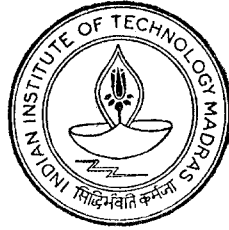


# **TWENTY FIRST ANNUAL REPORT**

**INDIAN INSTITUTE OF TECHNOLOGY, MADRAS  
1979-80**



# **TWENTYFIRST ANNUAL REPORT**

**1979 - 80**

**INDIAN INSTITUTE OF TECHNOLOGY, MADRAS**

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## VISITOR OF THE INSTITUTE

Sri N. SANJIVA REDDY

*The President of India*

### THE COUNCIL OF THE INDIAN INSTITUTES OF TECHNOLOGY

*Chairman :*

Hon'ble Sri B. Shankaranand,  
Union Minister for Education and Culture,  
Government of India, New Delhi.

*Members :*

Sri B. P. Poddar  
Chairman  
Board of Governors,  
I. I. T. Kharagpur.

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Board of Governors,  
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Prof. A. K. De,  
Director,  
I. I. T. Bombay.

Sri L.M. Thapar,  
Chairman,  
Board of Governors,  
I.I.T., Kanpur.

Prof. P. V. Indiresan,  
Director,  
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Dr. R. Ramanna.  
Chairman,  
Board of Governors,  
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Chairman,  
University Grants Commission,  
New Delhi.

Prof. P. Venkateswaralu,  
Director,  
I.I.T. Kanpur.

Sri G.K. Chandiramani,  
Chairman,  
Council of the Indian Institute of  
Science, Bangalore.

Prof. S. Dhawan,  
Director,  
Indian Institute of Science,  
Bangalore.

*Representative of the Central Government*

Sri C.S. Jha  
Educational Adviser (Tech.)  
Ministry of Education and Culture,  
New Delhi.

Sri J.A. Kalyana Krishnan,  
Financial Adviser,  
Government of India  
Internal Finance Division, New Delhi.

Dr. J.D. Sethi,  
Member,  
Planning Commission, New Delhi

*Representatives of the Rajya Sabha*

Sri Prem Manohar.

*Representatives of the All India Council for Technical Education*

Sri P. Sabanayagam,  
Secretary, Ministry of Education and Culture,  
New Delhi

*Nominees of the Visitors*

Prof. R.N. Dogra  
Dr. B. Nag  
Sri Sarog Gandhi

Sri Prakash Tandon  
Sri B. Ramachandra

*Secretary*

Dr. K. Gopalan,  
Deputy Educational Adviser (Tech.)  
Ministry of Education & Culture,  
New Delhi.

## The Board of Governors

### *Chairman*

Sri A. M. M. Arunachalam,  
Chairman and Managing Director,  
Tube Investments of India Limited,  
11/12, Rajaji Road, Madras-600 001

### *Nominees of the State Governments*

Sri M. R. Dharmiah Gowda  
(upto 30-9-79)

Sri Noor Ahmed (From 1-10-79)  
Director of Technical Education,  
Government of Karnataka,  
Bangalore.

Dr. S. Vasudev,  
Director of Technical Education  
Government of Kerala,  
Trivandrum.

Sri S. Vaiyapuri,  
Director of Technical Education,  
Government of Tamilnadu,  
Madras.

Prof. T. R. Doss,  
Former Vice-Chancellor,  
J. N. Technological University,  
Hyderabad.

### *Nominees of the Council*

Sri P. Sivalingam,  
Vice-Chancellor,  
Perarignar Anna University of  
Technology,  
Madras-600 025

Sri R. Aravamudan,  
Director,  
Systems Reliability Group,  
Vikram Sarabhai Space Centre,  
Trivandrum-695 022

Sri J. J. Mehta,  
Chairman and Managing Director,  
Polymers Corporation of Gujarat Ltd.,  
Giriraj Apartments,  
Race Course Circle,  
Opp. GEB Office,  
Baroda-390 007

Sri A. K. Khader Kutty,  
Chairman & Managing Director,  
Western Plywood Co. Ltd., Cannanore.

*Nominees of the Senate*

Dr. C. Ramasastry,  
Professor, Dept. of Physics,  
I. I. T. Madras (upto 31-12-79)

Dr. P. S. Srinivasan,  
Professor,  
Dept. of Applied Mechanics,  
I. I. T. Madras (upto 31-12-79)

Dr. M. C. Gupta (From 1-1-80)  
Professor Dept. of Mech. Engg.  
I. I. T. Madras.

Dr. V. Srinivasan,  
Professor,  
Dept. of Chemistry (from 1-1-80),  
I.I.T., Madras.

*Director*

Prof. P. V. Indiresan,  
I. I. T. Madras.

*Secretary*

Sri R. S. Virmani,  
Registrar,  
I.I.T., Madras.

**The Finance Committee***Chairman*

Sri A.M.M. Arunachalam,  
Chairman and Managing Director ,  
Tube Investments of India Limited,  
11/12, Rajaji Road, Madras.

*Members*

Dr. K. Gopalan,  
Deputy Educational Adviser (Tech),  
Ministry of Education and Culture,  
Government of India,  
New Delhi.

Sri J.A. Kalyana Krishnan,  
Financial Adviser,  
Internal Finance Division,  
Government of India,  
New Delhi.

Prof. T.R. Doss,  
Former Vice Chancellor,  
J. N. Technological University,  
Hyderabad.

Sri P. Sivalingam,  
Vice Chancellor,  
Perarignar Anna University of  
Technology,  
Madras.

Prof. P.V. Indiresan,  
Director, I.I.T., Madras.

*Secretary*

Sri R.S. Virmani,  
Registrar,  
I.I.T., Madras.



## The Buildings and Works Committee

### *Chairman*

Sri A.M.M. Arunachalam,  
Chairman and Managing Director,  
Tube Investments of India Limited,  
11/12, Rajaji Road,  
Madras.

### *Members*

Prof. P.V. Indiresan,  
Director,  
I.I.T., Madras.

Sri B. Raghupathi,  
Superintending Engineer,  
C.P.W.D., Madras.

Prof. L. N. Ramamurthi,  
Chairman,  
Estate and Works Committee,  
I.I.T., Madras.

Sri A. Meenakshi Sundaram,  
Chief Engineer,  
P.W.D., Madras.

Sri Y.S. Nagaraja Rao,  
Executive Engineer,  
I.I.T., Madras.

### *Secretary*

Sri R.S. Virmani,  
Registrar,  
I.I.T., Madras.

## The Senate

### *Chairman*

P. V. Indiresan

### *Members*

P. Venkata Rao

E. G. Ramachandran

D. Venkataswarlu

R. K. Gupta

S. D. Nigam

V. S. Nazir Ahamed

B. S. Murthi

C. Ramasastry

S. K. Srinivasan

M. C. Gupta

K. A. V. Pandalai

V. C. Venkatesh

R. Srinivasan

M. Venugopal

V. G. K. Murti

M. K. Achuthan

T. Gopichand

A. K. Srikanth

K. S. Sankaran

J. C. Kuriacose

R. Vasudevan

K. Srinivasaraghavan

V. Srinivasan

T. K. Bose

V. Anantaraman

N. V. Chandrasekhara Swamy

P. Srinivasa Rao

B. V. Aswathanarayana Rao

R. S. Alwar

K. P. Rajappan

G. Aravamudan

C. N. Pillai

P. T. Manoharan

H. N. Mahabala

M. Satyanarayana

H. C. Radhakrishna

D. Johnson Victor

N. R. Rajappa

D. Prithviraj

Vincent X. Kunukkasseril

G. V. N. Rayudu

S. Jambunathan

M. A. Parameswaran

C. R. Muthukrishnan

S. Ramani

D. K. Banerjee

B. Ramaswamy

V. Seshadri

Y. B. G. Varma  
 V. M. Krishnasastry  
 L. N. Ramamurthy  
 A. Kuppurajulu  
 K. Balaraman  
 K. A. Damodaran  
 C. S. Ballal  
 M. V. Krishnamurthi  
 S. C. Mitra  
 L. V. K. V. Sarma  
 K. M. Das  
 H. Raman  
 K. Thulasiraman  
 Y. Narayana Rao  
 P. R. Krishnaswamy  
 V. Radhakrishnan  
 H. Chandrasekharan  
 R. Natarajan  
 V. Ramamurti  
 M. S. Narasimhan  
 D. Kakati  
 H. Md. Roshan  
 P. S. Srinivasan  
 V. S. Raju

*Senior Warden*

R. Narayan

*Three educationists from outside the Institute nominated by the Chairman, Board of Governors :*

G. S. Laddha  
 M. Santappa  
 C. T. Kurian

C. Ganapathy  
 Klaus Schleusener  
 J. P. Raina  
 M. Ramanujam  
 R. S. Sirohi  
 J. Sobhanadri  
 H. S. Paul  
 S. R. Ramadas  
 Surjit Singh  
 T. P. Ganesan  
 K. R. Parthasarathy  
 C. S. Krishnamurthy  
 R. Kalyanakrishnan  
 B. V. Ramanamoorthy  
 V. Panchanathan  
 N. Subramanian  
 C. Kalidas  
 S. Radhakrishna  
 S. Subramaniam  
 R. Radhakrishnan  
 Y. V. G. S. Murthy

*Members of the Faculty (Nominees)*

R. K. Srikanta Kumaraswamy

P. Venkateswarlu

C. Dattatreyan

A. V. Krishna Rao

*Members of the Faculty (Invitees)*

K. Lakshminarayana

R. S. Srinivasan

R. L. Roy Choudhury

R. Nagarajan

*Secretary*

R. S. Virmani, Registrar

# REPORT BY THE DIRECTOR

(July 1, 1979 to March 31, 1980)

The year 1979-80 had been another year of fruitful activities for the Institute in its march towards fulfilling the goals and objectives for which it was established in 1959 by an Act of Parliament. The following pages give a brief report of the activities of the Institute.

## Student Strength

The parity achieved between undergraduate students and postgraduate students was maintained during the year under report. There were 1237 undergraduate students and 1282 postgraduate students.

At the last Convocation held on 29th September 1979, 234 students obtained the B.Tech. Degree, 41 the M.Sc. Degree, 207 the M.Tech. Degree, 39 the DIIT, 43 the MS and 55 the Ph.D. Degree. Of the 55 Ph.D. Degrees conferred, 20 were in Engineering disciplines.

## Administrative and Academic Performance

During the past one year, several reforms were introduced to improve the administrative and academic functioning of the Institute. That they have been successful may be judged from the fact that we have been able to utilize our resources much more effectively than in the past. For instance, in the previous year, we were able to absorb only around eighty per cent of our budget allocation; this year, we have raised our utilization from Rs.4.90 crores to around Rs.6.70 crores, which is substantially greater than the budget allocation. Of this, over rupees one crore went to augment the laboratory equipment. In addition, after several years, we could also complete the recruitment and promotion of staff at various levels. Their number makes an interesting reading. It is 77 at the scientific level, 70 for technicians, 51 for administrative staff and only nine at the Class IV level. In addition, seven others were taken in, mainly as replacement for the hospital. The backlog of promotions for the supporting staff also has been virtually wiped out with the completion of the process for 319 staff; another 170 cases will be finalised shortly. Also, the selections of SC/ST categories have been implemented according to both the spirit as well as the letter of national policy. In the light of this recruitment and taking into account the resignations, the total strength rose from 1985 to 2162 this year.

The pride of place among the reforms introduced should go to the systematic decentralization of authority. Not only have the financial powers been delegated downwards, much of the administration work also has been taken over from the Director, by the five Deans, who have started functioning from this year.

The Deans, also participate in policy making and meet every week for the purpose. Similarly, the Heads of Departments meet every month to plan the execution of the various institutional activities. Such participation in policy making and planning is further enlarged through the Boards that support every Dean and the Advisory Committees which help the Heads of Departments. On these Boards and Committees, staff at various levels as also students are included, so that a really wide base of opinion is available before any decision is taken. Through Class Committees, the students are further encouraged to participate in the planning and in the conduct of the various courses.

Thirdly, formalised procedures to make the Institute administration transparent to all, have been implemented. For instance, the minutes of the Deans Committee and of the meeting of the Heads of Departments, are widely circulated, so that everyone is kept abreast of the policy and planning programmes. A weekly Newsletter also provides information of factual nature.

As a natural extension of this communication process, programmes of feedback have also been introduced. Senior administrators right up to the Director's level, have been assessed for their administrative qualities. This process will be further enlarged in the next few weeks, when the students will be invited to assess the various courses attended by them.

The objective of these innovations of delegation of authority, wide range participation in decision making, the transparent functioning of the administration, two way communication, is not merely to increase organisational efficiency. These reforms also help to train more and more people in the art of administering an institution like ours. The development of such management skills, we feel, are by far the most important contribution made by these reforms.

In addition to the administrative reforms, this year witnessed a wholesale review and reorganisation of the academic process. The students are now given a wide ranging choice of subjects, which enables each one of them to adjust his academic programme to match his individual requirement, either in the nature of subject specialisation or in the type of courses which can be oriented towards research capability or production processes or towards engineering management. The students also can proceed at their own pace, fast or slow, according to individual convenience. Hopefully, when teachers and students settle down with these innovations a considerable amount of fun would be added to the learning process.

### **Awards received by Faculty**

The IIT continues to make its mark in the technical world. Prof. Y.B.G. Varma, Dr. M.S. Ananth and Mr. V.G. Rao of the Chemical Engineering Department secured the Best Paper Award of the Institution of Chemical Engineers. Prof. M.S. Narasimhan received a special commendation for his contribution to the Design of Antennas for the Indo-USSR troposcatter communication links. Our faculty also brought out over a dozen books, some of which have been accepted for international circulation.

### **Sponsored Projects and Industrial Consultancy**

We have now 85 sponsored research projects on hand with a total outlay of over Rs. 1.6 crores, and, in addition, the income from individual consultancy has come to nearly Rs. 25.00 lakhs. This is noteworthy, as the number of such jobs has dropped drastically, as we stopped undertaking from this year routine testing jobs. Four of the processes developed by our Faculty have been commercialised.

We have finalised most of the sixteen Joint Research Projects we had undertaken in collaboration with German Universities. We are particularly grateful to the Government of the Federal Republic of Germany for their continued help and support. As most people would know by now, their contribution has been by far the highest for any IIT. We have also some modest association in terms of research projects with Australia, France and the USA. In turn, we have embarked on a programme of co-operative development of the four Regional Engineering Colleges in the Southern Region. This will be in the shape of laboratory development, joint research projects and training facilities for faculty and technicians. We are also assisting the Government of India to help the growth of the University of Peradeniya and the University of Maratuwa in Sri Lanka.

### **Gymkhana**

Our boys, for the ninth year in succession, won the Inter-IIT Championship. Our Chess Champion, Sri M. Ramesh, has attained international standards by

winning the Second Prize in a tournament in Switzerland.

### SPONSORED PROJECTS (1979—80)

#### Sponsored Research Schemes/Projects

The following 21 projects have been financed by various organisations. Departmentwise details are given below. This is in addition to ongoing projects reported in the Annual Report 1978—79.

Sl. No.	Name of the sponsoring authority	Title of the project
<b>Applied Mechanics</b>		
1.	D S W	Research on (i) Aide to promote functional electrical stimulation (ii) ultrasonic mobility aid for the blind and (iii) Assessment of Leprotic feet and individualised footwear design.
2.	D A E	Flow induced vibrations in heat exchangers.
<b>Centre for Systems &amp; Devices</b>		
3.	D S T	Design and Development of Micro-wave Antenna employing edge diffraction techniques.
<b>Chemical Engineering</b>		
4.	D A E	Dynamics of Liquid Fluidization
<b>Chemistry</b>		
5.	INSA	Photoinduced catalytic reactions on semiconductor oxides (chemical effects of light and storage of energy) modifications of the oxide material.
6.	D S T	Effects of ionising radiations on solids and its role in catalysis.
7.	Madras Port Trust	Pollution studies of coastal waters in and around Madras Harbour.
8.	D S T	Chemical investigations on castor oil— a versatile raw material.



**Civil Engineering**

9. I S I Typification of Industrial structures

**Electrical Engineering**

10. Centre of Energy Studies, IIT, Delhi. Load frequency control of Power Systems

**Humanities and Social Sciences**

11. I R T Assessment of Transport Bus Drivers performance and application of Ergonomic design of buses for Road Safety.

**Mechanical Engineering**

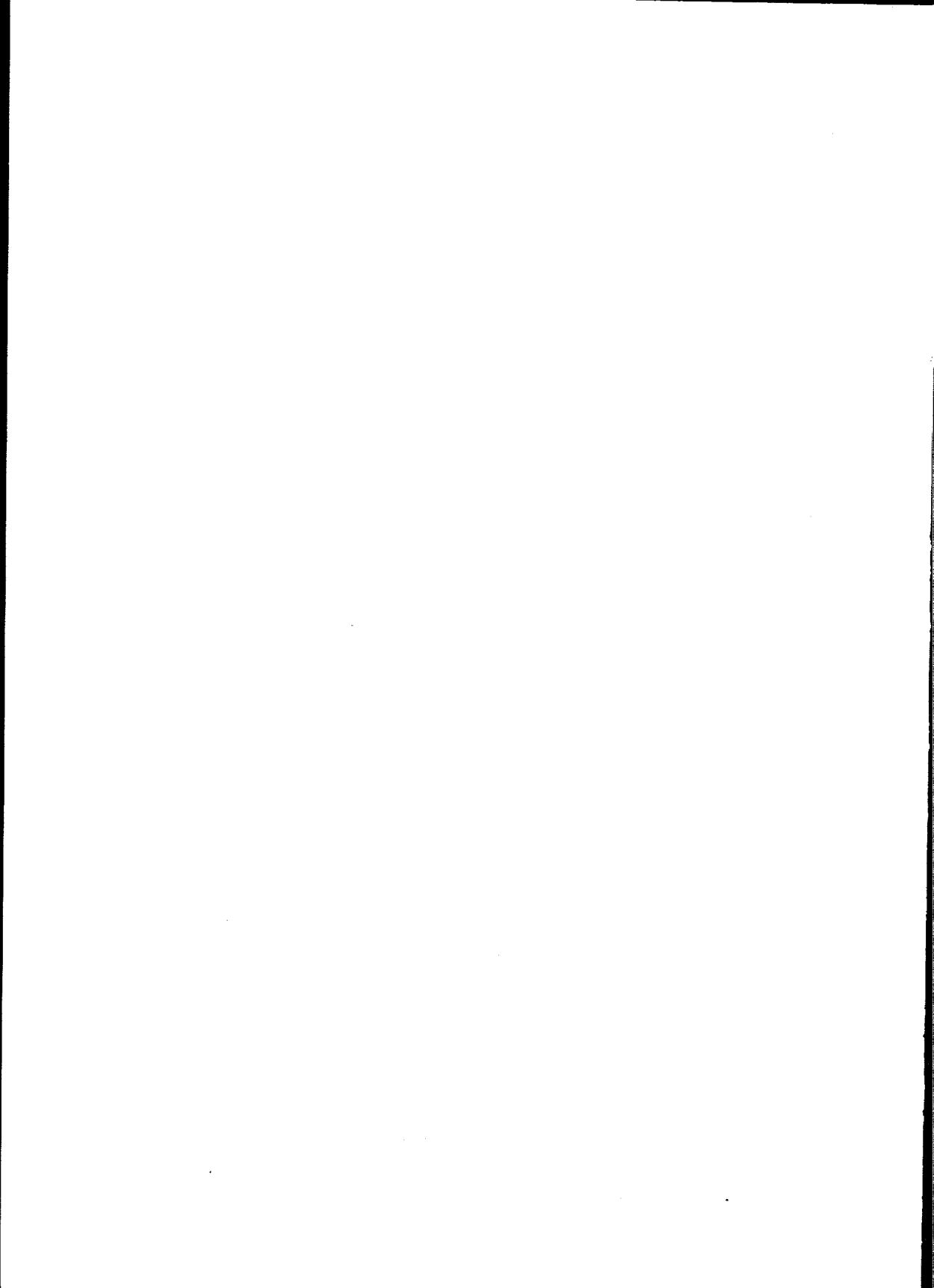
12. CSIR Effects of skewed entry boundary layers in secondary flows and losses in a turbine cascade.
13. ARDB Design and Development of an optical head for TV Tracker
14. —do— Design and Development of a Laser illuminator for Beam Riding guidance.
15. —do— Studies on combustion phenomena in a solid propellant rocket Ramjet Engine.
16. D S T Pneumatic Conveyance of Powdered materials at high concentrations

**Ocean Engineering Centre**

17. E I L Load transfer characteristics of Piles in weak rocks
18. E I L Formulas for stress concentration factors in tubular joints
19. ARDB Improving the existing capabilities of structural analysis programme
20. DRDO Analysis and design of Buoys and Cables

**Physics**

21. ICMR Cryogenic treatment of warts
-



## **RESEARCH CENTRES**

**Centre for Systems and Devices**

**Energy Research Centre**

**Fibre Reinforced Plastics Research Centre**

**Materials Science Research Centre**

**Ocean Engineering Centre**

THE UNIVERSITY OF CHICAGO

PHYSICS DEPARTMENT

PHYSICS 354

LECTURE 1

1980

## CENTRE FOR SYSTEMS AND DEVICES

### Educational Programme

- 1) Intensive Lecture course on 'Radar Technology'—Lectures by Dr. Eli Brookner between 27 - 12 - 79 and 31 - 12 - 79.
- 2) Short course on 'Moving Target Detection and Radar Signal Processing' Lectures by Dr. C.E. Muehe - during 29 - 1 - 80 to 8 - 2 - 80.
- 3) Short course on 'Micro-Processor-Based Design' — Co-ordinated by Sri V.N. Shukla.

### Research and Development

Nine Projects in the fields of interest to the Ministry of Defence (RCPO) are nearing completion. Four more projects have been approved by the Department of Electronics, Ministry of Defence for execution by this Centre, while a fifth is under process for sanction from Department of Missiles, also of Ministry of Defence. Apart from the above, a number of other projects sanctioned by DST, ISRO, Electronics Commission, ARDB etc., are in progress.

### Research Publications :

Papers - 10 Nos.

### Any other informations :

Mr. V.N. Shukla and Mrs. Ranjana Shukla joined this Centre as Design Engineers during December 1979.

## ENERGY RESEARCH CENTRE

### (a) Electrical Energy

#### QIP/UGC Teacher Fellowship

Programme	M.Tech.	M.S.	Ph.D.
No. trained so far	Nil	Nil	2
No. on rolls	Nil	1	1

## Research and Development

Sponsored Research Projects under progress in the year (Title of the project/ sponsor, total financial outlay) Coordinators of the project.

- i) Project on 'Development of Hardware and Software for the computer aided Power system Data and Control' Department of Science and Technology, New Delhi — Rupees Five Lakhs — Dr. A. Kuppurajulu and Dr. K. Raman Nayar.
- ii) ERC Project on 'Development of Hardware for Load frequency control of power systems' Centre of Energy Studies, New Delhi - Rupees One Lakh - Dr. A. Kuppurajulu and Dr. C. Venkatasessaiah.

## Research Publications

- i) Dynamic equivalents for excitation controllers and governor turbine systems - Sankaranarayanan, V., Elangovan, S., and Venugopal, K., presented at IFAC Conference held in Delhi, 16—18, Aug. 1979.
- ii) Coherency based design of decentralized optimal controllers for stabilization of large power systems, Sankaranarayanan, V., Elangovan, S., and Venugopal, M., presented at IFAC Conference held in Delhi 16—18, August 1979.
- iii) Multi-level optimal control of large scale power systems, Reddy, P.R., Kuppurajulu, A., Subramaniam, P., and Berg, G.J., presented at IFAC Conference held in Delhi, 16—18, August, 1979.
- iv) Optimal long Range Hydro-Thermal Energy Scheduling, Kuppurajulu, A., Raman Nayar, K. and Ramakrishnan, H. V., presented at IFAC Conference held in Delhi, 16—18, August, 1979.
- v) A fast power flow solution by the method of reduction and restoration, Krishnaparandama, T., Elangovan, S., Kuppurajulu, A., Sankaranarayanan V., - Paper accepted for publication in the March 1980 issue of IEE Proceedings, London.

## Assistance to Industry - I.C.C.

Major ICC projects executed during the year

- i) Project on 'Computer Programme development of Load flow solution using Newton Raphson technique' - M/s. Tata Consulting Engineers, Bombay.

- ii) Project on 'Load forecasting' sponsored by Tamil Nadu Electricity Board.
- iii) Project on 'Determination of suitable value of inertia constant for Lower Mettur Hydro Stations' by Tamil Nadu Electricity Board.

#### **New major equipment added**

- i) Micro '78 mini computer
- ii) PDP 11 mini-computer
- iii) D. C. Motor driven alternator system to stimulate transients in power systems.

#### **Equipment fabricated**

Interfaces have been developed and fabricated to connect the existing a.c. network analyser with the mini computer mentioned above for on-line computing system of a model power system network.

#### **Development Programme**

On-line computing system under installation.

#### **(b) Solar Energy**

M.Tech./M.S./Ph.D. Scholars working on Solar Energy

	M. Tech.	M.S.	Ph.D.
No. trained so far	6	1	3
No. on rolls	2	1	4

#### **Important Lectures and Seminars**

Weekly seminars and occasionally lectures from Visiting Scientists are being arranged.

#### **Research and Development**

##### **Sponsored Research Projects under progress**

Solar space cooling - partially funded by the Centre for Energy Studies, IIT, Delhi.

##### **Research Publications**

Gandhidasan, P., Sriramulu, V. and Gupta, M.C., 'Theoretical and Experimental Investigations of a Counter-current Solar Regenerator' - International Solar Energy Congress, Georgia, Atlanta, U.S.A., Aug. 1979.

Venkatesh, A., Sriramulu, V. and Gupta, M.C., 'Intermittent Solar Refrigeration', International Solar Energy Congress, Georgia, Atlanta, U.S.A., Aug. 1979.

Kumar, A., and Sriramulu, V., 'The effect of plate temperature on the transient response of a solar regenerator', National Solar Energy Convention, IIT, Bombay, Dec. 1979.

Samuel, A.A., Shet, U.S.P., Sriramulu, V. and Gupta, M.C., 'Suitability of East-West Oriented Parabolic Collectors for Solar Thermal Power Plants', All India Symposium and Exhibition on Solar Energy and its Utilization, Osmania University, Hyderabad, March 22-23, 1980.

Shivasankar, R., Vijayakumar Venu, Shet, U.S.P. and Gupta, M.C., 'Solar Energy Utilization in Stills — An Overview', *ibid.*

### **Departmental Projects**

Solar Air Conditioner for Hot Humid Climates (Open Desiccant System)

Investigations on a stationary concentrator

Solar Regenerators

Solar-operated Ammonia Absorption Refrigerator

Optimisation of a Solar Water Heating System

### **Assistance to Industry**

The division has rendered industrial consultancy for several firms in and around Madras on solar applications: tested flat plate collectors for M/s. Tungabhadra Steel Products Ltd., Thungabhadra, Karnataka; supplied solar energy devices such as flat plate collector, solar air heater, solar water heater to A.C. College of Technology, Karaikudi and to C. S. I. R. Regional Laboratory Trivandrum.

### **New major equipment added**

12 point potentiometric recorder, Micro computer with magnetic card reader and Memory attachment module, Sunshine recorder.

### **Visitors to the Department**

Mr. A. Langworthy of Department of National Development, Australia and Prof. J. C. V. Chinnappa of James Cook University, Australia visited the Solar Energy Division during February 1980.



## Development Programme

R and D work is being pursued in the following areas :

- i) Solar refrigeration (Intermittent and continuous)
- ii) Forced Circulation Industrial Solar water heater.

### (c) Wind Power Division

The Wind Power Division continued its project on the Vertical Axis Wind Generator in collaboration with B.H.E.L. (R & D). A proto-type machine has been installed at Kalpakkam and another machine is being installed at Rajkot. Based on laboratory studies, the performance of an aerodynamic brake has been tested and will be shortly incorporated in the proto-type machine. A control system for cutting in and cutting out the machine is also under development.

## FIBRE REINFORCED PLASTICS RESEARCH CENTRE

### Courses :

New Programmes introduced

An M. S. and Ph.D. programme on Composite Technology and Composite Structures has been formulated which will come into effect from July 1980.

New Courses introduced

An undergraduate elective course on 'Composite Materials' has been formulated. Courses on Composite Materials, Composite Structures have been offered to post-graduate students.

### Educational Programme :

(Continuing Education Programmes)

Short term courses

- i) Design of FRP products for Marine and transport applications - January 1980.
- ii) Workshop training programme on FRP-September 1979.
- iii) Workshop on FRP-February 1980.
- iv) Short course on Principles of FRP manufacture held at CGCRI, Calcutta in collaboration with Indian Ceramic Society - January 1980.

- v) Short course on FRP at Trivandrum in collaboration with V. S. S. C. Trivandrum and Lal Bahadur Shastri Centre of Government of Kerala, April 1980.
- vi) Participated in the H. A. L. Training Programme for Engineers and Managers.

### Research and Development

- i) Studies on jute polyester composites.
- ii) Development and fabrication of jute-polyester composite houses by filament winding.
- iii) Design and fabrication of a winding machine for the fabrication of houses.
- iv) Development of prepreg-fibreglass tapes.
- v) Studies on Fibre reinforced thermoplastics.
- vi) Studies on the effect of fillers and additives on the moulding and properties of FRP.
- vii) Formulation of sheet moulding compounds.
- viii) Development of the transfer moulding of FRP threaded bars.
- ix) Studies on filament wound pipes for tube well irrigation.
- x) Development of process and machinery to make chopped strand mat and roving.

Departmental projects :

Five

### Assistance to Industry

About 14 Industrial Consultancy projects consisting of design, development, fabrication and testing for a total amount of Rs. 90,000 have been taken up during the year.

## New Major equipment

One Vertical Milling machine and a high temperature furnace were also added to the centre. Fabrication of one glass fibre chopped strand mat making machine is under progress.

## Invited lectures delivered by the staff

### Lecture

Lecture on composite materials at the School of Technology, University of Cochin

Dr. N. G. Nair

The centre has already established a link with the FRP Industry in the country providing them technical guidance and consultancy services.

## Development work

Apart from the continuation of the on - going projects, the centre is likely to take up a few R and D projects from F.A.O. of the United Nations, Madras Unit, the Development of FRP containers for export and also a few projects from N.P.O.L. Cochin and N.B.O. New Delhi.

# MATERIALS SCIENCE RESEARCH CENTRE

## Important Lectures and Seminars

Title	Speaker
1. "Admantine Family of Semi-conductors"	Prof. B. R. Pamplin, School of Physics, University of Bath, United Kingdom
2. "RM5 Hydrogen Storage Materials"	Prof. K. A. Gschneidner, Dept of Materials Science and Engineering, Iowa State University, Iowa, U.S.A.

## Research and Development

a) Papers published	7
b) Papers presented at National and International Conferences	8

### **Sponsored Research Schemes and Projects**

In addition to the four on-going research projects, one more project entitled "Development of Electric Furnace upto 2200°C using  $\text{LnZrO}_3$  Ceramics" has been sponsored by the Department of Science and Technology, New Delhi.

### **Assistance to Industry**

Industrial Consultancy has been undertaken with CECRI, Karaikudi, BHEL, Bhopal, IDL Hyderabad and BHEL Trichy. This is also coordinated through the Department of Chemistry and Central X-ray Laboratory.

### **New Major Equipment added and Fabricated**

- a) Stereozoom microscope
- b) Keithley DC microvoltmeter
- c) High voltage potentiostat
- d) Vacuum coating unit
- e) Photoelectrochemical cell test set-up
- f) Nitrogen filled glove box for handling moisture and oxygen sensitive samples.

### **Visitors to the Department**

- 1) Prof. J.M. Thomas, FRS, Head, Dept. of Physical Chemistry, University of Cambridge, U.K.
- 2) Prof. B. R. Pamplin, School of Physics, University of Bath, U.K.
- 3) Prof. K. A. Gschneidner, Department of Materials Science and Engineering, Iowa State University, Iowa, U.S.A.

### **Invited Lectures delivered by the Faculty**

Prof. G. Aravamudan and Dr. G. V. Subba Rao delivered invited talks at the "Winter School of Solid State Chemistry", Indian Institute of Science, Bangalore.

Dr. G. V. Subba Rao delivered an invited talk at the Department of Atomic Energy Symposium on "General Experimental Survey of Reentrant Superconducting Systems".

### Developmental Programme

- 1) Study and development of semiconductors and new electrolyte systems for solar light-to-electricity conversion.
- 2) Improvement of efficiency of hydrogen production, using  $TiO_2$ ,  $SrTiO_3$  and  $Fe_2O_3$  electrodes, using solar energy.
- 3) Supersonic conductors for solid state high energy density batteries.

## OCEAN ENGINEERING CENTRE

### Academic Courses

New Programmes introduced

M.Tech., M.S. and Ph.D. Programmes in Ocean Engineering have been started from July 1979.

### Important Lectures and Seminars

Date	Title	Speaker
16-10-79	Foundation problems in power stations in big rivers	Prof. Dr. J. Brauns
17-10-79	Some aspects of Investigation of Dam materials for earth and Rockfill dams	Prof. Dr. J. Brauns
3 -1-80	The Oslo field - a case study in Marine Geology, Geophysics, Geo-techniques and Geochemistry	Prof. A. F. Richards
4 -1-80	Extracting Energy from the Ocean	Prof. A. F. Richards
8 -2-80	Some Aspects of Design of Pamban Highway Bridge with respect to Ocean Environment	Dr. V. Paramasivam Assistant Professor Civil Engineering
15 -2-80	Finite Element Analysis of Moving Boundary Problems	Dr. T. C. Gopalakrishnan Assistant Professor Ocean Engineering Centre
22 -2-80	Port Related Problems at Madras	Mr. M. R. Selvaraj Executive Engineer Madras Port Trust

7-3-80	Some Facets of Ocean Engineering Activities in the Federal Republic of Germany	Prof. V. S. Raju Head, Ocean Engg. Centre
21-3-80	Ocean Environment and its Biological influence on Marine Structures	Dr. V. V. Srinivasan Forest Research Institute University of Madras
25-3-80	Stability of Rock Slopes - A case study	Dipl. Ing. W. Lechnitz

### **Additional Laboratory**

The construction of a Laboratory to house a wave basin of area 30 m and 30 m with 3.5 m water depth, and a flume of area 45 m  $\times$  4 m with 2.5 m water depth fitted with Duplex type wave generator to create random waves, is expected to be completed by the end of 1980.

### **Major Equipment**

1) A data acquisition and control system DACS 78 with a micro-computer has been commissioned.

2) A model milling machine to make models of floating and submerged bodies to a maximum size of 5 m  $\times$  0.6 m and 0.8 m has been installed and commissioned.

3) A propeller making machine to cut propellers to a maximum diameter of 30 cm is commissioned.

### **Research Publications**

Papers : Total number published in Journals/Conferences - Six

### **Sponsored Projects**

1) 'Improving the capability of structural analysis program Sap IV' sponsored by Aeronautical Research and Development Establishment, New Delhi.

2) 'An Integrated approach to ship structure analysis by computer methods' sponsored by Department of Science and Technology.

- |   |  |
|---|--|
| 3) Load transfer characteristics of piles in weak rocks | } Sponsored by<br>Engineers India Limited<br>New Delhi |
| 4) Stress concentration in Tubular joints               |  |
| 5) Design of Buoys and Moorings                         | Ministry of Defence,<br>Government of India            |

### Assistance to Industry

Industrial Consultancy work has been undertaken on various projects and an amount of Rs. 1.15 lakhs has been earned under I.C.C. work.

### Visitors to the Department

- |                           |  |            |
|---------------------------|--|------------|
| 1) Prof. T. R. Chari      | Professor, Marine Geotechnique<br>Memorial University of New Foundland,<br>Canada          | Aug. 1979  |
| 2) Prof. Dr. Ing. Brauns  | Professor of Geotechnical Engineering,<br>University of Karlsruhe, West Germany            | Sept. 1979 |
| 3) Prof. A. R. Richards   | Director, Geotechnical Laboratory,<br>University of Lehigh, USA                            | Dec. 1979  |
| 4) Prof. C. C. Tung       | Professor of Civil Engg.,<br>North Carolina, USA   | Jan. 1980  |
| 5) Dipl. Ing. W. Lechnitz | Institute for Soil Mechanics & Rock<br>Mechanics, University of Karlsruhe,<br>West Germany | Mar. 1980  |

### Invited Lectures delivered by the Staff

- | Lectures   | Name of Staff         |
|--|-----------------------|
| 1) "Concrete for Hydrospace Structures" at Cement Research Institute, New Delhi - Oct. 1979            | Dr. M. R. Pranesh     |
| 2) "Dynamics of Offshore Structures" at Structural Engg. Research Centre at Madras                     | Dr. A. S. J. Swamidas |
| 3) "Offshore Structures" at the Short Term Course conducted at College of Engineering, Goa - Jan. 1980 | Dr. A. S. J. Swamidas |

- 4) "Underwater Structures" at the Short Term Course      Dr. C. Ganapathy  
conducted by F. R. P. Centre I.I.T. Madras - Jan. 1980      Chettiar

### **Other Information**

Prof. V. S. Raju attended the "International symposium on soils under cyclic and transient loading on soil" at University of Swansea U.K. Jan. 1980 and visited Ocean Engineering Laboratories in West Germany for four weeks in Jan-Feb. 1980.

Dr. T. C. Gopalakrishnan attended the 17th International Conference on Coastal and Ocean Engineering, at Sydney, Australia from 24th March to 9th April, 1980.

### **Developmental Programmes**

- i) The following project proposals for sponsorship are under consideration:
  - a) "Development of a manned submersible for Ocean studies", by Department of Science and Technology.
  - b) "Design of Underwater towed bodies" by Electronics Commission.
- ii) The first Indian Conference in Ocean Engineering is being held at Madras from 18th to 21st February, 1981 with Ocean Engineering Centre as host.



## **SCHOOLS FOR EDUCATION DEVELOPMENT**

Chemical Engineering Education Development Centre

Mechanical Engineering Education Development Centre

## **CHEMICAL ENGINEERING EDUCATION DEVELOPMENT CENTRE**

During the year 1979—80, the Centre has published the following books:

- 1) Fluid Flow Operations (A Laboratory Manual)
- 2) Food Industries
- 3) Heat Transfer Operations (A Laboratory Manual)
- 4) Project Engineering of Process Plants
- 5) Selection of Materials and Fabrication for Chemical Process Equipment (Question based)
- 6) SI Units in Engineering and Science
- 7) Chemical Engineering Education and Research in Indian Universities

The following books are under print/process of publication:

- 1) Chemtech IV
- 2) Instrumental Methods of Analysis (A Laboratory Manual)
- 3) Chemical Engineering Economics and Decision Analysis
- 4) Mass Transfer Operations (A Laboratory Manual)
- 5) Metallurgical Industries
- 6) Unit Processes
- 7) Materials of Construction for the Process Industry

## **MECHANICAL ENGINEERING EDUCATION DEVELOPMENT CENTRE**

The Centre has been established under the sponsorship of the Ministry of Education and Culture with the following objectives: (i) Development of curri-

culum and laboratory experience (ii) Study of appropriate learning situations and teaching methods and interaction between teaching and research (iii) Development of evaluation procedures including examination reform, instruments and demonstration experiments (iv) Study of interaction between industry, research and education (v) Processing of information and data and analysis of equipment in relation to laboratories and training (vi) Integration of the education process in relation to humanities, engineering and science (vii) Preparation of instructional materials, laboratory guides and text-book materials.

Keeping the above objectives in focus, the Centre has conducted a number of programmes during the past few years since its inception. During the current academic year, the following programmes have been completed.

#### **Monographs published**

- i. Plasticity Theory and its application in Metal Forming by  
Dr. V. Gopinathan
- ii. Production Process Handbook - Vol.I by G. Bapaiah

The monographs have been sent to all the Engineering Colleges in the country.

#### **Seminars organised**

i. A seminar on "Energy Technology Curriculum" was conducted on November 31, 1979, with the participation of senior faculty members from the Southern Universities. The seminar focussed attention on the importance of energy in our current Curricular Programmes.

ii. A seminar on "Creative Design" was held on March 29, 1980. The seminar was intended to highlight the need for creativity in our educational programmes.

Several other monographs on different aspects of mechanical engineering education are under preparation.

## **SPECIAL FACILITIES**

**Industrial Consultancy Centre**

**Engineering Design Centre**

**Central Electronics Centre**

**Regional Sophisticated Instrumentation Centre**

## INDUSTRIAL CONSULTANCY CENTRE

### Patents

Patents Processed	—	5
Patents obtained and applied for	—	45
Patents obtained with I. P. numbers	—	3

### Assistance to Industry

The consultancy services provided by the Institute to the industries during the period under consideration totalled to 449. The nature of consultancy services include analysis and design of buildings and structures, computer aided design and development of products, soil investigation, expert technical advice for cost evaluation, impulse testing, chemical analysis, fabrication of glass equipment etc.

(Different categories of staff who had joined the department during the period in question)

1. Prof. P. Srinivasa Rao	...	Took over as Dean of Industrial Consultancy and Sponsored Research
2. Dr. D. Balakrishnan	...	Joined as Chief Techno Economic Officer in July 1979
3. Sri R. Ambalavanan	...	Joined as Techno-Economic Officer in June 1979
Consultancy turnover for the period ending March 1980	...	Rs. 23 lakhs (approximately)
Sponsored projects in progress	...	95
Approximate value of the sponsored projects	...	Rs. 230 lakhs

## ENGINEERING DESIGN CENTRE

**Research publications** : Total number of papers ... 5

**Departmental projects** : 10

### Assistance to Industries

- a) Design of Silo for storage of carbon black for M/s. Binny Limited, Madras.
- b) Design of drive system for tanning drums for M/s. Avanti Leathers Limited, Madras.
- c) Design of fixtures and tooling for M/s. Rayala Corporation, Madras.

Services of staff members of Engineering Design Centre are being offered to student/research scholars/research guides of all departments/centres/sections.

## CENTRAL ELECTRONICS CENTRE

### Research and Development

1. A two channel telemetry system for Ph.D. Project in M.E. and M.H. Laboratory of Mechanical Engg. Department.
2. Instrumentation Amplifier (4 channels) for a Ph.D. project in Machine Tools Laboratory of Mechanical Engg. Department.

### Departmental Projects

1. A square wave generator system for Ph.D. project in I.C. Engines Laboratory of Mechanical Engineering Department.
2. Fabrication of a Square rooting circuit with amplifier project for I.C. Engines Laboratory of Mechanical Engineering Department.
3. A preamplifier and counter for research project for N.D.T. Laboratory of Metallurgy Department.
4. A Milling Machine project for Machine Tools Laboratory, Department of Mechanical Engineering.

### Assistance to Industry

The following ICC work was undertaken during the above period :

1. Chart Recorder for M/s. Rane Brake Linings Ltd., Madras-600 058.
2. Amplifier unit and Recorder for M/s. Rane Brake Linings Ltd., Madras-600 058.
3. Preheat Programmer for M/s. Rane Brake Linings Ltd., Madras-600 058.
4. Resistivity Meter for M/s. TWAD Board, RWS Divn., Madras.
5. 400 HP Induction Motor for M/s. Triveni Steel Pvt. Ltd., Madras. Work under progress.
6. HV Insulation Tester for M/s. Best and Crompton Engg. Ltd.
7. Micronephlometers for M/s. The Alkali and Chemical Corpn. of India Ltd., Ennore, Madras.

### New Major Equipment Added

1. 4 Channel FM Tape recorder from Bruel and Kjaer
2. 16 Channel oscillofil from Siemens
3. A Miniscope with DMM from Tektronix
4. A 5000 series storage oscilloscope with plugins - Tektronix
5. 512 MHz Counter from Hewlett Packard
6. Vibration Excitor - Bruel and Kjaer
7. Precision Digital Multimeter - Hartmann and Brown
8. Function Generator - Hewlett Packard

### Fabricated

A five channel instrumentational amplifier for a Ph.D. project in the Machine Tools Laboratory of the Department of Mechanical Engineering.

## REGIONAL SOPHISTICATED INSTRUMENTATION CENTRE

This Centre sponsored by the Department of Science and Technology houses sophisticated spectroscopic equipment dealing with almost all the branches of spectroscopy. It has been providing spectroscopic services to users from within the I.I.T. and outside. Apart from providing facilities to the scientists from various National Laboratories and Academic Institutes, analytical services and consultancy services were also provided to various chemical industries. The table below lists the number of measurements provided during the year 1979-80 on various spectrometers.

Spectrometer	Number of Measurements	
	IIT Madras	External
XL-100	635	310
A-60-D	4	1
EPR	1321	783
FIR	219	475
IR-12	109	47
PE-257	1764	657
DMR-21	874	747
AMINCO BOWMAN	830	3
AAGD	42	185
ORD	11	12
XRD		256½ hrs.

Enraf Nonius CAD-4 Single Crystal X-ray Diffractometer has been put to user service.



## New Equipment

The following equipment were acquired and are under installation :

1. Cambridge Stereo Scan 180 Scanning Electron Microscope
2. E-112 X-Q Band EPR Spectrometer with wide line NMR facilities
3. Gyrocode Observe Unit (Accessory to XL-100 NMR Spectrometer for use with multi nuclei  $^{63}\text{Cu}$ ,  $^{59}\text{Co}$ ,  $^{35}\text{Cl}$ ,  $^{17}\text{O}$ )
4. Cryodyne - Cryocooler for spectral measurements at ultra low temperatures (12K)
4.  $\text{Kr}^+$  Laser (to be used in conjunction with Cary 82 Laser Raman spectrometer)
6. Helium - Cryostat - for measurements down to 4.2 K.

## Fabrication

1. Universal mount for the Cryodyne - Cryocooler (Design and Drawings have been completed.)
2. An all glass low temperature cell for use with Laser Raman Spectrometer has been constructed and is being tested.

## Research Projects

Two Research Projects sponsored by DST are being carried out in R.S.I.C.

1. Microspectrophotometer (for optical microscopy work)
2. Matrix Isolation Spectroscopy

## Visitors

Professors E.De Boer from Netherlands and J.H. Ammeter from Switzerland (both distinguished Professors in the field of Magnetic Resonance Spectroscopy) delivered lectures. Prof. C. Sandorfy from the University of Montreal, Canada visited R.S.I.C. and delivered lectures on 'Hydrogen bonding'.

## Conferences

The 12th Annual Meeting of the Association of Magnetic Resonance Spectroscopists was held on 26th December 1979 and about 25 papers were read and discussed.

## New Appointments

Dr. S. Subramaniam and Dr. Surjit Singh, both Assistant Professors, were selected and appointed as Professors in R.S.I.C. Currently both Dr. Subramaniam and Dr. Surjit Singh are away on sabbatical leave in Germany on Humboldt Fellowship.

## **CENTRAL SERVICE FACILITIES**

Central Glass Blowing Section

Central Photographic Section

## CENTRAL GLASS BLOWING SECTION

The unit is well equipped with sophisticated glass blowing equipment such as high frequency generator, horizontal-cum-vertical lathe, forming lathe, universal lathe, grinding and polishing machines. The unit is turning out high vacuum stop-cocks and interchangeable ground glass joints, cryogenic and high vacuum glass systems and other types of complicated glass units. Facilities are also available for quartz-blowing.

The Section also offers training every year in glass blowing to post-graduate students.

## CENTRAL PHOTOGRAPHIC SECTION

Since its inception in 1967, the CPS has been catering to the needs of various Sections in the Institute including staff, research scholars and students.

Different photographic work such as processing of black and white movie films, movie taking, microphotography, photomicrography, slide preparation, documentation, circuit diagrams (printed circuits), developing, enlarging and processing are undertaken by the section.

## **CENTRE FOR RURAL DEVELOPMENT**

The Centre for Rural Development has undertaken several programmes dealing with application of Science and Technology to rural areas. Some of the projects undertaken are :

1. Biogas generation, storage and distribution. A 35 m<sup>3</sup> digester is in operation and pumping of well water, operation of a diesel pump, lighting for a room etc. have been done.
2. A solar still for collecting distilled water.
3. A wind mill for pumping sweet water from well.

Some projects which cater to the requirements of I.I.T. Madras and which have employment generating potential are :

1. A dairy farm capable of suppling 2000 litres of milk
2. A rice mill with a capacity of 50 bags of rice per day
3. A paper recycling plant
4. A chalk making unit with capacity of 2000 boxes per month
5. A carpentry training unit for 20 trainees
6. An industrial training unit for 50 trainees

These programmes are well underway and are expected to be fully operational by mid 1981. Most of these programmes were examined from a techno-economic point of view and those projects which have a value-added yield have been chosen.

## **QUALITY IMPROVEMENT PROGRAMME**

Under the QIP, 269 teachers of 51 Engineering Colleges were admitted so far for M.Tech. degree course and Ph.D research programmes. Currently 50 scholars are working for Ph.D. and 9 scholars are working for M.Tech. During the year under review, 6 short term courses were conducted for the benefit of teachers of Engineering Colleges.

## INDO-GERMAN COLLABORATION

Under the IV Indo-German Agreement, the following 16 Indo-German joint Research Projects were taken up :

- |   |   |
|---|---|
| 1. Development of high speed digital link                       | 9. Speed control of squirrel cage motor                       |
| 2. Design and development of a multistage fluidised bed reactor | 10. Systems approach to Engineering Design Structural Systems |
| 3. Centrifugal compressors                                      | 11. Development of precast elements for Housing               |
| 4. Design and construction of cryogenic equipment               | 12. Microwave Communication Systems                           |
| 5. Development of prestressed concrete railway sleepers         | 13. Development of alternate fuel for I.C. Engines            |
| 6. Heat transfer studies in electrical machines                 | 14. Formation and movement of the Saltwater interface         |
| 7. Magnetic properties of ferro-magnetic materials              | 15. Development of precision glass scales                     |
| 8. Improvement of weld qualities in wheels                      | 16. Solar energy for cold storage                             |

The final reports on these were submitted to GTZ in January/February 1980. These projects have also since been evaluated during April 1980 by a German Team as well as by an Indian Team of Experts separately and the evaluation reports have also been sent to GTZ. It is expected that about 4 to 6 of these projects will be continued further.

Proposals have been formulated for the V Indo-German Agreement and amongst other things, new joint Research projects on the same lines as above are expected to be taken up under this agreement also.

## INDO-FRENCH COLLABORATION

Mr. S. Laroze, Professor of Structures at Ecole Nationale Superior de L' Aeronautic at L' espace (Sup' Aero), Toulouse, France, visited the Aeronautical

Engineering Department for a period of two weeks in November 1979 and gave a series of lectures in the general area of Aerospace Structures.

Sri. P. Venkateswarlu, Assistant Professor left for France for a period of one year from 15—9—1979 to 14—9—1980 to work at ONERA CERT, Toulouse, France.

Dr. E. G. Tulapurkara, Lecturer, left for France for a period of about 15 months from 7—1—1980 to 31—3—1981 to work at ONERA, CERT, Toulouse, France.

## **CONSTRUCTION OF BUILDINGS**

The following are some of the important buildings which are in progress or were completed during the course of the year.

### **List of works completed**

- 1) Construction of D type quarters : Two Blocks
- 2) Construction of MOH : half Block
- 3) Construction of MOH : one Block
- 4) Overhead Reservoir
- 5) Enquiry Office
- 6) Extension to ME & MH Lab.
- 7) Construction of Thermal Turbo Machine Lab.
- 8) Construction of E type quarters : Two Blocks
- 9) Construction of E1 type quarters : One Block

### **Works in progress**

- 1) Construction of Hostel No. 11
- 2) Extension to Taramani House
- 3) Extension to Sarayu Hostel
- 4) Construction of Laboratory for Ocean Engineering Centre
- 5) Construction of building for R.S.I.C.
- 6) Construction of Z type quarters : Two Blocks

## **DEPARTMENTS**

**Aeronautical Engineering**

**Applied Mechanics (including Bio-Engineering)**

**Chemical Engineering**

**Chemistry**

**Civil Engineering**

**Computer Science**

**Electrical Engineering**

**Humanities and Social Sciences**

**Mathematics**

**Mechanical Engineering**

**Metallurgy**

**Physics**



## AERONAUTICAL ENGINEERING

### Research and Development

Papers in International Journals - 10

### Consultancy Work

For D.L.R.L., Hyderabad, regarding calculation of heat transfer for cooling of electronic equipment in a pod of a transit flying aircraft.

### Indo-French Collaborative Programme

Dr. P. Venkateswarlu left for Toulouse, France for a period of 12 months for advanced research work.

Dr. E. G. Tulapurkara left for France for a period of 15 months for advanced research work.

### Important Visitors to the Department

1. Dr. N. R. Subramanian, National Aeronautical Laboratory, Bangalore.
2. Prof. Simon Ostrach, Case Western Reserve University, USA
3. Prof. A. L. Ducoffe, Georgia Institute of Technology, USA
4. Prof. P. N. Murthy, IIT, Kanpur

### Sponsored Projects (Continuing)

1. Rarefied Gas Dynamics Facility (ARDB)
2. Numerical methods for the analysis of Wings and Bodies in subsonic/supersonic flows (ARDB)
3. Design and Development of a Ram-jet Engine (ARDB)

### Sponsored Projects (New)

Studies on combustion phenomena in a solid Propellant Rocket-Ramjet engine (ARDB) (along with Mech. Engg. Dept.)

## APPLIED MECHANICS

### Quality Improvement Programme

	M. Tech.	M.S.	Ph.D.
No. of trainees so far	9	...	10
No. on rolls in each of these courses	...	...	4

### Short Term Courses conducted

Winter School in 'Non-invasive Diagnostics and Rehabilitation techniques'

### Important Lectures and Seminars

1. Electrophysiology during altered states of consciousness Dr. C. Dostalek,  
Prague.
2. Microprocessors in diagnostics and ergonomics Dr. R. Harding,  
England.
3. Epilepsy Dr. T. R. Swaminathan, USA.
4. Computers in health care in USA Mr. Palaniappan, Madras.
5. Lectures on Rotor-dynamic problems  
Aeroelastic vibrations and Biomechanics Prof. Dr. Ing. O. Mahrenholtz,  
University of Hannover,  
West Germany.
6. Two day All India Conference on 'Acceptability of Rerefined Oils' was conducted during 15th and 16th February, 1980.

### Research Publications

Papers : Total numbers published in Journals : 49

### Departmental Projects

Sponsored 9

**Assistance to Industry**

1. Structural Design and Scientific Assessment of the manufacturing defects of the milk tanker of the Tamil Nadu Dairy Development Corporation.
2. Investigation of the failure of Forge Press Tie rods and recommendation for Design, for M/s Rane Brakes Ltd., Madras.
3. Computer analysis of multibay frames, for M/s Engineering Construction Corporation Ltd., Madras.
4. Testing the mechanical strength of the Bus Bar insulators and giving suitable recommendations regarding spacing of the insulators.
5. Zinc mill roll investigation, for M/s. National Carbon Co., Madras.
6. Design guidance for the rims of car tyre PCI Unit, for M/s. Dunlop India Ltd., Madras.
7. Mathematical Analysis of the asymmetric loading of cement mills by Finite Difference Approach, for M/s. ACC Vickers Babcock Ltd., Shahabad.
8. Performance characteristics of stockbridge dampers for Punjab State Electricity Board, Chandigarh; Indo-Asiatic Corporation, Calcutta.
9. Analysis of transmission line vibrations, for M/s. Electrometal Industries, Bombay.
10. Pipe line flexibility analysis, for M/s. SPIC, Madras.
11. Analysis of transmission line with and without dampers, for M/s Indo-Asiatic Corporation, Calcutta.
12. Biofeed back instrumentation, for M/s Sripharma, Vijayawada.
13. Calibration of Pitot Static Tube, for M/s. S. D. Hardson & Co., Calcutta.

**New major equipment added**

1. 6 channel digital carrier frequency amplifier (HBM)

2. Heterodyne Analyser 2010 (B & K)
3. Torque Strain Monitor Telemetry Unit (Acurex)
4. Octave Band Pass Filters (B & K)

### **Special Honours/Distinctions**

Prof. B. V. A. Rao, went to Netherlands and West Germany on Sabbatical Leave and spent 1 year and 3 months at the Eindhoven University of Technology and Technical University, Berlin, under a fellowship programme, and rejoined in July, 1979.

### **Visitors to the Department**

1. Dr. C. Dostalek, Prague.
2. Dr. R. Harding, England.
3. Dr. T. R. Swaminathan, USA.
4. Mr. Palaniappan, Madras.
5. Dr. B. Ramamurti, Madras.
6. Mr. H. Srinivasan, Chingleput.
7. Prof. Dr. Ing. O. Mahrenholtz, Technical University, Hannover, West Germany.

### **Invited Lectures delivered by the staff**

1. Theory of Shells, at BHEL, Trichy, by Dr. J. Ramachandran.
2. Theory of Plates, at BHEL, Trichy, by Dr. S. Venkatesan.
3. Bearing Design and Tribology, at BHEL, R & D Division, Hyderabad, by Dr. B. S. Prabhu.
4. Signature Analysis and Rotor Dynamics, at BHEL, R & D Division, Hyderabad, by Dr. B. V. A. Rao.
5. Rotor Dynamics and Flexible rotor balancing, at BHEL, R & D Division, Hyderabad, by Dr. B. S. Prabhu.

6. Modern Trends in Condition Monitoring Techniques related to Bearings, at Clinic on Bearings, Madras by Dr. B. S. Prabhu.
7. Turbulence and its measurement by hotwire anemometer, at BHEL R & D Division, Hyderabad, by Dr. B. H. L. Gowda.
8. The phenomenon of Vortex induced vibration, at MIT, Madras, by Dr. B. H. L. Gowda.

#### **Future Developmental Programme**

1. Extension of activities and intensification in applying some of the experimental results to clinical diagnostics and therapy.
2. Short-term courses on 'Experimental Stress Analysis', (May 1981) and 'Signature Analysis and Diagnostic Maintenance' (Dec. 1980).
3. Development of a sail type wind mill for pumping water in connection with Narayanapuram Development work.
4. Production of a 16 mm film on flow visualisation.
5. Recirculating free surface water tunnel for flow visualisation.
6. Rheo-electric analogy tank for flow problems.
7. Thermister anemometer for low speed measurement.

## **CHEMICAL ENGINEERING**

#### **Continuing Education Programme**

A Short Term Course and Seminar on 'Wood Science and Technology' was organised.

#### **Quality Improvement Programme**

	M. Tech.	M.S.	Ph.D.
No. of trainees so far	2	—	—
No. on rolls	3	3	3

## Research and Development

Research Publications :

Total number of papers in journals : 8

Books/monographs :

'Heat Transfer Operations - A laboratory manual' published by CDC, I I T, Madras.

## Symposium

Attended by

32nd Indian Institute of Chemical Engineering Conference at I. I. T., Bombay

Dr. T Venkatram  
Dr. N. Subramanian

Industrial Air Pollution Control organised by National Productivity Council

Dr. N. Subramanian

## Departmental Projects

DAE Project	--	One
M. S.	—	Three
Ph. D.	—	Three

## Assistance to Industry

1. Consultancy on 'Dust filter for cement dust and smoke
2. Testing of Neoprene bearings for
  - a) M/s Pioneer Rubber Industries, Madras
  - b) M/s Neelakantan Bros., Madras
3. 'Fluid bed roasting of chalcopyrites' for M/s Globe Chemicals, Bangalore

## New Major Equipment

Ordered for Tensile Testing Machine for High Polymer Engineering Laboratory

**Visitors to the Department**

	Name	Date
1.	Dr. Charguntla, M.I.T., U.S.A.	July 14—16, 1979
2.	Dr. Ing. G. Mennig, D.K.I., Darmstadt., West Germany	September 1979
3.	Prof. Dr. Ing. A. Vogelpohl, T.U. Clausthal, West Germany	March 1—13, 1980
4.	Prof. Dr. Ing. H. Gieskus, Dortmund University, West Germany	Feb. 28—March 2, 1980
5.	Prof. Dr. H. Hofmann, University Erlangen—Nurnberg, 8520 Erlangen, West Germany	March 14—16, 1980
6.	Dr. L.K. Doraiswamy, Director, NCL, Poona,	February 1980

**Invited Lectures Delivered by the staff**

	Lectures	Name of staff	Place
1.	'Two phase Flow'	Dr. Y.B.G. Varma	Regional Engineering College, Trichy
2.	'Advanced Evaporation and Distillation	Dr. Y.B.G. Varma	—do—
3.	'Fluidization Engg.'	Dr. N. Sankara- Srinivas	—do—
4.	'Characterisation of Particulate matter and gases'	Dr. M. Ramanujam	C.R.I. Training Course Calcutta
5.	'Grindability of Materials'	— do —	C.R.I. Training Course at Ballabgarh
6.	'Engineering require- ments for crushing operations'	—do—	C.R.I. Training course at Madras

**Future Development Programmes**

1. Computer process control
2. Micro processor applications in dynamics and control
3. Educational/Demonstration material acquisition for design division.

**CHEMISTRY****QIP/FIP Programmes**

The department had 6 FIP Scholars and one QIP Scholar on rolls for Ph.D. Degree.

Current strength :

	M.Sc.	Ph.D.
I Year	11	75
II Year	13	
No. of persons who took the degree	10	14

**Important Lectures and Seminars**

Title	Speaker
Methathesis Reactions of Cyclic olefins	Prof. H. Hoecker, University of Beyrouth, West Germany.
Some Inorganic Polymers	Prof. B. Wuderlich, Rennaselar Polytechnic, Troy, New York, USA
A new criterion to decide on the structure sensivity of reactions	Prof. S. J. Teichner, Director, Catalysis Research Institute, Lyon, France
Conversion of coal to Gasoline using zeolite catalysts	Dr. V.U.S. Rao, Pittsburgh Energy Technology Centre, USA
Inorganic silicates revisited	Prof. J. Thomas, Head, Physical Chemistry Department, University of Cambridge, U.K.



Atomic Absorption Spectroscopy and  
Plasma Emission Spectroscopy

Dr. R.L. Stux, International Product Co-ordinator, Atomic Absorption Systems of Instrumentation Lab., U.S.A.

Recent Advances in fast reaction kinetics

Dr. John Crooks, King's College, London, UK.

Chemistry and Biochemistry of Sirens

Prof. (Dr.) L. Jaenicke, Biochemie Institute, Universitat Koln, West Germany.

In collaboration with the Reactor Research Centre (Atomic Energy Department), Kalpakkam, the Department has been holding monthly Seminars. At these Seminars held at IIT/RRC - Kalpakkam, the staff and students of both organisations participated. A two-day symposium in Chemistry jointly organised by the University of Madras and Chemistry Department, IIT, Madras was held on 8th 9th March, 1980. About 75 Research papers were presented by the Scientists from various organisations in Madras. Active help was rendered to the Society for Advancement of Electrochemical Science and Technology, Karaikudi for holding a Seminar at Indian Institute of Technology, Madras, on Electroanalytical Chemistry in June 1979.

### Research and Development

Research projects of the department are being funded by agencies such as C.S.I.R., D.S.T., D.A.E., I.N.S.A. and I.S.R.O. These grants have been sanctioned to the faculty of the department in the areas such as, High Polymer Chemistry, Water and Air Pollution, Synthetic Organic Chemistry, Electrochemistry, Structural and Theoretical Chemistry, Dye Lasers, Radiation and Photochemistry of Semiconductor oxides, Photoelectrochemistry and problems relevant to storage of solar energy etc.

### Research publications

About 80 papers were published in Indian and foreign journals

### Departmental Projects

20 projects are in force including 5 recently sanctioned.

### Assistance to Industry

The Department has been having interaction with many organisations like BHEL etc. Problems such as removal of pollutants, analyses of materials, evaluation and testing of industrial catalysts etc. have been taken up with industries.

**New major equipment added**

A microcomputer is to be installed. Installation of a Gamma ray spectrometer cum Geiger-Muller counter has been taken up.

**Invited Lectures delivered by the staff**

Drs. C. S. Swamy, M. R. Udupa, V. Mahadevan, J. Rajaram, K. K. Balasubramanian and C. S. Venkatachalam gave a series of lectures for M.Sc. (Chemistry) students at the P.A.U.T., Guindy.

Dr. V. Ramakrishnan gave a series of lectures on Quantum Chemistry at the P.S.G.R. Krishnammal College, Coimbatore.

Prof. V. Srinivasan gave a seminar on Evaluation procedures on the Gandhi Jayanthi Day Symposium at Pachaiappa's College, Madras.

Dr. R. Narayan presented two papers in the meeting of the International Society for Electrochemistry at Trondheim, Norway in August 1979.

Dr. C. Kalidas has been nominated by INSA as the National Representative to IUPAC Commission on Solubility Data. He participated in the sub-committee meeting of IUPAC on solubility data in Davos, Switzerland.

Dr. V. Mahadevan presented a paper in January 1980 at the International Symposium entitled "New Frontiers in Science and Technology", organised at Madras by IUPAC.

Prof. S.R. Ramadas delivered invited lectures, at the University of Paderborn and Karlsruhe (West Germany).

**Future Development Programmes**

In addition to the already on-line activities, the Department is planning to initiate work on 'Process Development' wherein attempts will be made to produce fine and rare chemicals that are at present being imported at high costs.

The Department is also completing the establishment of the Nuclear Chemistry Laboratory. Work has also been initiated to tackle problems of environmental pollution.

## CIVIL ENGINEERING

### New programmes introduced

The earlier undergraduate Programme has been reorganised to credit system by incorporating changes in the syllabi and offering new electives.

### New Courses Introduced

Theoretical Geomechanics

### New system/method added

Partial prefabrication systems for housing

### Educational programme

#### Continuing Education Programme Short term/Part time courses conducted

1. Structural brick masonry
2. Advanced topics in design of tall tower structures
3. Limit state design of concrete
4. Computer aided design

#### Quality Improvement Programme/UGC Teacher fellowship Programme :

Serving Teachers Programme	M.Tech	Ph.D.
No. on rolls	1	11

### Important Lectures & Seminars

Title	Speaker
1. Small harbour design and development	Dr. H. H. Dette Technical University. Braunschweig West Germany
2. Probabilistic approaches to wave analysis	Dr. C. C. Tung North Carolina State University U.S.A.

Title	Speaker
3. Coastal erosion problems in Tamil Nadu	Mr. P. Kumaraswamy Institute of Hydraulics & Hydrology Poondi
4. Appropriate Technology in Transport	Dr. T. H. Thomas University of Warwick, U. K.
5. Public Transport in Calcutta	—do—
6. Cable stayed Bridges and Design of the Unique Ruck-a-Chucky Bridge in California	Prof. Firmage, Brigham Young University
7. Techniques for Software Development and Applications	Dr. P. J. Pahl, o. Professor, Technical University of Berlin
8. Precast Elements for Housing	Dr. Ing. H. Cordes University of Aachen, West Germany
9. Interactive Computer Graphics	Prof. James L. Lubkin Michigan State University

### Research and Development

1. Indo-German Research Project on development of precast elements for housing.
2. Research project on floating breakwater and flow visualisation in free surface flow.
3. A miniature drag balance to measure total drag, a digital counter display for velocity measurements and a two-component force balance have been developed.
4. A hollow block making machine has been developed.

### Research Publications

Papers—Total numbers published in journals: 50

**Books/Monogram**

Title	Author
1. Frequency and Storm floods analysis (Translated from German)	Dr. H. Raman
2. Finite element based optimization and numerical simulation model for ground water systems	Dr. K. Elango

**Patents processed**

1. A simple hand machine for making hollow blocks.
2. A demountable electro—mechanical strain gauge with digital strain indicator.

Departmental projects: 10

**Assistance to Industry**

1. Field trials on providing roofing using partial precast elements (2 projects).
2. Evaluation of building materials, quality control, concrete technology and practice. Repairs and maintenance of building.
3. Fatigue testing for front wheel hubs for Shaktiman trucks for Vehicles Factory, Jabalpur.
4. Bituminous Macadam and Asphalt concrete Mix Design for the proposed resurfacing and extension of runway for AFS, Tambaram, Madras.
5. Subsoil Investigation and Design of pavements for Air strip at Sriharikota for Department of Space, Nellore.
6. River system studies for Central Water Power Commission.
7. Wave data recording for Madras fishery harbour, Madras Port Trust.
8. Rating of current meters for various organisations of the country.
9. Pollution monitoring for Madras Port Trust.
10. Flow measurement for cooling water pumps for Tuticorin Thermal Plant.

11. Salinity intrusion in Hooghly estuary.
12. Three Dimensional Static Dynamic Analysis of T. G. Foundation, Projects Engineering Division, BHEL, New Delhi.
13. Technical Data Processing for SAP IV - E.I.L., New Delhi; Power Projects Engineering Division, Dept. of Atomic Energy; Rail India Technical and Economic Services, Bangalore.
14. Proof Testing of Neoprene Bridge Bearings - DGS & D, New Delhi; M/s Pioneer Rubber Industries, Madras; M/s Nilakantan Brothers, Madras.
15. Design of Shell Roof Over Filter Beds - Siruvani Projects - Coimbatore Water Supply Scheme - T.W.A.D.B., Coimbatore.
16. Investigation into the behaviour of 18 wire P. S. C. Sleepers-R.D.S.O., Lucknow.
17. Design of Folded Plate Roof - B.H.E.L., New Delhi.
18. Investigation into the behaviour of Clip Adaptors and Pandrol Clips - G.K.W. Ltd., Bangalore.
19. Checking of the Design of Conoidal Shell Roof - Wheel and Axle Plant, Bangalore.
20. Design of Prestressed Concrete Folded Plate Roof - Sri Prasad Constructions, Madras.
21. Checking of the Design of Folded Plate Roof, B.H.E.L., Trichy.
22. Production of P. S. C. Sleepers - Subrahmanyam and Co., Madras; Engineers Prestressed Structures, Gwalior; Tantia Construction Co., Calcutta.
23. Relaxation Test on Steel - Sterling Steels, New Delhi; Deccan Wires, Bangalore; I.S.I., New Delhi.
24. Design of Machine Foundation, IOC, Faridabad.
25. Checking the Machine Foundation against possible vibration - Eicher Tractors Ltd., Faridabad.
26. Checking the Design of Multistoreyed Building - TTD, Triupati.

27. Analysis and Design of Grid Floor for Police Training College at Kalaignar Karunanidhi Nagar — P.W.D., Madras.
28. Analysis of Antenna Structure, Defence Electronics Laboratory, Dehradun.
29. Design of Heavy Industrial Sheds — B.H.E.L., Trichy.
30. Design of Clarifloculator and Sludge Thickener—Voltas Limited, Bombay.

#### **Additional Laboratory facility provided**

1. Experimental set-up for thermal performance studies has been developed.
2. Concrete permeability apparatus and Ultrasonic concrete tester.

#### **New Equipment Fabricated**

- i) Hand machine for making hollow blocks.
- ii) A demountable electromechanical strain gauge with a digital strain indicator.

#### **Visitors to the Department**

1. Dr. Stossinger, Technical University, Aachen, Germany came to finalise the Indo-German project on formation and movement of salt water interface at Madras Coastal aquifer.
2. Dr. Cordes, Technical University Aachen, Germany came to finalise the Indo-German Project on development of precast elements for housing.
3. Students and faculty of 15 different organisations have visited the Civil Engineering Department.

#### **Invited Lectures delivered by the staff**

Lecture	Name of staff
1. Slum upgrading programme in Madras city (at University of Warwick, U.K.)	Sri K.N. Ramamurthy

Lecture	Name of staff
2. Computer solutions of anchorage zone stresses in pretensioned concrete (Roorkee University)	Dr. P. Kalyanasundaram
3. Special Lectures at	
a) Karnataka Regional Engineering College, Surathkal	Dr. H. Raman
b) College of Engineering, Trivandrum	Dr. H. Raman

### **Future Development Programme**

The Department is planning to promote research activities in the field of water resources engineering and system analysis, lighting, ventilation, acoustics, environmental engineering, energy conservation in buildings, housing and appropriate technology. The proposals for the establishment of the Advanced Study Centre in Urban Transportation have been put up and financial sanction awaited.

## **COMPUTER SCIENCE**

### **Courses in PG Programme**

The courses offered in the M. Tech. programme are well structured and permit students freely to choose electives in approximately five major areas of Computer Science. With the view to introduce the credit system into M. Tech. a reorganization of the course structure is proposed. The new structure would permit greater flexibility in the choice of electives and at the same time provide logical continuity through the semesters. Courses in the newly developed areas of Algorithms, Data Communications, Computer Networks, Distributed processing, Protection in Computer Systems etc., are proposed to be introduced from July 1980.

### **Education Programme**

1. Continuing Education Programmes Offered
  - a) COBOL Programming and Applications
  - b) Advanced Fortran Concepts
  - c) Job Control Language Concepts
2. Other Courses :
  - a) EDP Concepts and Practice
  - b) Modern Computer Concepts



The above two were conducted jointly with the Computer Society of India for the benefit of Computer professionals in the country.

3. A series of lectures covering 370 system concepts was organized for the benefit of the computer professionals at the Tata Consultancy Services.

### Important Lectures and Seminars

1. Dr. K. L. Kothandapani, NCR Corporation, U.S.A. (Computer aided design of LSI layouts).
2. Prof. S. V. Rangaswamy, I.I.Sc., Bangalore (Logic and Theorem Proving with Computers).
3. Prof. J. W. Carr, University of Pennsylvania (Distributed Computing using Micro Computers).
4. Prof. Jerome Saltzer, M.I.T. (Desk Top Computers Atomicity).
5. Dr. Thiagarajan, G.M.D. West Germany (Petrimets).
6. Prof. Claude Berge, University of Paris (Graphs, Nets and the concept of a kernel).
7. Dr. Subramanyam, University of Utah (Abstract Data Structures and Types).
8. Prof. Kesavan, University of Waterloo. (Aspects of Systems Engineering Programme in undergraduate education).

### Research and Development

- |                          |      |
|--------------------------|------|
| a) Research Publications | — 11 |
| b) Patents granted       | — 2  |

### Assistance to Industry

#### Details of Research and Consultancy Projects

Project	Agency
1. Development of computerised Scheduling System for Ocean Liners.	Shipping Corporation of India.
2. Computerisation of Telephone Directory.	Madras Telephones.

Project	Agency
3. Computerised project control system.	S.P.I.C.
4. Single Track Rail Simulation.	R.D.S.O.
5. Integrated Simulation Model for Nutritional System for Tamil Nadu and Kerala States.	Food and Nutrition Department.
6. Survey Data Analysis	RUHSA - CMC, Vellore
7. Computerised Personnel Information System.	Tamil Nadu Electricity System.
8. Selection of Computer Systems.	Ashok Leyland.

#### Special honours/distinctions conferred on staff

Prof. H. N. Mahabala has been appointed as a member of the Board of Governors of the Computer Maintenance Corporation of India.

#### Other Information

Equipment added : System Development facility consisting of different microprocessor systems, Alphanumeric displays and flexible disk systems.  
PRIME 450 RJE Station

#### Invited Lectures delivered by staff

1. Prof. C. R. Muthukrishnan, Prof. R. Kalyanakrishnan and S. Srinivasan organised and conducted a short term course on Modern Computer Systems to the professionals at Telco, Jameshedpur. This course was repeated for Computer experts at ICF, Southern Railway with assistance from Sri V. Aravamudhan and Sri M.K. Ramanujam.
2. Dr. Mrs. Kamala Krithivasan was invited to give lectures on Automata and Formal Languages to the Post-graduate students of the Regional Engineering College, Trichy.

#### Staff

Dr. Mrs. Kamala Krithivasan has been made a member of the Board of Studies in Mathematics in one of the Colleges attached to Madurai University.

The Computer Centre has promoted Computer Applications in Engineering, Social Sciences and Management optimization. As a result of this, the centre has earned by way of Computer charges a revenue of Rs. 37.4 lakhs during 1979—80.

### Future Plans

1. The computer facility is to be expanded for meeting the requirements for a large facility in the region, especially for Data Base applications. The proposed augmentation would provide for an additional 1270 Mega bytes of online storage, 2 Mega bytes of main storage and an auxiliary CPU compatible with the present CPU.
2. A small computing facility has been acquired to meet the computing requirements arising out of the proposed introduction of an undergraduate course in computing with Engineering applications. This system is expected to provide interactive computing upto 8 users simultaneously.

## ELECTRICAL ENGINEERING

### Educational Programme

A three week course on 'Computer Design and Maintenance' was conducted in November-December 1979 exclusively for the benefit of Telecommunication Engineering personnel from Indian Railways.

### Lectures delivered by invited speakers

Title	Speaker
1. Lyapunov's method for on-line computation of power system stability.	Prof. M. Robbon-Pavella, University of Liege, Belgium.
2. Introduction to geometric multivariate Synthesis. 'Current trends in control theory'.	Prof. W. M. Wonham, University of Toronto, Canada.
3. Use of computers in business and Industry.	Prof. J. F. Coales, Cambridge University, U. K.
4. Identification and control of Process Industries.	Dr. B. V. Raja Rao, Senior Technologist, R & D, Pilkington Brothers Ltd., U.K.

Title	Speaker
5. Static Frequency changers for the Megawatt Range. Optimal control of pulse width modulated inverters. Low Ripple Line controlled Rectifier for Electrochemical Processes.	Prof. Dr.-Ing. Joachim Holtz, Bergische Universitat, West Germany.
6. Digital simulation of Thyristor circuits.	Dr. K. Sankara Rao, Associate Professor, North Dakota University, U.S.A.
7. Field Theory.	Prof. N. Dharma Rao, University of Calgary, Canada.
8. Digital Filters-	Prof. A. Antoniou, Head, Elect. Engg. Dept., Concordia University, Montreal, Canada.

#### Distinguished visitors to the Department

1. Dr. Klamser, Asst. Under Secretary, Federal Ministry of Economic Cooperation, Federal Republic of Germany.
2. Dr. W. Gerhardt, Economic Counsellor, Embassy of Federal Republic of Germany, New Delhi.
3. Dr. G. Neumann, Director, DAAD, New Delhi.
4. Prof. Jablonski, Poland.
5. Prof. M. Noelker and Prof. E. Schoonfeldt,  
 Institute of Vocational and Technical Education in Developing Countries, Kassel, West Germany.

#### Invited Lectures delivered by the Faculty of the department at outside organisations seminars

Title	Speaker	Place delivered
1. Present day trends in induction motor drives	Dr. V. V. Sastry	College of Engineering, Guindy, Madras.

Title	Speaker	Place delivered
2. Interfer-fed synchronous motor drives.	Dr. Vedam Subramanyam.	RDSS, Lucknow.
3. Applications of COD's and CTD's.	Dr. J. P. Raina.	ISTE Winter School, College of Engg., Guindy, Madras.
4. Image Signal Processing.	Dr. J. P. Raina.	ISTE Winter School, College of Engg., Guindy, Madras.
5. Computer Generated imagery.	Dr. J. P. Raina.	ISTE Winter School, College of Engg., Guindy, Madras.
6. Teletext: a data display system in Television.	Sri. S. Srinivasan.	ISTE Winter School, College of Engg., Guindy, Madras.
7. Video Recording.	Sri K. P. Ramaswamy.	ISTE Winter School College of Engg., Guindy, Madras.
8. Colour TV Systems.	Dr. J. P. Raina.	ISTE Winter School on TV Engg. TTTI, Adyar, Madras.
9. Additional Sound in TV.	Sri S. Srinivasan.	-do-
10. A follow-the-master band pass filter for video applications.	Sri S. Srinivasan. and Sri P. C. Rai.	ISTE Symposium on Circuits and Systems.

### Research and Development

1. Number of research papers published (July 1979 to March 80) 25
2. Major sponsored research schemes and projects under progress
  - a) Development of ultrasensitive photo-diodes (pin photo diodes) for threshold detection of ultra violet, visible and near Infra-red radiation'.  
Sponsored by DST Government of India  
Principal investigator: Dr. M. K. Achuthan.

- b) Real time control of power systems:  
Sponsored by DST Government of India.  
Principal Investigator: Dr. A. Kuppurajulu.
- c) Radar clutter studies RCP  
Sponsored by RCPO, Ministry of Defence (completed in Sept.1979).  
Principal Investigator: Dr. D.K. Banerjee.
- d) Detection and measurement of air pollution using lasers  
Sponsored by DST Government of India.  
Principal Investigator: Dr. M. Mukunda Rao.

### **Indo-German Collaboration**

- a) Speed control of a squirrel cage induction motor  
Indian coordinator : Dr. B. Ramaswami.
- b) Microwave communication systems  
Indian coordinator: Dr. D.K. Banerjee.
- c) Data Link between PDP II and IBM 370 computer  
Indian coordinator: Dr. H. N. Mahabala.

### **Major consultancy Assignments**

1. Remedial measures for industrial and saline pollution problems in transmission line insulators :  
W. S. Insulators - Dr. Y. Narayana Rao.
2. Measurement of power loss in transmission line equipment :  
Rural Electrification Corporation - Dr. V.V. Bapeswara Rao.
3. Design Optimization of transformers (63 KVA to 10 MVA) :  
Transformers and Switchgears, Madras - Dr. V. V. Sastry, Dr. G. S. Rao and Dr. P. S. Rao.
4. Dr. V. C. V. Pratapa Reddy is a consultant to Southern Magnetics, Madras.
5. Retainer consultancy to Best and Crompton Company for one year given by Dr. V. V. Sastry.

**Major Laboratory Equipment added/fabricated**

- |  |                     |
|--|---------------------|
| 1. English version of caption generator.   | TV Lab.             |
| 2. Video game for 4 games.   | TV Lab.             |
| 3. Oscilloscope Systronix model 515 P single beam.   | Semi conductor Lab. |
| 4. LCR bridge with digital display.  | Semi Conductor Lab. |
| 5. Storage Oscilloscope.   | Machines Lab.       |
| 6. Analog electronic power, reactive power, voltage and current measuring devices for interfacing A.C. network analyser with microprocessor. | Power Engg.Lab.     |
| 7. A digital instrument for the measurement of frequency, frequency deviation and rate of change of frequency for power system control.      | Power Engg.Lab.     |
| 8. Test set up for conducting artificial pollution studies on MV insulators and surge diverters upto 220 KV.                                 | High Voltage Lab.   |
| 9. Three terminal ohmmeter.  | Measurements Lab.   |

A modern facility for printed circuit fabrication is being established in the TV Lab. as a central facility for the department.

**Books published**

1. Introduction to High Voltage Experimental Techniques  
D. Kind—translated from German by Dr. Y. Narayana Rao,  
John Wiley, Eastern.
2. Electrotechnical Measurements, Stockl, Winterling - Translated from  
German by Dr. P. Sankaran and Dr. A. Chandrasekaran, Springer  
Verlag.

**Assistance to Industry**

During the period July 1979 to March 1980 a total number of 43 jobs under ICC had been undertaken by the Department with a turnover of Rs. 1,50,345.

### **Future Developments and Programmes**

Acquisition of Micro-processor-based systems which will enlarge the scope of R and D work in the design and operation of microprocessors and their application in diverse fields of Electrical Engineering.

Application of TV for instructional purposes.

## **HUMANITIES AND SOCIAL SCIENCES**

### **New Programmes Introduced**

Ph.D Research programmes in English and History

### **New courses introduced**

An evening one year certificate course in Russian.

Two voluntary courses(evening) Colloquial German for beginners and advanced students.

100 level- History of Science and Technology.

200 level-- Introduction to Psychology.

500 level-- Accounting for Managerial control,  
Financial analysis for Managerial decisions,  
Technical communication and report writing.

600 level--Computing and Problem solving.  
Operations Management.

700 level--Oral and written communication,  
Methodology of research and thesis writing.

800 level--Group Theory and Group Skills,  
Theory and practice of fiction,  
Indian Literature in English,  
Financial Decision Making.

### **New System/method added**

Introduction of tape recorded material in the German classes.



### Changes made in curriculum

M.Tech: Complete revision of M.Tech. (Industrial Engineering and Industrial Management) curriculum.

B.Tech: As part of revision of the B.Tech. curriculum the department is offering courses, as part of core programme, in Humanities and Social Sciences, and a large number of electives to cater to the students' career needs.

### Educational Programmes - continuing education programme

Short term/part time courses conducted

1. IIT / Madras Productivity Council certificate course in Industrial Management.
2. IIT/Madras Management Association certificate course in Manufacturing Management.
3. 2 week intensive course for IIT candidates taking Goethe Institute certificate course 'German as a foreign language'

### Quality improvement programme/UGC Teacher fellowship programme

	M.Tech.	M.S.	Ph.D.
Serving teachers programme			
No. on rolls in each of these courses	—	—	4

### Important Lectures/Seminars

Speaker	Title
1. Prof. Theo Pirker Free University, Berlin	Technological Change in Contemporary Germany.
2. Prof. Bernhard Glasser Free University, Berlin	Technology Transfer and Relocation of Industries.
3. Sri E. R. Krishnamurti Executive Director Madras Stock Exchange	Capital Markets
4. Sri S. L. Rao Director, Mettur Beardsell	Business Policy

Speaker	Title
5. Sri T. K. Rajamani Branch Manager Hindustan Lever, Madras	Market Research
6. Sri S. Sankaranarayanan Secretary, Ashok Leyland	Financial Institutions
7. Sri Ravi Menon Managing Director R. J. Consultants	Corporate Planning
8. Sri S. Ramachander Manager, Hindustan Thompson	Advertising.

### Research and Development

#### Research Publications

Papers - Total number published in Journals 10

#### Books Monographs

Title	Author	Publication year
Human Relations in Industry- Management by participation	Dr. V. Anantaraman	1980
East India Company and South Indian Economy	Dr. C. Ramachandran	1980

#### Departmental Projects

1. IIT/IRT sponsored project on 'Assessment of Transport Bus Drivers performance and application of Ergonomics to Driver work space design and training'.
2. 'A systems approach to integrated rural development - An economic experiment' - San Diego State University / USA / IIT Madras / IOB/ Government of Tamilnadu/Madras Fertilizers.

#### Additional Space/Lab. etc. provided

Language laboratory under process of completion.

### New Major Equipment added

Language tapes/Tape recorders/Studio quality Tape recorder presented by Federal Republic of Germany.

### Visitors to the Department

1. Mr. Georg Neumann, Director, DAAD, New Delhi
2. Dr. (Mrs) H. Bruckner, German Teacher, IISc, Bangalore
3. Prof. Theo Pirker, Free University, Berlin
4. Prof. Bernhard Glasser, Free University, Berlin
5. Dr. M.C. Madhavan, Visiting Professor from San Diego State University, USA.

### Invited Lectures delivered by staff

Lecture	Name of staff
Invited faculty 'Management development programmes' in Hindustan Aeronautics, Singareni Collieries, Computer Maintenance Corporation, Mettur Beardsell, Institute of Indian Foundry men.	Dr. V. Anantaraman
'Engineering Management,' REC, Trichy Institute of Indian Foundry men.	Prof. R. K. Gupta
'Financial Management' at IFMR at Nagarjuna University	Dr. L. V. L. N. Sarma
'English for Technicians' at CIPET, Refresher course for Polytechnic Teachers at TTTI	Mr. V. S. Kumar

Dr. A. V. Krishna Rao has been invited to serve as a judge by Sahitya Academy, Southern Region.

### Future development programme

QIP programme for English teachers in Engineering Colleges, June, 1980.

## MATHEMATICS

### New courses introduced

Three additional 800 level courses were introduced during the period under review.

### Quality Improvement Programme/UGC Teachers Fellowship Programme

Serving Teachers Programme	Ph.D
No. of Trainees so far	5
No. on rolls	5

### Important Lectures and Seminars

Apart from the weekly seminars and Ph.D seminars given by the Faculty members and Research Scholars of the Department, the following lectures were given by eminent Scientists.

Title	Speaker
1. Valence Properties of solution of a Differential Equation	Prof. V. Singh, Punjab University, Patiala
2. Atiyah Singer Index Theory	Prof. M.S. Raghunathan, TIFR, Bombay
3. Structure of solution of Navier-Stokes equation	Prof. N. E. Joshi, Dept. of Mathematics Nagpur University.
4. Modified Dirichlet Problem	Prof. R. D. Bhargava IIT, Bombay.
5. Weak Interaction Effects	Dr. S.K. Singh, Aligarh University.
6. A quantitative sensitivity analysis for mathematical models	Prof. Dr. E. Adams, Professor of Applied Mathematics. University of Karlsruhe.
7. Non-linear Parabolic equations of Burger's type and their application	Professor G. L. Sachdev, Professor of Applied Mathematics. II Sc, Bangalore.

**Research and Development****Research Publications**

Papers — Total number published in journals — 25

**Books/Monographs**

Title	Authors	Publication year
Probabilistic analysis of Redundant Systems	Dr. S. K. Srinivasan Dr. R. Subramanian	1979 Springer Verlag, West Germany
General Principles of Quantum Mechanics	Translation of an important work of Nobel Laurate W. Pauli, from German, co-authored by Dr. P. Achuthan	Jan. 1980 Springer Verlag, West Germany.

**Staff**

A few of the faculty members are serving on the Boards of Studies, Selection Committees and examining bodies of various Universities and technological institutions.

Some of the faculty members serve on the Boards of Referees of research papers to be published in reputed journals. A few faculty members review research papers for review journals like Mathematical Review, Michigan, USA, Zentralblatt, Berlin, Germany.

**Invited Lecturers delivered by the staff**

Lectures by faculty given during the year include the following :

Lecture	Name of staff
The role of inhomogeneous Magnetic Field in the Elementary particles and Astro-Physics Problems, at 18th Annual Conference of Matscience, Madras	Dr. P. Achuthan

Lecture	Name of Staff
In search of a complete invariant for Graphs, in the Symposium on Combinatorics and Graphic Theory held at ISI, Calcutta.	Prof. K. R. Parthasarathy
Lectures to the students of the National Productivity Council	Dr. R. Subramaniam and Prof. K. R. Parthasarathy

Dr. C. V. Raghava Rao presented a paper in National Seminar in computer application in Science and Technology, sponsored by the UGC and Electrical Engg. Dept. Annamalai University.

### **Journal of Mathematical and Physical Sciences**

The Journal of Mathematical and Physical Sciences, a research journal, international in character and published by this Department continues to attract good quality research papers and review articles. So far 13 volumes, 65 numbers and 8200 pages have been published. Under the mutual exchange of publication programme initiated by this Department as on date, we are receiving 68 international research journals from abroad thus saving a few thousands of dollars by way of foreign exchange in addition to the increase in the income to the Institute by way of subscriptions.

### **Future developmental programme**

1. Strengthening 800 level Ph.D. courses
2. Set up a small Basic Fluid Dynamics Laboratory attached to the Department with minimum facilities which can later be used by theoretical research workers of the Department in verifying their theoretical ideas experimentally.
3. Starting 5 year M.Sc. (after Higher Secondary) course with an intake of 15 students.

## **MECHANICAL ENGINEERING**

### **Course**

#### **New courses introduced**

ME 745 Oil Hydraulic and Pneumatic Systems and Circuits was introduced as an elective in III semester of M. Tech. programme in Fine Technics.

DIIT (Aircraft Production) — Reintroduced

New courses in B. Tech. (Naval Architecture)

ME 342 Pumps and Compressors; ME 409 Marine Power Plants

ME 509 Ship Machinery

Two new Electives are offered for the B. Tech (Mech) (Credit system)

ME 561 Steam Turbine and Accessories

ME 564 Fans, Blowers and Compressors and

ME 312 Applied Thermodynamics and Heat Engines for III/5 (Naval Architecture and Electrical Engineering).

#### Education Programmes—Continuing Education Programme

Short term Production Engineering courses for Process Engineers from HAL, BEML, Instrumentation Ltd., XV Course—18th Feb. to 25th April 1980—22 participants.

#### Quality Improvement Programme/UGC Teacher Fellowship Programme

No. trained: M.Tech. 34

No. on rolls: Ph.D. 18

Short term course conducted:

Materials in Engineering (2 weeks, Dec. 1979, 20 participants)

Combustion Science and Technology, Dec. 10—22, 1979—22 participants.

#### Lectures and Seminars

‘Electronic Teleprinter’ by Shri D. Devarajan, Hindustan Teleprinters Ltd.

‘Cavitation Inception and Related Scale Effects’ and ‘Aspects of Cavitation noise with Applications’ by Dr. V. M. Arakeri, Indian Institute of Science, Bangalore.

‘Cavitation and its Importance’ by Dr. N. S. Lakshmana Rao, Indian Institute of Science, Bangalore.

'Solar Energy Activities at the Thermodynamic and Heat Transfer Institute, Stuttgart University' by Prof. E. Hahne, Stuttgart University, W. Germany.

'Second Law Analysis of Combination Process,' by Prof. T. A. Brzustowski, Vice-President, Waterloo University, Canada during Dec. 12 - 14—1979

'Fluidised Bed Combustion' by Dr. V. R. Rama Prasad, Project Manager, BHEL, Madras.

## **Research and Development**

### **Research Publications**

- |                     |    |
|---------------------|----|
| a) Papers Published | 93 |
| b) Books/Monographs |    |

'Mechanical Handling' is under preparation by Prof. M. A. Parameswaran, Dr. Madhusudhana Rao and Sri K. Ramakoteswara Rao under U.G.C. Grant.

### **Patents**

One patent for surface ignition engine has been applied for. One patent on drive system of wire winding machine.

<b>Sponsored Research Schemes and Projects</b>	13
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<b>Departmental Projects</b>	42
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### **Assistance to Industry**

- i) Tool Maker's Microscope (NRDC project)
- ii) Calibration of flow meters for Heavy Vehicles Factory, Avadi, Madras.
- iii) Calibration of Temperature indicators
- iv) Determination of thermal conductivity of insulating and building materials.
- v) Design of heat exchanger for borne electronic equipment.
- vi) Setting up a pump testing Lab. at Coimbatore (Dept. of Industries and Commerce)
- vii) Design and development of a Bulb turbine for BHEL, Bhopal. 10 engines have been tested for ISI certificate.



- viii) Design of industrial equipment for HYVAC.
- ix) Design of Belt conveyors for M/s Prabhakar Products.
- x) Design of Jib crane for M/s HYVAC.
- xi) Calibration of slip gauge, measurements of surface finish values.
- xii) Design and fabrication of mobile vapour compression demonstration panels.
- xiii) Calibration work of Thermocouples for BHEL, New Delhi.
- xiv) Testing of solar collectors for M/s. Tungabhadra Steel Products Ltd. Tungabhadra, Karnataka State.
- xv) Built solar energy devices for A. C. College of Technology, Karaikudi and CSIR Laboratory, Trivandrum.

### **Indo-Germen Collaboration**

#### **List of projects**

Precision Glass Scales.

Heat transfer studies in Electrical Machines — (completed).

Utilisation of solar energy for cold storage of food products.

Centrifugal compressors.

#### **Staff who have joined as experts from Federal Republic of Germany**

Mr. D. Rosenfeldt, Institut Feinwerk and Regelungstechnik, Braunschweig

Prof. Dr. F. Pischinger from Technical University, Aachen.

Dipl. Ing. E. L. Schmidt, University of Stuttgart, Germany.

Prof. Dr.- Ing. E. Hahne, University of Stuttgart, West Germany.

Prof. H. Gallus, Institut for Jet Propulsion and Turbomachines. University of Aachen, West Germany

**Staff who have gone to Federal Republic of Germany**

Dr. M. P. Kothiyal

Dr. P Srinivasa Rao

Dr. V. Seshagiri Rao

Prof. D. Prithvi Raj

Prof. H. C. Radhakrishna

**Special honours/Distinctions conferred on the members of the staff**

Prof. Dr. M. C. Gupta has been re-elected as Director of International Solar Energy Society for a second term. He is a reviewer for Solar Energy Journal published by ISES. He has been invited to be a member of the Advisory Committee of the International Seminar on Solar Energy to be held at ICTP, Trieste, Italy in 1981.

Prof. Dr. R. Natarajan is a Member of the Editorial Board of the International Journal of Fuel.

**Additional space/laboratory etc. provided**

ME and MH Lab — 1470 m<sup>2</sup>

**List of new equipment added**

Shaping machine

One universal testing machine

Heterodyne analyser for Machine Tool Dynamic Studies

Single pan balance

Exciter unit

Metallurgical microscope

Heightmaster

Laser Doppler anemometer

Frequency analyser

Signal conditioner

Wireless data coupling system

Constant temperature bath (-20°C to 60°C)

LT 20 HMT Lathe

Power Saw.

#### **Equipment fabricated**

Back to back gear test rig

Serrated troughed vibratory conveyor

1 ton Solar Absorption Refrigeration System

Solar boosted heat pump system.

#### **Visitors to the Department**

Prof. Richard K. Pefley from the University of Santa Clara, USA under NSF Project

Dr. G. A. B. Edwards, Director, W. S. H. Taylor Engg. Developments, UK.

Dr. K. Subramaniam, Senior Research Engineer, Ford Motor Co., Dearborn, Michigan, USA.

Prof. T. A. Brzustowski, Vice President (Academic), University of Waterloo, Canada.

#### **Invited lectures delivered by the staff**

Lectures delivered at BHEL, R&D in January 1980

Speaker	Title
Dr. D. Prithvi Raj	Introduction to Aerodynamic measurements in Turbomachines
Dr. N. Venkatarayulu	Pressure, velocity, flow direction and mass flow measurements in Turbomachines.

Speaker	Title
Dr. M. Ravindran	Optical measurements in Turbomachines.
Mr. K. V. Chalapathi Rao	Temperature measurement.

Lectures delivered in the College of Engineering, Guindy in Nov-Dec, 1979

Dr. D. Prithvi Raj, Dr. B.S. Murthy, Dr. A. Ramamohana Rao, Dr. N. Venkatarayalu, Dr. V. Ganesan and Mr. K. Ramakoteswara Rao.

Lectures on Grabing cranes to Cement Research Institute trainees at Bangalore

'Cutting Tools' at IIT Kanpur by Prof. V. C. Venkatesh

'Metrology in Quality Assurance' — ATI Madras by Prof. V. Radhakrishnan  
Stress in Metal Cutting by Dr. N. Chandrasekaran at Technological University, Denmark and at University of Copiegn, France.

'Solar refrigeration' by Prof. M. V. Krishnamurthy at ISTE Winter School at Guindy.

'Selection of refrigeration Equipment for dairy' — by Dr. V. Seshagiri Rao at ISTE Winter School, Guindy.

'Precooling of food products and Freezing of food products,' by Dr. S Srinivasamurthy at ISTE Winter School, Guindy.

'Thermophysical properties of food products' by Dr. K. Badarinarayana at ISTE Winter School, Guindy.

'Solar Energy' at the International Centre for Theoretical Physics, Trieste, Italy, by Prof. M. C. Gupta.

#### Other Information

Dr. K. M. Seetharamu was at the University College of Swansea, University of Wales on a post-doctoral assignment for 13 months working on Finite Element Methods in collaboration with the world's premier group working on this numerical technique.

A research project on 'Optimal tube bundle configurations for thermal design of fluid bed steam generators' with a grant-in-aid of Rs. 7.3 lakhs from the Dept. of Science and Technology is in progress under the coordinatorship of Mr. Vijay R. Raghavan.

Dr. K. N. Seetharamu chaired a session at the International Conference on Numerical methods in Thermal problems at Swansea, U.K. July 2—6, 1979. Two papers were presented at this conference by Dr. K. N. Seetharamu and Mr. Vijay R. Raghavan.

Dr. A. Ramohana Rao, chaired a symposium on Transmission Elements Organisation, Indian Institute of Plant Engineers, Madras—Oct. 1979.

Dr. V. C. Venkatesh attended CIRP conference at Davos, Switzerland, and also UNESCO Conference at Paris.

### **Future developmental programmes**

Development of a scanner for TV pictures.

Fluidized bed operations, Solar drying, Thermal Energy storage.

Heat transfer in rotating electrical machines.

Boiling heat transfer and two phase flow.

Applications of finite element methods to heat transfer problems.

Reversible machines for tidal power plants.

Multiple nozzle jet pumps.

Disc type friction pumps for slurry pumping.

Development of surface ignition alcohol engines.

Spark ignited gobar gas engines.

Research work in the areas of special mechanisms.

Sintered materials, vibration studies of ship hulls, metal spray, stress analysis, contact fatigue and optimisation of gears and other machine elements to be intensified.

A DST project 'Application of indigeneous materials in gear manufacture' has been proposed.

Recently a project on 'Pneumatic Conveyance of powders at high concentrations' has been taken up under the Dept. of Science and Technology which runs for three years and which will be developed as one of the main field of research.

Some new courses under credit system are being offered to undergraduate students at different levels. Vibratory conveying of solids in serrated troughs has been taken up for research and the system is being registered as a patent.

Specialized research in the field of metal cutting, new cutting tool machines, grinding, unconventional machining, surface integrity stress measuring unit, gear tribology, machine tool slides, in-process dimensional inspections and development of metrological instruments are proposed.

A thorough change in the curriculum for the M. Tech. (Mech., R and AC elective) is proposed.

Emphasis on research work on energy conservation and utilisation of solar energy is envisaged.

Research and development work in the area of combustion kinetics, turbulent combustion, automotive pollution, heterogeneous combustion, acoustic burner, combustion in swirling flow, solar cooling and system analysis of solar heating devices.

## **METALLURGY**

### **Educational Programme**

#### **Continuing Education Programme**

1. Advanced course on 'Welding Technology' from 7th to 11th September 1979 under the sponsorship of the Industrial Metallurgy Division, Indian Institute of Metals.  
Coordinator Dr. D. R. G. Achar
2. 'Industrial Applications of X-ray Diffraction' from 12th to 16th October 1979, under the sponsorship of the Industrial Metallurgy Division, Indian Institute of Metals.  
Coordinator Prof. R. Vasudevan.

### **Quality Improvement Programme**

Serving Teachers Programme - Ph.D - 2

### **Important Seminars/Courses Organised**

A two-day seminar on "Role of Metallurgy in Power Plants" was organised on 28th and 29th February 1980 in collaboration with the Reactor Research Centre,

Kalpakkam, under the sponsorship of the Industrial Metallurgy Division, Indian Institute of Metals.

A short term course on Moulding Materials and Processes sponsored by M/s Ennore Foundries Ltd. Madras was conducted by the Department from 15 to 18, Oct. 1979, under Continuing Education Programme.

### Lectures

Dr. H. W. Gudenau, Head of Process Metallurgy Division, Technical University, Aachen, West Germany, delivered a series of lectures on Process Ferrous Metallurgy.

Dr.M. Viswanathan, Technical Manager, Indian Copper Information Centre, Calcutta, delivered 4 lectures on "Fundamental Aspects of Electrometallurgy and Corrosion".

Dr. Guenther Toelg, Max Plank Institute fur Metallforschung, West Germany, delivered a special lecture on 'Analytical Characterisation of High Purity Materials' on 22—11—1979.

Prof. Zuern, Head of the Dept. of Applied Technology and Industrial Consultancy Services, and Welding Technology, Messer Grissheim Ltd. in Hoeschst Chemical Group, Frankfurt, Federal Republic of Germany delivered a series of lectures on Applications of Welding Technology.

### Research and Development activities

#### Research Publications

Papers 35

Department projects 6

#### Assistance to Industry

The Department continued, as usual, to maintain good liaison with industries and assisted them on technological matters.

Know-how on the following processes/instruments developed by Prof H. Md. Roshan, Prof. E. G. Ramachandran, Sri V. Jagasivamani and Sri K. V. Reddy have been taken up by the industry:

1. Thin walled aluminium castings for wall panels.
2. Thermocole Cutter.
3. Surface Pyrometer.

**Additional space/Laboratory added**

Magnesium Foundry - 100 sq. m.

**Major equipments added**

100 kg melting capacity Electric Arc Furnace.

**Fabricated**

1. "High velocity gravity drop hammer" - designed, fabricated and installed by Dr. S. M. Doraivelu and Dr. V. Gopinathan.
2. "Capacitance gauge to measure ram travel at high strain rates" designed and fabricated by Sri V. Jagasivamani and Dr. S. M. Doraivelu.

Dr. K. A. Padmanabhan joined the Department as a Professor from the Department of Metallurgical Engineering, Banaras Hindu University, Varanasi.

Dr. D.R.G. Achar visited the Technical University, Braunschweig and other research institutes in the field of welding Technology in the Federal Republic of Germany under the DAAD reinvitation programme. During his visit, he delivered special lectures on "Welding and Cladding of Dissimilar Metals" at the Technical University, Braunschweig and at Messer Griesheim GmbH, Frankfurt.

**Invited lectures delivered by the staff**

- |                        |  |
|------------------------|--|
| Prof. K.A. Padmanabhan | 'Deformation characteristics of some dilute two phase aluminium alloys' at the Reactor Research Centre, Kalpakkam on 7-2-80. |
| Dr. D.R.G. Achar       | "Weldability of Incolloys" Reactor Research Centre, Kalpakkam on 7-2-80.   |
| Dr. D.R.G. Achar       | "Recent trends in welding research and development in West Germany", Indian Institute of Welding, Madras Branch on 22-2-80.  |

In addition to the above, special lectures on various topics were delivered by the staff members to Guindy Engineering College, Madras, Regional Engineering College, Trichy and to the courses like HAL-Process planners, NAL-BEML Management courses organised by other departments of the Institute.



### Other information

1. Dr. V. Gopinathan has taken up research position at the Max-Planck Institute, West Germany for a period of one year.
2. Dr. K. J. L. Iyer returned to the Department in January 1980 after his research assignment at Atlantic Regional Laboratory, National Research Council, Halifax, Canada, for a period of one year.
3. Dr. D.R.G. Achar, on invitation, visited the Underwater Welding Centre at the Cranfield Institute of Technology, U.K. and delivered a special lecture on Welding and Cladding of dissimilar metals.

### Developmental Programme

1. Development of casting processes
2. Development of foundry equipment
3. Electron and laser beam welding/cutting facilities
4. Weld simulation studies
5. Development of underwater welding technology.

## PHYSICS

### New Courses introduced for the M.Sc., and Ph.D. students

Credit system in M.Sc., is introduced with a set of core courses which are compulsory for all students and some optional courses.

Dye lasers 800 level

### Conferences held

'Nuclear Physics and Solid State Physics' Symposium held during December 1979 organised by D. A. E. and IIT jointly.

About 500 scientists participated and presented over 600 papers from all over the country.

International Symposium on Solid State Spectroscopy was held during April 1980. About 50 participants attended from all over the world.

#### **New Projects :**

- |  |   |
|--|---|
| 1. Preparation and investigation of magnetic materials of technical interest.                      | Dr. K. V. S. Rama Rao<br>Dr. C. Ramasastry<br>Prof. Dr. Weiss |
| 2. Design and construction of cryogenic equipment like centrifugal pumps etc.                      | Prof. R. Srinivasan<br>Prof. Dr. Klipping                     |
| 3. N. M. R. studies in Ordered Magnetic Alloys   | Dr. K. V. S. Rama Rao   |
| 4. Development of new supersonic materials and the study of their defect properties                | Dr. B.V.R. Chowdhury  |
| 5. Development of Optical Modulator  | Dr. S. Radhakrishna<br>&<br>Dr. B. V. R. Chowdhury            |
| 6. Studies of adsorption and desorption under conditions of ultra high vacuum and low temperatures | Dr. G. Rangarajan   |

#### **Participation in International Conferences**

Dr. A. V. Narasimham returned after spending a year at various institutions in Europe and USA.

**Important Lectures and Seminars**

Title	Speaker
1. Basic Research on Materials Failure Processes	Dr. Pooley, U.K.
2. Applied Semiconductor Physics	Prof. Dr.-Ing. Claus Reuber West Germany
3. Spin Echo Double Resonance	Dr. N. Weiden, West Germany
4. Total Solar Eclipse	Dr. Klaus John, USA & Dr. Franz Rathmann, USA
5. X-ray Crystallography of Macro-Molecules	Dr. G. Kartha, USA

**Research and Development**

## Research Publications

Total number of papers published 50

Number of Ph.D. during the year 5

**CENTRAL LIBRARY**

The significant activities of the different divisions of the Central Library during the period July 1979 to March 1980 are as follows :

**Administration, Reprography and Binding (ARB) Division**

The following staff members have undergone or gone for further studies.

- |                                   |                                      |
|-----------------------------------|--------------------------------------|
| 1. Sri S. Venkatasubramanian, UDC | Certificate course in Librarianship. |
| 2. Sri K. Sankaran, STA           | M.L.I.S.                             |
| 3. Sri C. R. Sekar, L.A.          | B.L.I.S.                             |
| 4. Sri P. M. Krishnamurthy        | Certificate Lib. Sc.,                |
| 5. Mrs Rekha Asthana              | -do-                                 |

Sri P. Venkatesan, Assistant Librarian, attended a one-day seminar on Procurement and Inventory Management for Decision Makers held at IIT Madras on 8-3-1980.

Sri P. N. Swamy, Technical Assistant (Reprography) attended a two-day seminar on 'Phototype Setting for Books and Commercial Printing' held at Madras on 7-8th March 1980.

Sri C. Deenadayalu, Deputy Librarian and Kum. T. A. Rama, Technical Assistant (Programmer) attended a symposium on Professional and Consumer Electronics held at Madras on 17-3-1980. Sri Deenadayalu presented two papers in the symposium.

The Reprographic Services continued to be made available to all the members of the Institute as well as outside organisations.

#### **Circulation Reference and Maintenance (CRM) Division**

The borrowing facilities to the Research Scholars, P. G. students and other technical staff have been considerably enhanced by increasing the number of tickets issued to them. Likewise the number of tickets to the undergraduate students and administrative staff have also been increased during the year under review. This is greatly helping them to make greater use of the Library.

As the Library building has reached its optimum capacity it was decided to transfer the less used publications to different departments. This work of segregation of less used publications is under progress.

#### **Acquisition and Processing (A & P) Division**

During the current year the output of the Acquisition and Processing Division increased. Procurement of books was intensified and as a result of this and increase in cost of publications the expenditure increased upto 33% over that of the last year.

A CARD - 0 - PRINT Machine for duplicating catalogue cards has been procured.

#### **Periodical and Documentation (P&D) Division**

The issue of Library Documentation Notes which had been revived last year in a modified manner continued to be made available to the Scientific and Technical staff of our Institute as well as other outside organisations on nominal payment.

The Library arranged for subscription of about 87 titles by accelerated surface Post. 50 new titles were added to the already 1150 titles subscribed in the past. The translation service also continued to cater to both the Library's internal as well as external members.

### Statistics on other Library Activities

#### Library Membership

(1) Institute members (staff and students)	5,929
(2) Outside members ... Individual	10
Corporate	30
(3) Consultation permits	180

#### Circulation

(1) No. of Readers Visited	79,694
(2) No. of volumes issued	86,902
(3) No. of Reservations for books a) Registered	6,614
b) Fulfilled	3,629
(4) Amount of overdue and other charges realised	Rs. 25,978
(5) Inter Library loans :	
Borrowed for Inst. members	78
Lent out from Instt. Library	76

#### Acquisition

Books and Bound vols. of periodicals	7,527
Pamphlets and reports	1,859
Microfilms and microfiches	88
Ph.D theses	57
Total intake during the year	9,531
Total accessions upto March 1980	1,76,790

**Current periodicals**

By subscription	1,150
From Technical University, Berlin (under aid)	62
By exchange/Gift	160
Library Documentation Notes	
Recipients ... Internal	104
External	17
Translations arranged	12

**Reprographic Service**

Microfilms made	589 frames
Photocopies made	1213 pages
Korestat copies made	5053 pages
Gevafax copies	57706 pages

**Publications printed**

1. Final reports on Joint Research Projects (Phase I) under IV Indo-German agreement
2.                                -do-                                Phase II
3. IIT Madras Act and Statutes, 1979
4. A Glance at Central Library of IIT Madras
5. Narayanapuram Report
6. Report on Soil investigation for 4 × 120 MV Tripoli West Power station extension for Soil Energy Laboratory.

**Binding**

1. No. of books and journals bound from the Library	479
2. No. of publications (reports, lecture notes etc) bound for the departments	526

3. No. of stationery forms and registers bound	1,539
4. No. of back volumes of journals bound through external binders	2,963

## CENTRAL WORKSHOP

### Outstanding jobs done in the Central Workshop

1. Spur gears for electronic surface measuring instrument of styles type	—Metrology Laboratory Mechanical Engg. Dept.
2. Crystal holder for a modulator	—Laser Laboratory Electrical Engg. Dept
3. Machining of Hydrostatic slide-way bed and sliding guides	—Applied Mechanics - D.S.T. Project
4. Grinding of Thoriated Tungsten Electrodes	—Department of Atomic Energy, Kalpakkam
5. Calibration of special pressure gauges	—National Environmental Engineering Research Institute, Madras
6. Bevel gears cutting	—C.V.R.D.E., Avadi
7. Spur gears for track recording	—R.D. & S. O., Ministry of Railways, Hyderabad.
8. Differential pressure monometer primary Work orders completed during 1979-80	—Electrical Engineering Department —1374

## INSTITUTE HOSPITAL

The Institute Hospital is a 30 bedded Hospital serving a Campus population of nearly 10,000 (students and staff) and a daily average of about 300 out-patients.

Dr. P. Venugopalan, M.S. has joined as Surgeon Specialist & Medical Officer-in-Charge of Institute Hospital on 7-3-1980.

Dr. M. S. Prakas, M.S., F.I.C.S. (who was the Medical Officer-in-Charge) has been relieved of his duties with effect from 31-1-1980.

Dr. AL. Annamalai, FRCP, FICA, FCCP, D.T.M. & H and Dr. P.M. Palani, M.D. were the Part-time Physicians and both have been relieved of their duties with effect from 31-1-1980.

Dr. P.M. Palani, M.D. has rejoined this Institute as Part-Time Consulting Physician on 1-3-1980.

Dr. T. Ramadass, B.Sc., M.S., F.I.C.S., D.L.O. is continuing as Part-Time E.N.T. Surgeon at the Institute Hospital.

The following Medical Officers have been continuing their services at the Institute Hospital in their respective lines:-

- |  |   |
|--|---|
| 1. Dr. Sumati Khangaonkar, M.B.B.S., D.A.              | — Anaesthetist                                  |
| 2. Dr. Lalitha Kumari, M.B.B.S., D.G.O.                | — Lady Medical Officer                          |
| 3. Dr. Radha Rajagopalan, M.B.B.S., A.B.,<br>PED (USA) | — Paediatrician                                 |
| 4. Dr. T.P. Alaganantham, M.B.B.S.                     | — Medical Officer,<br>assisting the Surgeons    |
| 5. Dr. N.A. Jayavelan, M.B.B.S.                        | — Medical Officer<br>assisting the<br>Physician |

Plans for an X-Ray plant and a Bio-Chemistry Laboratory have been submitted.

Schemes and Plans for a Surgical and Gynaecological Theatre with Post-Operative beds for men, women and children and an Intensive Care Unit have been submitted.

Schemes for additional-para-medical and medical staff in proportion to this Hospital have been submitted.

The Institute Hospital works on a 24 hour basis on all days of the year and gives efficient medical, surgical (including ENT), Gynaecological and Paediatric medicare to the campus.



With effect from 1—3—1980, the Institute Hospital functions as stated below :-

Week Days	FN — 8-30 to 11-30 a.m.
	AN — 4-00 to 7-30 p.m.
Saturdays, Sundays and other Institute Closed Holidays :	8-30 to 11-30 a.m.

### Statistics

#### From April 1979 to March 1980

I	Total number of out-patients	—	1,01,312
II	Total number of In-Patients	—	985
III	Emergencies attended	—	1,707
IV	Dressing	—	10,951
V	Injections	—	34,042
VI	Operation :		
	a) Major	—	3
	b) Minor	—	52
	c) E.N.T.	—	37
	d) Gynaecological	—	12

### PLACEMENT OFFICE

During the year under review nearly 165 companies/establishments from public and private sectors contacted the placement office. Representatives from 80 companies visited this office and conducted campus-interviews.

To facilitate quick placement, this office continues to keep in touch with such industries and organisations as may require technically qualified personnel and furnishes them with information about the courses offered and specialisations available in IIT Madras. Since the Institute has on its rolls students from foreign countries also, placement office sponsors these students to employment organisations in their home countries.

In addition, this office handles applications from students of undergraduate and postgraduate courses for practical training during the summer vacation. While enabling the students to acquire practical experience, the training also serves to help the industries in making use of their services and assessing their potential.

The placement office also looks after the work pertaining to the Alumni Association of the Institute.

## INSTITUTE GYMKHANA

### Sports

This year the Institute Gymkhana functioned with a well defined provision of finance for its activities.

Our Institute teams participated in the Madras Collegiate Athletic Association, Inter Collegiate League competitions in various games such as Hockey, Foot Ball, Volley Ball, Tennis, Ball Badminton, Basket Ball and Cricket. Many of the teams were winners in the zonal matches. The Basket Ball, Volley Ball, Ball Badminton and Hockey teams also participated in Open Tournaments such as Bertram Memorial Tournament conducted by Loyola College and the Stanley Medical Sports Festival. A major achievement was our Basket Ball team winning the Championship trophy in the Inter Engineering College meet held at Annamalai University. The crowning success of our sports activity lies in our winning the General Championship of the 16th Inter IIT Meet for the 9th year in succession. This was held at IIT Delhi in Dec. 1979. We also won the General Athletic Championship. A noteworthy feature was our lifting the gold for weight lifting after a long time apart from other games such as Tennis, Volley Ball and Table Tennis.

This year, interest in Rowing was revived and our team participated in the Inter University meet held at Madras for the first time and acquitted itself well. Our Ball Badminton team also participated in the Inter University Tournament held at Madras.

Our Bridge team competed in many open tournaments and we won the Kakinada Gold Cup in an open Bridge competition held at Kakinada in December 1979.

A noteworthy mention is about our Chess player Sri M. Ramesh who participated in the 18th World Junior Chess Championship (under 20 years) held at Skien, Norway. He was placed 47th with 5 1/2 points. He also won the II prize in the 2-day YARL cup International tournament held at GAUSDANL. This was 10 nation, 40 player, 7 round Swiss League tournament. He also finished

8th in the SKEI Grand Prix which was a 9-round Swiss League, finishing with 6 points. In the III Asian Junior Chess Championship 1979 held at Sivakasi in the month of Dec. he finished 7th.

The Gymkhana conducted as usual, a flood lit Basket Ball tournament in the OAT. The tournaments were for the Gerhard Fischer Cup and the Kokila Rajiah Trophy, the former being for men and the latter for women. There were a large number of participants for both the tournaments and all the nights the OAT was jam packed with enthusiastic spectators. On the opening day of the tournament an exhibition match was arranged between the State Bank of India team and the Indian Overseas Bank team. Both the teams were packed with state and national level players. The spectators very much enjoyed this exhibition match. The Gerhard Fischer cup was won again by Loyola and IIT Madras were the runner-up. The Stella Maris college, Madras annexed the Kokila Rajiah Trophy from the previous year's holders, QMC Madras.

The Swimming Pool as usual attracted a large number of enthusiastic swimmers as well as upcoming champions.

With the help of the Madras Riding Club many of our students are able to take to horse riding at a very nominal cost. Interest in this sport amongst students is on the increase.

### **Cultural and literary activities**

Our students have won a large number of prizes and awards in competitions both in the city of Madras, and elsewhere in the country, in cultural festivals. They have won the overall championship in Festember conducted by REC, Trichy (for the second time in succession), Mood Indigo organised by IIT Bombay and in Techofest conducted by PAUT, Madras. Our Students have won several prizes in Inter Collegiate Debates, Indian Classical and Light Music, Western music, Fine Arts, and other literary and cultural events.

Our Institute organized the Annual Cultural Festival Mardigras from January 23 - 27, 1980. Twentytwo Colleges participated in the several Literary, Music and Fine Arts Competitions. The standard of performance in several events was pronounced by the Judges to be bordering on the professional.

## **NATIONAL CADET CORPS**

This Unit imparts general service training and training in Aeronautical Engineering subjects to Cadets who are students of the Institute.

## **Enrolment**

Training in the Air Wing NCC is spread over three academic years, i.e. six semesters. The students who join the NCC are required to complete training for a minimum of four semesters. The authorised strength of Cadets is 200, who are equally divided into two flights.

During the academic year 1979 - 80, 104 students of First Year B. Tech. class were enrolled in NCC. The total strength of the Cadets was 200 at the beginning of the training session.

## **Training**

Keeping the aims of NCC in view, training was imparted to the Cadets in accordance with the revised syllabus for Technical Air Squadrons issued by the Director General NCC. As part of the curriculum, basic and advanced Military training was also imparted. As part of the technical training specialised subjects covered the two Technical branches of the Air Force Viz. Aeronautical Engineering (Mechanical) and Aeronautical Engineering (Electronics). Qualified Air Force instructors as well as NCC part time Officers imparted the necessary technical and Service training.

Training in Gliding was imparted to senior Cadets at Air Force station, Tambaram. Aeromodelling training was conducted by a qualified Aeromodelling instructor. A large number of cadets showed keen interest in Aeromodelling. Firing practice in the skeet range using clay, pigeon trap and revolver shooting were also carried out.

## **Camp Training**

This year, in December/January 1979-80, Annual Training Camp was not conducted due to some administrative problems and the same was postponed to July 1980.

Two cadets and one part time NCC officer, FLT. Lt. V. SUBRAMANIAM attended Air Force attachment camp at No. 3 Base Repair Depot, Air Force Chandigarh, from 18 June 79 to 14 July 79. They were given training in the various aspects of maintenance/overhaul of Military Aircraft and their components. Their stay with the Air Force Personnel has also given them an insight into the way of living under varying conditions of the Air Force Personnel.

## **Ceremonial Parades**

The cadets of this unit participated in a guard of honour presented to the Member, Planning Commission, Shri V.G. Rajadhayaksha on 20th Sept 1979 on the occasion of the 16th Convocation of the Institute.

### **Promise Day Parade**

The NCC promise is administered to all the cadets on the Promise Day Parade held every year during the Independence day week in the month of August. Prof. P. V. Indiresan took the salute during the Promise Day Parade held on 16 August 79. He also administered the promise to all the cadets. 'B' and 'C' certificates and various other camps and courses certificates were awarded to the successful cadets during the training year 1979—80.

### **Social Service and Blood Donation**

One part time officer and 23 cadets of this unit donated blood to the Red Cross Society of India, Madras in the month of August and September 1979.

### **Weaker section of students and foreign students**

During the year under report special attention was given for the general progress of the weaker section students in their academic work and other activities. The book-bank was further developed. Part-time job facilities have been provided to some of the needy students. Steps have been taken towards their proper placement after successful completion of the courses.

Number of students : 181

During the year under report the foreign students have been guided to meet and solve their problems successfully. Their progress in academic as well as extra-curricular work has been good.

Number of students : 88

## **HOSTELS**

All the students and Research Scholars of this Institute are expected to reside in the Hostels of the Institute. There are 10 Men's Hostels and one Women's Hostel. About 200 students reside in a Men's Hostel and about 75 in Women's Hostel. One more Men's hostel and an extension to the Women's Hostel are under construction. The Hostels are named after the rivers.

All the Hostel affairs are managed by the HOSTEL MANAGEMENT consisting of a Chairman (appointed by the Director), Registrar, Dean of Students, Wardens and student representatives.

Each hostel is administered by a Warden appointed by the Director from among the faculty members of the Institute. He is assisted by an Assistant Warden,

resident in the Hostel. Each hostel has a Hostel Council consisting of the Warden as Chairman, Assistant Warden and Student Secretaries as members. The internal matters and activities of each hostel are looked after by its Hostel Council.

The Wardens of all hostels form the Wardens' Council with a Chairman appointed by the Director. The Chairman, Council of Wardens is also the Chairman of the Hostel Management. Students are involved in all Hostel affairs. A certain measure of self-governing, decision making and problem-solving is involved in the hostel administration at the Institute. This aspect of the Institute hostel life promotes the students sense of responsibility and sensitive self-awareness.

As the Institute is a residential one, the students have several opportunities to come into contact with the teaching staff of the Institute. The atmosphere in the hostels is conducive to the growth of a cosmopolitan outlook. Owing to the national character of the Institute and its hostels, the students develop integrated personalities over a period of harmonious living in the Hostels.

#### **Central Supplies Unit**

In an attempt to effect economy and increase the efficiency in the procurement of bulk items for use in the hostels, a separate Central Supplies Unit has been organised under the supervision of a separate Warden assisted by a resident Assistant Warden. The policy matters of this Unit are decided by a governing Council consisting of Chairman, Hostel Management, Warden of Central Supplies Unit, Registrar, Wardens of all Hostels Resident member and student representatives. This Unit also undertakes the supply of milk to the hostels and campus people residing in the Staff Quarters.

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# NAMES OF FACULTY MEMBERS, DEPARTMENT - WISE

## AERONAUTICAL ENGINEERING

### Professors

Dr. K.A.V. Pandalai	Dr. K.A. Domodaran
„ A.K. Srikanth	Prof. K. Balaraman
„ T.K. Bose	„ C.S. Ballal
„ N.R. Rajappa	

### Assistant Professors

Dr. R.M. Siddaveera Gowda	Dr. S. Krishnan
„ G. Subramanian	„ P. Venkateswarlu
„ T.K. Varadan	

### Lecturers

Sri E.G. Tulapurkara	Sri S. Santha Kumar
„ A. Krishnan	„ S.C. Rajan

## APPLIED MECHANICS

### Professors

Dr. N.V. Chandrasekharaswamy	Dr. V. Ramamurthi
„ B.V. Aswathanarayana Rao	„ P.S. Srinivasan
„ R.S. Alwar	

### Assistant Professors

Dr. R.S. Srinivasan	Dr. Megha Singh
„ K. Motiram Patil	„ V. Ramjee
„ T.M. Srinivasan	„ B.H. Lakshmana Gowda
„ S. Venkatesan	„ B. Srinivasa Prabhu
„ M. Balakrishnan	„ N.Ganesan

**Lecturers**

Sri P. Krishna Iyer	Sri S. Radhakrishnan
Dr. P.A. Aswathanarayana	„ G. Venkata Rao
„ J. Ramachandran	„ J. Lakshminarasimhan
„ S. Narayanan	„ G. Bapaiah

**Scientific Officer Grade I**

Sri C.R. Subramanian

**Lecturer Grade II**

Sri G. Thomas

**CHEMICAL ENGINEERING****Professors**

Dr. D. Venkateswarlu	Dr. P.R. Krishnaswamy
„ T. Gopichand	„ M. Ramanujam
„ M. Satyanarayana	„ N. Subramanian
„ Y.B.G. Varma	

**Assistant Professors**

Dr. K. Remananda Rao	Dr. Ch. Durgaprasada Rao
„ T. Venkatram	„ R. Subramaniam
„ N. M. Raghavendra	„ A. Baradarajan
„ G. S. Davies	„ N. S. Srinivas
„ M. S. Ananth	„ S. Subba Rao
„ A. Prabhakara Rao	

**Lecturers**

Dr. R. Vedaraman	Dr. V. Srirama Chandra Rao
„ C. Chandraprasad	Sri D. V. Seetharama Murthy
„ T. K. Ramanujam	



**CHEMISTRY****Professors**

Dr. J. C. Kuriacose	Dr. P. T. Manoharan
„ V. Srinivasan	„ C. Kalidas
„ G. Aravamudan	„ S. R. Ramadas
„ C. N. Pillai	

**Assistant Professors**

Dr. V. Ramakrishnan	Dr. R. Narayan
„ J. Rajaram	„ M. S. Gopinathan
„ C. S. Swamy	„ M. Srinivasan
„ V. Mahadeva Iyer	„ K. K. Balasubramanian
„ K. Narayanan	„ B. Viswanathan
„ T. V. Ramakrishna	„ V.R. Satyanarayana Rao
„ M. Ramakrishna Udupa	

**Lecturers**

Dr. D. V. Ramana	Dr. S. Vancheesan
„ R. Ramaswamy	„ T. K. Varadarajan
„ C. S. Venkatachalam	„ N. Balasubramanian
„ C. R. Krishnamurthy	

**Lecturer - Grade II**

Sri N. Sundaram	Sri M. S. Subramanian
„ T. Subramanian	

**Senior Scientific Officer Grade II**

Dr. R. P. Viswanath

## CIVIL ENGINEERING

## Professors

Dr. K. S. Sankaran	Dr. L. N. Ramamurthy
„ P. Srinivasa Rao	„ C. S. Krishnamurthi
„ D. Johnson Victor	„ R. Radhakrishnan
„ H. Raman	„ T. P. Ganesan

## Assistant Professors

Sri R. L. Roy Choudhury	Dr. K. Elango
Dr. Nainan P. Kurian	„ B. Ramanathan
„ V. Paramasivam	„ P. Sambandam
„ H. Achyutha	„ H. Suresh Rao
„ P. Kalyanasundaram	„ Y. R. Nagaraja
„ N. Rajagopalan	„ P. K. Aravindan

## Lecturers

Sri V. D. Muthayya	Dr. Md. Mohideen
„ K. N. Ramamurthy	„ V. Dakshinamurthy
„ D. Hariharan	„ S. Dakshinamurthy
Dr. V. R. Rangaraju	„ B. S. Thandeeswara
„ N. R. Krishnaswamy	„ S. Narasimha Rao
Sri M. S. Mathew	Sri D. Raja Rao
„ K. Gopalakrishnan	

## Lecturers Grade II

Sri S. Meenakshisundaram	Sri A. Ramachandraiah
„ V. G. Idichandy	

## ELECTRICAL ENGINEERING

## Professors

Dr. P. Venkata Rao	Dr. B. Ramaswami
„ M. Venugopal	„ V. Seshadri

„ V. G. K. Murti  
 „ M. K. Achuthan  
 „ K. P. Rajappan  
 „ D. K. Banerjee

„ A. Kuppurajulu  
 „ Y. Narayana Rao  
 „ J. P. Raina

#### Assistant Professors

Dr. C. Dattatreyan  
 „ V. V. Sastry  
 „ M. Mukunda Rao  
 „ V. V. Bapeswara Rao  
 „ P. Sankaran  
 „ G. Sridhara Rao  
 „ Vedam Subramanian  
 „ A. Chandrasekaran  
 „ C. Eswaran  
 „ R. Parthasarathy  
 „ M. V. Chalapathy Rao  
 „ R. Parimelazagan

Dr. P. Subbarami Reddy  
 „ C. Narayana Reddy  
 „ T. A. Ramalinga Bhat  
 „ K. Radhakrishna Rao  
 „ T. J. Vitto  
 „ J. P. Agarwal  
 „ S. Srinivasan  
 „ M. Antony Reddy  
 „ S.S. Yegnanarayanan  
 „ V.C.V. Pratapa Reddy  
 „ V. Venkata Rao

#### Lecturers

Sri Varadarajan Subramaniam  
 Dr. B.S. Bhanumurthy  
 Sri M. Krishnamurthy  
 Sri P.C. Majhee  
 „ G.T. Manohar

Sri K. Palaniswamy  
 Dr. P.A. Janakiraman  
 Sri. S. Yuvarajan  
 Dr. C. Venkataseshiah  
 „ P. Sashidhara Rao  
 Sri G. Govardhagiri Rao

#### Senior Design Engineers

Sri S. Raman

Sri P. Ramaseshagiri Rao

## HUMANITIES AND SOCIAL SCIENCES

**Professors**

Prof. R.K. Gupta  
Dr. S. Ramani

Dr. V. Anantaraman

**Assistant Professors**

Dr. A.V. Krishna Rao  
Sri V.S.N. Sarma  
Dr. L.V.L.N. Sarma  
Sri V. Arumugam

Sri E. Unnikrishnan  
Dr. R. Rajagopalan  
Dr. (Mrs.) V. Hamsalcelavathy  
Dr. (Mrs.) Sakunthala Balaraman

**Lecturers**

Sri V.S. Kumar  
Sri S.B. Dias  
Dr. C. Ramachandran  
Sri V. Jayasankar

Sri Krishnakumar Menon  
Sri T.T. Narendran  
Mrs. Elizabeth Nainan Kurian  
Sri Durgaprasada Rao

## MATHEMATICS

Dr. S.D. Nigam  
,, S.K. Srinivasan  
,, H.S. Paul

Dr. L.V.K.V. Sarma  
,, K.M. Das  
,, K.R. Parthasarathy

**Asst. Professor**

Dr. R. Subramanian  
,, V. Subba Rao  
,, D.S. Subramanyan  
,, Y. Nagendra  
,, A. Avudainayagam

Dr. T.S. Sankara  
,, U.N. Srivastava  
,, P. Achuthan  
,, P. Bhattacharya  
,, C.M. Purushotham  
,, (Mrs.) S. Kalpakam

**Lecturers**

- |                       |                        |
|-----------------------|------------------------|
| Dr C. V. Raghava Rao  | Dr. P. R. Parthasarthy |
| „ S. N. Venkatarangam | „ Surendranath Majhi   |

**Senior Scientific Officer Grade II**

Dr. K. Swaminathan

**MECHANICAL ENGINEERING****Professors**

- |                        |                        |
|------------------------|------------------------|
| Dr. B. S. Murthy       | Dr. H. C. Radhakrishna |
| „ M. C. Gupta          | „ D. Prithviraj        |
| „ V. C. Venkatesh      | „ G. V. N. Rayudu      |
| „ M. A. Parameswaran   | „ V. Radhakrishnan     |
| „ V. M. Krishna Sastry | „ H. Chandrasekaran    |
| „ M. V. Krishnamurthy  | „ R. Natarajan         |

**Assistant Professors**

- |                        |                      |
|------------------------|----------------------|
| Dr. K. Lakshminarayana | Dr. V. Sriramulu     |
| „ K. A. Bhaskaran      | „ K. N. Seetharamu   |
| „ A. Ramamohana Rao    | „ G. Gopalakrishnan  |
| „ K. V. Gopalakrishnan | „ R. Raman           |
| „ P. K. Philip         | „ M. Venkatarayelu   |
| „ T. Rajagopalan       | „ M. Ravindran       |
| „ V. Ganesan           | „ S. Srinivasamurthy |
| „ M. P. Kothiyal       | „ P. Srinivasa Rao   |
| „ M. Madhusudhana Rao  | „ R. Krishnamurthy   |
| „ V. Seshagiri Rao     |                      |

**Lecturers**

- |                        |                      |
|------------------------|----------------------|
| Sri K. S. Padiyar      | Sri K. Narayanaswami |
| „ K. R. Govinda Mallan | „ V. Balabaskaran    |

„ V. N. Rajan	„ O. Venkata Krishnaiah Chetty
„ D. V. Ramalingeswara Rao	„ S. Kumaraswamy
„ A. Venkatesh	„ J. Fazlur Rahman
„ K. V. Thiagarajan	„ K. Gopinathan
„ K. V. Chalapathi Rao	„ G. Anjaneyelu
Dr. U. S. Premananda Shet	„ V. Venkateswara Rao
Sri Vijay R. Raghavan	„ G. Muthu Veerappan
„ K. Ramakoteswara Rao	„ G. Kuppaswamy
Dr. B. Nagalingam	„ V. Jayaprakash
Sri S. Rajesham	„ Y. G. Srinivasa
„ K. N. Gopalan	

### Lecturer Grade II

Sri S. Krishnamurthy

### Design Engineers

Sri T. Nagarajan	Sri A. Arun
„ M. Singaperumal	

### METALLURGY

#### Professors

Dr. E. G. Ramachandran	Dr. K. Srinivasaraghavan
„ R. Vasudevan	„ H. Md. Roshan
„ V. Panchanathan	„ K. Ananthapadmanabhan

#### Assistant Professors

Sri R.K. Srikanta Kumaraswamy	Dr. D.R. Gopalakrishna Achar
Dr. V.M. Radhakrishnan	„ V. Gopinathan
„ S. Prasanna Kumar	„ K.J. Lakshminarayana Iyer
„ O. Prabhakar	

**Lecturers**

Sri S. Ramakrishna Iyer  
 Dr. C.V. Gokularathnam  
 „ S. Raghavan  
 Sri R.N. Shenoy  
 „ P. Venugopal

Sri S.D. Pathak  
 „ V. Jagasivamani  
 „ P. Kesavan Nair  
 „ S. M. Doraivelu

**Lecturer Grade II**

Sri S. Kumaran

**PHYSICS****Professors**

Dr. C. Ramasastry  
 „ B.V. Ramanamurthy  
 „ S. Radhakrishna  
 „ R. Srinivasan

Dr. Y. V. G. S. Murthy  
 „ J. Sobhanadri  
 „ R.S. Sirohi

**Assistant Professors**

Dr. V. Sivaramakrishnan  
 „ C.K. Narayanaswami  
 „ S. Swaminathan  
 „ S. Bhimasankara Sastri  
 „ K. Viswanatha Reddy  
 „ R. Ramji Rao

Dr. B.M. Sivaram  
 „ K.V.S. Rama Rao  
 „ G. Rangarajan  
 „ A.V. Narasimhan  
 „ B.V.R. Chowdhari

**Lecturers**

Sri V. Ramabhadran  
 Dr. (Mrs.) Mahaseshayee  
 Sri B. Subrahmanyam  
 Dr. B.S.V. Gopalam  
 Sri B.S.V.S. Ramachandracharyalu  
 „ K. Srinivasan

Sri V. Ramachandran  
 „ V. Damodara Das  
 „ G. Srinivasamurthy  
 „ Jagabhandhu Majhi  
 „ Sriraman Srinivasan  
 „ S. Srinivasan

**Lecturers Grade II**

Sri K. Sarangapani

Kum. T.M. Vimala

„ V. Subramanyamurthy

Sri T.S. Natarajan

**REGIONAL SOPHISTICATED INSTRUMENTATION CENTRE**

**Professors**

Dr. Surjit Singh

Dr. S. Subramanian

**Scientific Officer Grade I**

Dr. T. K. K. Srinivasan

**OCEAN ENGINEERING CENTRE**

**Professors**

Dr. V. S. Raju

Dr. C. Ganapathi Chettiar

**Assistant Professors**

Dr. M. R. Pranesh

Dr. A. S. J. Swamidas

„ T. C. Gopalakrishnan

„ K. Muthukrishniah

**Lecturers**

Dr. S. P. Subramanian

**ENERGY RESEARCH CENTRE**

**Assistant Professor**

Dr. S. Elangovan

**FIBRE RE - INFORCED PLASTIC RESEARCH CENTRE**

**Professor**

Dr. Vincent Kunnukkasseril

**Chief Design Engineer**

Dr. N. Gopalakrishnan Nair

**Assistant Professor**

Dr. P. Palaninathan



**Design Engineer**

Sri B. Jagadish Chandra Babu

**INDUSTRIAL CONSULTANCY CENTRE**

**Chief Techno Economic Officer**

Dr. D. Balakrishnan

**Techno Economic Officers (SR)**

Sri C. Sivaprasada Rao

Sri Y. G. Narasimha

**Techno Economic Officer**

Sri R. Ambalavanan

**ENGINEERING DESIGN CENTRE**

(Machinery Equipment)

**Chief Design Engineers**

Sri T. S. Chennabasavan

Dr. M. A. Velusami

**Senior Design Engineers**

Sri Dev Kishore Sharma

Sri S. D. Kalander Saheb

„ S. K. Malhotra

„ R. Ramachandran

**CENTRE FOR SYSTEMS & DEVICES**

**Professors**

Dr. B. Kakati

Dr. M. S. Narasimhan

**Lecturers**

Dr K. Narayana Bhat

Sri M. C. Chandra Mouli

**Senior Scientific Officer**

Sri P. R. Vaya

**Senior Scientific Officer Grade II**

Sri Krishnan Kumar

**Design Engineers**

Sri V. N. Shukla

Smt. Ranjana Shukla

COMPUTER CENTRE

**Professors**

Dr. H. N. Mahabala

Dr. K. Thulasiraman

Dr. C. R. Muthukrishnan

Dr. R. Kalyana Krishnan

**Assistant Professor**

Dr. R. Nagarajan

**Lecturer**

Dr. Mrs. Kamala Krithivasan

**Manager (Systems)**

Sri S. Srinivasan

**Assistant Manager (Operations)**

Sri P. Seshasayee

**Senior Systems Programmers**

Sri M. Kothanda Ramanujam

Sri V. Aravamudan

**Programmers Grade I**

Sri Timir Kumar Basu

Sri N. Anantha Padmanabhan Thamby

**Programmers Grade II**

Smt. Vijayalakshmi Sirohi

Smt. Vatsala Krishnan

**Shift Engineer**

Sri R. Deenadayalu

CENTRAL ELECTRONIC CENTRE

**Scientific Officer Grade I**

Sri T. N. Ranganathan

**Scientific Officer Grade II**

Sri R. Rangachari

**CENTRAL WORKSHOP****Senior Workshop Superintendent**

Sri S. Jambunathan

**Assistant Workshop Superintendent**

Sri N. L. N. N. Kumar

**Scientific Officer Grade II**

Sri K. Parthasarathy

**MATERIALS SCIENCE RESEARCH CENTRE****Assistant Professor**

Dr. G. V. Subba Rao

**DEANS**

Academic Courses	—	Dr. N. V. C. Swamy
Academic Research	—	Dr. R. Srinivasan
Industrial Consultancy and Sponsored Research	—	Dr. P. Srinivasa Rao
Staff Welfare	—	Dr. D. Venkateswarlu
Students	—	Dr. P. T. Manoharan

**Advisers**

Foreign and Weaker Section Students	—	Dr. P. Achuthan
Sports activities	—	Prof. K. Balaraman
Cultural activities	—	Dr. R. Natarajan
Training and placement	—	Dr. M. Satyanarayana

## ADMINISTRATION

### Director's Office

#### Director

P. V. Indiresan

#### Secretaries

V. V. Natarajan

M. N. Srinivasan

## CENTRAL ADMINISTRATION

### Registrar

R. S. Virmani

### Deputy Registrars

W. Hanumesi Rao  
(Administration)

M. Gopalan  
(Academic)

V. Shanmugam  
(Administration)

### Budget and Audit Officer

R. Venkataraman

### Finance and Accounts Officer

A. V. Karunakaran Nambiar

### Stores and Purchase Officer

A. Thirunavukarasu

### Security Officer

T. N. Venkataraman

### Assistant Registrars

D. Thiagarajan  
(Recruitment & Projects)

G. R. Raghunatha Rao  
(Administration)

### Assistant Finance and Accounts Officers

R. Kannan

Mohamed Yacoob

**Assistant Stores and Purchase Officer**

M. C. James

**Assistant Security Officer**

Jesudian Cruz

**ENGINEERING UNIT**

**Executive Engineer**

Y. S. Nagaraja Rao

**Assistant Engineers**

Abraham Varghese

D. Ramanathan

N. Malayalam

M. Doorvasulu Reddy

D. R. Patel

**Horticultural Superintendent**

P. Manickavachakam

**Statement of Accounts**  
**1978-79**

**INDIAN INSTITUTE OF  
RECEIPTS AND PAYMENTS ACCOUNT**

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**RECEIPTS**

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	Rs.
<b>Opening Balance</b>	1,88,43,030
Receipts on Capital Account	
Grant from Government of India (i) on Capital Account	1,22,14,000
<b>Other Capital Receipts</b>	
Refund of Customs Duty	27,74,613

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3,38,31,643

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# TECHNOLOGY, MADRAS

FOR THE YEAR 1978 - 79

## PAYMENTS

	Rs.	Rs.
<b>On Capital Account</b>		
(i) Works and Buildings		64,63,322
(ii) (a) <b>Equipment Furniture and Fittings</b>		
<b>Departments</b>		
1. Chemistry	1,31,817	
2. Physics	1,11,149	
3. Mathematics	47,048	
4. Humanities & Social Sciences	29,996	
5. Civil Engineering	1,63,342	
6. Mechanical Engineering	4,12,912	
7. Electrical Engineering	3,35,269	
8. Chemical Engineering	2,41,071	
9. Metallurgy	5,46,657	
10. Applied Mechanics	2,55,362	
11. Aeronautical Engineering	5,05,137	
	<hr/>	27,79,760
(b) <b>Indigenous Capital Equipment</b>		
1. Chemistry	4,728	
2. Chemical Engineering	1,197	
3. Mechanical Engineering	996	
4. Applied Mechanics	3,250	
5. T. V. Lab.	4,450	
	<hr/>	14,621
(c) <b>Central Services</b>		1,43,267
(d) <b>Research Centres</b>		
Engineering Design Centre	1,329	
R. S. I. C.	10,789	
Composite Structure (FRP)	1,84,824	
Materials Science Research Centre	64,009	
Energy Research Centre	1,15,291	
Inter University Partnership Projects	50,382	
Television Lab.	75,041	
Futurology	2,873	
	<hr/>	5,04,538
		<hr/>
	C/o	99,05,508



**INDIAN INSTITUTE OF  
RECEIPTS AND PAYMENTS ACCOUNT**

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**RECEIPTS**

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	Rs.	Rs.
<b>Grant from Government of India</b>	B/F	3,38,31,643
(ii) On Revenue Account		3,28,90,000
<b>Receipts from Academic Section</b>		
Tuition fees	4,23,726	
Hostel Seat Rent	1,71,267	
Gymkhana and Medical Fees	56,598	
Fines	6,132	
Examination Fees	58,400	
Degree in Absentia	2,768	
	7,18,891	
	C/o	6,74,40,534

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# TECHNOLOGY, MADRAS

FOR THE YEAR 1978 - 79 (Contd.)

## PAYMENTS

	Rs.	Rs
B/F		99,05,508
(e) Central workshops		47,043
(f) Computer Centre		2,09,731
(g) Centre for Rural Development		85,685
(h) Replacement of obsolete Equipment		9,623
<b>(iii) Customs Duty on West German Equipments</b>		
Customs Duty Clearance Charges		34,72,17
<b>(iv) Furniture and Fittings ( Departments, Office and Library etc. )</b>		3,77,521
<b>(v) Others</b>		
Motor Vehicles		1,56,659
Cycles		—
Typewriters and Duplicators		—
Hospital Equipments		49,397
Telephones		—
Fire fighting Equipments		—
<b>(vi) Library</b>		
(i) Books	3,76,459	
(ii) Journals and Back Volumes	8,57,004	
(iii) Equipments	25,646	
	<u>          </u>	12,59,109
<b>Revenue Account</b>		
Academic Sections-Pay and Allowance of Teaching Staff.		
1. Chemistry	7,07,229	
2. Physics	7,10,921	
3. Mathematics	4,70,499	
4. Humanities & Social Sciences	4,14,788	
5. Civil Engineering	8,35,797	
	<u>          </u>	
	31,39,234	<u>          </u>
C/o		1,55,72,455

**INDIAN INSTITUTE OF  
RECEIPTS AND PAYMENTS ACCOUNT**

**RECEIPTS**

	Rs.	Rs
<b>B/F</b>		6,74,40,534
<b>Other Receipts</b>		
Application fees from students	4,07,834	
Application fees for posts in the Institute	1,436	
Admission fees	10,441	
Grade Card	4,456	
Gymkhana Receipts (Campastimes)	—	
Institute Bus Collection	2,40,598	
Hire Charges on Institute Vehicles	44,862	
Library Overdue Collections	29,977	
Institute Day and Association fees	3,950	
Student's Amenities Fund-Receipts from students	7,435	
	-----	7,50,989
<b>Interest</b>		
Interest on Conveyance Advance	3,291	
Interest on Security Deposits with Tamil Nadu		
Electricity Board	6,740	
Interest on call deposits with SBI Endowments	6,52,428	
	-----	6,62,459
<b>Miscellaneous Receipts</b>		
Sale of Question papers, Tender forms, Iron Scrap, etc.	6,57,932	
Institute contribution to CPF (Refund)	—	
Miscellaneous Recoveries	823	
Breakages from students	352	
Hire charges for Convocation Gowns	1,684	
Guest House Boarding Charges	11,454	
Subscription to Journal of Mathematical & Physical Science and sale proceeds of Institute Publications	66,955	
Migration Certificates	100	
Library Membership fees	4,714	
Short Term & Other Courses	1,75,400	
	-----	9,19,414
<b>C/o</b>		6,97,73,396

# TECHNOLOGY, MADRAS

FOR THE YEAR 1978 - 79 (Contd.)

## PAYMENTS

	B/F	Rs.	Rs.
		31,39,234	1,55,72,455
6. Mechanical Engineering		12,49,500	
7. Electrical Engineering		10,59,110	
8. Chemical Engineering		5,23,625	
9. Metallurgy		4,22,786	
10. Applied Mechanics		4,95,951	
11. Aeronautical Engineering		3,66,755	
			<u>72,56,961</u>
<b>(ii) Pay and Allowances for Non-Teaching Staff</b>			
1. Chemistry		2,36,053	
2. Physics		4,07,790	
3. Mathematics		26,687	
4. Humanities & Social Sciences		64,550	
5. Civil Engineering		3,85,591	
6. Mechanical Engineering		8,76,746	
7. Electrical Engineering		5,98,468	
8. Chemical Engineering		3,51,692	
9. Metallurgy		2,95,846	
10. Applied Mechanics		2,42,191	
11. Aeronautical Engineering		1,37,122	
			<u>36,22,736</u>
<b>(iii) Departmental Expenses</b>			
1. Chemistry		1,76,822	
2. Physics		1,72,075	
3. Mathematics		3,796	
4. Humanities & Social Sciences		10,896	
5. Civil Engineering		3,62,051	
6. Mechanical Engineering		4,91,569	
7. Electrical Engineering		4,04,629	
8. Chemical Engineering		4,40,356	
9. Metallurgy		4,74,821	
10. Applied Mechanics		2,18,920	
11. Aeronautical Engineering		2,88,032	
			<u>30,43,967</u>
Centre for Rural Development Officers (Pay & Allowances)			32,993
Indo-German Projects (Pay & Allowances)			1,27,906
			<u>2,96,57,018</u>
	C/o		

**INDIAN INSTITUTE OF  
RECEIPTS AND PAYMENTS ACCOUNT**

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**RECEIPTS**

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	Rs.	Rs.
B/F		6,97,73,396
<b>Receipts from Buildings</b>		
Licence Fee	8,36,536	
Electricity, Water & Service Charges	<u>2,85,605</u>	
		11,22,141
<b>Lawn and Gardens : Usufructs &amp; Sewage farm</b>		12,406
Receipts from Computer Centre		31,57,618
Central Photographic Section		16,638
General Stores		

C/o

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7,40,82,199

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# TECHNOLOGY, MADRAS

FOR THE YEAR 1978 - 79 (Contd.)

## PAYMENTS

	Rs.	Rs.
B/F		2,96,57,018
<b>a. Library</b>		
Pay & Allowances (Officers)	94,491	
—do— (Establishment)	3,41,869	
Journal of General Interest	2,011	
Contingencies Operating cost	86,749	
Binding Charges	18,100	
	<u>          </u>	5,43,220
<b>b. Computer Centre</b>		
Pay & Allowances (Officers)	2,93,642	
—do— (Others)	1,04,380	
Other Charges	12,69,516	
Payment to IBM for Non-Qualifying Usage	—	
	<u>          </u>	16,67,538
<b>2. Centres</b>		
Pay & Allowances (Officers)	2,33,292	
—do— (Establishment)	2,90,483	
	<u>          </u>	5,23,775
<b>c. Central Workshops</b>		
Pay & Allowances (Officers)	50,968	
—do— (Establishment)	10,31,218	
Working Expenses (Departments Tools & Other consumables)	1,37,647	
	<u>          </u>	12,19,833
Stipend for apprentices		61,912
<b>d. (i) Centrai Electronic Centre</b>		
(Pay & Allowances)		81,386
<b>(ii) Air Conditioning Unit</b>		
(Pay & Allowances)		44,867
		<u>          </u>
		3,37,99,549

INDIAN INSTITUTE OF  
RECEIPTS AND PAYMENTS ACCOUNT

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RECEIPTS

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	Rs.	Rs.
B/F		7,40,82,199

C/o

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7,40,82,199

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# TECHNOLOGY, MADRAS

FOR THE YEAR 1978 - 79 (Contd.)

## PAYMENTS

	Rs.	Rs.
B/F		3,37,99,549
e. Special Instruments Lab. (RSIC)	36,899	
Electron Microscope Lab.	6,976	
Electronic Instruments Servicing & Development Centre	10,325	
Central Photographic Section	37,710	
Central Glass Blowing Section	47,841	
Air Conditioning Unit	44,758	
X-ray Defraction Laboratory	27,033	
Energy Research Centre	37,449	
Centre for Rural Development	17,777	
Fibre Reinforced Plastic Research Centre	83,999	
Television Engg. Lab.	31,270	
Engg. Design Centre	4,799	
Material Sciences Research Centre	89,772	
Indo-German Projects	1,18,243	
Indo French Collaboration	220	
	-----	5,95,121
f. Institute Scholarships		
Post-Graduates & Research	27,98,003	
Under Graduates	6,03,719	
	-----	34,01,722
g. N.C.C.		
Pay & Allowances	41,258	
Other expenditure	26,463	
	-----	67,721
h. Athletic & Gymkhana		
Pay & Allowances	15,944	
Other expenditure	1,93,941	
	-----	2,09,885
C/o		----- 3,80,73,998



INDIAN INSTITUTE OF  
RECEIPTS AND PAYMENTS ACCOUNT

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RECEIPTS

---

Rs.

B/F

7,40,82,199

C/o

7,40,82,199

# TECHNOLOGY, MADRAS

FOR THE YEAR 1978 - 79 (Contd.)

## PAYMENTS

	B/F	Rs.	Rs.
			3,80,73,998
<b>i. Other Items</b>			
Part-time Lectures		1,725	
Visiting Professors		3,993	
Technical Bulletin & Journals		55,393	
Symposia & Seminars		6,407	
Implant Training/Courses/Visits		19,636	
Continuing Education Programme organised by the Institute		74,000	
Quality Improvement programme (Initiated by the Ministry of Education)		19,489	
Director's Laboratory		—	
Director's Discretionary Fund for Research		—	
Membership fees to outside bodies		29,532	
Remuneration to External Examiners		43,495	
Convocation		44,509	
Prizes for Academic Distinction		3,173	
Joint Entrance Examination		2,54,149	
Common Examination for Post-Graduate Admission (CEPA)		1,59,311	
		<u>          </u>	7,14,812
<b>Hostels</b>			
Allowances to Wardens			13,711
<b>(iv) Other Sections</b>			
<b>(a) Central Administration</b>			
Pay and Allowances of Officers		3,27,580	
Pay & Allowances of other staff		17,74,341	
		<u>          </u>	21,01,921
<b>(b) Contingencies</b>			
Postage		1,54,205	
Entertainment		10,687	
Telephone		3,21,495	
Liveries		63,877	
		<u>          </u>	
		5,50,264	
	C/o		<u>          </u>
			4,09,04,442

INDIAN INSTITUTE OF  
RECEIPTS AND PAYMENTS ACCOUNT

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RECEIPTS

---

	Rs.
B/F	7,40,82,199

C/o

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7,40,82,199

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# TECHNOLOGY, MADRAS

FOR THE YEAR 1978 - 79 (Contd.)

## PAYMENTS

	Rs.	Rs.
B/F	5,50,264	4,09,04,442
Stationery	1,81,709	
Printing	21,761	
Advertisement	97,085	
Miscellaneous Expenses	2,82,961	
	<u>          </u>	11,33,780
<b>(c) Other Items</b>		
Director's Discretionary Fund		
Payments	4,755	
Less: Recoveries	415	
	<u>          </u>	4,340
<b>Stores</b>		
Pay & Allowance of Officers	41,053	
—do— Other Staff	2,14,788	
	<u>          </u>	2,55,841
<b>General Stores</b>		
Purchases	1,11,809	
Less: Issues	1,00,195	
	<u>          </u>	11,610
Security		2,00,257
Special Security Guards		1,49,031
<b>Lawns &amp; Gardens</b>		
Pay & Allowance of Horticultural		
Superintendent	18,086	
Pay & Allowance of Other Staff, Wages		
to Labourers, Purchase of Seeds etc.,	2,59,544	
	<u>          </u>	2,77,630
Power		17,85,743
Mosquito Control		403
Water		2,35,063
Oil & Petrol		1,08,187
Repairs & Maintenance of Furniture		90,290
Duty, Insurance and Road Taxes		31,295
Repairs & Maintenance of Motor Vehicles		2,12,156
Fire Fighting Operating Cost		3,155
	<u>          </u>	4,54,03,223
C/o		

INDIAN INSTITUTE OF  
RECEIPTS AND PAYMENTS ACCOUNT

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RECEIPTS

---

	Rs.
B/F	7,40,82,199

C/o

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7,40,82,199

# TECHNOLOGY, MADRAS

FOR THE YEAR 1978 - 79 (Contd.)

PAYMENT		Rs.	Rs.
B/F			4,54,03,223
<b>Works &amp; Maintenance</b>			
Pay & Allowances of Officers	74,572		
—do— Other Staff	6,19,207		
Other expenditure on Maintenance	21,52,989		
Property Tax	9,09,816		
	<hr/>		37,56,584
<b>Hospital</b>			
Pay & Allowances of Medical Officers	1,39,147		
—do— Other Staff	1,28,506		
Purchase of Medicines etc.	4,04,185		
	<hr/>		6,71,838
Grant to Central School			—
Grant to Vana Vani High School			613
Repairs & Maintenance of Typewriters & Duplicators			40,155
Audit Charges			18,570
Legal Expenses			6,861
Honorarium to Legal Adviser			—
Honorarium to Part-time Liaison Officer			—
<b>Travelling Allowances</b>			
Board of Governors	20,971		
Staff Committees, Selection Committees, etc.	35,977		
Candidates called for interview for appointment etc.	24,594		
External Examiners	59,690		
Joint Entrance Examination	56,355		
	<hr/>		1,97,587
<b>Commitment under Indo-German Agreement</b>			
Customs Duty on personal effects of West German Experts	24,692		
Lodging Allowance to Experts	25,000		
	<hr/>		49,692
Other facilities	—		—
			<hr/>
C/o			5,01,45,123

**INDIAN INSTITUTE OF  
RECEIPTS AND PAYMENTS ACCOUNT**

**RECEIPTS**

	Rs.	Rs.
B/F		7,40,82,199
<b>Recovery of Advances</b>		
Motor car and other conveyance	64,870	
Festival Advance	1,11,355	
Customs Duty on Equipment from West Germany	41,03,342	
Customs Duty on personal effects of West German Experts	28,952	
On account of UNESCO Coupons	28,294	
Miscellaneous Advance	13,05,571	
		56,42,384
<b>Deposits</b>		
Suppliers' Deposits (Institute)	90,354	
Contractors' Deposits (works)	5,68,875	
External Scholarship	6,57,721	
CSIR	4,90,657	
Student's caution Deposits	28,111	
Miscellaneous Deposits	10,22,910	
Quality Improvement Programms (Organised by Government of India)	15,81,200	
Centre for systems & Devices (Defence Ministry)	15,81,200	
Industrial Consultancy work & Projects	88,79,602	
Cryogenics Engg. (Sub-Centre)	4,46,000	
		1,37,65,430
<b>Centres</b>		
Grant from Government of India for Ocean Engg. Centre		
On Capital Account	24,05,000	
On Revenue Account	10,95,000	
		35,00,000
C/o		9,69,90,013

# TECHNOLOGY, MADRÁS

FOR THE YEAR 1978 - 79 (Contd.)

## PAYMENTS

	Rs.	Rs.
B/F		5,01,45,123
Contribution to Societies	—	
L. S. & P. C. on account of personnel on Foreign Services	22,446	
Contribution to Employees Welfare Scheme	18,296	
Training and Welfare activities of staff members	2,191	
Subsidy to Hostels due to revision of salary for Hostel Employees	5,02,757	
		5,45,690
<b>Provident Fund/Gratuity/Pension</b>		
C. P. F. (contribution & Interest)	1,50,000	
C.P.F. cum-Gratuity (Contribution & Interest)	19,46,620	
G.P.F. cum pension-cum-Gratuity (Interest)	42,820	
Gratuity & Pension	74,871	
		22,14,311
<b>Advance paid</b>		
Motor car and other conveyance	2,42,107	
Festival Advance	2,36,420	
Customs Duty on Equipment from West Germany	35,19,797	
Customs Duty on Personal effect on West German Experts	—	
UNESCO Coupons	33,600	
Other Miscellaneous Advance	12,75,676	
		53,07,600
<b>Refund of Deposits</b>		
Supplier's Deposits (Institute)	65,848	
Contractors' Deposits (works)	4,04,019	
External Scholarship	6,31,321	
C. S. I. R.	5,39,560	
Students Caution Deposits	25,968	
Miscellaneous Deposits	7,82,703	
	24,49,412	
C/o		5,82,12,724



**INDIAN INSTITUTE OF  
RECEIPTS AND PAYMENTS ACCOUNT**

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**RECEIPTS**

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<b>B/f.</b>	<b>Rs.</b>
	9,69,90,013

<b>Total</b>	<u>9,69,90,013</u>
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**(Sd.) A. V. KARUNAKARAN NAMBIAR**  
Finance & Accounts Officer

# TECHNOLOGY, MADRAS

FOR THE YEAR 1978 - 79

## PAYMENTS

	Rs.	Rs.	Rs.
	B/F	24,49,419	5,82,12,724
QIP Programme (organised by Government of India,) Centre for Systems & Devices (Defence Ministry)		21,00,716	
Industrial Consultancy work & Projects		63,46,858	
Cryogenics Engg. (Sub-Centre)		89,282	
			1,09,86,275
<b>Centres</b>			
Ocean Engg. Centre			
Building & Construction		6,04,361	
Equipments		18,00,645	
Pay & Allowance			
Officers	1,36,502		
Others	1,18,143		
		2,54,645	
Departmental Expense		79,984	
Establishment of Sub-Centres at other I.I.T.s.		8,06,000	
			35,45,635
<b>Closing Balance</b>			
Cash on hand		2,08,453	
With State Bank of India		2,40,36,926	
			2,42,45,379
		<b>Total</b>	<b>9,69,90,013</b>

(Sd.) R. S. VIRMANI  
Registrar

(Sd.) P. V. INDIRESAN  
Director

**INDIAN INSTITUTE OF  
INCOME AND EXPENDITURE ACCOUNT**

**EXPENDITURE**

<b>Educational Expenses</b>	Rs.	Rs.
<b>Pay of Teaching Staff</b>		
Department of Chemistry	7,19,460	
Physics	7,18,502	
Mathematics	4,69,555	
Humanities & Social Sciences	4,17,948	
Civil Engineering	8,29,247	
Mechanical Engineering	12,57,743	
Electrical Engineering	10,59,910	
Chemical Engineering	5,30,940	
Metallurgy	4,22,164	
Applied Mechanics	4,99,582	
Aeronautical Engineering Centres	3,66,197 2,26,412	
	<hr/>	75,17,660
<b>Pay of Non-Teaching Staff</b>		
Department of Chemistry	2,30,897	
Physics	4,05,148	
Mathematics	26,722	
Humanities & Social Sciences	62,879	
Civil Engineering	3,82,024	
Mechanical Engineering	8,74,574	
Electrical Engineering	6,00,284	
Chemical Engineering	3,51,570	
Metallurgy	2,93,420	
Applied Mechanics	2,41,733	
Aeronautical Engineering Centres	1,37,426 2,82,734	
Indo-German Projects	1,27,083	
	<hr/>	40,16,494
C/o.		<hr/> 1,15,34,154



**INDIAN INSTITUTE OF  
INCOME AND EXPENDITURE ACCOUNT**

<b>EXPENDITURE</b>			
	B/F	Rs.	Rs.
<b>Departmental Expenses</b>			1,15,34,154
Chemistry		1,54,200	
Physics		1,56,604	
Mathematics		3,796	
Humanities & Social Sciences		10,677	
Civil Engineering		3,39,918	
Mechanical Engineering		4,22,574	
Electrical Engineering		4,20,457	
Chemical Engineering		2,14,597	
Metallurgy		4,69,995	
Applied Mechanics		1,62,920	
Aeronautical Engineering		1,69,336	
		<u>          </u>	25,25,074
<b>Library</b>			
<b>Pay and Allowances</b>			
Officers		97,108	
Establishment		3,44,686	
Contingencies-Operating Cost		92,948	
Journals of General Interest		2,011	
Binding Charges		18,100	
		<u>          </u>	5,54,853
<b>Computer Centre</b>			
Pay and Allowances Officers		2,88,930	
Pay and Allowances Establishment		1,04,761	
Other Charges		12,77,369	
		<u>          </u>	16,71,060
<b>Workshops</b>			
Pay and Allowances of Workshop Superintendent		51,147	
Pay and Allowances of other staff		10,31,704	
Working Expenses (Instruments, Tools other Consumables)		1,42,959	
Stipend to Apprentices		<u>          </u>	12,25,810
			62,612
<b>Ocean Engineering Centre</b>			
Pay and Allowances		2,76,608	
Working Expenses (Instrument & other Consumables etc.)		88,523	
Sub-Centre		8,06,000	
		<u>          </u>	11,71,131
			<u>          </u>
	C/o.		1,87,44,694

**TECHNOLOGY, MADRAS**

**FOR THE YEAR ENDED 31-3-1979**

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**INCOME**

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**Rs.**

**Rs.**

**4,30,02,663**

**C/o.**

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**4,30,02,663**

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**INDIAN INSTITUTE OF  
INCOME AND EXPENDITURE ACCOUNT**

EXPENDITURE		Rs.	Rs.
	B/F		1,87,44,694
Energy Research Centre		39,720	
Centre for Rural Development		17,788	
Special Instruments Laboratory (RSIC)		33,745	
Electron Microscope		5,892	
Electronic Instruments Servicing & Development Centre		25,560	
Central Photographic Section		27,024	
Central Glass Blowing Section		52,654	
A. C. Unit		61,250	
X-Ray Defraction Unit		26,705	
Fibre reinforced Plastics Research Centre		1,09,002	
Television Engineering Lab.		38,992	
Engineering Design Centre		7,713	
Material Sciences Research Centre		90,432	
Indo-German Projects		1,18,243	
Indo-French Collaboration		220	
		-----	6,54,940
Pay and Allowances--C. R. D.			33,053
Pay and Allowances--Central Electronic Centre			81,754
Pay and Allowances--Air Conditioning Unit			44,524
<b>Institute Scholarships</b>			
Post-Graduate and Research		27,95,508	
Under-Graduate		6,09,042	
<b>N. C. C.</b>		-----	34,04,550
Pay and Allowances		40,812	
Other Expenditure		26,288	
<b>Athletic and Gymkhana</b>		-----	67,100
Pay and Allowances		16,032	
Other Expenditure		1,94,383	
		-----	2,10,415
Part-time Lectures		1,725	
Visiting Professors		3,833	
Technical Bulletin and Journals		55,393	
Symposia and Seminars		6,407	
Inplant Training/Courses/Visits		19,636	
Continuing Education Programme organised by the Institute		74,001	
		-----	1,60,995
	C/o.		-----
			2,34,02,025

# TECHNOLOGY, MADRAS

FOR THE YEAR ENDED 31—3—1979

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## INCOME

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	Rs.	Rs.
B/F.		4,30,02,663

C/o.

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4,30,02,663

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**INDIAN INSTITUTE OF  
INCOME AND EXPENDITURE ACCOUNT**

**EXPENDITURE**

B/F.	Rs.	Rs.
		2,34,02,025
Quality Improvement Programme initiated by the Ministry of Education	19,489	
Director's Laboratory	—	
Director's Discretionary Fund and Research	—	
Membership fees to outside bodies	29,532	
Joint Entrance Examination	2,54,149	
Remuneration to External Examiners	43,494	
Convocation	44,509	
Prizes for Academic Distinction	3,173	
Common Examination for P. G. Admissions	1,59,311	
	<u>                    </u>	5,53,657
<b>Hostels</b>		
Allowances to Wardens		12,496
<b>Central Administration</b>		
(Pay and Allowances)		
Officers	3,30,273	
Establishment	17,76,946	
	<u>                    </u>	21,07,219
<b>Contingencies</b>		
Postage	1,54,289	
Entertainment	10,687	
Telephones	3,21,495	
Liveries	23,946	
Stationery	2,11,635	
Printing	21,037	
Advertisement	99,716	
Sundries (Miscellaneous Expenses)	2,80,604	
	<u>                    </u>	11,23,409
<b>Other Items</b>		
Director's Discretionary Fund	4,340	
General Stores	11,468	
	<u>                    </u>	15,808
	<u>                    </u>	2,72,14,614
C/o.		

# TECHNOLOGY, MADRAS

FOR THE YEAR ENDED 31-3-1979

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## INCOME

---

	Rs.	Rs.
B/F.		4,30,02,663

C/o.

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4,30,02,663

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**INDIAN INSTITUTE OF  
INCOME AND EXPENDITURE ACCOUNT**

**EXPENDITURE**

	B/F	Rs.	Rs.
			2,72,14,614
<b>Stores</b>			
Pay and Allowances Officers		41,859	
Pay and Allowances Establishment		2,14,288	
		<u>          </u>	2,56,147
Security			1,99,515
Special Security Guards			1,37,031
<b>Lawns and Gardens</b>			
Pay and Allowances of the Horticultural Superintendent		18,148	
Wages to Labourers, Purchases of seeds etc.		2,59,453	
		<u>          </u>	2,77,601
Power			17,95,451
Mosquito Control			403
Water Charges			2,35,063
Oil and Petrol			1,08,187
Repairs and maintenance of Furniture			90,290
Duty, Insurance and Road Taxes			31,295
Repairs and Maintenance – Motor vehicles and Cycles			1,94,411
Fire fighting operating cost			3,155
<b>Works and Maintenance</b>			
Pay and Allowances Officers		74,839	
Pay and Allowances Establishment		6,21,855	
Other charges		21,52,989	
		<u>          </u>	28,49,683
Property Tax			8,91,816
<b>Hospital</b>			
Pay and Allowances Medical Officers		1,37,665	
Pay and Allowances Establishment		1,29,835	
Purchase of Medicines		3,13,019	
		<u>          </u>	5,80,519
	C/o		<u>          </u>
			3,48,65,181

# TECHNOLOGY, MADRAS

FOR THE YEAR ENDED 31—3—1979

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## INCOME

---

	Rs.	Rs.
B/F		4,30,02,663

C/o

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4,30,02,663

**INDIAN INSTITUTE OF  
INCOME AND EXPENDITURE ACCOUNT**

**EXPENDITURE**

	B/F	Rs.	Rs.
Grant to Vanavani High School			3,48,65,181
Repairs & Maintenance of Typewriter and Duplicators			613
Audit Charges			44,683
Legal Expenses			18,570
Honorarium to Legal Adviser			6,860
Honorarium to P.T. Liaison Officer			—
<b>Travelling Allowances</b>			
Board of Governors		20,971	
Selection Committee, Senate etc.		35,977	
Candidates called for interview		24,594	
External Examiners		59,690	
Joint Entrance Examination		56,356	
		<u>          </u>	1,97,588
<b>Commitments under Indo-German Agreement</b>			
Customs Duty on Personal effects to West German Experts			24,692
Lodging Allowances to West German Experts			25,000
Subsidy to Hostels due to revision of salary to Hostel Employees			5,02,757
Employees Welfare Scheme			18,296
L.S. & P.C. on account of personnel on Foreign Service			22,446
G.P.F. Contribution etc.,			22,64,790
Cost of Stores lost, damaged or rendered unserviceable, written off			7,704
Training and Welfare activities to staff members			2,192
Excess of income over Expenditure			50,01,291
		<u>          </u>	<u>          </u>
	<b>Total</b>		<b>4,30,02,663</b>
			<u>          </u>

(Sd.) **A. KARUNAKARAN NAMBIAR**  
Finance and Accounts Officer

# TECHNOLOGY, MADRAS

FOR THE YEAR ENDED 31—3—1979

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## INCOME

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B/F	Rs.	Rs.
		4,30,02,663

Total	<u>4,30,02,663</u>
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(Sd.) R. S. VIRMANI  
Registrar

(Sd.) P.V. INDIRESAN  
Director

# INDIAN INSTITUTE OF

## BALANCE SHEET AS

### CAPITAL FUND AND LIABILITIES

	Rs.	Rs.	Rs.
<b>Capital Fund</b>			
Value of land per contra		1,12,17,262	
Block value of German aid per			
contra-Equipments	8,89,17,803		
Technical Books and Journals per contra	13,93,118		
		9,03,10,921	
<b>Computer Systems per Contra</b>			
As per last balance sheet		1,54,50,458	
<b>Block Value of Gift from USA</b>			
Analogue Computer per contra		2,28,100	
Capital grants and balance of income			
and Expenditure account as on 31--3--78	15,37,61,116		
Add: adjustment	4,67,201		
Less: adjustment	15,42,28,317		
	1,147		
Add: Capital grant during 1978-79	15,42,27,170		
Add: Excess of Income over Expenditure for the year 1978-79	1,46,19,000		
	50,01,291		
		17,38,47,461	29,10,54,202
Gymkhana Fund			49,811
Endowment Fund			
(Governor's prizes etc.)			1,53,350
<b>Deposits</b>			
Earnest Money, Caution and			
other Deposits		32,82,256	
Industrial Consultancy Centre & Projects		1,10,13,890	
			1,42,96,146
<b>Sundry Creditors</b>			
On works account		5,19,729	
For supplies made or services rendered to			
Departments/Sections		9,57,210	
			14,76,939
<b>Outstanding Expenses Payable</b>			
Pay and allowances			13,70,675
Scholarships			2,62,762
C/o			30,86,63,885

# TECHNOLOGY, MADRAS

AT 31-3-1979

## PROPERTY AND ASSETS

	Rs.	Rs.	Rs.
<b>Land</b>			
Value of land gifted by the Government of Tamil Nadu			1,12,17,262
<b>Buildings</b>			
Cost of completed Buildings as on 31.3.1978	8,44,76,149		
<b>ADD</b> Buildings completed during the year	19,03,056	8,63,79,205	
Buildings under Construction as on 31.3.78	13,84,519		
<b>ADD</b> Expenditure for the year	58,26,843		
	72,11,362		
<b>LESS</b> Transferred to completed buildings account	19,03,356		
		53,08,306	9,16,87,511
Diesel Generator			2,14,232
<b>Equipments Furniture &amp; Fittings</b>			
At cost as per balance sheet as at 31.3.78	2,73,42,003		
<b>ADD</b> addition during the year	41,47,717	3,14,89,720	
Less cost of equipment written off during the year		2,840	
			3,14,86,880
Computer acquired through German Food Aid Funds under the Indo-German Agreement			1,54,50,458
A cost as per balance sheet as on 31.3.79			
Value of Analogue Computer received as gift from USA (Tools for freedom)		2,28,100	
<b>ADD</b> Customs Duty, Insurance etc.		11,044	
			2,39,144
C/o.			15,02,95,487



**INDIAN INSTITUTE OF  
BALANCE SHEET AS**

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**CAPITAL FUND AND LIABILITIES**

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	Rs.	Rs.	Rs.
B/F			30,86,63,885
Other Allowances - Medical			20,884
Wages to N.M.R. Labourers - Departments etc.			74,139
Audit Fees			12,000
Computer receipts received in advance			9,500
Stipend to Apprentics			3,200
<b>Excess Fees Refundable</b>			
Fees refundable on account of Scholarship and freeship as on 31-3-79			10,118
<b>American Chemical Society</b>			
<b>Account with First National City Bank</b>			
<b>New York Account (A)</b>			
Balance as per last year Balance Sheet			1,10,934

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C/o

30,89,04,600

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# TECHNOLOGY, MADRAS

AT 31-3-1979

## PROPERTY AND ASSETS

	B/F	Rs.	Rs.	
				15,02,95,487
Block value of equipment from West Germany as per Balance Sheet as on 31-3-78		8,57,28,713		
Add : Additions during the year		31,90,521		
		<u>8,89,19,234</u>		
Less : Value of German Equipment written off		1,431		
		<u>8,89,17,803</u>		
Customs duty and clearance charges on equipment from West Germany as per Balance Sheet 31-3-78		1,80,43,692		
Add: Customs duty paid during the year		6,87,183		
		<u>1,87,30,875</u>		10,76,48,678
Motor Vehicles at cost as per balance sheet as at 31-3-78			8,21,508	
Add : additions during the year			43,690	
			<u>8,65,198</u>	
Library Books and Scientific journals at cost as on 31-3-78			81,29,745	
Add: additions during the year			12,33,463	
			<u>93,63,208</u>	
Less: cost of library books written off during the year			4,864	
			<u>93,58,344</u>	
Block value of technical books journals from West Germany as per balance sheet as at 31-3-78			12,91,840	
Add: additions during the year			1,01,278	
			<u>13,93,118</u>	
Typewriters and duplicators at cost as per balance sheet as on 31-3-78			4,42,019	
Add : additions during the year			2,350	
			<u>4,44,369</u>	
		C/o.		27,00,05,194

INDIAN INSTITUTE OF  
BALANCE SHEET AS

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CAPITAL FUND AND LIABILITIES

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	B/F	Rs.
		30,89,04,660
Unpaid items as on 31—3—1979 as per undisbursed pay register		47,817

C/o

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30,89,52,477

# TECHNOLOGY, MADRAS

AT 31—3—1979

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## PROPERTY AND ASSETS

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	B/F	Rs.	Rs.
			27,00,05,194
Tools and plants works as at 31-3-78		3,02,310	
ADD : Additions during the year		<u>1,472</u>	
			3,03,782
Cycles at cost as per Balance Sheet as at 31-3-79			24,999
Investment Account, Endowment Fund, Governor's Prize etc. as on 31-3-79			1,53,350
<b>Stock as on 31—3—1979</b>			
Consumables stores with Department			21,00,271
Construction materials with Engineering unit works Account			14,18,150
Guest House Provisions			252
Stationery articles			79,000
Consumables stores & Liveries with General Stores			57,753
Tyres and Tubes, Spare parts etc.			71,757
UNESCO Coupons			68,593
Gymkhana Assets (Projector and Tape Recorder at cost as per last year Balance Sheet)			49,811
Fees recoverable			26,233
Licence fees etc., recoverable			41,012
Taramani House Boarding charges recoverable			5,061

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C/o

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27,44,05,218

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INDIAN INSTITUTE OF  
BALANCE SHEET AS

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CAPITAL FUND AND LIABILITIES

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	Rs.	Rs.
B/F		30,89,52,477

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Tctal Rs. 30,89,52,477

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(Sd.) A. V. KARUNAKARAN NAMBIAR  
Finance and Accounts Officer

# TECHNOLOGY, MADRAS

AT 31-3-1979 (Contd.)

PROPERTY AND ASSETS			
	Rs. B/F	Rs.	Rs. 27,44,05,218
Income receivable for the Computer Centre		8,26,293	
LESS unrealised amount written off		<u>1,147</u>	8,25,146
<b>INDUSTRIAL RESEARCH AND DEVELOPMENT FUND</b>			36,510
Hire charges of Institute vehicles etc. recoverable			5,819
Water charges due from the Madras Corporation			4,67,201
Services charges due from Madras Corporation			18,000
Stamps on hand			11,616
C. P. F. contribution recoverable			1,05,389
C. P. F. Interest on bonds recoverable			14,48,472
Payments from grant received from the American Chemical Society Equipment as on 31-3-79			1,10,934
<b>ADVANCE AND DEPOSITS</b>			
Works advance			16,74,504
Other (General)			45,84,195
<b>DEPOSITS WITH T. N. S. E. B.</b>			4,35,680
Collector of Customs - Account I			4,99,981
Collector of Customs - Account II			30,116
Unpaid Balance (per contra) with State Bank of India in 'C' Account			
Cash on hand	47,817		
Imprest	<u>500</u>		
Cash on hand (other than 'C' A/C)	2,08,453		
With State Bank of India	<u>2,40,36,926</u>		
		48,317	
		<u>2,42,45,379*</u>	2,42,93,696
* 1) Earnest Money, Caution & other deposits	32,82,256		
2) Industrial consultancy & projects	1,10,13,890		
3) Unspent amount of grant	<u>99,49,233</u>		
	<u>2,42,45,379</u>		
			<u>Total 30,89,52,477</u>

(Sd.) R. S. VIRMANI  
Registrar

(Sd.) P. V. INDIRESAN  
Director