

NEWSLETTER

न्यूज़ लैटर

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No. 1

IIP-IFP-PC Technical Seminar



Dr S K Joshi, DG, CSIR and Secretary, DSIR, delivering the inaugural address. Seated (L to R) Dr T S R Prasada Rao, Dr J P Franck, Professor M M Sharma and Mr J C Barbier.

A one day seminar organised by the Indian Institute of Petroleum (IIP), Dehradun, alongwith the Institut Francais du Petrole (IFP) and Procatalyse (PC), France, at New Delhi, on November 27, 1991 was inaugurated by Dr S K Joshi, Director General, Council of Scientific and Industrial Research (CSIR) and Secretary, Department of Scientific and Industrial Research, Govt. of India. Professor M M Sharma, FRS, Director, University Department of Chemical Technology (UDCT), Bombay, delivered the keynote address.

The seminar was attended by over 150 delegates from petroleum and petrochemical industries of India. The IFP delegation was led by Mr J C Barbier, Director, Industrial Division and consisted of Dr A Convers, Area Sales Manager, and Mr J Cosyns, Engineer. The PC team was led by Dr J P Franck, General Manager and consisted of Mr J F Boucher, Area Sales Manager.

Dr S K Joshi, in his inaugural address, stated that, CSIR, IFP and PC will review the technical

agreement signed earlier between India and France for research and development in the area of petroleum. Dr Joshi pointed out that the ongoing collaboration between IIP and IFP had helped the petroleum sector by adding every year Rs.600 crores worth of value added products and out of the 40 odd CSIR laboratories IIP stands first in product value realized through technology transfer. He advised that, while entering into fresh agreement with IFP, he also expected IFP-PC and IIP to achieve greater technology transfer not only to Indian industry but also to other countries in the world. He noted that the association of IFP and IIP of about 31 years has been very productive and developmental, and jointly with IFP, IIP has had many successes. CSIR would like to work closely with IFP and PC keeping in view the needs of the industry and make a 'model' agreement to gain and grow together to achieve the goals, he added.

Dr Joshi noted that, it is sheer coincidence that the seminar was being held at a time when our Prime Minister Mr P V Narasimha Rao was extending an invitation to France to collaborate more with India, and this would give impetus to the joint work being done.

Professor M M Sharma stressed that IIP-IFP should pay more attention to the technologies that could make the best use of natural gas. He said that hydrogenation was going to play a very important role in the times to come, and as such, IIP must devote its R and D efforts in the utilisation of natural gas as India

needs innovative technology in this field which would in future become very important for the country.

Both Mr Barbier and Dr Franck appreciated the role of IIP in developing many technologies in the field of petroleum refining on its own and also many other processes jointly with IFP and hoped that continued cooperation would yield fruitful results.

Dr T S R Prasada Rao, Director, IIP, while welcoming the participants, gave a resume of the joint processes developed in collaboration with IFP, and stated that, as many as ten commercial plants are in operation in the country and two are under construction. The continued cooperation can lead to evolution of newer technologies which have potential of being commercialised on a global basis, and the seminar would help to identify latest technologies. Dr Rao also pointed out that this seminar was organised as a part of the celebrations of the Golden Jubilee Year of CSIR, and it was indeed heartening to note that, the French delegation could time their visit during this Golden Jubilee Year.

The seminar consisted of three technical sessions followed by discussions. The scientists from IIP, IFP and PC presented the latest developments in technologies like catalytic reforming, hydrogenation and hydrostabilisation of refinery streams. A vote of thanks was proposed by Dr K S Jauhri, Head, Industrial Liaison, IIP.



Professor M M Sharma, Director, UDCT, addressing the delegates.

JOINT COORDINATION COMMITTEE MEETING: CSIR AND IFP

The third meeting was held on November 28, 1991 in which CSIR team consisting of **Mr K N Johry**, Head, International Scientific Collaboration, **Dr T S R Prasada Rao**, Director, **Dr K S Jauhri** and **Mr Mohan Lal** of IIP, and **Mr S L Mehrotra** of CSIR and the IFP-PC delegates participated.

Mr Johry drew the attention of the participants on the views expressed by **Dr S K Joshi**, DG, CSIR, that the ongoing collaborative projects should be made more productive and fruitful and also time bound.

Possibilities of export of joint IIP-IFP and IIP technologies, technical services to the third world countries including service of IIP in the transfer of IFP processes abroad, exchange of scientists and organisation of seminars/symposia and training courses jointly in the fields of common interest were discussed. Validity of IIP-IFP collaborative processes and IFP-CSIR protocol were extended for a period of 3 years.

Dr S K Joshi, DG, CSIR, graced the occasion at the time of signing of the document. □

IFP-PC DELEGATION VISITS IIP

IFP-PC delegation consisting of **Mr J C Barbier**, **Dr A Convers**, **Mr J Cosyns**, **Dr J P Franck**, **Mr J F Boucher** and **Mr H L Suresh** of SS Consultants visited IIP on November 25, 1991 and held discussions with IIP scientists. Areas of possible cooperation between IIP, IFP and PC were identified which included evaluation of reformer catalysts, separation through liquid membranes, use of CNG as alternative fuel in engines, modification of 2-stroke engines, development of higher capacity film burners, biotechnology and of a process for n-butenes, hydration to secondary butyl alcohol (SBA). IFP's assistance in export of IIP technologies like solvent extraction of aromatics, food grade hexane and solvent dewaxing/deoiling through their global network was also explored. □

EIGHTH RESEARCH COUNCIL MEETING

A meeting of the newly constituted Research Council (RC) of the Institute was held on November 1, 1991. It was attended by **Mr K N Venkatasubramanian**, Chairman, Indian Oil Corporation, **Professor K Vasudeva**, Indian Institute of Technology, New Delhi, **Dr D N Rihani**, General Manager (R&D), Engineers India Limited, **Mr M B Lal**, Executive Director, Centre for High Technology, **Mr V Raghuraman**, Deputy Director General, National Productivity Council, **Dr Paul Ratnasamy**, Deputy Director, National Chemical Laboratory and **Professor D V Singh**, Director, Central Road Research Institute. **Mr Lovraj Kumar**, Chairman RC, **Mr S L Khosla**, Chairman, Oil & Natural Gas Commission and **Mrs Lalitha B Singh**, Adviser (PC), Department of Chemicals & Petrochemicals could not attend due to preoccupations. **Dr P K Mukhopadhyay**, Director, Indian Oil Corporation R&D Centre and **Dr G Jaya Rama Rao**, former Executive Director, Centre for High Technology, attended the meeting as invitees. In the absence of Mr Lovraj Kumar, Mr Venkatasubramanian chaired the meeting.

Dr T S R Prasada Rao, Director,



Mr K N Venkatasubramanian, Chairman, IOC, chairing the eighth RC Meeting. Seated (L to R) Professor K Vasudeva, Mr V Raghuraman, Mr M B Lal, Dr T S R Prasada Rao, Dr G Jaya Rama Rao, Professor D V Singh, Dr D N Rihani, Dr Paul Ratnasamy and Dr P K Mukhopadhyay (RC Members).

IIP, welcomed the members of the new RC and apprised them about its constitution and functions and proposed nomination of **Dr V K Bhatia** as its Secretary which was approved. A resolution appreciating the significant contributions made by the erstwhile RC during its tenure was passed.

Giving details of the new initiatives taken for better interaction with the industry, Dr Prasada Rao mentioned that he had approached chief executives of almost all refining and petro-chemical companies and exposed IIP's capabilities in various areas. As a result of which, top level delegations from petroleum and petrochemical industries visited the institute for discussions to identify specific areas of mutual interest. He expressed confidence that before the next meeting of the RC, some new projects will be taken up. Giving highlights of the progress of research projects and achievements, he mentioned that the number of research papers as well as their quality judged by the impact factor (IF) has gone up during the last year.

The members commended the progress and the efforts being made

by the IIP to cater to the needs of the industry. It was suggested by them that IIP should also develop processes for chemicals and intermediates, an area where enough emphasis has not been laid. It will also contribute to more external cash flow and will also lead to import substitution of important chemicals in the long run. It was also pointed out by the members that more emphasis should be given to patents since a process cannot be backed until there is a patent for it. Poster presentations on the status of some of the ongoing projects at the IIP, introduced for the first time in the RC meeting, were very much appreciated by the members.

Discussing the impact of the new industrial policy on the R&D at IIP, it was felt that because of the free flow of imported technology in some cases, indigenous technology will have to become more competitive and should be developed to a stage at which it can be offered for commercialization on a turn key basis. To achieve this goal it will be good to involve EIL and the user industry. This can eventually also lead to export of indigenous technology. They were of the view that

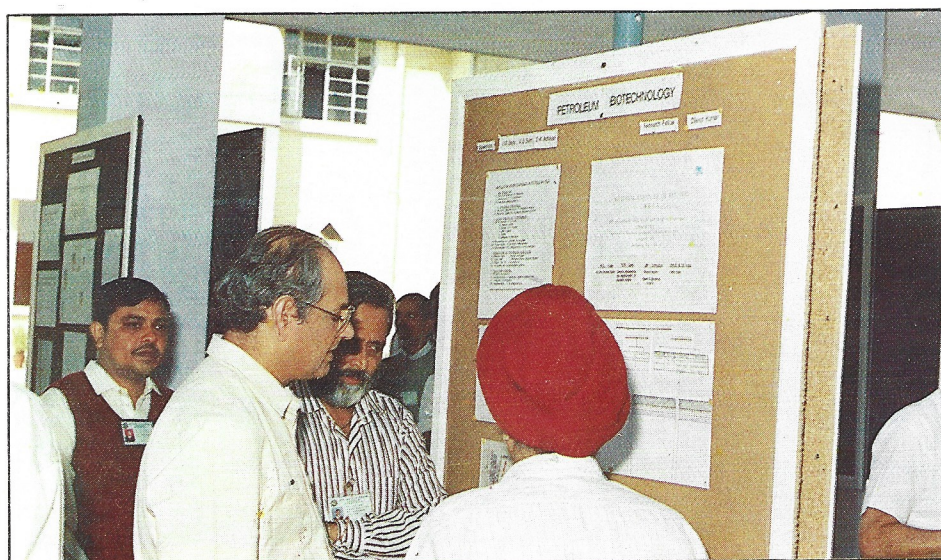
development of joint IIP-Institut Francais du Petrole technologies had demonstrated that such collaboration was indeed a good model. Dr Prasada Rao informed about IIP's plans to organise a joint IIP-IFP-PC conference on November 27, 1991 at New Delhi for updating the industries with new developments of technologies of IIP and IIP-IFP which are globally competitive.

Studies on fuel quality, utilisation of compressed natural gas in engines, reduction of vehicle emission levels, operation of two-stroke engines on lower oil-to-fuel ratios and adoption of catalytic reforming instead of hydrocracking were some of the topics in which great interest was evinced by the members. Referring to the Eighth Plan document, the members said that it is prudent to select only a few projects and fund them adequately. Dr Prasada Rao assured that depending on the funds available, priorities will be redefined. □

TECHNOLOGY TRANSFER

Agreements have been signed with the following organisations:

- **Gas Authority of India Ltd. (GAIL)**, for building up of infrastructural facilities for evaluation of Compressed Natural Gas (CNG) conversion kits for passenger car and automotive diesel engines and development of a two-stroke engine for CNG. (October 1991)
- **VAM Organic Chemicals Ltd., Bhartiagram**, for collaborative work on development of the process for manufacture of catalysts. (October 22, 1991)
- **Tusharmatic, Dehra Dun**, for transfer of technology on Smoke Meter. (November 6, 1991)



Mr K N Venkatasubramanian, Chairman, IOC, participating in the Poster Session held during the RC Meeting.

● Oxide India Ltd., Durgapur, for making Alumina Catalyst for dehydration of alcohols to olefins. (November 12, 1991)

● Cadila Laboratories Ltd., Ahmedabad, for developing a process for the manufacture of Tetra-Methylene sulphone. (November 14, 1991)

● Flash Industries, Nagpur, for transfer of technology on Large Nutan Stove. (November 15, 1991)

● Gujarat Auto Projects and Services Ltd., Vadodara, for transfer of technology on Petrofit kit for Dual Fund Operation of Diesel Vehicles with Alcohol. (December 12, 1991) □

TRAINING PROGRAMMES

A three-weeks training programme on Petroleum Refining Technology was arranged from October 7-25, 1991 at the Institute for 13 chemical engineers from Bharat Petroleum Corporation Limited (BPCL), Bongaigaon Refineries and Petrochemicals Limited (BRPL), and Cochin Refineries Limited (CRL). The faculty was drawn largely from the IIP and the rest, from Engineers India Limited (EIL), Indian Oil Corporation Limited (IOC), Oil Coordination Committee (OCC) and Centre for High Technology (CHT).

Mr M B Lal, O.S.D., CHT, inaugurating the course presented a total scenario of the Oil industry, its problems and prospects and also gave a detailed account of various refinery operations and futuristic trends in refinery processes. He was concerned about the weak links of the country and remarked that the participants are fortunate to be at the IIP, a store house of information and ideas, which they should fully utilise without any inhibitions.

Mr Rajiv I Modi, Executive Director, Cadila Laboratories, and Dr P V Krishna, former ILO expert, also graced the occasion. Mr Modi also stressed the need for a greater interaction with industry and academia to achieve greater indigenisation of technology.

Dr T S R Prasada Rao, Director, IIP, earlier in his welcome address, emphasised that the Institute should have such an approach that logically it is a corporate R&D for the Oil industry of our country and industry should always try to encourage indigenous technology and be ready to take risks to implement them.

Mr K K Malhotra, President, Reliance Industries Limited, delivering the valedictory address on October 25, advised the trainees to tie-up theory with what they observe, as the process of learning never ends in a career.

Mr R K Prasad, DGM (P&A), BRPL, also graced the valedictory function and said that the trainees should make best application of what they have learnt at the IIP and try to excel in their areas and accept challenging assignments.

Dr Prasada Rao exhorted the trainees to draw inspiration from the successful and eminent professionals present on the occasion to achieve excellence in their career.

Dr Himmat Singh, Head, Training Division, proposed the vote of thanks. □

DISTINGUISHED VISITORS

Dr G P Phondke, Director, Publication and Information Directorate (PID), Council of Scientific and Industrial Research, New Delhi, Nov. 21, 1991.

Mr Rajeshwar Dayal, Chief Engineer, National Research Development Corporation (NRDC), New Delhi, Nov. 21, 1991.

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**SAVE OIL -
SAVE FOREIGN EXCHANGE**



Mr K K Malhotra, President (Manufacturing and Projects), Reliance Industries Ltd., delivering the Valedictory address. Seated (L to R) Dr T S R Prasada Rao, Mr R K Prasad, and Dr Himmat Singh.

Applications of Biotechnology in Petroleum Industry

V R Sista

ABOUT THE AUTHOR



V R Sista
M Sc, M Tech, Ph D

Joined the Institute in 1962. He was associated in Research and Pilot Plant activities for nearly two decades at Vadodara to develop processes for Single Cell Protein from Gas Oil fraction, n-paraffin, molasses and alcohol and effluent treatment studies. He guided 4 Ph D thesis works and 7 projects for partial fulfillment of M Sc/M Tech degree. He has to his credit 2 patents, 25 publications in reputed journals and 20 presentations in National/International seminars/symposia. He is a member in the panel of Experts of Industrial Extension Bureau (Indextb) of Gujarat Government to provide Biotechnology activities. At present he heads the Biotechnology Group at the Institute.

Biotechnology is currently attracting a great deal of interest as a result of highly publicised achievements in genetic engineering. The academic disciplines involved in 'Biotechnology' are microbiology, biochemistry and chemical engineering. The new biotechnology can be described as the union of classical biochemistry and traditional pharmaceutical technology with advances in genetic engineering and related developments in processing technology which include fermentation and downstream processing, whereas genetic engineering can be defined as the laboratory technique to modify the hereditary code of living cell, giving it new or unique abilities. Biotechnology has already made great progress in agriculture, medicine and industry. In the petroleum field too, it has found its applications in almost every sphere of petroleum industry.

Biotechnology techniques can be used for oil exploration and enhanced oil recovery. Presence of hydrocarbons utilising microbes on the surface soil and subsoil samples is an indication of the gases, migrating generally vertically from the reservoir. After considerable field trials and surveys conducted in USA, Hungary and Australia, and successes claimed, it is established

that geomicrobial methods in combination with geochemical methods can give best results in oil exploring studies.

In most of the oil fields only 30-40% oil in place is recovered by conventional methods. Enhanced oil recovery refers to oil recovery over and above that obtained by the natural energy available in the reservoir. Biotechnologists are actively studying the use of microbes for enhanced oil recovery from the existing reservoirs and the technique known as microbial enhanced oil recovery (MEOR) was first suggested in 1928. MEOR can basically be divided into two categories (i) in situ microbial technique (ii) injection of microbial products such as biopolymers or biosurfactants. Biosurfactants are lipid associated high molecular weight compounds having surface active properties of reduction in interfacial tension (IFT). IIP has identified surfactant producing microbes and is actively involved in its production and application.

Like all chemical industries, the pollution problem has become an unavoidable part of oil industry also. The increased production and transportation of crude oil results in contamination of soil and marine oil spills. While natural flora helps in

restoration of environment, well defined microbial techniques are now being developed for oil spill management, reclamation of contaminated soil and degradation of toxic organic compounds. The potential for creating, through genetic manipulation, microbial culture which is able to degrade different types of hydrocarbons has been demonstrated by Prof A M Chakraborti, Indian born American scientist, who successfully combined the plasmids from four different bacterial strains capable of digesting different types of hydrocarbons into the organism *Pseudomonas*. This organism termed 'Super bug' has much faster growth rate on crude oil and consumes major portion of the oil. This was the first genetically engineered microbe to be patented.

Energy intensive physical and chemical separation processes currently used in hydrocarbon processing can be replaced to some extent with biotechnological processes. Dewaxing and desulphurisation of petroleum fraction are examples in which significant work has been reported. Microbial dewaxing may be carried out with yeast and some bacterial strains. Process know-how developed by IIP for conducting microbial dewaxing of diesel fractions to improve the pour

point of the oil is being extended to heavier petroleum fractions.

The main attraction for chemical dewaxing process is that it can be carried at ambient temperatures and yield of dewaxed oil with improved pour point is likely to be more, as these microbes selectively assimilate and remove only n-paraffinic hydrocarbons. Also as by-product, instead of waxy component, protein enriched cattle feed is produced.

Extensive studies conducted by IIP on the bioconversion of alkanes to produce single cell protein (SCP) for cattle feed has resulted in complete understanding of the biochemical pathways of alkane metabolism. Bacterial yeast and fungi can be employed for SCP production but most of the work has been concentrated only on yeast species as they are relatively easy to separate from fermentation broth and have low nucleic acid content. Among yeasts *Candida* specie has been studied extensively in IIP. One of the yeast strains of this species IIP-4 has been adapted to grow on different carbon substrates under non aseptic conditions with maximum specific growth rate 0.38 hr^{-1} on C_{14} - C_{18} cut paraffins, 0.25 hr^{-1} on heavier solid paraffins and 0.94 hr^{-1} on molasses. The biomass produced by fermentation of hydrocarbon substrate is separated from broth and residual hydrocarbon by solvent extraction using two solvents system comprising acetone and light naphtha and is finally dried to either granular form or fine powder. The product obtained has a protein content of 55-60% with carbohydrate and lipids as other major components. The amino acid profile of the protein is well balanced and is rich in lysine, one of the essential amino acids. Research work right from basic microbiology to the safety aspect of the final product produced in 1 m^3 capacity pilot fermenter has been done in detail. This was one of the

projects which registered notable progress since 60s. Even though in some corners the toxicological aspect of the final product is being questioned, it is the oil crisis which has affected the progress of the project.

Monobasic fatty acids like lauric and myristic can be produced using special microbial strains. Exhaustive work has been reported on the production of citric acid from n-paraffin using special *Candida* strain.

The possibility of producing fats and oils by microbes has been explored and it was discovered that certain microbes termed "Oleageneous" have the capability of storing fat upto 60% of its cell mass. Yeast *Rhodotorula* strain (IIP-30) has been studied in detail. The process comprises of two phases: the growth phase, during which the cells grow in nutrient rich medium and the carbon source controls the final cell concentration in the fermenter, and the lipid accumulation phase during which fermentation is allowed to continue in the absence of nitrogen. In industry, microbial lipids are used for the production of soaps, detergents, paints, polish, ink and lubricant additives. The use of molasses as carbon substrate is good for cellular growth but it poses problems to achieve nitrogen limiting conditions. Production of aminoacids by fermentation is one of the important industries in Japan. Even though the main starting material for biotechnological production of aminoacids is starch hydrolysate or sugars, n-paraffin also attracted attention. Glumatic acid which is widely used for the production of mono-sodium glutamate, a flavouring and taste enhancing agent in food industry, can be produced in large concentration from n-paraffin by bacterial strains.

Bacteria have recently been reported to produce biodegradable plastics. Polyhydroxy butyrate (PHB)

and polyhydroxy valerate (PHV) are the biopolymers which are produced under nitrogen, phosphorus and sulphate limiting conditions. PHB compares well with polypropylene in terms of molecular weight, melting point, crystallinity and tensile strength. ICI has a process for producing PHB commercially which is being used in production of biodegradable films, sterilised medical dusting powder and fibers.

Acrylamide, an important petrochemical, is being manufactured by a Japanese company using strain *Pseudomonas chlorophus*. This bacterial strain converts acetonitrile to acrylamide under mild operating conditions.

Anerobic digestion of a variety of wastes including municipal, agricultural and industrial wastes generate biogas which is rich in methane and can be used as an alternative source of energy. Two major carbon sources in the wastes, namely carbohydrates and lipids/fats are degraded to methane by anaerobes. Theoretical yield and composition of gas derived from these carbon sources is a function of many factors such as digester temperature, mixing, loading rate, and the composition of feed stock. Three basic processes that occur in the anerobic digester for the microbial production of methane are:

- primary hydrolysis involving the enzymatic conversion of insoluble organic compounds and polymers (cellulose) to soluble organics,
- fermentation of these products to organic acids, and
- fermentation of organic acids to produce CO_2 and methane gas during methanogenic stage.

The efficient recycling of the livestock, human and plant wastes to produce biogas and the nutrient rich digested sludge can meet the needs of rural communities. While biogas can serve the energy needs

for cooking and lighting, the sludge can be used to enhance soil fertility and higher agricultural production.

The fermentation technology for ethanol production is well established, yet it is an area where significant R&D work is still going on. Starchy material cassava, wood, residue from agriculture and forestry, urban and industrial waste like newspapers, food packages, spent sulphite liquor, cheese whey, waste from vegetable and fruit industries, etc. are some of the raw materials in which attention is being focussed. The development of better and higher alcohol tolerance yeast strains, continuous fermentation technique to yield higher alcohol concentration and higher productivity, improvement of the energy efficiency of the process are some of the biotechnological problems that are being tackled. Acetone Butanol

Ethanol (ABE) solvent mixture is produced by the fermentation of sugars and is used as oxygenated compounds in automotive fuels for boosting octane number of unleaded gasoline. Application of immobilized cells in fixed bed and fluidised bed reactors are the recent developments.

Hydrogen sulphide is highly corrosive especially in the presence of water vapours and as it is toxic, strict control on its release into the environment must be affected. In the Bio sulphur reducing (Bio-SR) process developed in Japan, the capacity of *Thiobacillus ferro-oxidans* to convert ferrous to ferric has been exploited for conversion of H₂S to sulphur. The elemental sulphur is recovered as byproduct whereas ferrous sulphate is oxidised to ferric sulphate in a bioreactor containing active culture of *Thioba-*

cillus ferro-oxidans. This process has been commercialised and is in use since 1984.

The efficient use of biotechnology is exemplified in human system where all reactions are carried out at 37.8°C at pH ranging from 2 to 7.5 with an effective pH control system to maintain blood pH at almost neutral level. The downstream processes involving absorption, adsorption, filtration, osmosis, membrane separation etc. are carried out effectively for the period of at least 60 to 70 years with just 2000 calories and about 50 grams of protein intake per day. Experts believe biotechnology holds the key to many of our critical problems in the area of food, drugs, chemicals waste disposal, disease control and energy production.

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Dr Ashok Parthasarthy, Additional Secretary, Department of Scientific and Industrial Research (DSIR), New Delhi, Nov. 22, 1991.

Dr H Lakshman, General Manager (Operations), **Mr A Varadarajan**, Deputy General Manager (DGM), **Mr P Nageswara Rao**,

Senior Technical Services Manager, and **Dr K S Balraman**, DGM, and **Dr Meenakshi Sundaram**, DGM, Madras Refineries Ltd., December 11, 1991.

Dr V S Rao and **Mr J Prasad**, Armour Polymers, Bombay, September 24, 1991.

Mr Rajiv Modi, Executive Director, and **Dr P V Krishna**, Consultant, Cadila Laboratories, Ahmedabad, October 7, 1991.



Dr Ashok Parthasarthy, Addl. Secretary, DSIR (extreme left) being explained the Delayed Coking Technology under development at IIP by Mr M M Kumar (extreme right). Looking on are (L to R) Dr G P Phondke and Mr Rajeshwar Dayal.

COLLOQUIA

- **Mr Don Surbey**, Lubrizol Corporation USA.
"Heavy duty diesel engine and passenger car lubrication trends and synthetic oils: Worldwide Scenario," October 10, 1991.

HONOURS, AWARDS & RECOGNITION

● **Dr T S R Prasada Rao**, Director, IIP delivered the seventh C K Murthy Memorial lecture entitled "Catalytic Reforming and Recent Indian Achievements" at the Indian Chemical Engineering Congress 1991 and 44th Annual Session of Indian Institute of Chemical Engineers, held at A C College of Technology, Anna University, Madras, during Dec. 18-21, 1991.

● **Mr A K Jain** was awarded Gold Medal for securing first position in the M E (Thermal Engineering) examination by the University of Roorkee.

● The paper entitled "Catalytic cracking of n-hexadecane" by **R P Badoni** and **S D Bhagat** has been awarded second prize in the paper session of the Sixth National Workshop-cum-Seminar on Catalysis in Energy Conversion and Environment held at the School of Mines, Dhanbad, during Dec. 28-30, 1991.

● **Dr T S R Prasada Rao** was invited by Department of Chemicals and Petrochemicals, Ministry of Chemicals and Fertilizers, New Delhi, to be a member of the Experts Group on Petrochemicals constituted under chairmanship of **Shri Rakesh Mohan**, Economic Adviser, Ministry of Industries. This Expert Group will review the various issues related to petrochemical industry including technology. □

LECTURES DELIVERED

Dr T S R Prasada Rao
'The opportunities and challenges of Indian petroleum refining industry: Role of IIP', at the Indo-French Technical Association, India International Centre, New Delhi, November 26, 1991, and

'Zeolite catalysis in fine chemicals', during the workshop organised by UDCT Alumni, Bombay, November 29, 1991.

Mr K K Gandhi
'Need of a driving cycle and its status today in the country' and 'Emission and fuel economy', at the Central Road Research Institute, New Delhi, November 29, 1991.

Mr Dinesh Kumar
'History/current driving cycle' and 'Vehicle road load determination and simulation on chassis dynamometer', at Central Road Research Institute, New Delhi, November 29, 1991.

Mr Mohan Lal
'Fundamentals of reforming', 'Development of a bimetallic catalyst' and 'Hydrotreatment of refinery streams', at Bongaigaon Refineries and Petrochemicals Ltd. (BRPL), December 2-8, 1991.

Dr Alok Saxena
'Reformer modelling' and 'Revamping of existing reformer to increase capacity', at Bongaigaon Refineries and Petrochemicals Ltd. (BRPL), December 2-8, 1991

Dr A K Gupta
'Petrochemical Industry', at University of Roorkee, Dec. 17-18, 1991. □

SEMINARS ATTENDED

Dr T S R Prasada Rao, Director, IIP, **Mr R P Mehrotra**, **Mr Mohan Lal**, **Mr Jai Ram Rai**, **Dr Y K Kuchhal**, **Mr P C Gupta** and **Mr M M Kumar**, Scientists, attended Chevron Technology Seminar held at New Delhi during Oct. 23-24, 1991. □

PARTICIPATION IN EXHIBITIONS

● **International Show at Nairobi**
Mr P N Bhambi, Head, Industrial & Domestic Combustion Division, attended an International show held

from September 29 to October 10, 1991, at Nairobi where IIP industrial film burner and improved domestic heating and lighting appliances were exhibited. He also visited some industries with a view to explore the possibility of transferring the know-how of IIP burner and appliances.

● **IITF 1991**
IIP participated in the India International Trade Fair 1991, held at Pragati Maidan, New Delhi, from November 14 to 24, 1991. Panels showing progress and products developed by the Institute were displayed in the CSIR stall. Visitors showed keen interest in the smoke meter, low air pressure (LAP) film burner, process for re-refining of used crankcase oil etc. □

THIS NEWSLETTER IS ONE YEAR YOUNG

This Newsletter completes one year - an year full of excitement, hopes and trials. It is rightly said, to conceive is pleasantly easy, but to deliver, is quite difficult. When it was conceived everybody felt, Oh! what's there, it will be a pleasure. But it was only when delivering the first issue early last year, it was realised how difficult it is. To design the mast-head, to collect, collate and edit the news items, to decide the format, to get it typed and then printed, to send it out in least possible time - have been full of rigours though quite memorable ones. It had its usual teething troubles and in its infancy requires a lot of care and attention for its healthy growth. We have sincerely put in hard work to ensure this. How far we have been successful in this endeavour is for the readers to judge. We can only wish Many Happy Returns of the Day.

देहरादून नगर राजभाषा कार्यान्वयन समिति की भा पे सं में बैठक

देहरादून नगर राजभाषा कार्यान्वयन समिति की वर्ष 1991 की दूसरी छमाही बैठक इस बार सोमवार, दिसम्बर 16, 1991 को भारतीय पेट्रोलियम संस्थान में हुई, जिसकी अध्यक्षता श्री विनय कान्त नागर, भारत के महासर्वेक्षक (सर्वेयर जनरल ऑफ इण्डिया) ने की। उन्होंने सदस्यों को सम्बोधित भी किया। अध्यक्ष का स्वागत संस्थान के निदेशक डॉ टी एस आर प्रसाद राव व डॉ गिरीश चन्द्र मिश्र, राजभाषा अधिकारी ने किया। बैठक में देहरादून स्थित केन्द्र सरकार के लगभग 50 कार्यालयों के वरिष्ठ अधिकारी उपस्थित थे। इसमें श्री डी पी बन्दूनी, सहायक निदेशक, क्षेत्रीय कार्यान्वयन कार्यालय (उत्तर), राजभाषा विभाग, गाजियाबाद के निर्देशन में, चालू छमाही में विभिन्न कार्यालयों के द्वारा की गई हिन्दी के प्रगामी प्रयोग संबंधी प्रगति, प्रयासों में कमी व उनमें सुधार की आवश्यकता आदि विषयों पर चर्चा हुई और सदस्य कार्यालयों द्वारा दिए सुझावों पर भी विचार किया गया। संस्थान में हिन्दी की गतिविधियों का विवरण डॉ मिश्र ने दिया।



डॉ टी एस आर प्रसाद राव 'देहरादून नगर राजभाषा कार्यान्वयन समिति' की बैठक में बोलते हुए। उनके बायें से क्रमशः सर्व श्री विनय कान्त नागर और डी पी बन्दूनी

सोनल मानसिंह का शैक्षिक नृत्य प्रदर्शन

अक्टूबर 29, 1991 को संस्थान के प्रेक्षागृह में अंतर्राष्ट्रीय ख्याति प्राप्त भरतनाट्यम और ओडिसी नृत्यांगना सुश्री सोनल मानसिंह के आख्यान व प्रदर्शन का एक कार्यक्रम आयोजित हुआ। इसका आयोजन "स्पिक मैके" (SPIC-MACAY - सोसायटी फॉर प्रमोशन ऑफ इण्डियन क्लैसिकल म्यूजिक एण्ड कल्चर अमंगस्ट यूथ) नामक संस्था ने किया। आयोजन संस्थान के कर्मचारियों के बच्चों के हित को ध्यान में रखते हुए किया गया था। अपने द्वारा अपनाए हुए नृत्य के दो रूपों अर्थात् भरतनाट्यम और ओडिसी में "आंगिक अभिनय" और "सात्विक अभिनय" के महत्व पर जोर देते हुए सुश्री सोनल मानसिंह ने चार प्रकार के "अभिनय" और आत्माभिव्यक्ति का प्रदर्शन किया। उन्होंने यह भी बताया कि ऋग्वेद के युग से चले आ रहे भारतीय

शास्त्रीय संगीत और नृत्य मात्र सार्वजनिक मनोरंजन की वस्तुएँ नहीं, बल्कि आत्म-साक्षात्कार की ओर ले जाने वाली सीढ़ियाँ हैं। उन्होंने उभरते हुए कलाकारों को सुझाव दिया कि वे भारतीय साहित्य और वेदों का ज्ञान प्राप्त करें और साथ ही संस्कृत व नृत्य रूपों के जन्म-स्थानों वाले प्रदेशों की भाषाओं में महारत हासिल करें। कार्यक्रम दर्शकों द्वारा बेहद सराहा गया।



सुश्री सोनल मानसिंह आख्यान व प्रदर्शन देते हुए

डॉ टी एस आर प्रसाद राव, निदेशक, भा पे सं ने कार्यक्रम की अध्यक्षता की। उन्होंने संस्थान में दिए गए प्रदर्शन के लिए सुश्री सोनल मानसिंह का धन्यवाद किया। उन्होंने आशा व्यक्त की कि "स्पिक मैके" भविष्य में भी ऐसे शिक्षाप्रद कार्यक्रम आयोजित करता रहेगा, ताकि युवा वर्ग में हमारी विपुल सांस्कृतिक विरासत के प्रति चेतना जगे।

भूकम्प सहायता में भा पे सं का योगदान

गत अक्टूबर 20, 1991 को गढ़वाल में आए भीषण भूकम्प के कारण हुई विपदा के बाद चल रहे राहत कार्यों में संस्थान की भागीदारी के रूप में भा पे सं उपनिवेश कल्याण समिति द्वारा शीत काल को ध्यान में रखते हुए उपनिवेश निवासियों से कपड़े इत्यादि एकत्र कर नवम्बर 7, 1991 को श्री हनुमंत लाल, प्रशासन नियंत्रक के नेतृत्व में आठ स्वयं सेवकों का एक दल गढ़वाल में कपड़े वितरित करने के लिए गया। ये सदस्य थे - सर्व श्री (डॉ) रघुवीर सिंह गहरवार, राजेन्द्र प्रसाद बडोनी, हरबंस सिंह, विवेक कुकरेती, रमेश चन्द्र ध्यानी, भगतराम नौटियाल, गोविन्द सिंह चौहान एवं ओम प्रकाश धाम। डॉ टी एस आर प्रसाद राव, निदेशक ने इस दल को रवाना किया और इस दल के सदस्यों को इस हेतु दो दिन का विशेष अवकाश दिया।

इस प्रकारों में महिलाओं व लड़कियों के लिए संगीतमय कर्मी दौड़, सांस्कृतिक कार्यक्रम, पुरस्कार-वितरण और होनर्स कर्मी का आयोजन हो।
 इन समारोहों में महिलाओं व लड़कियों के लिए संगीतमय कर्मी दौड़, कबड्डी और भापूय युद्ध कबड्डी के बीच आयोजित एक प्रदर्शनी भव।
 शतरंज, कैरम, साइकिल दौड़ और डबल क्रिकेट और भा प से स्टाफ कीड़ा सदाह में बहुत सी गतिविधियाँ सम्पन्नित थीं, जहाँ डबल टेनिस पर आयोजित कार्यक्रम में पुरस्कार दिए गए।

यह सदाह दिसम्बर 25-31, 1991 के दौरान आयोजित किया गया एवं विजेताओं को भा प से उपनिवेश के समुदाय केन्द्र में नए वर्ष की पूर्वसंख्या

भा प से युव कलब (युवामंडल) का कीड़ा-सदाह

इस प्रतियोगिता के मुख्य बोधरी सहज सिंह, ग्राम प्रधान, मिर्वाला, थे और भा प से के वरिष्ठ वैज्ञानिक श्री भाधवानन्द बन्दूनी आयोजन समिति के सदस्य थे। इसमें 36 पुरुषों व 8 कनिष्ठ वर्गों की बालिकाओं की टीमें ने भाग लिया। भा प से की टीम का इसमें इच्छा प्रदर्शन रहा और इसके श्री ए सिंह जिला वॉलीबाल टीम के प्रशिक्षण कैम्प के लिए चुने गये हैं।



डॉ टी एस आर प्रसाद राव वॉलीबाल प्रतियोगिता का उद्घाटन करते हुए।
 इसी प्रतियोगिता में भा प से, दून शक्ति कलब द्वारा, अक्टूबर 11 से 13, 1991 तक आयोजित जिला स्तरीय वॉलीबाल प्रतियोगिता का उद्घाटन किया। भा प से स्टाफ कलब ने मिर्वाला की टीम, शक्ति कलब, को खेल "क्रिकेट" के लिए 1500 रुपये और एक वॉलीबाल व "नेट" प्रदान करने का आश्वासन दिया।

दूरदर्शन जिला स्तरीय वॉलीबाल प्रतियोगिता का उद्घाटन

नया खण्ड और नया 'मास्ट हेड' - आशा है पाठक पर्यट करंगे।

संस्थान के निम्न कर्मचारियों ने वै और अ प संकुल, पालमपुर में 17 से 19 नवम्बर, 1991 में उत्तर क्षेत्र के स्थित आयोजित शान्ति स्वरूप मदनार स्मृति खेल प्रतियोगिता (अंतरंग) में इन प्रतियोगिताओं में सकलता प्राप्त की -
 शतरंज: श्री योगेश कुमार, बिज: सर्व श्री जय कृष्ण कुमार, रणजीत कुमार बनर्जी, सुनील कुमार बरुआ, जयदेव सिंह और चन्द्रनाथ भागत एवं कैडेटिंग: एकल: श्री चन्द्र राज शीवास्तव, युगल: सर्व श्री स्टैन्ली पोरशन और चन्द्र राज शीवास्तव। परन्तु राष्ट्रीय स्तर विज्ञान संस्थान, गोआ, में दिसम्बर 1991 में आयोजित अखिल भारतीय खेल प्रतियोगिता में सकलता से वांचित रहे।

24वीं एस एस टी एम टी (अंतरंग) खेल प्रतियोगिता

यह दल धनसाली से 10 किलोमीटर दूर वसिष्वाला नामक ग्राम में पहुँचा। व वहाँ प्रति विद्यार्थी के उपरान्त आगती सुबह धनसाली, अमरसल, कैलासा व भागावत नामक ग्रामों में भूकम्प से प्रभावित लोगों को कड़े हितरित किए गए। नवम्बर 9, 1991 को दल के प्रमुख श्री हनुमंत लाल, प्रशासन निदेशक से अतिरिक्त जिलाधीश (बहाल कार्य) ने भेंट के दौरान बहाल संतोष व प्रशंसा व्यक्त की कि भापूय का यह दल दूर-दराज के ग्रामों तक पहुँच कर प्रभावित लोगों को कुछ सहायता पहुँचा सका साथ ही यह सुझाव भी दिया कि यदि भापूय उपर्युक्त चारों ग्रामों में से किसी एक को अपना ले तो कम से कम उस ग्राम के निवासियों को राहत सामग्री संतोषजनक ढंग से पहुँचाई जा सकती है। इस और प्रयास जारी है।

डॉ टी एस आर प्रसाद राव (मध्य में) और श्री हनुमंत लाल (दाहिनी ओर) भूकम्प सहायता दल के अन्य सदस्यों के साथ



भा पे सं अनुसंधान वेत्ता क्लब

अनुसंधानवेत्ताओं के मध्य बौद्धिक अन्तर्सम्बंध बढ़ाने के उद्देश्य से डॉ टी एस आर प्रसाद राव, निदेशक, भापेस की अध्यक्षता में संस्थान में अनुसंधान वेत्ता क्लब का हाल ही में गठन किया गया है। क्लब के उद्देश्य हैं - जाने माने वैज्ञानिकों एवं विद्वानों, संस्थान के वरिष्ठ वैज्ञानिकों एवं अनुसंधान वेत्ताओं द्वारा समसामयिक विषयों पर व्याख्यानों का आयोजन। "एण्डेवर" (Endeavour) नामक एक ड्रैमासिक पत्रिका भी प्रकाशित करने की योजना है, जिसमें अनुसंधान वेत्ताओं और, मेहमान स्तंभ में, संस्थान के वरिष्ठ वैज्ञानिकों द्वारा लिखित लेख होंगे।

इस क्लब का उद्घाटन डॉ प्रसाद राव द्वारा अक्टूबर 11, 1991 को किया गया। डॉ गिरीश चन्द्र जोशी, उप निदेशक ने भी इस अवसर पर श्रोताओं को सम्बोधित किया।

हमारी उन सभी को शुभकामनाएँ।

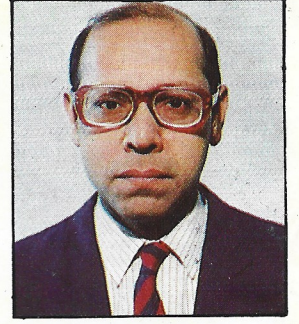
भा पे सं यूथ क्लब की स्थापना

"स्पिक मैके" अर्थात् "सोसायटी फॉर प्रमोशन ऑफ इण्डियन क्लैसिकल म्यूजिक एण्ड कल्चर अमंगस्ट यूथ" (SPIC-MACAY) द्वारा अक्टूबर 29, 1991 को प्रेक्षागृह में आयोजित प्रसिद्ध नृत्यांगना सुश्री सोनल मानसिंह के आख्यान व प्रदर्शन से प्रेरणा लेकर भापेस के कर्मचारियों के पालितों ने बच्चों में छिपी प्रतिभा को ढूँढ निकालने एवं सांस्कृतिक, सामाजिक और खेल-कूद संबंधी गतिविधियों को उत्साहित करने के लिए एक "यूथ क्लब" अथवा युवा-मंडल की स्थापना की। इस युवा-मंडल की पहली गतिविधि थी नवम्बर 14, 1991 को बाल-दिवस का आयोजन। इस अवसर पर मंडल ने एक सांस्कृतिक संध्या का आयोजन किया, जिसमें नृत्य, गीत, संगीत और एक प्रहसन सम्मिलित थे।

नव-वर्ष पूर्वसंध्या कार्यक्रम

नव-वर्ष की पूर्वसंध्या दिसम्बर 31, 1991 को सामुदायिक केन्द्र में भापेस स्टाफ द्वारा सांस्कृतिक कार्यक्रमों का आयोजन किया गया, जिसमें संस्थान के कर्मचारियों एवं उनके बच्चों ने गीत, संगीत, चुटकुले, तम्बोला आदि में भाग लिया। इसके उपरान्त आतिशबाजी का कार्यक्रम हुआ, जिसको उपस्थित समुदाय द्वारा सराहा गया। डॉ टी एस आर प्रसाद राव इसके मुख्य अतिथि थे तथा श्रीमती प्रसाद राव के कर कमलों द्वारा पुरस्कार वितरण के पश्चात् सामुदायिक रात्रि भोज का आयोजन किया गया। इस कार्यक्रम का संयोजन सर्व श्री जी एन सुन्दरियाल, प्रेम प्रकाश मणि, सह सचिव, भापेस स्टाफ क्लब तथा एच आर अग्रवाल, गिरीश चन्द्र कोठारी एवं बी एल सैनी के सफल प्रयासों से सम्पन्न हुआ।

कार्मिक समाचार



पदोन्नति पर बधाई

- श्री सुधीर सिंहल, वैज्ञानिक-जी, अप्रैल 1990 मार्च 1965 में वे संस्थान में वरिष्ठ अनुसंधान वेत्ता के रूप में नियुक्त हुए, सन् 1966 में वैज्ञानिक-बी बने और 7 वर्षों तक वैज्ञानिक-एफ के रूप में कार्य करने के बाद वे अप्रैल 1990 से वैज्ञानिक-जी बन गये हैं। 'भा पे सं' में 27 वर्षों की अपनी सेवा में उन्होंने इंजनों में ईंधनों और स्नेहकों के अनुप्रयोग के क्षेत्र में एवं औद्योगिक यंत्रावली में एवं साथ ही आई सी इंजनों में वैकल्पिक ईंधनों के उपयोग पर भी कार्य किया है। उन्होंने कई शोध पत्र आदि भी प्रकाशित किए हैं और भा पे सं के गतिविधियों के संबंध में कई देशों का दौरा भी किया है।

स्वागत है

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- डॉ अंशु शर्मा, वैज्ञानिक "बी", नवम्बर 6, 1991
- श्री जय प्रकाश, हेल्पर "ए", दिसम्बर 4, 1991

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सेवा-निवृत्ति पर भावभीनी विदाई

- श्री भूष, हेल्पर "बी", दिसम्बर 31, 1991

असामयिक निधन पर हार्दिक शोक

श्री यूसुफ अख्तर, उप भंडार एवं क्रय अधिकारी (तदर्थ), नवम्बर 10, 1991

**आप व आपके परिवार
के लिए
नव-वर्ष सुखमय व समृद्धिशाली हो ।**

निदेशक
दिसम्बर 31, 1991

व कर्मचारीगण, भा पे सं