



# NEWSLETTER

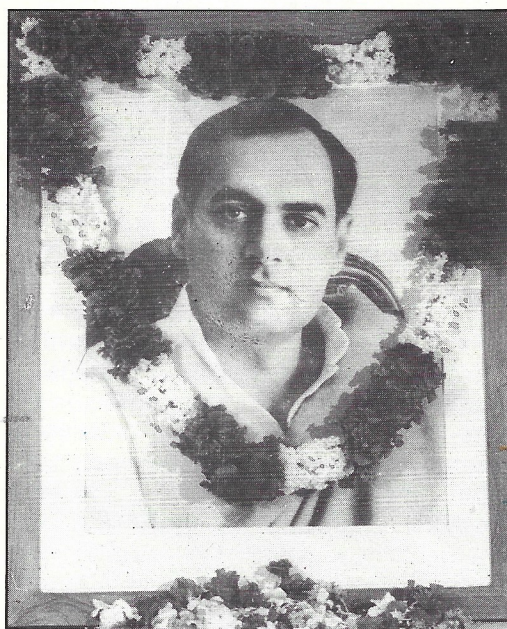
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No. 3

## Homage to Mr Rajiv Gandhi



The horrendous news of the assassination of Mr Rajiv Gandhi, former Prime Minister, and President, Council of Scientific & Industrial Research (CSIR), was received with a sense of shock and disbelief by the employees of the institute. A condolence meeting was held on May 23, 1991, in which a resolution was passed and sent to Mrs Sonia Gandhi, expressing deep grief and heartfelt sympathies of all the employees of IIP.

Expressing the sentiments of the employees on the solemn occasion, Dr T S R Prasada Rao, Director, IIP, said, "In the death of Mr Rajiv Gandhi, the country has lost a champion of science and technology, as he was a staunch votary of applying science and technology for the overall development of the country, especially to improve the living standards of the poor and the deprived. Mr Gandhi kept himself abreast of the latest developments and had identified science and technology oriented societal missions and gave them his utmost support. He had deep rooted concern and vision to usher the country into the comity of advanced nations by the turn of the century. As President, CSIR, his support and contribution to science and technology programmes will be ever remembered."

## IIP FELICITATES Dr S K JOSHI

A function was organised to felicitate **Dr S K Joshi** on his appointment as Director General, Council of Scientific & Industrial Research (CSIR), on June 3, 1991 at the institute. **Dr T S R Prasada Rao**, Director, expressed his happiness in having Dr Joshi at IIP as this was the first CSIR laboratory he visited after taking over as Director General of CSIR on April 18, 1991. The institute was also fortunate in having **Professor B K Bachhawat**, Member, CSIR Society and its Governing Body, on this occasion to preside over the function.

Welcoming Dr Joshi, Dr Prasada Rao said that it was very important to know our leader who is an outstanding scientist with notable contributions in the field of Solid State Physics and Material Sciences. His modest disposition will endear him to one and all, and under his leadership CSIR will rise to still greater heights, he added. Professor Bachhawat, in his introductory remarks, also spoke of the humane qualities of Dr Joshi and having known him well, was sure that CSIR will benefit considerably under the guidance of an outstanding scientist like him.

Dr Joshi thanked everyone present for the love and affection

shown to him and said that CSIR with its 28,000 employees has an important place in India, of which IIP is an integral part. He appreciated the institute's achievements in petroleum refining, catalysis, specialty products and other areas. He exhorted the employees to do more creditable work as the institute has the potential to serve the petroleum sector which has a turnover of around Rs. 40,000



*Mr Ibrahim, the oldest employee, presenting bouquet to Dr S K Joshi, Director General, CSIR.*

crores per annum. IIP's achievements have already resulted in a total product value of Rs. 800 crores per annum which is commendable, and he congratulated the group of scientists and others involved in getting the **First CSIR Technology Award** for developing aromatic extraction technology, which is resulting in saving Rs. 200 crores per annum in

foreign exchange. He also stressed that such recognition is possible only with the support of workers at all levels. He was happy to note that this technology was developed indigenously in collaboration with Engineers India Ltd. He advocated that utilisation of technologies should be fully ensured with the involvement of industries and said that a lot of output is expected from the institute due to its unique linkage with the petroleum industry. Young scientists should be identified and encouraged to work with freedom so that they excel in their work.

While proposing the vote of thanks, Dr Prasada Rao assured Dr Joshi that IIP will strive to achieve excellence in R&D related to petroleum, taking cognisance of valuable advice given by him.

After the felicitation function, Dr Joshi met young scientists of the institute. He spent well over two hours with this group and interacted with them. This rare gesture on his part gave a lot of encouragement and a new direction to these scientists. Based on the counsel, they assured him of their whole-hearted devotion to duty and readiness to meet the challenges. □

## FAREWELL TO Dr A P MITRA, FRS

The employees of the institute gave a touching farewell to their former Director General, **Dr A P Mitra**, FRS, at a function organised on June 5, 1991. **Dr T S R Prasada Rao**, Director, welcomed Dr Mitra and recalled his outstanding contributions to the development of science and technology in the country. He pointed out that Dr Mitra is one of the few eminent scientists who has been honoured as a Fellow of the Royal Society. He said that the occasion can also be deemed as a felicitation function for him on becoming a **Bhatnagar Fellow**. "Dr Mitra is close-



*Dr S K Joshi, Director General, CSIR, addressing the employees. On his left are Professor B K Bachhawat, Member CSIR Society, and Dr T S R Prasada Rao, Director, IIP.*

ly associated with research in ionosphere and green house effect and it is very appropriate that we are having him with us today, which happens to be the World Environment Day. He has been instrumental in implementing the best aspects of the Abid Hussain Committee Report and also promoted close interaction with the industry," he added. Representing the employees **Mr K D Sharma** and



*Dr A P Mitra, former Director General, CSIR, receiving memento from Dr T S R Prasada Rao, Director, IIP.*

**Mr O N Anand** spoke on the occasion. Mr Sharma credited Dr Mitra for the introduction of an 'Open CR system' in CSIR, and for his positive attitude to the problems of the employees which reflected his abilities as an able administrator also. Mr Anand eulogised Dr Mitra as a 'leading light' amongst the scientists and praised him for his scientific accomplishments, especially in Solid State Physics and related areas. He observed that Dr Mitra is an expert in man-management and has shown a rare acumen in solving problems of the employees often keeping aside bureaucratic hurdles.

Dr Mitra, in his farewell speech, said that the Indian scientific community and the CSIR scientists are second to none. He was of the view that IIP has a unique role to play as it has major opportunities to work for the petroleum sector which has a direct bearing on the economy of the country. Other countries look forward

to having collaborations with various CSIR laboratories, including IIP which has excellent facilities and is ideally located. He stressed that scientists should be given all the freedom and facilities to execute their work and, if necessary, national problems should be solved by pooling all the expertise available in the 41 laboratories of CSIR. He advised that societal and national problems need immediate attention and time factor in solving them is as important as quality of work and expressed his confidence that the institute will rise to meet these challenges.

In his vote of thanks Dr Prasada Rao said that the directions spelt out by Dr Mitra will be kept in mind and the institute will strive hard to fulfil its responsibilities. He presented a memento to Dr Mitra on behalf of the employees of the institute as a token of their regard and affection. □

### IIP FOUNDATION DAY

The institute celebrated its Foundation Day on April 14 and 15, 1991. It was on April 14, 1963, that the institute started functioning at Dehradun. This day, therefore, is

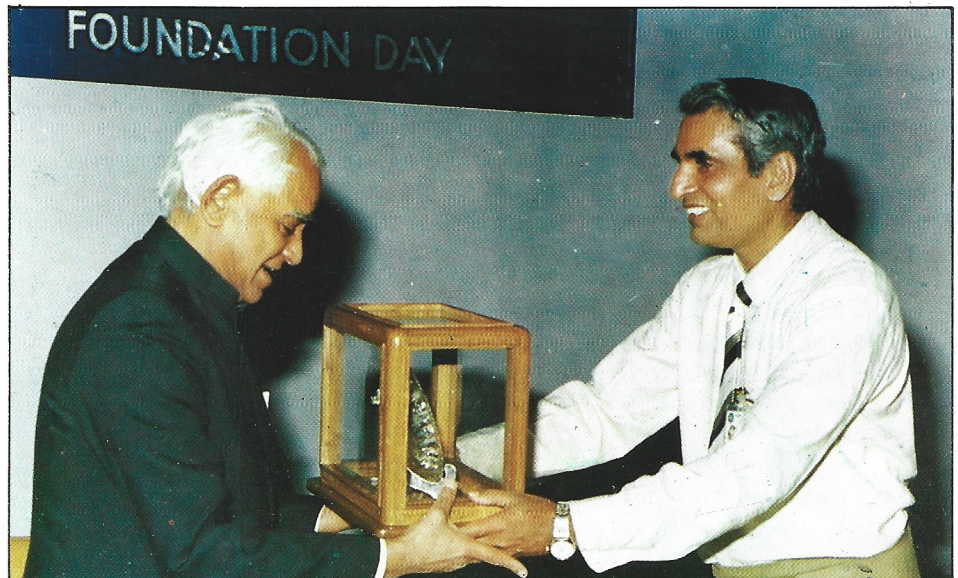
### TECHNOLOGY TRANSFER

*Process know-how for the production of para tertiary butyl phenol (500 tpa) has been given to M/s Tara Oils & Fats, Lucknow, against license fee of Rs. 4.25 lakhs.*

observed as Foundation Day every year.

**Mr Lovraj Kumar**, former Secretary in the Ministry of Petroleum & Chemicals, delivered the Foundation Day lecture titled "Challenges in Oil Industry" on Monday the April 15, 1991. Having been closely associated with the institute for three decades, Mr Kumar briefly covered the transition of activities at IIP to keep pace with the needs of the petroleum industry, and its creditable achievements. He felt happy that the institute, alongwith Engineers India Limited (EIL) and other similar organisations has set the pace for rapid development of refining and petrochemical processes. He dealt with technologies already adopted, and enumerated several successful

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*Mr Lovraj Kumar, former Secretary, Ministry of Petroleum & Chemicals, receiving memento from Dr T S R Prasada Rao, Director, IIP.*

# Indigenous Solvent Extraction Technology for Production of Pure Aromatics

Dr B S Rawat

## ABOUT THE AUTHOR



Dr B S Rawat  
M Sc, Ph D

Joined the institute in 1964, and now heads its Separation Processes Division. He has over 60 publications including some in prestigious international journals, and five patents to his credit. Under his guidance, five researchers have got Ph D degrees in chemistry. In recognition of his outstanding contributions he and his group received many awards such as Special Citation Award by ICMA (1985), Silver Medal in the best invention category in the 46th All India Industrial Exhibition held at Hyderabad (1986), FICCI Award (1986), NRDC's Award jointly with EIL (1987), First Award for Excellence in Technology Development, jointly with EIL (on 40th year of commemoration of India's Independence, 1988), and First CSIR Technology Award for 1990.

Indian Institute of Petroleum, in collaboration with Engineers India Limited, has been working for the development of an indigenous solvent extraction technology for production of pure benzene and toluene. Pure benzene is the source for industrially important organic intermediates such as caprolactum, nitrobenzene, chlorobenzene, phenol, acetone, styrene, linear alkyl benzene etc. for the manufacture of nylon, dyes, drugs, pharmaceutical preparations, resins, rubber, detergents and a host of other products. The demand for benzene is increasing throughout the world at a rate of about 5% per annum. In India particularly, benzene today is in short supply despite the production of about 3,20,000 tonnes per annum (tpa). The future projections of demand for benzene are estimated at about 8,50,000 tpa by the turn of the century.

Knowing fully well the importance of benzene, the development of indigenous solvent extraction technology was undertaken at the institute in 1970.

After screening many solvents, sulpholane was found to be the best solvent for development of extraction technology. The flow diagram depicts the process involved. The feedstock reformed naphtha entering the ex-

tractor midway, moving upwards, comes in contact with the descending solvent which selectively extracts the aromatics. Raffinate of low aromatic content is removed from the top of the extractor. Any dissolved and entrained solvent present in raffinate is removed by water washing in the raffinate 'wash column. Solvent free raffinate is then sent to storage. Extract phase (solvent phase rich in aromatics) from the bottom of the extractor enters the stripper column. Here, any dissolved non-aromatics in the solvent are stripped off from the solvent and removed as overhead stream.

The aromatics and solvent contained in the stripper column bottom are fed into the solvent recovery column. Because of the large difference in boiling points of sulpholane and the heaviest aromatic hydrocarbons, the separation between them is readily achieved. The high purity aromatics collected as overhead of this column are fed via clay treating tower to the fractionating section for separation of individual aromatic hydrocarbons.

The developmental activity required generation of voluminous equilibrium and mass transfer data on laboratory batch and continuous units. The data were used to evolve

the methodology for developing the process flowsheet.

The development of this technology took about ten years and the first plant was offered in 1981-82 to Bharat Petroleum Corporation Limited (BPCL), Bombay, which went on stream in August 1985 and since then this unit is producing about 1,00,000 tpa of pure benzene and about 17,000 tpa of pure toluene. The capacity of this unit is roughly 1½ times the combined capacity of the three units operating in the country based on imported technologies. The purities and yields of benzene and toluene produced at BPCL with IIP-EIL technology is considered to be the largest indigenous technology developed in the country in the petroleum sector.

In bidding for this technology for BPCL, IIP and EIL had to compete with well established process licensors such as UOP who had already a proven record of successful commercialisation. This factor was the major hurdle in getting the IIP-EIL technology accepted due to lack of commercial experience. The case for "Going Indigenous" was strongly supported by the Scientific Advisory Committee of the Ministry of Petroleum after going into great details of the chemical engineering aspects of

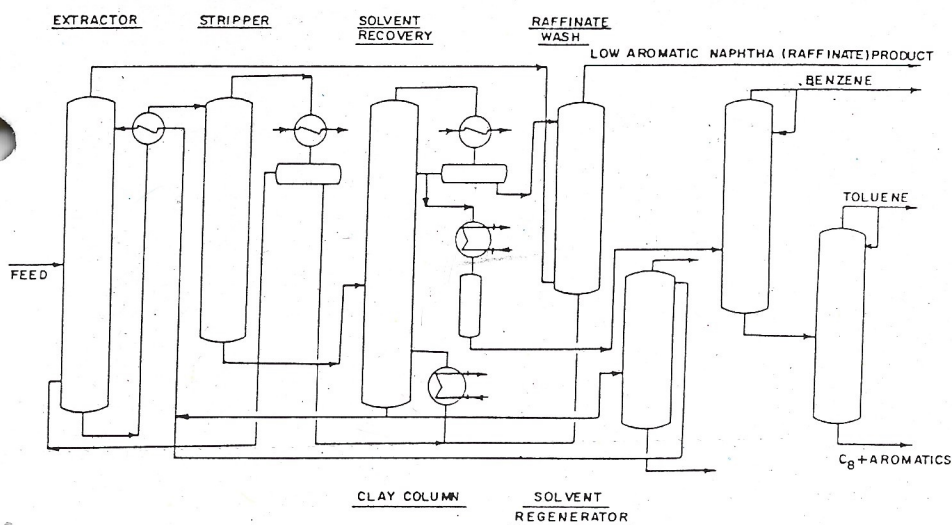
the process.

Next plant based on this indigenous technology was built at Cochin Refineries Limited, Cochin. This plant also had started operating in February 1989 and since then this unit is also producing benzene and toluene in approximately the same quantities and purities as those of BPCL unit. With the production of benzene and toluene in these two units, the country is saving foreign exchange to the tune of Rs. 200 crores per annum in

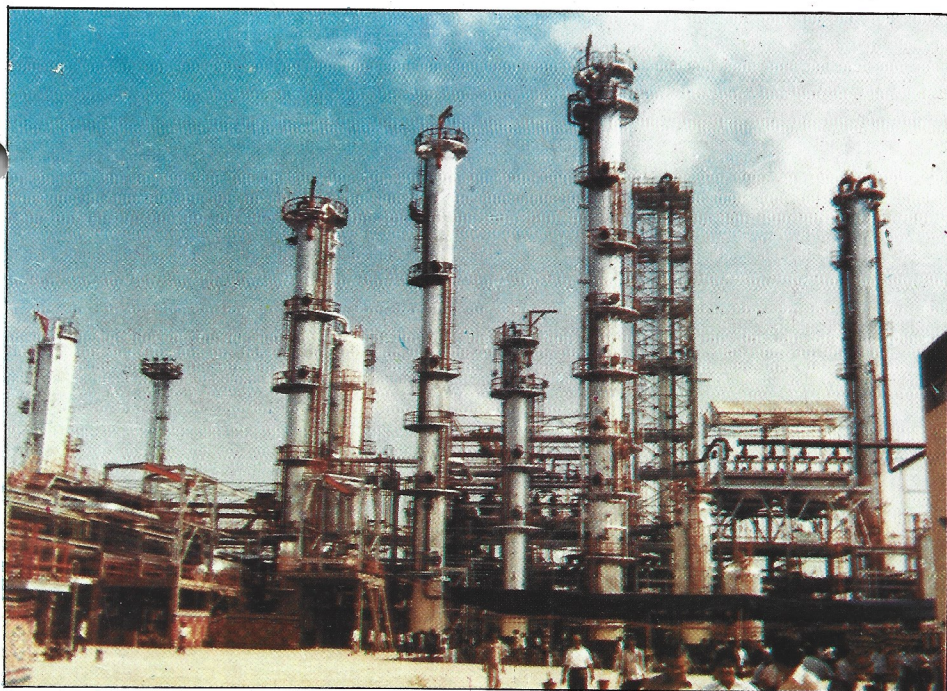
terms of product cost. Looking at the demand scenario, the technology for production of pure benzene has been offered to National Aromatics Product Company, Madras; National Organic Chemical Industries Ltd., Bombay; Salimpur Petrochemicals, U.P.; and Haldia Petrochemicals, West Bengal.

The technology has also been extended for the production of low aromatic naphtha from high aromatic naphtha. Low aromatic naphtha is required for petrochemical and ferti-

liser units. For this purpose the technology has been offered to dearomatise 6,40,000 tpa of naphtha each to Haldia Petrochemicals and proposed Mangalore Refinery and Petrochemicals. These two units will be producing very low aromatic naphtha suitable for down stream naphtha cracker units. Currently, technologies for production of aviation turbine fuel/superior kerosene and foodgrade hexane are being developed and these are in an advanced stage of development. □



SIMPLIFIED PROCESS FLOW DIAGRAM FOR PRODUCTION OF HIGH PURITY BENZENE & TOLUENE



The aromatics extraction unit at Bharat Petroleum Corporation Ltd., Bombay.

### IIP GETS CSIR TECHNOLOGY AWARD

It is a matter of pride and great satisfaction that a project team, consisting of Dr B S Rawat, Dr A N Goswami, Dr M K Khanna, Mr G S Dang, Mr J M Nagpal, Mr S K Gupta, Mr Guruprasad, Mr P C Gupta and Mr R S Kaushik received the **First CSIR Technology Award** for 1990 for the development of Aromatic Extraction Technology in collaboration with Engineers India Limited. The award carries a citation and Rs. One Lakh in cash, and is shared with National Chemical Laboratory, Pune. **Professor M M Sharma**, Director, University Department of Chemical Technology, Bombay, and Chairman, Technology Advisory Board (Chemical Sciences) of CSIR, gave away the award to Dr Rawat, Project Leader of the team, on April 28, 1991, at New Delhi. **Dr S K Joshi**, Director General, Council of Scientific & Industrial Research, and Directors of CSIR laboratories were present on the occasion. **Dr T S R Prasad Rao**, Director, IIP and Dr Rawat represented the institute at the function. Dr Rawat also made a presentation on the award winning technology.

## TASK FORCE ON MEOR

As a follow-up action on the decisions taken in the Brain Storming Sessions, organised by the Department of Biotechnology on March 15, 1991, at New Delhi, the first meeting of the task force on Microbial Enhancement of Oil Recovery (MEOR) was held under the chairmanship of **Dr T S R Prasada Rao**, on May 8, 1991. Besides scientists from National Institute of Oceanography, Goa; National Environmental Engineering Research Institute, Nagpur; Tata Energy Research Institute, and Oil India Limited, New Delhi; **Dr V R Sista**, **Mr V S Saini** and **Mr D K Adhikari** from the institute participated in the discussions. □

## TECHNOLOGY ADVISORY BOARD (BIOSCIENCES) (Brain Storming Sessions)

The Technology Advisory Board (TAB) of Biosciences Group of Council of Scientific & Industrial Research organised Brain Storming Sessions on Membrane Biology, Molecular Biology, Differentiation & Morphogenesis, and Biotransformations during June 2-9, 1991.

**Professor B K Bachhawat**, Chairman of TAB (Biosciences) initiated the discussions. Two former Director Generals of CSIR, viz. **Dr S Varadarajan** and **Dr A P Mitra** as well as the present incumbent **Dr S K Joshi** participated in the deliberations, indicating the importance they attach to the area as well as to the motivation of young scientists in undertaking innovative research and development work.

Besides scientists from laboratories under the Biological Sciences Group, **Dr T S R Prasada Rao**, Director, and the institute's Biotechnology Group - **Dr V R Sista**, **Mr V S Saini** and **Mr D K Adhikari** actively participated in the deliberations. □

## TRAINING PROGRAMMES

### Dibrugarh University

A two-weeks' training programme on "Petroleum Refining Technology" was organised for the post graduate students of Dibrugarh University from April 2, 1991. The programme was practical oriented and also covered some class room presentations on chemistry of crude oils, basics of petroleum refining and evaluation of petroleum products. Besides post graduate students, two staff members including **Mr B Dowerah**, Professor in the Department of Petroleum Technology at Dibrugarh University, participated in this programme.

### National Thermal Power Corporation

A three weeks' training programme on "Petroleum Products and their Characterisation" was organised for executive trainees (Chemistry) of National Thermal Power Corporation (NTPC), from April 8, 1991. It was inaugurated by **Mr D N Avasthi**, Member (Personnel), Oil and Natural Gas Commission, Dehradun.

The course comprised of lectures by faculty drawn from the institute and oil industry. The trainees also had an exposure towards laboratory practicals, apart from actively participating in question-answer sessions. The course concluded on April 26, 1991, and the valedictory address was given by **Dr P V Krishna**, Consultant (former ILO Expert, and Advisor - Petrochemicals, in the Department of Petrochemicals and Fertilisers). **Mr S C Seth**, Senior Manager (Training) NTPC, was also present on the occasion.

**Dr T S R Prasada Rao**, Director, welcomed the guests on both the occasions and **Dr Himmat Singh**, Head, Training Division, proposed vote of thanks. □

## SECRETARY DST VISITS IIP



**Dr P Rama Rao**, Secretary, Department of Science & Technology, Ministry of Science & Technology, visited the institute on June 29, 1991. Having acquainted himself with the different areas of research and current activities of the institute, he had detailed discussions with the Director, **Dr T S R Prasada Rao** and senior scientists. He showed keen interest in the progress of R&D projects, especially those related to conservation of petroleum products, biotechnology etc., and suggested intensive work in these areas particularly in the utilisation of compressed natural gas as engine fuel.

## COLLOQUIA

- **Dr K L Mallik**, GM (R&D), Lubrizol India Limited, Bombay, "Additive scenario in our country - retrospect and prospects", May 8, 1991.
- **Professor T G Krishnamurthy**, Biochemical Engineer, Vivekananda Kendra Yoga Research Foundation, Bangalore, "Health care technology and stress management", May 8, 1991.
- **Dr S Sivakumar**, Norway Institute of Technology, "Analysis of transient heat transfer data in packed beds", June 12, 1991. □

## DISTINGUISHED VISITORS

**Mr S K Kapoor**, General Manager, Hindustan Petroleum Corporation Limited, Bombay, held discussions with Director and various groups of scientists to explore the possibilities of joint ventures, on April 10, 1991.

**Professor A Sethuramiah**, Head, Industrial Tribology, Machine Dynamics and Maintenance Engineering Centre, Indian Institute of Technology, New Delhi, held discussions in the area of Tribology, on May 2, 1991.

**Dr V V Iyengar**, General Manager, Fibers Marketing Division, Reliance Industries Limited (RIL), New Delhi, and **Dr V K Bansal**, Head Technical Services, RIL, Bombay, saw the instrumental analytical facilities at the institute and also explored the possibilities of utilising these, on May 14, 1991.

**Mr D W Raut**, Chief Manager, **Mr K Ramnath**, Senior Manager (R&D), and **Mr S R Mehta**, Chief Technical Services Manager, Hindustan Petroleum Corporation Limited, Bombay, visited the institute to follow up action on the decisions taken during the visit of their General Manager, on May 15, 1991.

**Mr H L Suresh**, Institut Francais du Petrole's Representative in India, held discussions with the Director on the progress of IIP-IFP collaborative work, on May 17, 1991.

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ARE LIMITED

**Mr P K Rudra**, Chairman & Managing Director, **Mr A S Rapael**, Director (Technical), and **Mr C R Reddy**, Director (Finance) of Lubrizol India Ltd., Bombay, visited the institute on June 7, 1991, for discussions with the Director and senior scientists. □

## DEPUTATIONS

### Abroad

**Dr Mukesh Saxena**, Engineer, visited UK from February to April 1991, under the CSIR - British Council Programme. During this period he underwent training on research and development of IC engines at the British Internal Combustion Engine Research Institute, Slough. He also visited the University of Bath and Queen's University, Belfast.

**Dr B S Rawat**, Head, Separation Processes Division, visited Illinois Institute of Technology and University of Minnesota, USA, under the CSIR-NSF Scientific Exchange Programme from May 9-27, 1991. He also had detailed discussions on membrane separation processes, hollow fiber extraction, emulsion science and pressure swing adsorption with the research groups of these two institutions. □

## HONOURS, AWARDS AND RECOGNITION

**Dr B P Pundir** has been invited to be a member on the Expert Committee to evolve vehicle mass emission standards for the year 1995 and 2000 A D for India. The committee has been constituted by the Central Pollution Control Board with effect from May 16, 1991 with a term of one year.

He was also invited to be an Expert Member on Scrutiny Committee for two Ph D scholars in Department of Mechanical and Industrial Engineering, University of Roorkee, held on May 28, 1991. □

## IIP FOUNDATION DAY

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examples such as those using reforming and xylene isomerisation catalysts. However, he stressed the need for increasing the efficiency of operation, yield and quality of feed stocks and products, and at the same time ensuring environmental protection, to match the best in the world. Mr Kumar advised that the pace of design and development should be accelerated to optimise the use of domestically available crudes and natural gas, and in this task the user industry should also be an active partner. The institute should act as a catalyst in generating technology in advance of demand, he added.

Earlier, **Dr G C Joshi**, Deputy Director, welcomed the chief guest and other participants. The Director, **Dr T S R Prasada Rao**, introduced Mr Kumar and presented a brief account of IIP's achievements and R&D work being done at the institute, especially in refinery processes and catalysts. He informed that, as a result of technology transfer, the total value of products marketed in the country is estimated to be more than Rs. 800 crores per year. He exuded confidence that the institute, in collaboration with Engineers India Limited and Indian Petrochemicals Corporation Limited, will be in a position to offer technologies which are globally competitive to oil refineries and petrochemical industries. **Mr R N Bhargava**, representing the CSIR on this occasion, emphasised the need for development of new technologies in the oil sector. Dr Prasada Rao, on behalf of the staff, presented a memento to Mr Kumar. The first issue of IIP Newsletter was also released by him.

A variety entertainment programme was organised on the previous day, April 14 (Sunday), in which a large number of staff members and their families participated and this was followed by an informal get-together and dinner. (See the Hindi Section) □



संस्थान कर्मचारियों के बच्चों द्वारा प्रस्तुत नृत्यों की कुछ झलके। दाहिनी ओर - सुश्री मंजू श्रीवास्तव

### स्थापना दिवस - रंगारंग कार्यक्रम

संस्थान के स्थापना दिवस के उपलक्ष्य में रविवार, दिनांक अप्रैल 14, 1991, की संध्या को एक रंगारंग कार्यक्रम का आयोजन किया गया, जिसमें कर्मचारियों एवं उनके परिवार के व्यक्तियों ने उत्साहपूर्वक सहयोग दिया। कार्यक्रम का शुभारम्भ सुश्री प्रसाद राव ने दीप प्रज्वलित कर के किया। सुश्री मंजू श्रीवास्तव द्वारा निर्देशित सरस्वती वंदना, मयूर नृत्य एवं राजस्थानी समूह नृत्य बहुत सराहनीय थे। एकल नृत्यों की श्रृंखला में सुश्री हरिता राव द्वारा प्रस्तुत "भरत नाट्यम", सुश्री तनु श्रीवास्तव द्वारा नृत्य नाटिका "नारी के रूप", सुश्री साक्षी मल्होत्रा द्वारा पाश्चात्य धुन पर शास्त्रीय नृत्य, सुश्री निधि शर्मा एवं सुश्री नीति वर्मा द्वारा भजनों पर किये गये नृत्यों ने दर्शक दीर्घा को मंत्र-मुग्ध कर दिया। सुश्री शैलजा सक्सेना द्वारा निर्देशित "ऐतिहासिक विवाह" प्रस्तुति, जिसे बहुत ही नन्हे बच्चों ने अभिनीत किया, बहुत आकर्षक रही। गीतों एवं गजलों की श्रृंखला में सुश्री आशा अरोड़ा, सुश्री पूनम श्रीवास्तव, और सर्व श्री प्रेम प्रकाश मणी एवं श्रीराम मेहरा ने सराहनीय योगदान दिया। गीतों में तबले एवं हारमोनियम पर संगत सर्व श्री कृष्ण बिहारी माथुर एवं शांत प्रकाश मणी ने दी। कार्यक्रम का संचालन श्री चंद्रराज श्रीवास्तव ने बहुत मनोरंजक ढंग से किया। श्री बिलोचन सिंह रावत, सचिव आई आई पी स्टाफ क्लब, एवं उनके सहयोगियों द्वारा आयोजित इस कार्यक्रम को अंतिम रूप श्री सहदेव सिंह नेगी ने धन्यवाद प्रस्ताव पारित करके दिया।

इस कार्यक्रम की समाप्ति पर एक अंशदायी रात्रि भोज का प्रबन्ध किया गया। इसमें लगभग 700 व्यक्तियों ने भाग लिया। इस प्रयास के लिए श्री प्रेम विजय डोगरा प्रशंसा के पात्र हैं।

इस अवसर पर प्रति वर्ष आयोजित किए जाने वाले मेले को पृथक रूप से शुक्रवार दिनांक जून 7, 1991, को आयोजित किया गया।

### आई आई पी मेला

मेले का उद्घाटन डॉ टी एस आर प्रसाद राव ने किया। इसमें अनेक खेलों व खाद्य पदार्थों के स्टॉलों के साथ-साथ अलंकृत वेष, आरती, शिशु प्रदर्शनी आदि प्रतियोगितायें भी आयोजित की गयीं, जिसमें सुश्री प्रसाद राव द्वारा पारितोषिक वितरण किया गया।

### कार्मिक समाचार

#### पदोन्नति पर बधाई

- डॉ सुखलाल सिंह सरोहा, वैज्ञानिक "बी", सितम्बर 1, 1984 से
- वरिष्ठ आशुलिपिक, मार्च 18, 1991 से
- सर्व श्री सुरेश कोठारी, सतीश चन्द्र भट्ट और गोपाल प्रसाद शर्मा
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#### शोक समाचार

श्री देवी सिंह, भंडार सहायक, का मई 17, 1991, को असामयिक निधन हो गया। उनके परिवार को हार्दिक संवेदनायें।