki acetylation of methyl 2, 4-dihydroxy-5-acyl-and 3-acyl benzoates. *J. Indian Chem. Soc.*, **37,** 491.

— Petrochemicals from acetylene.

1961 Physical properties and chemical constitution. Part I. Latent heat of evaporation, density, temperature, and composition of organic liquids. *J. Indian Chem. Soc.*, **38,** 558.

1962 (With SATPANTHI, PS) Heterocyclic compounds. Part XXXVI. Coumarins from 2-propyl hydroquinone.

1963 (With DESAI, (Miss) PR) Heterocyclic compounds. Part XXXVII. Synthesis of scopoletin. *J. Indian Chem. Sco.*, **40,** 456.

— (With DESAI (Miss) PR, SAHARIA, GS and SHARMA, BR. Studies in the cycloheptane series. Part I. Synthesis of some derivatives of 1-arylamino cycloheptane. *J. Indian Chem. Soc.*, **40,** 525.

1965 (With SATPANTHI, PS) Azo dyes. part II. Azo dyes from tetrahydro-thiazoles and rhodamines. *Vidya, Guj. Univ. J.*, 92.

— Physical properties and chemical constitution, Part II. Latent heat of evaporation, density, temperature, surface tension, and composition of organic liquids. *J. Indian Chem. Soc.*, **42,** 536.

— New types of parachors and some new observations on the Friedel-Crafts reaction (Eighteenth Acharya PC Ray Memorial Lecture, 1965) *J. Indian Chem. Soc.*, **42,** 651.

1966 (With DESAI, BM AND DESAI, JI) Azo dyes Part I. Azo dyes from 2-arylimino-4-keto-tetrahydrothiazoles. *Vidya. Guj. Univ. J.* 72.

1967 Necessity for more trained technologists in India. *Indian J. App. Chem.* **30,** 133.

1968 Some new observations on the Friedel-Crafts reaction. Phenyl anthraquinonyl-ureas and thioureas as Vat Dyes. *J. Indian Chem. Soc.* **45,** 195.

1969 Fluorescent brightening agents. The unsymmetrical derivatives of 4, 4-diamino-stilbene-2, 2-disulphonic acid. *J. Indian Chem. Soc.* **46,** 595.

— The Industrial development of India after independence. (Presidential Address, Sixth Annual Convention, Indian Chemical Society, Ahmedabad). *Indian J. Appl. Chem.* **32,** 1.

— (With SAHARIA, GS, AND SODHI, HS) Studies in sulphonamides. Part IV. Condensation of 4-acetamido-1-naphthalene sulphonyl chloride with primary amino compounds. *Indian J. Appl. Chem.* **32,** 381.

— (With SAHARIA, GS, AND SODHI, HS) As above. Part V. Preparation of N^1-heterocyclic substituted sulphonamides from α-naphthylamine and evaluation of their antibacterial properties. *J. Indian Chem. Soc.*, **46,** 115.

— (With SAHARIA, GS, AND SODHI, HS) As above. Part VII. Some N^6-heterocyclic sulphonamides from 2-naphthylamine as possible antibacterial agents. *J. Indian Chem. Soc.*, **46,** 411.

1970 (With SAHARIA, GS, AND SODHI, HS) As above. Part VI. Condensation of 2-acetamido 6-naphthalene sulphonyl chloride with ammonia and twentynine different primary aromatic amines and biological evaluation of the sulphonamids. *J. Indian Chem. Soc.*, **47,** 65.

— (With DALAL, (Miss) SK) Physical properties and chemical constitution. Part-III. *J. Indian Chem. Soc.*, **47.**

1971 (With DESAI, BM AND DESAI RM) Studies in nephthalene series. Part XXI. Use of 4-Acyl-1-naphthols, 4-Aroyl-1-naphthols, 6-Acyl-2-naphthols and the arylamides of Schaeffer's acid for the azoic dyeing of wool. *Indian J. Appl. Chem.*, **34,** 315.

— (With PARIKH, AR, AND THAKER, KA) Fries reaction. Part X. Rearrangement of some arylsulphonates of methyl salicylate. *J. Inst. Chemists* (India) **43,** 183.

— (With CHANDRASEKHAR, TR, DESAI, BM, AND MARABALLI, MS) Studies in the Friedel-Craft reaction. Part XI. γ-substitution in the synthesis of fluoresceins. *J. Indian Chem. Soc.*, **48,** 1079.

— (With DALAL, (Miss) SK) Physical properties and chemical constitution. Part IV. *J. Indian Chem. Soc.* **48.**

1972 (With DALAL, (Miss) SK) Physical properties and chemical constitution. Part V. *J. Indian Chem. Soc.*, **49.**

1973 (With PARIKH, AR) The Fried reaction. Part VII. The rearrangement of aryl 1-naphthyl and 2-naphthyl sulphonates. *J. Inst. Chemists* (India) **45.**

— (With PARIKH, AR, AND THAKER, KA) Fries Reaction. Part VIII. Rearrangement of aryl-p-toluenesulphonate. *J. Inst. Chemists* (India), **45,** 91.

— (With PARIKH, AR, AND THAKER, KA) Fries Reaction. Part IX. Rearrangement of aryl-1-naphthyl and 2-naphthylsulphonate. *J. Inst. Chemists* (India), **45,** 99.

— (With PARIKH, AR AND RAISINGANI, (Miss) NK) Physical properties and chemical constituion. Part V. Ultrasonic velocities in liquids. *J. Inst. Chemists (India),* **45,** 55.

— (With PARIKH, AR, AND RAISINGANI (Miss) NK) Physical properties and chemical constitution. Part VII sonochar. A new physical constant.. *J. Inst. Chemists (India),* **45,** 48.

— (With DESAI, BM, AND DESAI, RM). The use of p-rosaniline as diazo coupling component for azoic dyes. *J. Indian Chem. Soc.,* **50,** 69.

1974 (With BAJAJ, HS, SAGAR, JM AND SAHARIA, GS) Studies in cyclohexane series. Part VIII. The confirmed evidence for the existence of two conformers of 4-methyl-cyclohexane-1, 1-dicarboxylic acids. *J. Indian Chem. Soc.,* **51,** 624.

1975 (With BAJAJ, HS, GAUTAM, RK AND SAHARIA, GS) As above. Part X. The mode of ring opening of the anhydrides of 1-carboxy cycloalkane-1-acetic acids puring the Friedel-Crafts reaction. *J. Indian Chem. Soc.,* **52,** 1076.

— (With BAJAJ, HS, AND SAHARIA, GS) As above. Part XI. Friedel-Crafts condensation of the anhydrides of *cis-* and *trans*-1-carboxy-4-methylcyclohexane-1-acetic acids with aromatic hydrocarbons and the synthesis of 3-methyl-8, 9-and substituted 8, 9-benzo-spiro (5, 5) undecanes. *J. Indian Chem. Soc.,* **52,** 203.

— (With BAJAJ, HS, AND SAHARIA, GS) As above. Part XII. Friedel-Crafts reaction of the anhydrides of trans-1-carboxy 3-, and 2-methylcyclohexane-1-acetic acids with aromatic hydrocarbons and synthesis of 2-, and 1-methyl-8, 9- and substituted 8, 9-benzospiro-(5, 5) undecanes. *J. Indian Chem. Soc.,* **52,** 833.

— (With BAJAJ, HS, AND SAHARIA, GS) As above. Part XIII. Synthesis of some substituted 1, 2, 3, 4-tetrahydro-acridones and phenanthridones and N-aryl-5-methyl 2, 3, 4, 5, 6, 7-hexahydroindol-2-ones. *J. Indian Chem. Soc.,* **52,** 962.

1976 (With BAJAJ, HS, AND SAHARIA, GS) As above. Part XIV. *J. Indian Chem. Soc.,* **52.**

1977 (With BAJAJ, HS, AND SAHARIA, GS) As above. Part IX. Synthesis of cis-4-methylcyclohexane-1-ol-2-carboxylic acids. *J. Inst. Chemists* (India), **49,** 90.

— (With BAJAJ, HS, AND SAHARIA, GS) As above. Part XV. Preparation of two isomeric 3-methylcyclohexane-1, 1-dicarboxylic acids. *Indian J. Chem.,* **15B,** 189.

1978 (With BAJAJ, HS AND SAHARIA, GS) As above. Part XVI. Two isomers of 2-methylcyclohexane-1, 1-dicarboxylic acid. *J. Inst. Chemists (India)* **50,** 105.

1984 The Scientific and Industrial Development of India with special reference to the Indian Dyestuff Industry—H.K. Sen Memorial Lecture, 1984. *J. Inst. Chemists (India),* **57,** 44.

List of Indian Patents Granted to Dr RD Desai and Coworkers

1. Indian Patent No. 27771 of 1970 : Desai, RD., and Joshi, PN—This relates to the use of 4-acyl-1-naphthols as secondary components in dyeing and printing with azo dyes.
2. Indian Patent No. 29471 of 1941 : Desai, RD, and Sen Gupta, HD—This relates to the discovery of stabilisers for preparing homogeneous mixtures of petrol and rectified spirit in various proportions as motor fuel.
3. Indian Patent No. 29934 of 1941 : Desai, RD and Muthukrishnan, K—This relates to the application of azoic dyes from naphthol as and similar compounds to wool, silk and rayon.
4. Indian Patent No. 29947 of 1941 : Desai, RD This relates to the manufacture of arylamides of long-chain fatty acids directly from the vegetable oils. These amides on sulphonation behave as good wetting-out agents.
5. Indian Patent No. 33241 of 1942 : Desai, RD, and Mehta, MB—This relates to the manufacture of insecticides from petroleum hydrocarbons.
6. Indian Patent No. 87818 of 1965 : Desai, RD, Dalal (Miss) SK, and Parikh, AR—This relates to the manufacture of substituted 2, 4, 6-triamino-1, 3, 5-triazine derivatives as new fluorescent brightening agents.
7. Indian Patent No. 90379 and 90380 of 1965 : Desai, RD, Dalal, (Miss) SK, and Parikh, AR—These two patents relate to the manufacture of new fluorescent brightening agents from 4, 4′-diaminostilbene-2, 2′-disulfonic acid.

Papers Submitted for Publication

1. (With DALAL, (Miss) SK, AND PARIKH, AR) Studies in the Friedel-Crafts reacion. Part XII. The condensation of phenylisocyanate and phenyl isothiocyanate with some aromatic hydrocarbons, *J. Indian Chem. Soc.*
2. (With DALAL, (Miss) SK AND PARIKH, AR) As above. Part XIII. The condensation of phenylisothiocyanate with some resorcinol derivatives in presence of anhydrons aluminium chloride. An evidence of β-and γ-substitution in this reaction. *J. Inst. Chemists (India).*
3. (With DALAL, (Miss) SK AND PARIKH, AR) As above. Part XIV. Vat dyestuffs from mono and di-aminoanthraquinones. *J. Inst. Chemists (India).*
4. (With DALAL, (Miss) SK, AND PARIKH, AR) As above, Part XV. A preliminary investigation of the vat dyestuff from anthraquinone and nitrobenzene in the presence of anhydrous aluminium chloride. *J. Indian Chem. Soc.*
5. (With DALAL, (Miss) SK, AND PARIKH, AR) As above. Part XVI. The condensation of phenylisocyanate and phenylisothiocyanate with phenolic methyl ethers and of m-tolylisothio cyanate with 1-amino- and 2-aminoanthraquinones, *J. Indian Chem, Soc.*
6. (With DALAL, (Miss) SK, AND PARIKH, AR) Unsymmetrical fluorescent brightening agents from 4, 4′-diaminostilbene-2, 2′-disulphonic acid. *J. Inst. Chemists (India).*

Unpublished Research Works

— (With BEDEKAR, VD) Azo-dyes for acetate silk from phenyl dihydroresorcinol.

— (With BEDEKAR, VD) Azo-dyes for acetate silk from dimethyl dihydroresorcinol.

— (With SHAH, BV) Basic dyes of the malachite green series.
— (With SHAH, BV) Acid wool dyes of the quinoline yellow type.
— (With MEHTA, HB) The technical manufacture of hydron blue and allied products.
— (With PANDYA, YM) The technical manufacture of sulphur black type.
— (With PANDYA, YM) Sulphur dyes of the type of sulphur black T from naphthalene.
— Investigations of the manufacture of alkyl-naphthalene sulphonic acids as wetting-out agents of nekal X type.
— Investigations on the derivatives of umbelliferone as fluorescent brightening agents.
— (With JOGLEKAR, VB) Investigations on the economic utilization of Karanj oil and Kokum butter.
— (With AMIN, JH) Investigations on the preparation of nicotinic acid from quinoline.
— (With CHANDRASEKHAR, TR) Studies in cyclohexane series. Part VII. The condensation of the cyanohydrins of d-camphor and 1-menthones with aromatic amines.
— (With CHANDRASEKER, TR) Attempted synthesis of 1-carboxy-2-isopropyl-5-methyl-cyclohexane-1-acetic acid.
— (With CHANDRASEKHAR, TR) The non-existence of the four isomeric forms of 2-methyl and 3-methyl-cyclyhexane-1-carboxy-1-acetic acids.
— (With DESAI, SK) Chromones containing the alkylated benzene nucleus and their bromination.
— (With NAIK, SK) The industrial use of Tapioca starch in sizing.
— (With KUNDEL, RH) Synthesis of some acridine derivatives as dyestuff intermediates.
— (With KUNDEL, RH) Dyes from drivatives of phenanthraquinone.
— (With SHAH, RC) vat dyes from phenanthraquinone.
— (With SHAH, RC) Azoic dyes from phenanthraquinone.
— Sulphur dyes from Phenanthraquinone.
— (With SHAH, BV) Preparation of insecticides analogous to D.D.T.
— (With SHAH, RC) Action of glycerine and arylamines on coconut oil.
— (With SHAH, RC) Dehydration of castor oil.
— (With NABAR SV) Alkylation of the derivatires of 2-mercaptobenzoxazole, 2-mercapto-benzthiazole and 2-mercaptobenzimidazole.
— (With PATEL, MISS) PR, and Dalal (Miss), SK) Physical properties and chemical constitution, refractor dispersion in organic liquids.
— (With DALAL, (Miss) SK) Studies in vat dyes. Part VI. Phenyl carboxyl and phenyl thiocarboxyl derivatives of anthraquinone.

Popular Articles on Scientific Themes by Dr RD Desai

— Synthetic Processes and Dystuffs
— Science Looks Ahead
— The Romance of Coal-Tar Derivatives
— The Romance of Coal-Tar Derivaties and Prospects of Indian Dystuff Industry
— An Urgent Need for the Department of Chemical Technology in Gujarat University