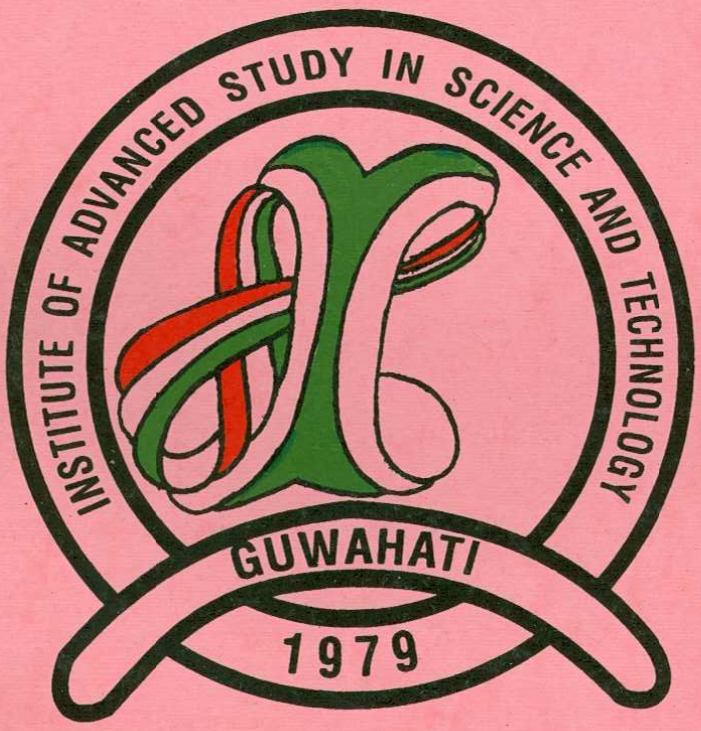
ANNUAL REPORT

1994-1996



INSTITUTE OF ADVANCED STUDY IN SCIENCE AND TECHNOLOGY

JAWAHARNAGAR, KHANAPARA
GUWAHATI-781 022

ANNUAL REPORT

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Fax/Tel : (0361)-560859

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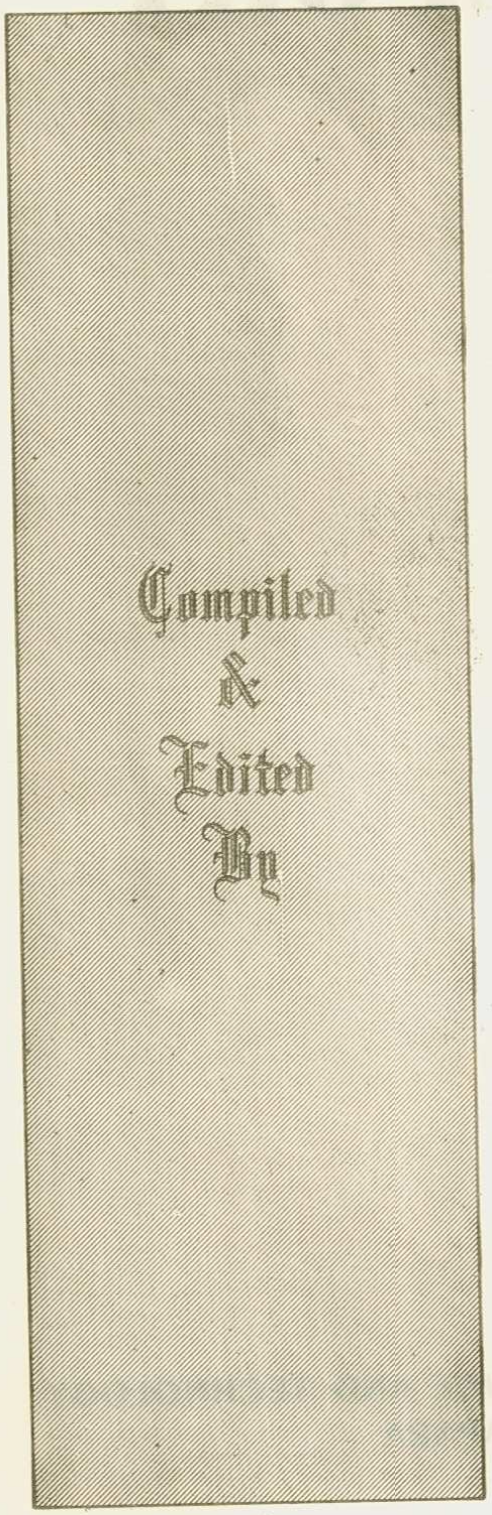

Professor K.C. Barua
Director, IASST

Dr. M.K. Kalita
Administrative Officer &
Secretary (i/c), IASST

Professor A.K. Agarwal
Head, Mathematics &
Statistics Division

Dr. Joyanti Chutia
In-Charge, Plasma
Physics Division

Dr. P. Azad
In-Charge, Life
Sciences Division

Dr. S. Deka
In-Charge, Resource
Management &
Environment Division

Mr. A. Barman
In-Charge, Computer
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Assisted By :

Mr. Anupam Barman
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Dr. P. Goswami, Former Director (Honorary) of IASST.

Dr. P. Goswami served the Institute as an Honorary Director from May '87 to Jan '96. He left for his heavenly abode on 16th February 1996.

Dr. Goswami was born on 13th June 1925 at Nalbari and had his early education there. Then he studied at Cotton College, Guwahati and Assam Medical College, Dibrugarh. He obtained his Doctorate Degree from Glasgo University in Biochemistry and from Guwahati University in Medicine, Dr. Goswami started his professional career at Guwahati Medical College and retired in 1985. Dr. Goswami was an active scientist and had nearly 60 published papers to his credit. 17 students/ scholars obtained Ph. D. degree under his guidance. Dr. Goswami was closely and actively associated with Assam Science Society. He was a popular writer in biology and medical sciences. During his tenure, Dr. Goswami played the key-role, with his dynamic approach and dedication, towards the development of the Institute. Being extremely amiable and modest person, he won admiration from every individual.

May his noble soul rest in peace.

FOREWORD

It is of great pleasure for me to present before you the ***Annual Reports*** for the year 1994-95 and 1995-96 of the Institute of Advanced Study in Science & Technology, Guwahati. Because of certain unavoidable reasons the two reports are brought and together, although the reports were prepared with a time gap of few months.

I want to keep in record our deep sense of respect and gratitude to ***Dr. P. Goswami***, the former Honorary Director of the Institute, from whom I took over the charge only on First of February 1996, who breathed his last on 16.2.96 afternoon. I shall not forget his smiling face with which he used to greet me whenever I met him. It is indeed a great loss for everybody, particularly for the members of this Institute. May his soul rest in peace.

The Institute of Advanced Study in Science & Technology, presently housed in different rented buildings, has been in a position to establish itself as a research institute in the recent past. The Annual Reports will remain as testimony of the work done by the young scientists of this Institute.

During the years under report the ***Ninth National Symposium on Plasma Science and Technology***, 1994 was hosted by the Institute. The foundation stone of the ***IASST*** complex was laid by the then ***Honourable Chief Minister Late Hiteswar Saikia***. The Division of Mathematical Science was established with a grant from ***DST***, Govt. of India. This division has started functioning. The master plan for the ***IASST*** complex has been accepted and the first instalment of grant for the construction of road, site development, boundary wall construction etc. has been sanctioned by the Govt. of Assam. The survey work, soil testing etc. have been completed, and we proposed to start the work after this rainy season is over.

We are thankful to ***DST***, Govt. of India, ***DSTE***, Govt. of Assam, Department of Biotechnology Govt. of India for their financial support to carry on research activities in different divisions of the Institute.

I thank all the members of the ***IASST*** for their help and co-operation in building up this Institute and hope that during the next five years the Institute will be able to shift to its own complex and also contribute for the development of Science & Technology in the ***NE*** region.

Professor K.C. Barua
Director, IASST.

COUNCIL OF THE INSTITUTE OF ADVANCE STUDY IN SCIENCE AND TECHNOLOGY (1994-95)

1. Dr. P.C. Bora — Chairman
   Former Vice-Chancellor (up to May 1995)

   Prof. D. Chaliha — Chairman
   Former Vice-Chancellor (Sept. 1995)

2. Dr. P. Goswami — Director
   (up to Jan. 1996)

   Dr. K.C. Barua — Director
   (Since Feb. 1996)

3. Dr. Bikash Sinha — Member
   Director, Variable Energy Cyclotron Centre, Sector 1/F, Calcutta-700 004
   (Representative of the DAE, Govt. of India)

4. Dr. A.C. Ghosh — Member
   Director, Regional Research Laboratory, Jorhat.

5. Dr. A.K. Goswami — Member
   Director, ASTEC, Silpukhuri, Guwahati.

6. Dr. D.N. Barthakur — Member
   Former Vice-Chancellor, Assam Agriculture University, Jorhat (Co-opted.)

7. Shri U. Miri — Member
   Director, Technical Education
   Kahilipara, Guwahati

8. Dr. K.C. Barua — Member
   Rector, Dibrugarh University, Dibrugarh.
   (Nominee of V.C., D.U.)

9. Secretary — Member
   Deptt. of Science, Technology & Enviornment, Govt. of Assam, Dispur, Guwahati

10. Secretary — Member
    Department of Education, Govt. of Assam
    Dispur, Guwahati.

11. Dr. B.D. Barua — Member
    President, Assam Science Society, Guwahati.

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    Professor, Deptt. of Physics, Gauhati University Guwahati. (Nominee of the V.C. G.U.)

13. Dr. D.T. Khathing — Member
    Professor & Head of the RSIC,
    North Eastern Hill University, Shillong
    (Nominee of the V.C., NEHU))

14. Dr. P.C. Deka — Member
    Professor & Head of the Department of Biotechnology, A.A.U.
    (Nominee of the V.C., AAU)

15. Dr. K.C. Barua — Member
    Director, Forensic Laboratory, Govt. of Meghalaya, Shillong, (Co-optd.)

16. Dr. G.K.D. Majumdar — Member
    Reader, Deptt. of USIC, Gauhati University Guwahati. (Representative of the Assam Science Society)

17. Dr. P. Azad — Member
    Assistant Professor, IASST, (Representative of Academic staff, IASST)

18. Dr. P. Deka — Member
    General Secretary, Assam Science Society Guwahati.

19. Dr. M.K. Kalita — Member
    Secretary (I/c), IASST

20. Representative from CSIR — Vacant

21. Representative from U.G.C. — Vacant

22. Representative from D.S.T. — Vacant

STAFF OF THE INSTITUTE

Director — **Dr. P. Goswami (up to Jan. '96)**

Director — **Dr. K.C. Barua (Since Feb. '96)**

Plasma Physics Division

1. Dr. Joyanti Chutia — *Associate Professor*
2. Dr. G.C. Das — *Associate Professor*
3. Dr. C.B. Dwivedi — *Assistant Professor*
4. Sri H. Bailung — *Research Assistant*

Life Sciences Division

1. Dr. P. Azad — *Assistant Professor*
2. Dr. J. Kotoky — *Assistant Professor*

Resource Management and Environment Division

1. Dr. L.C. Kagti — *Professor (Hony.)*
2. Dr. S. Deka — *Assistant Professor*

Mathematics & Statistics Division

1. Dr. J. Medhi — *Professor (Hony.)*
2. Dr. B.K. Tamuli — *Professor (Hony.)*
3. Dr. A.K. Agarwal — *Professor & Head*
4. Dr. K.K. Das — *Asstt. Professor*
5. Dr. (Mrs.) M.R. Agarwal — *Asstt. Professor*
6. Sri D.N. Das — *Chief Statistician*

Computer Science Division

1. Sri A. Barman — *Assistant Professor*
2. Sri B. Bora — *Jr. Programmer*
3. Ms. L.B. Mahanta — *Jr. Programmer*
4. Sri N. Bhagobaty — *Senior Instructor*
5. Ms. Madhuri Talukdar — *Instructor*
6. Ms. Prgoti Choudhury — *Instructor*

Visiting Scientists

1. Dr. Y. Nakamura — *Institute of Space and Astrnauiical Science, Tokyo, Japan.*
2. Dr. G.P. Bhattarcharjee — *I.I.T., Kharagpur*
3. Dr. G. Baruah — *I.I.T., Guwahati*
4. Dr. P. Gupta — *I.I.T., Kanpur*
5. Dr. M. Dutta — *Gauhati University*
6. Dr. H.K. Baruah — *Gauhati University*

Research Fellow/Scholar

1. Sri A. Sarma
2. Ms. A. Devi
3. Ms. R. Devi
4. Ms. D. Devi
5. Ms. N. Barua
6. Sri A. Buragohain
7. Sri R. Sarma
8. Sri S. Dey
9. Sri R.P. Bhatta
10. Sri Prasanna Deka
11. Ms. Smita Duorah
12. Sri Kaushik Saha
13. Sri Manab Hazarika
14. Sri Arup K. Deka
15. Sri Ranjan Kalita

Supporting Staff

1. Sri M. Singh
2. Ms. J. Bordoloi
3. Md. S. Talukdar
4. Sri S. Goswami

Administration

1. Dr. M.K. Kalita
   Administrative Officer & Secretary (i/c)
2. Sri M.C. Baruah, *F.A.O. (up to Sept. '95)*
   Md. A Mazid, *F.A.O. (from Oct. '95)*
3. Sri R. Sarma, *P.R.O.*
4. Sri P.K. Deka, *U.D.A.*
5. Sri S. Sarma, *Account*
6. Ms. S. Bora, *L.D.A.*
7. Sri R. Kalita, *L.D.A.*
8. Sri R. Mahanta, *Jr. Accountant*
9. Sri D. Deka, *L.D.A.*
10. Sri K. Baishya, *Library Assistant*
11. Sri Nimai Hazam, *Driver*
12. Sri B. Deka, *Massenger*
13. Sri U. Deka, *Messenger*
14. Sri S. Das, *Messenger*

Laboratory Helper/Watcher

1. Sri T. Talukdar
2. Sri Madan Kalita
3. Sri Gora Gupta
4. Sri N. Goswami
5. Ms. Madhabi Das
6. Sri K. Deka
7. Sri H. Medhi
8. Sri L. Saud
9. Sri A. Pathak
10. Sri Balabhadra Pathak
11. Sri Balen Das
12. Sri Bipul Das
13. Sri Nalini Dutta Lahkar

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RESEARCH AND DEVELOPMENT ACTIVITIES

PLASMA PHYSICS DIVISION

Plasma Physics Division of the IASST is engaged in theoretical and experimental investigations of the linear and non-linear behaviour of the plasma waves/oscillations. These problems are being pursued in different context of the relevant plasma systems ranging from earth to space. For example, theoretical and experimental identification and characterization of he normal modes driven by the plasma sheath in double plasma (DP) device form a major programme of the division.

1. Experimental Programme :

1.1. Double Plasma Device :

It is a device where basic researches in plasma, specially the non-linear phenomena in laboratory plasmas are carried out. The device has two chambers namely, source and target where plasma is produced by hot cathode discharge and confined by multiple magnets. A mesh grid of 85% transparency is placed in between the two chambers. The chamber is evacuated up to $1x10^{-6}$ torr. Pure Ar and SF6 gas are used to produced plasma. Plasma density is 10^8–10^9/cm^3 and temperature is 1-2 eV.

In this device, study of chaotic phenomena, propagation of non-linear ion acoustic waves, modulational instability, sheath phenomena etc, have been carried out.

Different plasma parameters are measured with the help of Langmuir probes, Retarding potential analyzer and emissive probes. External sinusoidal signal, pulse signal or wave packets are launched through plasma from signal generator, pulse generator and function generator. The signals picked up by the probes are recorded and analyzed in X-Y recorder, spectrum analyzer, digitising oscilloscope and PC-AT computer.

The Project on **"Study of chaotic phenomena in plasmas"** financed by DST, Govt. of India under the principal investigator of Dr. Joyanti Chutia was successfully completed on 30th October, 1994.

In this project the following works have been completed during 1994-95.

In the double plasma device, periodic windows are observed with the variation of the amplitude of the external signal when the frequency of the external signal is at the edge of the total suppressed position of the internal oscillation. The period subtracting phenomena are observed when the frequency of the applied signal is lowered. The phase space trajectories and Poincare section using a specially adapted differential circuit to the system are drawn to know the chaotic routes. The strange attractors for chaotic orbits have been identified. Computer simulation shows that the Van der pol oscillations may lead to chaotic processes when higher orders of perturbations are considered.

Some other phenomena like observation of solitary wave propagation through multicomponent plasma are also made. The wave packets which is purely amplitude modulated is found to undergo

steepening leading to formation of a solitary pulse-like structure, while propagating through multicomponent plasma. At large wave amplitude the wave packet splits into two pulses.

Ph.D. Theses submitted :

Mr. Heramba Baillung, Research Assistant and Mr. Anjan Burgohain, Part-time research worker under the supervision of Dr. Joyanti Chutia have submitted their theses on "Nonlinear properties of Ion-Acoustic Waves in Laboratory Plasma" and "Studies of Chaotic Instabilities in Ion-Beam Plasma System" respectively for Ph.D. Degree in the Gauhati University.

2. Theoretical work :

Theoretical aims at the development of he appropriate physical model to understand the linear and non-linear dynamic of the sheath driven instabilities.

Partially ionised plasmas and dusty plasmas constitute the part of the plasma system which have been motivated to the active theoretical research programme of the division to explain certain basic phenomena in plasmas.

Theoretical work is devoted to the description of the linear turbulence, its characteristics and driving mechanism. The study of the non-linear dynamics of the collective plasma waves is centered around the nonlinearily localised coherent structures like solitons, double layers, shocks along with other exciting modes. The aim of our theoretical observations is to advance the knowledge for the future experiments in plasmas to be counted by the scientific community. Especially to relate the actual spectrum of the nonlinear waves in various plasma modes e.g. in homogeneous plasma with experiments, the study is stimulated expeditiously.

This division has carried out an exhaustive research in the field of nonlinear wave propagation under various plasma configurations of unmagnetized/magnetized plasmas. The study of the stability behaviour as well as the interaction dynamics of the various solitons in plasmas have been considered to evolve a consistent theoretical model to explain the observations in laboratory and space plasmas.

In spite of the above mentioned areas, a new approach of the theoretical plasma modeling has been adopted to describe the anomalous transport behaviour of the magnetically confined plasmas. This approach is interdisciplinary in nature and it applies the group-theoretical method to find out the functional form of the transport coefficients. These studies have application in developing the fusion device of appropriate confinement time.

Most of the plasmas occurring in nature and in laboratory are highly uncorrelated. They are characterised by the ideal behaviour. The development of the dynamic model equations for the correlated plasmas is a formidable task. The division is actively involved in the problems of correlated plasmas.

Recently, an attempt to do the theoretical modelling and to find the formation of discharges in plasmas, have been made. Actual modification is focused to the nonlinear wave phenomena on Townsend and discharges keeping in mind that the observation could stimulate the experiment. ✦

MATHEMATICS AND STATISTICS DIVISION

MATHEMATICS :

Professor B.K. Tamuli (Honorary) has completed the draft of the book "Nearings and their Radicals". The contents of the book are the following :

Chapter I : ***Preliminaries :*** Nearings and N-groups; N-subgroups an ideals; Homomorphisms and N-homomorphisms; Maximality in nearings.

Chapter II : ***Ideals of Nearrings :*** Annihilators and Noetherian quotients; Modular ideals; Primitive ideals. Prime ideals.

Chapter III : ***Radicals of Nearrings :*** The radicals Jo(N), Jf(N) and i2(N); the quasi-radical Jh(N); the Prime radical and the Nil radical; Radical properties.

Chapter IV : ***Semi-primitive Nearrings :*** Primitive nearrings; Semi-primitive nearrings; Primitive and Semi-primitive nearrings with d.c.c.; simple nearrings.

As mentioned in last year's report, a distinctive feature of the book is its new approach to the subject matter. It has incorporated current research results and is expected to enable the beginner to steer clear of the details and ensure that the reader does not lose sight of the wood because of the trees and goes straight to the higher regions of the subject.

STATISTICS :

The Institute took up in the middle of 1992-93, a project entitled "Study of the Availability and the Requirements of the S&T Manpower in Assam during next 20 years", sponsored by the Department of Science and Technology (DST), Govt. of India with Prof. J.Medhi as the Principal Investigator.

The field-work connected with the field-survey for collection of primary data on employment of S&T personnel covering the Central and State Govt. departments, all P.S.U.'s autonomous body, Professional and Research institutes, Public and Private Sector industries and other establishments employing S&T personnel, was completed during the year. The data processing work of the field-survey remained in progress in the Computer Centre of the IASST at the end of the year.

Manual tabulation and analysis of the host of secondary data for estimation of current stock of different categories of S&T personnel, their likely availability up to 2010-11A.D. was taken up simultaneously. Time series data on stock of all important categories of S&T manpower were in progress at the end of the year.

A meeting (2nd) of the Project Advisory Committee on the project to review the progress, was held in the month of November, '94, which was attended by most of the members, including Dr. A.R. Rajeswari, Advisor, D.S.T., Govt. of India. The meeting, while expressing satisfaction over the progress, made valuable suggestions regarding analysis and presentation of data in the report. ✦

RESOURCE MANAGEMENT AND ENVIRONMENT DIVISION

Impact of oil exploration on environment has become a serious and wide spread problem all over the world. In India, especially in the North-eastern Region, where petroleum is explored, the problem of pollution of the environment by crude oil contamiation has been expanding to more and more areas. Crude oil contaminationa adversely affects both aquatic and terrestrial eco-system.

Most of the terrestrial ecosystem in oil producing communities are important agricultural lands under seasonal cultivation. Contamination of oil may result damaging the physico-chemical properties and miro habitat of the soil and plant growth.

Investigation already carried out concerns the study of the impact of oil pollution on the physico-chemical properties and the nature of microorganisms present in the soil and growth of rice plants in treated with various concentrations of crude oil in the laboratory condition.

During the first half of year 1994-1995, the following work has been completed :

1. Occurrence of bacterial and fungal population in the crude oil polluted soil collected from specified distances from the OCS/GGS to study the impact of petroleum pollution on microflora.
2. Investigation on the impact of petroleum pollution on soil processing micro-organisms namely ammonifying and free living nitrogen fixing bacteria were carried out in the soil samples collected from specified distances from the OCS.
3. Physico-Chemical properties of the petroleum polluted soil samples were investigated for comparative study on the impact of oil pollution in the vicinity of the oil exploring region and away from it at specific distance.
4. Impact of crude oil pollution in the rice field soil on the growth, development, grain quality, yield an survival of the rice plants were investigated under laboratory condition.

Compilation, data processing and final technical report writing of the project on "A Study on the impact of oil exploration microflora in the rice field of Upper Assam" sponsored by Ministry of Environment and Forests. Govt. of India has been completed.

In continuation of the previous project during the latter part of the 1994-95 special attention has been given to study the occurrence and activities of hydrocarbon degrading microorganisms in the petroleum polluted rice field soil in the vicinity of the oil exploring region of Upper Assam.

Investigation are in progress to enumerate and characterize the hydrocarbon degrading micro-organisms viz. bacteria and fungi in the petroleum polluted rice field soil collected from the oil installation region at Moran.

Attempts has also been made to identify the certain hydrocarbons present in the test soil samples and in crude oil collected from Moran Oil Field for comparative study of Degradation activities performed by soil micro-organisms. ✦

LIFE SCIENCES DIVISION

Research activities of certain priority areas in the fields of Biofertilizer, Bio-chemistry and Muga Silk are being carried out in the Division of Life Sciences.

BIOFERTILIZER : Considering the need of the hour to substitute chemical fertilizer, studies or Rhizobium biofertilizer have been started with collection of effective nodules and Rhizobium soils in respect of Blackgram, Greengram, Lentil, Arhar, Urdbean, Lathyrus and Pea from bench mark sites of six districts viz. Kamrup, Nalbari, Nagaon, Sonitpur, Lakhimpur and Jorhat of Assam to isolate and identify local viable strains of better adaptability and wide host range. Four Field Trial Stations (F.T.S.), Agriculture Deptt., Govt. of Assam viz. Gerua, Teliabebejia, Chariduar and Chuklibaria of the districts viz. Kamrup, Nagaon, Sonitpur and Lakhimpur respectively have also been involved in the project with kind permission from the Director, Agriculture Deptt. Govt. of Assam for sample collection and successive field trial purposes.

Isolation and purification of the Rhizobium isolates (Total 30x10) have been done by most modern techniques. Experiments for selection of efficient Rhizobium strains through laboratory and field test are continuing. Nodulation and nitrogenase activity tests along with characterization of strains with intrinsic antibiotic tests and serogrouping are in progress.

MUGA SILK PROJECT : The technique innovated by Dr. J.N. Talukdar, IASST for indoor rearing of Muga Silkworm which is considered as the spectacular breakthrough in Muga Culture due to its capacity to force the Muga Silkworm contrary to common belief, to feed indoor as normally as on tree, was given demonstration in the residence of Dr. Hemaprabha Saikia, the president of Nagarpalika and the Mayor of Guwahati.

It was a winter season, the most unfavourable time for rearing Muga Silkworm, when the crop under demonstration, was raised. In fact, except during October-November and to some extent during February-March, climate of other seasons of the year are not favourable for rearing Muga Silkworm. Inspite of unfavourable environmental factors, the experiment under demonstration was also quite successful. It is heartening to note that the officers and Scientists of the Central Silk Board and the Govt. of Assam who visited the programme opined that the technique will be useful at least for production of much needed seed cocoon.

Further, a team from the Department of Science and Technology, Govt. of India, New Delhi under the leadership of Dr. (Mrs.) Kamla Kumar, the Jt. Advisor, DST, New Delhi with Dr. S.B.Dandin, Director, Karnataka State Sericulture Research Development Institute, Bangalore as the expert member visited the IASST and on the basis of its recommendation, the DST, New Delhi sectioned recently a 3 year project mainly for popularising and disseminating the technique by arranging demonstration and training programmes.

BIOCHEMISTRY : During the year 1994-95, research activities on the study of the efficacy of some of the selected Medicinal Plants have been undertaken. This group is, at present, engaged in finding the bio-activity, pharmacology and therapeutic values of Medicinal plants used traditionally by the people of this Region.

During the year, the team is working on the plant, "NAPHAFU" Clerodendron Colibrookianum. Walp. used by many ethnic groups in the hilly areas of N.E. Region as a traditional remedy for hypertension. The biochemical, pharmacological as well as clinical properties of the plant was studied from hypolipidaemic and hypotensive point of view by preparing different extracts of the leaves of this plant. The experiments were conducted on male albino rats.

The group has isolated a glycosyl sterol (β-0-β) glucosyl stigmasta-5, 25(27)-diene, a novel compound, along with some other compounds

The mounts of the new and the other compounds of major interest isolated from the plant being small in quantities, new techniques and methodologies have been adopted to isolate and collect a substantial amount of the compounds from the plant to study the efficacy of these compounds on experimental animals. The work is in progress.

The team has also undertaken the study of some Hormones in respect of malnutrition and reproduction along with hepato-protective action of Teminalia Chebula.

The team has collaborative tie-ups in some aspects like sophisticated instrumentation and pharmacological / pharmaceutical studies with Professor Z.N. Hen, Professor & Head, Chemistry and Pharmaceutical Sciences Deptt., Shanghai Second Medical University, China.

SANCTION OF NEW PROJECT :

(a) Project proposal on "Studies on Rhizobium biofertilizer for improvement of Pulse Production in Assam", has been sanctioned by the Deptt. of Biotechnology, Govt. of India to Dr. P. Azad, Asstt. Professor of this Division, vide letter No. BT/R & D/02/04/93 dtd. 22.3.94.

(b) Another project proposal on "Survey Collection and Study on Phytopathogenic Fungi on Cultivated Crops of Assam" has been sanctioned to Dr. P. Azad, Asstt. Professor of this Division by the Assam Science Technology and Environment Council, Silpukhuri, Guwahati, Assam vide letter No. ASTEC.S&T/192/20/94-95/5881 dtd. 21.2.95.

(c) A project on "Development of Muga Culture with special reference to Indoor Rearing Technique" was sanctioned by the Deptt. of Science and Technology, Govt. of India, New Delhi-110 016 for a period of three years vide No. SSD/WS/889/94 dtd. 1.3.1995.

ACADEMIC ACHIEVEMENTS :

1. Mrs. Dipali Devi working in the Muga Silk-worm Project, Life Sciences Division has been awarded Ph.D. by the Gauhati University for her thesis "Effect of seasonal variation on certain enzymes of haemolymph of Anthereae assama Ww." She worked under the guidance of Dr. D.K. Sarma, Reader, Gauhati University.

2. A four membered high powered team of DST, Govt. of India, comprising Dr. (Mrs.) Kamla Kumar, Jt. Advisor, and Dr. (Mrs.) Shashi Ahuja, Principal Scientific Officer of the DST, Govt. of India along with Prof. S.S. Handa, Head, Pharmaceutical Sciences Deptt. Punjab University (presently Director RRL, Jammu) and Dr. O.P. Agarwala, CSIR, New Delhi, visited the Division to study the feasibility of the project on Herbal Medicine, submitted to the DST by this Division for financial assistance.

TRAINING AND SEMINARS :

1. Mr. A.K. Deka, a Junior Research Fellow under the project "Rhizobium-Biofertilizer" has obtained training on Rhizobium Technology in the Microbiology Division, IARI, New Delhi-110 012.
2. Dr. Dipali Devi participated in the National Seminar on "Recent Trends in applied Zoology, held at Gauhati University from 24-25 Feb. 1995.
3. Dr. J. Kotoky, Assistant Professor, Biochemistry Section of the Division of Life Science participated in the 82nd Session of the Indian Science Congress held at Jadavpur University, Calcutta from 3-8th January, 1994.
4. Dr. J. Kotoky participated in a training programme on Herbal Medicine in the Shanghai Second Medical University, China under Professor Ze-Nai CHEN, Head of the Deptt. of Chemistry and pharmaceutical Sciences Deptt. from December 4-11, 1994.
5. Dr. J. Kotoky undertook training on instruction specially on AAS. H.P.D.C. FT-IR and G-C-MS in Singapore sponsored by Shimadzu (Asia-Pacific) Pvt. Ltd. Japan from Dec. 12-17, 1994. ✦

COMPUTER SCIENCE DIVISION :

COMPUTER SCIENCE :

During 1994-95, the Computer Science Division of the Institute of Advanced Study in Science & Technology has generated another batch of trained personnels under the various courses conducted in Computer Science and Application. Moreover, specific jobs were also done for different institutions like Gauhati University, Cotton College, L.C. Bharali College, Assam Engineering Institute etc. The Division has helped in the research programmes of the IASST by providing computer time and consultancy services wherever required. Other jobs included statistical data analysis as well as graph preparation for research scholars of the Institute.

The Computer Science Division has also carried out the data entry and validation work for the project entitled **"Study of the Availability and the Requirements of S&T Manpower in Assam in next 20 year"** sponsored by the Department of Science & Technology (DST), Govt. of India with Prof. J. Medhi as the Principal Investigator.

SPECIALISED PROGRAMMES :

1. The Division, this year also deputed Sri A. Barman, Astt. Professor to Assam Engineering Institute for conducting a One-Week training programme on **"Computer Assembly, Hardware Maintenance & Trouble Shooting"** for the technical staff and students of AEI under the Directorate of Technical Education, Assam.

2. Sri Niranjan Bhagabati, Ms. Progoti Choudhury and Ms. Madhuri Talukdar have been deputed to Assam Administrative Staff College for assisting in the training programmes.

3. Sri Bhogeswar Bora attended the Summer School on **"Microprocessor and its Applications"** with hands on training held from 18th and 19th July, 1994 conducted by the Institute of Electronics & Telecommunication Engineers (India) at Department of Electronics & Telecom. Assam Engineering College, Guwahati.

ACADEMIC ACHIEVEMENT :

1. Sri A. Barman has submitted a dissertation entitled **"Pattern Recognition of Some Specific Assamese Characters with Different Variations in Fonts using the Hopfield Neutral Network"** at Birla Institute of Technology and Science, Pilani in partial fulfilment of the requirements for the award of M.S. Degree in Software System under the supervision of Dr. Prabin Kr. Bora, Ph.D. (IISc. Bangalore), Reader, Department of Electronics Sciences, Gauhati University.

The Computer Science Division has been conducting the following courses in Computer Science and Applications :

(a) Certificate Course of One-month duration.
(b) Certificate Course of Three-month duration.
(c) Certificate Course of Six-month duration.
(d) Post Graduate Diploma in Computer Applications of One year duration.

TRAINING PROGRAMMES :

During the year 1994-95, the number of students trained up through different courses are given below :

Name of Courses conducted	No. of Student Admnted	No. of Student Passed out
1. Post Graduate Diploma in Computer Application (PGDCA)	36	17
2. Certificate Course of Six month duration	35	16
3. Certificate Course of Three month duration	28	18
4. Certificate Course of One month duration	75	60

RESEARCH PUBLICATIONS

PLASMA PHYSICS :

1. Electrostatic shock wave in dusty plasmas C.B. Dwivedi and B.P. Pandey, Physics of Plasmas 2 (1995) 4134.
2. Streaming instability of a dusty plasma in presence of mass and charge variation B.P. Pandey & C.B. Dwivedi. Pramana. J. Physics. 45 (1994) 255.
3. Characteristics aspects on the stability of kadomtsev.· Petviashvili solitary waves in plasmas G.C. Das, M. Gogoi and P. Deka, Planet & Space Science Vol. 42 p. 993, 1994.
4. Propagation of various K-dV solitary waves in an inhomigeneous two temperature electron plasma G.C. Das, S. Surachandra & Kh. I. Singh, Chaos, Soliton & Fractal (1995). Vol 6 (1996) 309.
5. Some aspect of the solitary waves in relativistic inhomogeneous plasma. G.C. Das, S. Duorah, S. Surachandra and C. Uberoi. Planet & Space Science (1995) vol. 44(1996) 485.

MATHEMATICS & STATISTICS :

6. Dey, S. and Sarmah, P. (1995) : "Estimation of parameter of a model of a 1 out of N:G repairable system, "Micro-electronics and Reliability. U.K.

LIFE SCIENCES :

1. Azad, P. (1995) : Biotechnology of Rhizobium Biofertilizer. East conference on Emerging Areas in Science & Technology, RRL Jorhat, C-11, pp.34.
2. Deka, A.K.; Kalita, R. and Azad, P. (1995) : Screening for efficient strains of local Rhizobium strains of Assam. Abs. of papers, Assam Science Society. pp.26.
3. Kalita, R.; Deka, A.K. and Azad, P. (1995) : Search for viable Rhizobium strain(s) with wide host range for improvement of pulse production in Assam. Abs. of papers, Assam Science Society, pp. 71.
4. Talukdar, J.N. (1995) : Symptoms of a Microsporidian infection in the Muga Silk-worm, Antheraea assamensis : effect on egg production and hatching, Sericologia 35(I), pp.55-60.
5. Devi, D. and Sarma, D.K. (1994) : Effect of seasonal variation on the larval haemocytes of Antheraea assama Ww. Journal of Gauhati University, Sci. XXXII.
6. Sarma, D.K. and Devi, D. (1996) : Seasonal variation of the foliar constituents of the primary food plants of Muga Silkworm (Antheraea assama Ww.) Sericologia, 37(1).
7. Sarma, D.K.; Devi D. and Turchetto, M. (1995) : Seasonal variation in the haemolymph free amino acids of the late larval stages of Antheraea assama Ww. Indian Journal of Sericulture, 34(2), pp.122-126.
8. Goswami P.; Kotoky, J.;CHEN Z.N. and Yang, Lu, "A new glycosyl sterol from C. Colibkookianum Walp." proceedings of the 82nd Session of the Indian Science Congress Association (Chemistry Section) held at Calcutta from 3-8 January, 1995.

9. Goswami, P. and Kotoky J. : "Chemical constituents of C. Colibrookianum Walp. a hypotensive plant, proceedings (Chemistry Section) of the 82nd Session of the Indian Science Congress held at Calcutta from 3-8 January, 1995.

PAPERS PRESENTED IN CONFERENCES AND SEMINARS :

1. Measurement of Negative ion density ration in Multicomponent Plasmas. · H. Bailuing, A Buragohain and J. Chutia. 9th National Conference on Plasma S&T, Guwahati (1994) pp.2.
2. Excitation of low frequency instability in ion beam plasma. A. Buragohain, H. Bailung, J. Chutia. 9th National Conference on Plasma S&T. Guwahati (1994) pp.4.
3. Sheath Induce Instability in ion beam plasma systej. J. Chutia & A. Buragohain. Proc. XXII ICPIG. Conference in U.S.A. (1995).
4. G.C. Das : On Kadomtsev-Petivashvili Solitary Waves in interplanery Space-plasmas.

Present in 9th National Sympo. on Plasma Science & Technology (Plasma 94) held on November 14-17, 1994 at IASST, Khanapara, Guwahati-781 022, Assam.

5. G.C. Das : On Arc Formation in Elenbaas-Heller plasma model, present in 9th National Symp. on Plasma Science & Technology (Plasma 94) held on November 14-17, 1994 at IASST, Khanapara, Guwahati-781 022, Assam.
6. G.C. Das and S.S. Singh : Observations of solitary waves and corresponding doble layers in relativistic inhomogeneous space plasma. International Conference on Plasma Physics organised by ICPP held at Foz do Iguacu-Parana, Brazil on October 24-28, 1994.
7. G.C. Das and S. Duorah : Plasma Heating by Resonant Absorption of Low Frequency Waves in the Ionosphere, 6th Manipur Science Congress held on November 23-25, 1994 at Manipur University, Manipur.
8. C. Uberoi and G.C. Deka : Generalised Hall-MHD Model for the study of Kinetic effects on Alfren waves. 9th National Symposium on Plasma '94 Guwahati, 1994.
9. S. Deka : Hydrocarbon degrading micro-organisms and its prospective to control the problem of environmental pollution. (Abstract). National Seminar on sustainable developmental strategy for India, 15th September to 17th September, 1994 held at JNU College, Pasighat, Arunachal Pradesh.
10. A. Devi, S. Deka, H.P. Barthakur and L.C. Kagti L Impact of Gas flaring on physico-chemical properties and occurrence of microflora in rice soil at Geleky oil field of Assam, (Abstract) Ann. Tech. Ses. Assam Science Society (1994)
11. S. Deka and C.K. Baruah : Sources and quantities of Carbonhydrate for the growth of Rhizobia Sp. (Abstract) Ann. Tech. Ses., Assam Science Society (1994).
12. A. Devi, H.P. Barthakur and K.G. Bhattacharya : Determination of a few metals in top soil of oil fields in Upper Assam. Paper presented at National Seminar on New Horizons in Analytical chemistry 23-24 February, 1995 at Indian Institute of Chemical Technology, Hyderabad.

RESEARCH REPORTS :

1. Instability and transport in an ectrostatically levilated equilibrium of dust, K. Avinash, C.B. Dwivedi & B.P. Pandey, Report No. IPR/RR-126/94, October 1994.

ACADEMIC VISIT :

Mr. Arun Sarma, JRF, attended the 4th SERC School held during May-June, 1994 at Saha Institute of Nuclear Physics, Calcutta.

Dr. Joyanti Chutia was invited by the Head of the Physics and Astro-Physics Department, Delhi University for 10 days with effect from 3.3.95 to visit the plasma laboratory and to deliver talks. During the visit the knowledge of technical knowhow of Dense Plasma-Focus which is a suitable source of high energetic electronic beam, ion beam, neutron beam and softX-ray beam was imparted. The application of Dense Plasma Focus in different field was also discussed. The knowledge of designing of laser shadowgraphy. Two talks were related to low frequency sheath instability and chaotic instability in ion plasma system.

Dr. C.B. Dwivedi visited the Institute of Plasma Research in Gandhi Nagar in Dec.-Jan., 1994-95 and delivered talks on "Theoretical Modelling of Sheath Induced Instability and Effect of Radiative Cooling on Jeans instability."

Dr. G.C. Das attended the 6th Manipur Science Congress held at Manipur University in 23-25 November, 1995 and presented the research paper. He also delivered a series of lectures in the Department of Mathematics, Manipur University.

Dr. G.C. Das Visited the Indian Institute of Science, Bangalore and during May-June, 1994 gave a talk on "The Nonlinear Phenomena in Plasmas". He visited IISc. again on inter-institute collaborative research in March 1995.

Dr. S. Deka and Miss A. Devi participated at the workshop on Development on Ecology organised by ASTEC held on 25-29 October, 1994.

Dr. S. Deka participated as a resource person in the workshop of Secondary School Science Teacher organised by Assam Scinece Society held on 12th December, 1994 at Chhaygaon H.S. School.

Dr. S. Deka presented a paper in National Seminar on sustainable developmental strategy of India held on 14-17 September, 1994 at Pasidiat College, Arunachal Pradesh.

Miss A. Devi Presented a paper in National Seminar on New Horizon in Analytical Chemistry held on 23-24 February, 1995 at Indian Institute of Chemical Technology, Hyderabad. ✦

SEMINAR/CONFERENCE ORGANISED

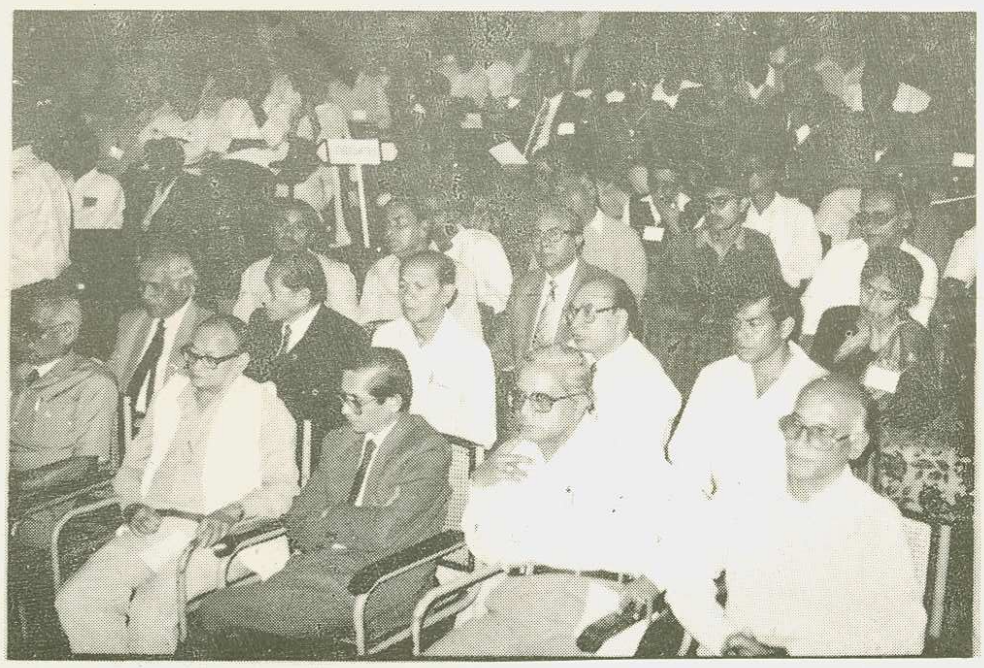
1. Dr. (Mrs.) Meenaxi Bhattarcharyee, Assistant Professor, Mathematical Sciences Division, IASST delivered talk ***"Post Graduate Teaching of Mathematics in India & Abroad."***
2. Dr. J. Chutia, Associated Professor, IASST and Dr. G.C. Das, Associate Professor, IASST, delivered talk on ***" Future of Plasma Physics Research and possible Application of Plasmas."***
3. Dr. J. Kotoky, Assistant Professor, Life Science Division, IASST, delivered talk on ***"Phytochemistry guided biological assays of medicinal plants."***
4. Dr. S. Deka, Assistant Professor, Resource Management and Environment Division, IASST, delivered talk on ***"Role of Microorganism in petrolium polluted soil."***
5. Sri Deepak Goswami, Principal System Anslyst, N.I.C., Govt. of India, Guwahati-6, delivered talk on ***"Graphic presentation."***
6. Sri Anupam Barman, Assistant Professor, Computer Science Division, IASST, delivered talk on ***"Computer Simulation."***
7. Sri A.K. Singh, Principal System Analyst, N.I.C. Govt. of India, Guwahati-6, delivered talk on ***"Computer Network and Socio-economic Development of the Country."*** ✦

NINTH NATIONAL SYMPOSIUM ON PLASMA SCIENCE AND TECHNOLOGY

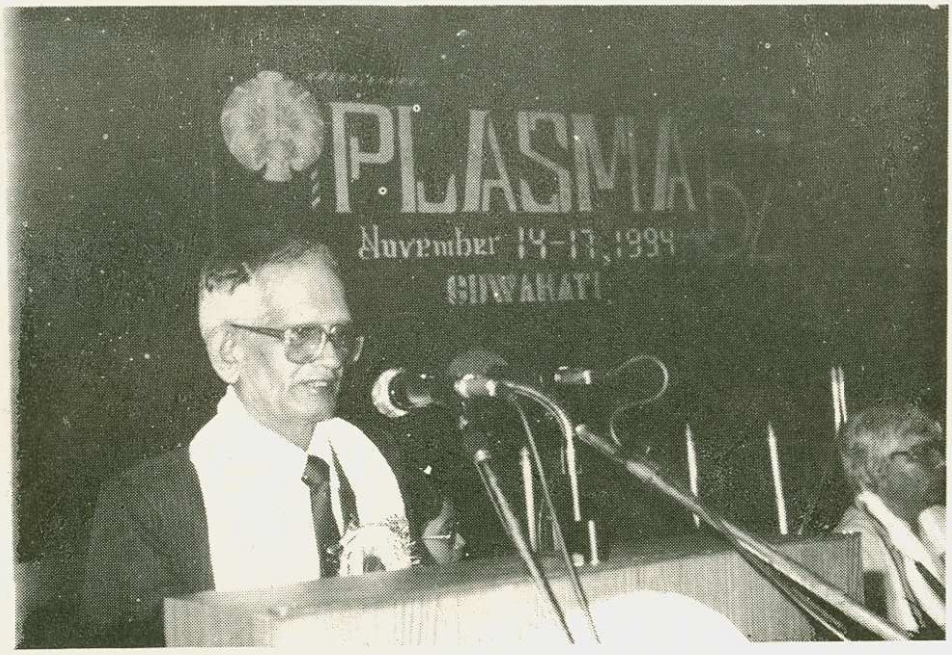
The 9th National Symposium on Plasma Science and Technology was organised with Dr. Joyanti Chutia as the organising Secretary under the aegis of IASST from 14-17 November, 1994. About 200 delegates from the length and breadth of the country gathered for the purpose. The participation and deliberation of Indian top ranking scientists on Plasma Science and Technology made the symposium very fruitful for the community of the Plasma Scientists. In a glittering but solemn function on the morning hours of the 14th November, in the absence of the Chief Minister, it was inaugurated by Sri Haren Bhumij, the honourable Minister for Science, Technology and Environment. At the onset, the delegates were welcomed by Dr. P. Goswami, Director of IASST.

The function was chaired by Dr. P.C. Bora, Chairman, Council of IASST. The souvenir brought out to mark the occasion has been released by Sri Haren Bhumij, the Minister of Science, Technology and Environment. Distinguished scientist Dr. (Ms.) Bimala Buti, Dr. Y.C. Saxena addressed the gathering as guest of honour. They highlighted the importance of research in Pasma Physics which is at present not getting the frontline importance though there is immense possibility of harnessing the non-conventional source of energy by Plasma Research. The key-note address on "Fusion Research in India" was delivered by Prof. P.K. Kaw, Director, Institute for Plasma Research. He explained briefly but minutely the present status of Fusion Research in Tokomak which has been a Scientific marvel in the field of fusion reactor where controlled Thermo-nuclear reaction can occur to release energy as is happening in the Sun day in day out. He mentioned the research work carried out in Aditya, the first Tokomak in India at the Institute of Plasma Physics. Further work plan and application of steady state technology for fusion reaction was also described in such a lucid manner that even a man of non-scientific background could follow some of what is going around the world in the field of fusion reaction. He was optimistic and hopeful about the possibility of generating energy by fusion process. In the subsequent days of the technical sessions the scientist from Institute of Plasma Research, Centre for Advanced Technology, Bhabha Atomic Research Centre, Physical Research Laboratory, Indian Institute of Technology, Saha Institute of Nuclear Physics, Indian Institute of Science talked on different aspects of Plasma Physics. There were total fourteen number of invited talks. In the poster sessions, where 150 number of posters were displayed and the scientists actively took part and interact through active discussions on posters. In the 9th National Symposium on Plasma Science and Technology, the participants could provide a forum for the scientist to exchange their views for creating new ideas for achieving a breakthrough in the generation of fusion energy which is drawing the attention of the scientist community all over the world and also in the industrial applications of Plasma Physics, the possibility of application of plasma in different industries were explored. ✦

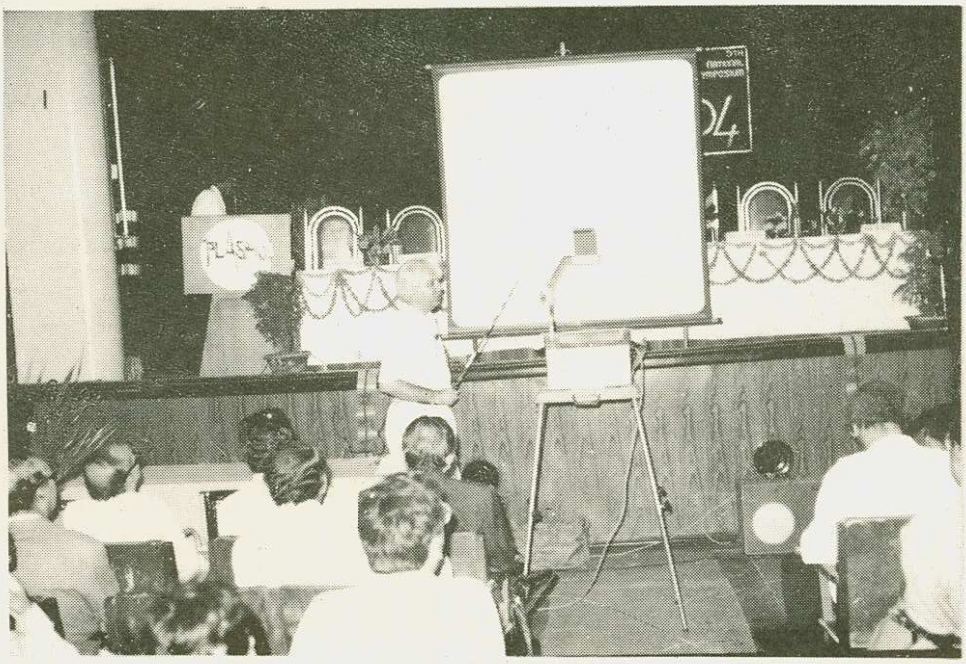
Inaugural session of Ninth National Symposium on Plasma '94



A section of the audience in the inaugural function of Plasma '94



Dr. P. Goswami, Director of IASST delivering the welcome address



Prof. P.K. Kaw, Director, IPR delivering the Key-note address

Sixteenth anniversary function of the Institute

A section of the audience in the anniversery function

ON GOING PROJECTS

1. Study of Chaotic Phenomena in Plasmas	Ministry of Science and Technology, Govt. of India.
2. Study of Availability and Requirements of S&T Manpower in the State of Assam in the next 20 years.	Ministry of Technology & Environment Council, Govt. of India.
3. Studies on some aspects of Muga Silk Worm, Antheraea Assamesis	Assam Science, Technology and Environment Council, Govt. of Assam.
4. Development of Mathematical Sciences Division, IASST	Ministry of Science and Technology, Govt. of India.
5. Development of Muga Culture with special reference to indoor rearing technique	Ministry of Science and Technology, Govt. of India.
6. Studies on Rhizobium Biofertilizer for improvment of pulse production in Assam	Department of Biotechnology, Govt. of India.
7. Survey Collection and Study on Phytopathogenic Fungi on Cultivated Crops of Assam	Assam Science Technology and Environment Council, Guwahati.
8. Development of Muga Culture with Special Reference to Indoor Rearing Technique.	Deptt. of Science and Technology, Govt. of India.

INSTITUTE OF ADVANCED STUDY IN SCIENCE AND TECHNOLOGY
ANNUAL ACCOUNTS OF RECEIPTS AND PAYMENTS FOR THE YEAR 1994-95

RECEIPTS		PAYMENTS	
Particulars of Receipts	*Amounts (Rs.)*	*Heads of Payments*	*Amounts (Rs.)*
1. Opening Balance (Including Reserved)	11,83,448.74	1. General Office Management Plasma Physics, Life Sciences Resource Management and Computer	42,02,782.20
2. Grants from Govt. of India No STS/05/04/90 DST. Dtd. 5.8.94 for Manpower	2,80,000.00	2. IASST, General	12,120.40
3. Grants from Govt. of India No. BT/RRD/02/04/93. Dtd. 22.3.94 for Biofertilizer	6,55,000.00	3. Education	3,00,086.00
4. Grants from Govt. of India No. DST/MS/IRHPA 001/93 Dtd. 24.3.94 for Mathematics & Statistics	5,00,000.00	4. Mathmatics & Statistics	1,93,801.00
5. Grants from Govt. of India No. SP/S2/V05/94. Dtd. 13.3.95 for Sheath Induced.	3,69,226.00	5 Biofertilizer	4,68,269.00
6. Grants from Govt. of India No. 35D/IVS/889/94. Dtd. 1.3.95 for Biotechnology Muga Silk culture	3,00,000.00	6. Manpower	3,60,344.00
7. Grants from Govt. of Assam No. STE/47/91/172. Dtd. 2.9.94 of General Office Management etc.	40,00,000.00	7. Sheath Induced etc.	38,657.00
8. Grants from Govt. of India No. B(2)H. 125/93/12. Dtd. 29.3.94 for —do—	1,00,000.00	8. Biotechnology Muga Culture	38,049.00
9. Other Receipt —do—	84,180.00	9. Closing Balance (including Reserve of Rs. 2 lakhs)	22,04,778.28
10.IASST General, Fees Receipts & Interest	3,47,032.14		
TOTAL	*Rs. 78,18,886.88*	*TOTAL*	*Rs. 78,18,886.88*

Contents (1995-96)

- Plasma Physics Division 1
- Mathematical Science Division 5
- Life Sciences Division 7
- Resource Management & Environmental Division 9
- S & T Manpower Study Cell 11
- Computer Science Division 12
- On-going Projects 13
- Receipts & Payments A/c for the year 1995-96 15

PLASMA PHYSICS DIVISION

Research and Development activities

A. Experimental :

(I) The propagation of envelope of soliton in nonlinear despersive media such as fluids, optical fibre has been condisered as a subject of recent interest. Argon Plasma, however, does not fulfil the condition for generation of envelope soliton due to positive group velocity dispersion and an initial wave envelope breaks into number of components.

An attemp was made to investigte the nonlinear propagation of ion acoustic wave packet in multi component plasma with negative ions produced by injecting SF6 gas into Ar-Plasma. Uniform Plasma density was maintained throughout the experimental region using multdipole magnets for surface plasma confinement. The Plasma Parameters measured with the help of Langmuir probe and ion envergy analyser were plasma density 10^8 - 10^9 cm3, electorn temperature Te=1-2eV and ion temperature Ti=0,!eV. The negative to positive ion density reation was maintained in between 0.2-0.35.

Both the ion acoustic compressive and rarefactive solitary waves were used as a diagnostic tool as ensure the role of negative ion injected into the AR-Plasma. The modified K-dV equation supported the evolution of both compressive and rarefactive solitary waves in multicomponent plasma with negative ions at the critical plasma with negative ions at the critical density ratio.

The evolution of ion acoustic wave envelope was examined by applying a purely amplitude modulated wave packet into the anode of the source chamber. Near the critical density ratio of negative to positive ions the inital large amplitude wave envelope separates out into two wave packets moving at different speed along the axis of the plasma volume. The wave packet steepens leading to the formation of solitary pulse like structure when the wave amplitude of the evolution is maximum at the centre and radially falls linearly. But for high amplitude wave, the radial fall of the amplitude from the centre is oscillatory.

The observed results could not be explained by K-dV equation. However, nonlinear Schrodinger equation including the contribution of negative ions and trapped particles may be accounted for explanation.

(II) The low frequency instabillity due to sheath around the grid in a double plasma device and the physical mechanism for the excitation of instability are being studied in detail at our laboratory.

The potential near the sheath and in the plasma were measured withe help of an emissive probe when the probe emission is very strong. The floating potential were measured across a 10 M..resistance.

The plasma potential suffers a sharp fall at the ion rich sheath edge and a knee was observed in plasma potential profile. The threshold condition for excitation of the instability were examined and dependence of frequency of instability was studied under combined effect of sheath and ion beam.

From the experimental study it was found that the sheath follows the child Langmuir Law and the frequency of instability varies inversely withe sheath thickness. Hence the transit time model is considered to explain the observed phenomena. It was also noted that three ion beams in the target plasma were necessary to excite the instability.

They are :

(i) The ions which entered the sheath from the target Plasma at Bohm speed.

(ii) The reflected ions at the potential hill (due to higher source plasma potential) from the sheath towards the target chamber.

(iii) The free fall ions due to plasma potential difference between source and target plasma.

The instability growth was also examined by applying a test wave which interacts with the internal oscillations when their frequencies were nearly equal. Typical interferometer method was used to detect the growth.

It was established that the instability was excited in the presheath region only when the ratio of free-fall ion beam velocity to the reflected ion beam velocity fall within 0.5 and 2.0.

B. Theoretical :

Research work carried out within the academic year of 1995-96 comprises of theoretical problems of various nature in the context of different plasma system.

In the light of the charged dust grains, the Jeans instability has been revisited to understand the role of the grains on the gravitational Collapse of the self gravitating dust grains. It is demonstrated that in relevance to planetary rings and interstsllar media, the inclusion of the ion dynamics cannot cause additional destabilisation of the self gravitating dusty plasma as claimed earlier. It is further shown that the streaming of the cold ions enhances the Jeans condensation. Consistency of the result with the previous work and new aspects arising owing to the consideration of ion dynamic is discussed.

It is found that the radiative cooling of the electrons due to trace elements overwhelms the gravitational collapse. It is attributed to the acoustic stabilisation of the Jeans instability and plays an important role in the process of gravitational collapse and eventually in star formation.

A set of new model equations has been developed to describe the collective behaviour of a weakly correlated plasma system. A simple but novel physical model has been proposed to understand the dispersion characteristics and driving mechanism of the ion-rich sheath driven instability.

A novel scale invariance technique has been employed to discuss the ni driven turbulent transport within a new fluid model. The analysis reveals the decisive role of the finite Larmor radius effect to determine the fluctuation form of the transport co-efficient. It is shown that the approximations considered by earlier workers are qualified with additional requirements within the new fluid approach. Application of the results in fusion research is highlighted.

An attempt in finding the various characteristics role of soliton propagation in plasmas has been made by the augmentation of Korteweg-de Vries, Kadomit. Sev-Petviashvili and kortewed-deVrics-Zakharov equations. The aim is to know the mechanism of the formation of different solitary waves linking with those observations made by satellites in space-plasmas. Many new findings stemming from the theoretical observation provide an advanced knowledge in stimulating further observation in various plasma configuration.

Recently, based on the linear perturbation technique employed to the system of equations governing the plasma contamined by more massive dust particles, a linear dispersion relation is derived to study the EMW instability driven by the kinetic energy of the dusty particles. The study mechanism

will motivate to explain certain basic phenomena in solar system, magneto-sphere, auroras, cometary tails, solar wing etc.

A very important feature of Alfven waves in plasmas has been explore with a view to showing its application in heating the coronal plasmas. Formation of kinetic Alfven waves in Hall-MHD model plasma shows a better understanding of the Alfven work. The work expects to explain the theory of absorption of Alfven waves given in recent modelling of plasmas with having neutrals and dust grains in multi component plasmas which could be the new features as well.

Recently, the discharge phenomena, in a Elenbass-Heller Plasma model have been aimed as shown in the formation of sparking discharges developed rapidly in plasma column.

VISIT TO INSTITUTE

(i) Dr. C.B. Dwivedi visited the Institute for Plasma Research, Gandhinagar under the SERC Fellowship Programme of DST, Govt. of India during 1st May-31st July '95. During the visit he gave a talk on "collective models in dusty Plasma."

(ii) Dr. Joyanti Chutia visited the Institute for Plasma Research, Gandhinagar to discuss with the experts for the project on "Development of Plasma Physics Division at IASST" during July 1995.

(iii) Dr. C.B. Dwivedi visited Institute of Geomagnetism, Bombay during 1-7 August 1995 and delivered a talk on "Correlation effect in non ideal Plasma."

(iv) Mr. A. Sarma attended SERC School at IPR, Gujarat during December 1995.

Research Publications

1. Theoretical Modeling of a Weak Correlation effect in a non-ideal Plasma C.B. Dwivedi and V.M. Bannur Physics of Plasmas 3(2), (1996), pp. 685.
2. Scaling laws for Plasma transport due to ni-driven turbulence, C.B. Dwivedi and M. Bhattarcharjee Pramana-J. Physics 46(3), (1996), pp. 229.
3. Effect of radiative condensation on Jeans Instability. C.B. Dwivedi, R. Singh and K. Avinash Physica Scripta, vol 53, (1996), pp. 760.
4. Ion dynamics and gravitational instability of a dusty Plasma, B.P. Pandey and C.B. Dwivedi, J. Plasma Physics, vol. 55, (1996), pp. 395.
5. Propagation of Solitary Ion Wave packet in Multi-component Plasma with negative Ion. H.Bailung, Joyanti Chutia and Y. Nakamura, Chaos, Solitons & Fractals 7 No.1 (1996), pp. 21.
6. Observation of Beam Enhanced Sheath Instability in a D-P device. A Sarma, H. Bailung and Joyanti Chutia, Physics of Plasma. vol. 3 No. 9 (1996), pp. 3245.

Papers Presented in Conferences

1. Study of ion sheath properties in D.P. device. A. Sarma, H. Bailung and Joyanti Chutia Proceedings of 10th National Symposium on Plasma BHU, Varanasi, October 1995.
2. Basic Study in sheath instabilities. A Sarma, H. Bailung and Joyanti Chutia. Proceedings of 10th National Symposium on Plasma BHU, Varanasi, October 1995.

3. Sheath-driven low frequency Instability C.B. Dwivedi Proceedings of 10th Natioanl Symposium on Plasma BHU, Varanasi, October 1995.
4. Characteris Behaviour of Kadomtsev Petiviashvili Solitary waves in Interplanetary Plasma. G.C. Das, P. Deka and S. Duorah Proceedings of 10th National Symposium on Plasma BHU. Varanasi, October, 1995.
5. Excitation of Ion-Acoustic waves in Muticomponent Plasma. G.C. Das. Proceedings of 10th National Symposium on Plasma BHU. Varanasi, October, 1995.
6. Transient behaviour of small amplitude ion acoustic solitary waves in relativistic plasmas, G.C. Das and K.M. Sen. Proceedings of 10th National Symposium on Plasma BHU. Varanasi, October, 1995.
7. Model of arc formation in Elenbass steller plasmas. G.C. Das Proceedings of 10th National Symposium on Plasma BHU. Varanasi, October, 1995.
8. Surface Plasma Oscillations of a Multi-ion magnetised plasma. G.C. Das Proceedings of 10th National Symposium on Plasma BHU. Varanasi, October, 1995.
9. Streaming Instability in magneto-dusty Plasma-C.B. Dwivedi, G.C. Das, M.K. Kalita and B.C. Kalita. Annual Conference, Assam Science Society (1995).

Seminars Attended

1. Dr. C.B. Dwivedi delivered an invited talk on "Sheath driven low frequency instability in Plasmas", in the 10th National Symposium on Plasma BHU. Varanasi, October, 1995.
2. Dr. Joyanti Chutia delivered a talk on "Plasma and it Application" in February (1996) in Assam Science Society.
3. Dr. C.B. Dwivedi delivered a talk on "Dusty Plasma : Issues and Challenges" at IASST on 1 Sept. 1995.
4. Dr. C.B. Dwivedi delivered a talk on "Recent Problems in dusty Plasma" at CPP in Sept. 1995.
5. Dr. G.C. Das delivered a talk on "The Formation of Arc. Discharge in Plasma Column and Its Feasibility in Modern Research" at IASST.
6. Mr. Arun Sarma delivered two talks on "Magnetic Reconnection"at IASST during Feb. 1995.

9. Any change in the Division : No
10. Any other important activity :
    (a) A prestigious Scientific award namely Dr. Biraj Mohan Das Memorial Science Award was conferred on Dr. C.B. Dwivedi.
    (b) A trust under the name and title "Trust For Development of Plasma Physics Research" was formed. ✦

MATHEMATICAL SCIENCE DIVISION

Research and Development activities :

Mathematical Science :

The Mathematical Science Division is engaged in carrying out research in the following four areas.

(i) q-Series and partition theory, (ii) Probability and Statistics, (3) Operator theory and (iv) Harmonic Analysis.

1. Q-SERIES AND PARTITION THEORY :

A series involving rising q-factorials $(a;q)_n$ defined by

$$(a;q)_n = \sum_{i=0}^{\infty} \frac{(1-aq^i)}{(1-aq^{n+i})}$$, is called a "basic series" or "Eulerian series" or "q-series".

Following are two very famous q-series identities called Rogers-Ramanujan identities :

1. $$\sum_{n=0}^{\infty} \frac{q^{n^2}}{(q;q)_n} = \prod_{n=1}^{\infty} (1-q^{5n-1})^{-1} \quad (1-q^{5n-4})^{-1}$$

2. $$\sum_{n=0}^{\infty} \frac{q^{n^{2+}+n}}{(q;q)_n} = \prod_{n=1}^{\infty} (1-q^{5n-2})^{-1} \quad (1-q^{5n-3})^{-1}$$

Using Euler's classical partitions these identities were interpreted combinatorially by P.A. Mac Mahon. Latter A.K. Agarwal and G.E. Andrews introduced a new class of partitions called n-colour partitions and they used these new combinatorial objects for interpreting several analytical identities combinatorially. Further properties of n-colour partitions such as graphical representation, conjugate and self-conjugate n-colour partitins, relationship with other known combinatorial objects are being studied . We hope that parallel to the theory of classical partitions of Euler a complete theory for n-colour partitions can be developed.

2. PROBABILITY AND STATISTICS :

Multivarate Abel Series distribution and generalized quasi factorial series distributions are defined. On specializing parameters there generalized distributions lead to some well known as well as some new distributions. Various applications are found.

A classical generilized poisson distributions (GPDs) has been studied defining some new exponential class of sums. The suitability of these distributions are found in some real life situations. Bivariate distributions of GPDs are also studied.

3. HARMONIC ANALYSIS :

An eminent problem in Korovkin Approximation theory is to characterize the commutative Banach algebras A C in terms of the structure space (A) which admit a finite universal Korovkin set if it exists. We are interestd in this problem for certain commutative Banach algeras defined on locally compact groups which are also of current interest in Harmonic Analysis. We have been succeeded in solving the problem for the following Banach algebras:

1. $Z(l^1(G))$, the centre of group algebra, where G is a (i) non abelian compact group, (ii) connected $[SIN]$ group, (iii) $[Z]$ group such that $G=KZ$, where K is a compact open normal subgroup of G and Z is the centre of G.
2. Segal algebra $S(G)$, where G is a compact abelian group.
3. The centre, $Z(S(G))$, of a segal algebra, where G is a non abelian compact group.

We also have succeeded in solving the problem (w.r.t. positive spectral contraction operations) in a Segal algebra $SCG)$, where G is a locally compact abelian group. At present we are investigating the problem for $Z(L^1(G)$, where G is an $[IN]$ group and also for $Z(L_w^I(G))$, the centre for Beurling algebra. Many other interesting Banach algebras are planned to work on, subsequently.

Research Publications

1. A.K. Agarwal, "New classes of infinite 3-way partition identities", ARS combinatorica (Canada), vol. 44 (1996)
2. A.K. Agarwal & R. Balasubramanian, "Generalized jonal numbers and a new class of partitions". J. Indian Math. Soc., vol. 61 no. 3-4 (1995) pp.153-160.
3. K.K. Das, S.B. Nandi & I.D.C. Nath, "Characterization of some discrete Distributions, contributions to Appl. Math. Statist. 1 (1995) pp.20-24.
4. S.B. Nandi and K.K. Das, A family of the multivariate Abel series distributions. Sankhya, Series A, pt. 2 (1996) pp.252-263.
5. M.R. Agarwal and U.B. Tewari, On existence of finite universal Korovkin sets in the centre of group algebras, Monatshefte Fur Mathematick, (Accepted).
6. M.R. Agarwal and U.B. Tewari, On existence of finite universal Korovkin sets in Segal algebras, Rendiconti del Circolo di Matematico di Palermo, (Accepted).
7. M.R. Agarwal and U.B. Tewari, On universal Korovkin sets w.r.t. positive spectral contraction operators, rendicanti del circolo di matematico di Palermo, (Accepted).

Other Activities

Division members have been participating in the Monthly Mathematics Seminar Programme at IIT, Guwahati.

Seminars Attended

1. M.R. Agarwal Participated in the "Discussion Meeting on Harmonic Analysis" held at university of Delhi, South Campus, Delhi from 24th to 26th March, 1996 and gave a talk on "On a problem of Korovkin Approximation Theory in Harmonic Analysis."
2. K.K. Das presented his paper (with S.B. Nandi and D.C. Nath) "Some probability model on predetermined point of attraction" in the Seminar on "Statistics and Operations Research: their applications to diverse fields" held at Gauhati University, Dec. 30-31, 1995. ✦

LIFE SCIENCES DIVISION

Research and Development Activities

Biofertilizer, Phytopathogenic fungi, Phyto-Chemistry of medicinal herbs and Muga Silk are certain priority areas in which research activities are being carried out in the Division of Life Sciences.

BIOFERTILIZER

Isolated and purified Rhizobium isolates have been maintained for six districts viz. Kamrup, Nalbari, Nagaon, Sonitpur, Lakhimpur and Jorhat of Assam for screening viable efficient strains of native Rhizobia, Nodulation test both in the laboratory and in the field are continuing along with the intrinsic antibiotic tests for charaterisation of the strains. Nitrogenase activity and serogrouping tests will be followed after antibiotic market test.

PHYTOPATHOGENIC FUNGI

Epidemiological studies of certain major disease of economic crops like sheath blight and blast diseases of rice, late blight of potato and tomato, red-rot of sugarcane etc. have been initiated for diseases forecasting, prevent and protect crop loss disease free and disease prone zones will be determined for major crops for future crop planning in Assam.

MUGA SILK

As envisaged in the project proposal field testing in Demonstration of the indoor rearing technique of Muga Silkworm was carried out in the village Ganapati, Rani of Kamrup District. Rearing was performed during the winter months (Nov.-Dec.) in the year 1995 involving the rearers of five muga growing families of the village. Dr. (Mrs.) Kamla Kumar, the Joint Advisor, DST Govt. of India and Manjit Singh Jolly who came to Guwahati in connection with the Annual Review meeting, for the year 1994-95 as leader and one of the expert members of the team respectively also visited the rearing.

Two laboratory rearings were performed during Nov.-Dec. '95 and March-April '96 to make behavioural study of the muga silk worm larves. The escaping behaviour of the first instar larves from the rearing trays which cause problem during rearing was more or less prevented by using clean dry sand as a barrier in the rearing tray.

Experiments were designed for the evaluation of moisture, protein and carbohydrate contents of "som" and "sualo" leaves. Moisture content of the leaves for early spring is determined. 62.32% and 61.3% moisture were recorded in the control group for "som" and "sualo" leaves respectively. Experiments for determination of the same in preserved leaves is also initiated. Confirmatory result is yet to obtain.

PHYTO CHEMISTRY OF MEDICINAL HERBS

In continuation of the earlier work on the study on the study of phytochemical and biochemical studies on C. Colibrookianum with respect to hypertension. The group in this section is engaged in

screening the active fraction(s) of the plant responsible for the activity. Different organic solvents have been used for fractionation and the fraction following standard procedures have been administered to the experimental animals to evaluate the activities. The work on ethyl acetate fraction has been completed and found remarkable activity of this fraction on different blood biochemical parameters with respect ot hypertension. The phytochemical and biochemical analysis of the Mectt extract have been taken up and the work is in final state.

Research Publication :

1. Seasonal varations in the haemolymph free aminoacids of Antheraea assama w.w. D.K. Sharma, D.Devi and M.Turchetto, Ind. J. Seric. vol. 34 no. 2 (1995), pp. 122-125.
2. A sterol Glycoside from leaves of clerodendron colibrodiamum, J. Kotoky, P. Goswami, Z.N. Chen, Y. Lu., Phytochemistry, vol. 41, no. 1 (1996), pp. 279-81.

Papers presented in Seminars/Conference

(i) Azad, P. (1995) : Biotechnology of Rhizobium Biofertiliser. East conference on Emerging areas in Science & Technology, RRL. Jorhat, pp. 34

(ii) Deka, A.K. ; Kalita , R.K. and Azad P. (1995) : Screening for efficient strains of local Rhizobium strains of Assam. Abs of papers, Assam Science Society. pp. 26.

(iii) Kalita, R.K., Deka, A.K. and Azad, P. (1995) : Search for viable Rhizobium strains(s) with wide host range for improvement of pulse production in Assam. Abs. of papers, Assam Science Society, pp. 71

(iv) J. Kotoky, "Study of the Metallic contents of some medicinal plant", "Proceedings of the thirty second Annual convention of chemists." held at University of Rajasthan, Jaipur from 26-29 Dec. '95.

(v) P. Goswami and J. Kotoky, "Study of the Metallic contents of C.Colicrookianum walp., a potent hypotensive plant." 83rd annual session of the Indian Science Congress Association", held at Patiala, from 3-8 Jan '96. Chemistry section, pp. 19.

(vi) Goswami P. and Devi. R. : Effect of ethyl acetate extract on blood biochemical parameters Ann. Tech. session Assam Science Society, 1995 (Abstract published).

Other activities

1. Field demonstration of indoor rearing method at Ganapati, Rani, Kamrup during November '95.
2. Indoor rearing technique was exhibited with live demonstration at the Goreswar session of Bodo-Sahitya Sabha from 16-18 February, 1996.
3. Dr. (Mrs.) Dipali Devi, Research scientist have been awarded National Associateship and complete 6 months Post Directoral training at MCB, I.I. Sc., Bangalore under the Supervision of Prof. K.P. Gopinathan.
4. Dr. J. Kotoky participated in the FT-NMR workshop held in RSIC, NEHU, Shillong from 17-22 October 1995.
5. Dr. J. Kotoky participated in the 83rd Annual Session of Indian Science Congress held at University of Patiala, Punjab from 3-8 January '96. ✦

RESOURCE MANAGEMENT AND ENVIRONMENT DIVISION

Research and Development Activities

The Resource Management and Environment Division, IASST was established on 4th, March 1991 to work on a research project entitled "Impact of oil exploration on microflora in rice field soil of upper Assam" sponsored by ministry of Environment and forests, Govt. of India. The aims and objectives of this division mainly concern (i) to the study of the resources viz plant and animal of the N.E. region of India and to manage these resources for future use. (ii) to study the sustainable developmental strategies of these resources in the context of N.E. region. (iii) to study the environmental pollution caused due to industrialization of N.E. region and (iv) to study the remedical measures of these pollutions through appropriate technologies etc.

Presently the Division is engaged on the investigation of the problem on "Development of Microbial method(s) for control of hydrocarbaonaceous pollutions in soil of Assam- a feasibility study" sponsored by Department of Science and Technology Govt. of India.

During the year 1995-96, investigation on following Research work has been carried out in the Division as a part of the objectives of the above mentioned project.

Research Publication:

Paper published in book

1. Deka, S. (1996) : Hydrocarbon degrading micro-organisms and its prospective to control problem of Environmental Pollution. In "Sustainable Development Strategy" (Ed. S.P. Sukla and N. Sharma), pp. 111-117.

Paper Represented in Seminar

1. Deka, S. (1995) : Microbiological method(s) for clean up hydrocarbonaceous pollutants. Atstract of East Conference. Page 33, October 18-20, 1995, RRL, Jorhat.

2. Deka, S; Barthakur, H.P. and Kagti L.C. (1995) .: Effect of formation water on germination and growth of certain pulses and real seeds. Abstract of Assam Science Society, Ann. Tech. page 76.

(i) Collection of soil and water samples from the petroleum polluted oil field situated at Moran.

(ii) Analysis of physio-chemical properties of collected formation water of Moran oil field.

(iii) Studies on impact of formation water on germination, growth and development of certain cereal and pulse crops.

(iv) Isolation of hydrocarbon degrading bacteria from petroleum polluted soil collected from oil field at Moran.

Meanwhile, the proposal for development of resource Management and Environment Division in IASST has been submitted containing all total 14 project proposals in the various discipline on flora, fauna and environment as a whole, the ministry recently decided to take RM&ED in IASST as nodel agency to carry out substantial research for the Management and development of the resources of the North Eastern Region.

In this connection the first expert Committee meeting was held on 15.7.95 at 10.00 a.m. at the conference room of the IASST in the presence of Dr. D. Bandopadhyay, Additional Director, Ministry of Environment and Forests, Govt. of India and other experts from different organization.

The committee finally recommended that (a) the RM&ED of IASST is to collect the various information on research carried out by different organizations of the country on the flora and fauna with special reference to the N.E. region. (b) The RM&ED of IASST to be analysis of the data thus collected and examine the validity and accuracy of the data on consultation with various departments/organisations etc. (c) The RM&ED of IASST is then to prepare the suitable package on the data after analysis. (d) the RM&ED of IASST is to take step to disseminate the data to the different member of the expert committee constituted to find out the gap/deficiency of research work already carried out by different organisations/agencies. (e) On the basis of the data base, the topic for research by RM&ED or other organisations/agencies are to be identified and to be placed in the next meeting of the committee of expert.

Rupees fifteen lakhs have already been sanctioned by the Ministry as seed money to initiate the project for development of RM&ED in IASST.

Already data collection on flora and fauna including environment of N.E. region is under progress. ✦

S&T MANPOWER STUDY CELL

"Availability & the Requirements of S&T Manpower in Assam during the next 20 years."

The study sponsored by the department of Science and Technology (DST), Government of India, which was taken up by this Institute in the middle of 1992-93 with Professor J.Medhi as the Principal Investigator, had been completed during the year and the final report submitted to DST in December 1995.

The final report, consisting of nine broad chapters, contains data on, (i) the current (1990-91) stock of S&T Manpower in Assam viz. the different categories of Engineering & Technology Manpower, Medical & Paramedical Manpower, Agriculture, Veterinary & Allied Manpower, General Science Manpower and Management & other professional manpower, together with some relevant characteristics of this manpower like, sex, educational level, employment, unemployment, self-employment, employment co-efficients etc. (ii) likely availability of these categories of Manpower in Assam at 5-yearly interval upto 2010-11 A.D. from the presently available educational and training infrastructure in the state, (iii) the likely requirement of these categories of manpower at 5-yearly interval upto 2010-11 A.D. and (iv) a balance sheet of supply vis-a-vis Demand upto 2010-11 A.D. Attempt has also been made to provide some suggestions for augmenting the educational and training programmes in the state to tackle the likely imbalances in the supply : Demand equation over the perspective period. As per the existing practice, the DST will print out the report and furnish some copies to this institute.

Before submission of the final report, the Principal Investigator gave a broad resume of the project in the meeting of the project review committee of NSTMIS Schemes of the DST held on 30-31 October, 1995 at Madras University. The meeting recognised the 'Pioneering work attempted in the project and its immediate utility.

STUDIES ON

UTILISATION AND CAREER PROFILE OF POST GRADUATE AND Ph. Ds IN SCIENCE & TECHNOLOGY

AND

TO THE EXTENT OF R&D ACTIVITIES UNDERTAKEN BY THE Ph.Ds IN HIGHER EDUCATIONAL INSTITUTIONS IN THE N.E. REGION

The DST, Government of India has sanctioned this project to the Institute in January 1996. The project involves a total Cost of Rs. 7.06 lakhs and is to be completed in two years time. The study is to cover the entire North Eastern States. The implementation of the scheme has been started from February 1996 with Professor J. Medhi, as Principal Investigator and Shri D.N. Das as CO. P.I. assisted by 3 Investigators. ✦

COMPUTER SCIENCE DIVISION

Computer Activities

During 1995-96, the Computer Science Division of the Institute of Advanced Study in Science & Technology has generated another batch of trained personnels under the various courses conducted in Computer Science and Application. The Division has helped in the research programmes of the IASST by providing computer time and consultancy service whenever required. Other jobs included statistical data analysis as well as graph preparation for research scholars of the Institute.

The Computer Science Division has also carried out the data entry and validation work for the project entitled **"Study of the Availability and the Requirements of S&T Manpower in Assam in next 20 year"** sponsored by the Department of Science & Technology (DST), Govt. of India with Prof. J. Medhi as the Principal Investigator.

Academic Achievements

1. Sri A. Barman was awarded the MS Higher Degree of Birla Institute of Technology and Science (BITS), Pilani for the Session 1994-95 in Software System Branch.
2. Sri B. Bora was sponsored for the MS Higher Degree from IASST at Birla Institute of Technology and Science (BITS) Pilani for the session 1995-96 in System and Information Branch.

Training Programmes

The Computer Science Division has been conducting the following courses in Computer Science and Application :

(a) Certificate Course of Six-month duration.
(b) Post Graduate Diploma in Computer Application.
(c) DOEACC "A" Level Course of One Year duration.

During the year 1995-96, the number of students trained up through different courses are given below

Name of Courses Conducted	*No. Students Admitted*	*No. of Students Passed out*
1. Post Graduate Diploma in Computer Application (PGDCA)	35	Final Exam in Jan. '97
2. DOEACC "A" Level Course	17	Final Exam in July '96
3. Certificate Course of Six-month duration	80	60

Affiliation

Two Institutes have been granted affliation to conduct the Six-month's Advanced Certificate Course for which the Examination will be conducted at IASST.

1. Institute of Computer Science and Information Management, Dispur.
2. Electrocomp Computer Systems, Nalbari. ✦

ON GOING PROJECTS

Plasma Physics Division

"Study of the Sheath Induced Nonlinear Phenomena in Multi-component Plasmas"
Sanctioned by DST, Govt. fo India

Scientists involved

1.	Dr. Joyanti Chutia	Principal Investigator
2.	Dr. C.B. Dwivedi	Co-Investigator
3.	Dr. G.C. Das	Co-Investigator
4.	Mr. Arun Kumar Sarma	JRF
5.	Mr. Ashok Kumar Das	JRF

Life Sciences Division

Title of Project	*Name of the Scientists*	*Sponsoring Authority*
(i) "Studies on Rhizobium Biofertilizer for Improvement of Pulse Production in Assam"	Dr. P. Azad	Deptt. of Biotechnology, Govt. of India
(ii) "Survey, collection and study on phytopathogenic fungi on cultivated Crops of Assam."	Dr. P. Azad	Assam Science Technology & Environment
(iii) "Development of herbal medicine with special reference to Heptic disorder."	Dr. J. Kotoky	Department of Science & Technology, Govt. of India
(iv) "Development of Muga culture with special reference to indoor rearing Technique."	Dr. J.N. Talukdar	Department of Science & Technology, Govt. of India.

Resource Management & Environment Division

"Development of Microbiological method(s) for control of Hydrocarbonaeous pollutants in soil of Assam a feasibility study"
Principal Investigator : Dr. S. Deka, Asstt. Professor, RM&ED.
Sponsored by : Department of Science & Technology, Govt. of India, New Delhi.

Plasma Physics Division: (Research Scholars)

1.	Mr. Arun Sarma	JRF
2.	Mr. Ashok Das	JRF

Ph.D. Scholars

Name	*Topic of Research*	*Registered*
Mr. Arun Kr. Sarma	Study of the Sheath Induced Nonlinear Phenomena in laboratory plasmas	on 16/2/95 in Gauhati University under the guidance of Dr. Joyant Chutia.

Resource Management & Environment Division : (Research Scholars/Assistants)

(i) Miss Arundhuti Devi, Senior Research Assttant
(ii) Mrs. Dr. Nabanita Dutta Bordoloi, Research Assistant
(iii) Mr. Manmohan Huzuri, Field cum Laboratory Assistant
(iv) Mr. Madan Kalita, Field Attendent.

Ph.D Scholars

Name	*Topics of Research*	*Registered*
Miss Arundhuti Devi	"Impact of oil field operation on soil quality near upper Assam Oil field"	Thesis submitted for the Ph.D Degree of G.U.

Life Sciences Division : (Ph.D. Scholars)

Name	*Research Topic*	*Registered on*
1. Mr. Arup Kr. Deka	"Studies on effectiveness of native Phizobial strains & their impact on pulse production in Assam."	8.4.96
2. Mr. Ranjan Kalita	"Effect of efficient strain(s) of Rhizobium with VA mycorhizae for improvement of pulse production in Assam".	6.4.96

INSTITUTE OF ADVANCED STUDY IN SCIENCE AND TECHNOLOGY

ANNUAL ACCOUNTS OF RECEIPTS AND PAYMENTS FOR THE YEAR 1995-96

RECEIPT		PAYMENTS	
Particulars of Receipts	*Amounts (Rs.)*	*Heads of Payments*	*Amounts (Rs.)*
1. Opening Balance (including Reserve of 2 lakhs)	22,04,778.28	1. General O/M, P/Physics Life Sci., R.M & Computer	38,00,380.90
2. Grant-in-aid from Govt. of Assam, DSTE No. STE/47 91/234, Dt. 19.11.95 for Gen. Office Management etc.	40,00,000.00	2. Biofertilizer	3,07,467.40
3. Grant-in-aid from Govt. of India, DBT, No. DBT/RND/ 02/04/93 Dt. 27.7.95 for Biofertilizer.	1,08,000.00	3. Micromethod	47,143.00
4. Grant-in-aid from Govt. of India DST, No. SR/OY/GB-03/94 dt. 5.5.95 for Micromethod	60,000.00	4. Dev. of Mathematics and Statistics Division	3,51,141.00
5. Grant-in-aid from Govt. of India, DST, No. SSSP/PH/ 47/95, Dt. 3.8.95 for Herbal Medicine	4,00,000.00	5. Herbal Medicine	83,843.00
		6. Fungi	3,257.00
6. Grant-in-aid from Govt. of Assam, ASTEC, No. ASTEC/ SVT/192/20/94-95/5881, Dt. 21.2.95 for Fungi	41,600.00	7. Manpower	2,08,356.00
		8. Industrialization	4,01,840.00
7. Grant-in-aid from Govt. of India, DST, No. STS/05/04/90 DST, Dt. 29.5.95 for Manpower	1,25,000.00	9. Career Profile	32,427.00
		10. Seed Money	4,94,726.00
8. Grant-in-aid from IDRC (Canada) for Industrialization Project.	3,82,880.00	11. Seath Induced	4,16,039.00
9. Grant-in-aid from Govt. of India, No. DST/NSIMIS/ 0504/95,Dt. 3.1.96 for Career Profile	3,00,000.00	12. Muga Culture	3,29,256.56
		13. Land Development	62,990.00
10. Grant-in-aid from Govt. of India, Do, No. 12/8/93 P.I., Dt. 19.4.95 for Resource Management & Environment (Seed Money)	15,00,000.00	14. Misc. Expenses on various activities from IASST Fund	3,54,655.97
		15. Closing Balance	
11. Grant-in-aid from Govt. of Assam for Dev. of Land and Building (Boundary Wall)	10,00,000.00	(a) Cash Balance	35,51,746.29
		(b) Reserve Fund	4,00,000.00
12. Misc. grants from Govt. of India & Govt. of Assam for IASST Fund Bank Intt. and Fees etc.	7,23,010.84		
TOTAL	*Rs. 108,45,269.12*	*TOTAL*	*Rs. 108,45,269*