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April 2000 - March 2001

INSTITUTE OF ADVANCED STUDY IN SCIENCE AND TECHNOLOGY

JAWAHAR NAGAR, KHANAPARA , GUWAHATI - 781022 Assam (INDIA)

Annual Report

April 2000 - March 2001

Institute of Advanced Study in Science and Technology
Khanapara, Guwahati - 781 022, Assam, India

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Foreword

I deem it to be a great privilege to be able to keep on record the following forewording note on the Annual Report of the Institute of Advanced Study in Science and Technology (IASST) for the period under review during which I served the institute in dual capacity viz. as its Chairman cum Director I/C.

During the period under review, the research and development activities in all the four divisions of the IASST, namely, the material Sciences, the Life Sciences (Biochemistry, Biotechnology and Sericulture), Resource Management and Environment and Mathematical Sciences (Mathematics and Statistics) have been quite satisfactory. It may be mentioned that the Plasma Physics Division has been recently renamed as the Materical Sciences Division so as to include, besides Plasma Physics, other branches of Physical sciences e.g. Polymer Science, Electronics etc. Besides continuing with some of the on-going projects, the scientists of the institute have been able to obtain research grants for several new research projects from different funding agencies like DST, DBT, ASTEC, NEC etc. A number of original research papers have been published during the year in journals of international repute. Members of the faculty have scientific interactions with several important research institutes of the country: Several reputed scientists from India and abroad, have also visited the institute during the period under review.

The Computer Science Division has been conducting computer-based academic programmes such as One year PGDCA course under the State Council for Technical Education, DTE, Govt. of Assam, One year DOEACC 'A' Level course etc. The courses conducted by the Division are now in great demand. However, the faculty members of the Division should also engage themselves in computer based research programmes.

The IASST, since its formal establishment in 1979, has been functioning in rented premises, under great constraints. However after receiving a development grant from the DST, GOI, the institute is now constructing its own building etc at its own site in a 20 acre plot of land granted by the Govt. of Assam. It is reasonably expected that the institute will be able to function from its own premises within a couple of years or so.

However, the financial constraints faced by the institute, in regard to recurring expenditures for salary of the staff, maintenance etc., have been very acute. This has also adversely affected in appointing talented, promising young researchers in the institute.

Currently the recurring expenditures are being provided by the State Govt. of Assam. But the amount of fund released by the GOA is gradually dwindling from year to year, and also becoming quite uncertain due to the financial crunch faced by the GOA. As such, it is apprehended that unless the Govt. of India extends requisite grant - in -aid for recurring expenses - mainly under the Salary Head, the activities of the institute will be badly hampered. As this is the only institute of this type in the NE region and as the institute has the potential of being a model centre for advanced research in this region of the country, all concerned should see that the IASST is provided with adequate financial grant-in-aid for recurring expenses and help in its meaningful growth.

I thank all the scientists and the members of the Academic as well as the Administrative staff for their sincere and dedicated service to the Institute.

Prof. K.M.Pathak
Chairman, IASST
&
Ex-Vice Chancellor,
Tezpur University

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1. PLASMA PHYSICS DIVISION

1.1. Experimental Research :

The areas where experimental investigations have been carried out, are as follows:

(a) Study of sheath and instabilities in magnetised plasmas.
(b) Study of Nonlinear Phenomena in Multicomponent Plasmas.
(c) Plasma Processing.

(a) Study of sheath and intabilities in magnetized plasma

Experimental set up

The experiment is performed in a hollow stainless steel cylinder 1 meter in length and 0.2 meter in diameter. The schematic diagram of the experimental set up is show in Figure 1. A mesh grid of 95% transparency is introduced vertically at a distance of 46 cm apart from the right end of the chamber. It divides the system into two regions namely source region and diffused region. The chamber is evacuated by a rotary pump followed by a diffstak pump to attain a base pressure of 1.5 x 10 $^{-6}$ Torr. N_2 gas is injected into the chamber at a working pressure of 0.75 x 10 $^{-4}$ Torr. Plasma is produced in the source region of the chamber by hot filament discharge phenomena. The plasma sustaining in the diffused region is controlled by its production in the source, which are penetrating across the grid. In order to produce an external axial magnetic field, several turns of copper coils are wounded in region of 33 cm at the middle of the chamber. Due to the flow of the current in the coil ranging from 2.5 Ampere to 20 Ampere produces magnetic field of strengths from 66 gauss (G) to 515 gauss (G) accordingly in the system. An ion rich sheath is produced across the mesh grid by applyingly a negative voltage

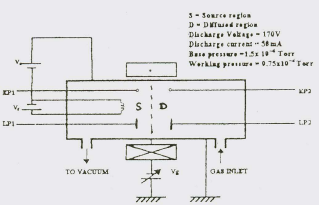


FIGURE 1. SCHEMATIC DIAGRAM OF THE EXPERIMENTAL SETUP. EP = EMISSIVE PROBE, LP =LANGMUIR PROBE

($-V_g$) into it. The plasma density at the source region is of the order of $10^9/cm^3$ whereas it is somewhat lesser at the diffused region i.e. of the order of $10^8/cm^3$. Plane Langmuir probes (LP_1 and LP_2) and emissive probes EP_1 and EP_2 are inserted in the source region at a distance of 6 cm away from the grid, whereas LP_2 and LP_2 are introduced in the diffused region at the same distance apart from the grid. With the help of the Langmuir probe, the plasma density temperature are measured. The emissive probes are used in this experiment to obtain the plasma potential profile on both sides of the grid. The floating potential technique is mainly used to measure the potential profile by emissive probe.

Result:

The dependence of the plasma parameters on the external magnetic field applied perpendicular to the grid and also upon the grid biasing voltage in the source and the diffused region is studied experimentally. The experiments are performed under the magnetic field ranging from 66 G to 515 G. For a particular magnetic field, a system can be said to be a weakly coupled or strongly coupled plasma if $\Gamma_e < 1$ or $\Gamma_e > 1$ where Γ_e is given by a relation

$$\Gamma_e = [e^2 (4\pi n_e/3)^{1/3}]/kT_e.$$

Here, n_e and T_e are the plasma density and electron temperature respectively for a particular magnetic field strength (B). In this consideration, our plasma system is behaving as a weakly coupled one for the entire range of applied magnetic field. Experiments are performed for different grid biasing voltages ranging from -70 V onward to -100 V in presence of the above mentioned magnetic fields. Plasma is produced in the source region are found to be of the order of 10^9 cm $^{-3}$ and 2-6 eV respectively. The change of electron temperature with magnetic field strength for V_g = -80 V in the source region is shown in Figure 2.

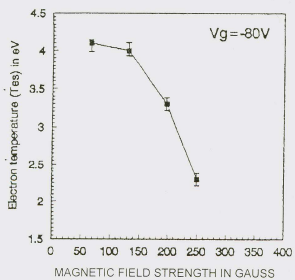


FIGURE 2. VARIATION OF ELECTRON TEMPERATURE WITH B AT Vg = - 80 V IN THE SOURCE REGION.

It is found that though electron temperature decreases with B, the quantitative values are lesser in comparison to that of the diffused region (table 1).

Table 1. Electron temperature at V_g = -80 with various B in source region.

Magnetic field strength in G	66	130	197	250
Electron temperature in eV	4.1	4	3.3	2.3

Table 2. Electron temperature at B = -130 G with various $-V_g$ in source region

Grid bias voltage in V	-70	-80	-90	-100
Electron temperature in eV	3.55	4	5	7

Table 3. Electron temperature at V_g =-80 V with various B in diffused region.

Magnetic field strength in G	66	130	197	250
Electron temperature in eV	8.5	9.45	11.55	12.8

Table 4. Electron temperature at B = 130 G with various -Vg in diffused region.

Grid bias voltage in V	-70	-80	-90	-100
Electron temperature in eV	10.9	9.45	10.5	7.15

Table 5. Plasma density at V_g = -80 V with various B in source region.

Mafnetic field strength in G	66	130	197	250
Plasma density in cm^{-3}	$0.16x10^9$	$0.19x10^9$	$0.22x10^9$	$0.24x10^9$

Table 6. Plasma density at B = 66 G with various Vg in source region.

Grid bias voltage in V	-70	-80	-90	-100
Plasma density in cm^{-3}	$0.22x10^9$	$0.16x10^9$	$0.16x10^9$	$0.15x10^9$

Table 7. Plasma density at V_g = -80 with various B in diffused region

Magnetic field strength in G	66	130	197	250
Plasma density in cm^{-3}	$0.3x10^8$	$0.2x10^8$	$0.12x10^8$	$0.16x10^8$

Table 8. Plasma density at B = 130 G with various V_g in diffused region.

Grid bias voltage in V	-70	-80	-90	-100
Plasma density in cm^{-3}	$0.3x10^8$	$0.2x10^8$	$0.136x10^8$	$0.086x10^8$

Table 9. Electron-nature collision frequency at V_g = -80 V with various B in the source region.

Magnetic field strength in G	66	130	197	250
Electron-neutral collision Frequency in sec^{-1}	485	600	928	1438

Table 10. Electron-netural collision frequency at B = 130 G with various V_g in the source region.

Grid bias voltage in V	-70	-80	-90	-100
Electron-neutral collision Frequency in sec^{-1}	751	600	523	219

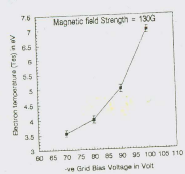


FIGURE 3. VARIATION OF ELECTRON TEMPERATURE WITH V_G AT B = 130 G IN THE SOURCE

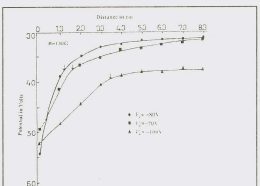


FIGURE 3. POTENTIAL PROFILE NEAR THE GRID AT THE DIFFUSED REGION WITH B = 130 G AND VARYING -Vg.

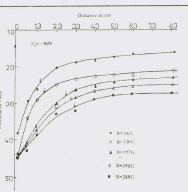


FIGURE 5. POTENTIAL PROFILE NEAR THE GRID AT THE DIFFUSED REGION WITH Vg = -80 V AND VARYING B.

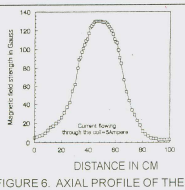


FIGURE 6. AXIAL PROFILE OF THE EXTERNAL MAGNETIC FIELD THROUGHOUT THE CHAMBER LENGTH WHEN CURRENT FLOWING THROUGH THE COIL IS 5 AMPERE

The effect of external magnetic field and the grid biasing voltage for the considerable change of the plasma parameters in a magnetized, plasma system has been studied (Fig. 3-6). In the weakly coupled plasma system, the kinetic energy of the electron is playing a key role for the variation of electron temperature with magnetic field in both source and diffused region partitioned by the grid. The grid biasing voltage also has effects on the plasma sheath and temperature. The changes of plasma parameters are more effective in the diffused region than in the source region due to magnetic field.

(b) Study of nonlinear phenomena in Multicomponent Plasmas:

Observations on steady state iron rich sheath around a negatively biased grid in a double plasma device have been made in multicomponent plasma with negative ions. A hump in the potential profile is found to occur at the sheath edge. The characteristics of the hump depend on the grid voltage, source-biasing voltage, density-difference in the two chambers and the negative to positive ion concentration ratio. It is argued that resonance, which is coupled with the beam ions and background ions, is associated in the excitation mechanism to create the concentration ratio, the hump grows in height and above the critical ratio, the width of the hump increases but the hight decreases and ultimately it vanishes. The variation in the hump potential profile due to the injection of negative ions can be explained by the ion momentum exchange and their dynamics.

(c) Plasma Processing Unit :

A magnetron-sputtering unit has been installed to carry out plasma processing research in the division. The first phase of the processing consists of modifying the surface properties of bell metal which is an alloy of copper and tin used for making idols, kitchen utensils, ornaments, musical instruments and decorative pieces. The artisans of this region have known the art of making the items by the process of casting and beating. But the production of hardened surfaces of bell metal by products with combination of increased fatigue and wear resistance is a persistent technological problem. So, coatings on such surfaces are required to be made for chemical and heat resistance and anti corrosion applications.

PLASMA PROCESSING CHAMBER WITH SPUTTERING UNIT

The plasma Magnetron RF and DC

sputtering unit has been designed and fabricated to study the Plasma Assisted Physical Vapor Deposition (PAPVD) technique for surface modification of bell metal. The system is planer magnetron sputtering unit. The aim of this PAVD technique is to produce films having functional and decorative properties.

The sputtering unit consists of a cabinet containing vacuum pumping system together with all the electrical components necessary for the coating process. Magnetron sputtering involves the application of both electrical and magnetic fields to the cathode. For electrical field, either DC or RF (13.56 MHz) source is used. The magnetic field is produced by permanent magnets. The cathode has this magnetic field. The electrical field is applied between cathode and anode.

The Vacuum chamber made of SS is having internal diameter 300 mm and cylindrical length 400 mm. The top of the chamber is fixed with a flat plate to which the magnetron target holder is attached. Two view ports, two feed throughs and two air admittance valves are also provided in the chamber.

The system is evacuated upto $1x10^{-5}$ torr. Argon gas is admitted at a pressure of $(1-5) \times 10^{-3}$ torr. RF discharge is maintained to the electrodes through capacitive coupled impedance. The interaction between plasma and the electrode will sputter the atoms from the cathode. They will be then accelerated to bombard the surface of the substrate through the plasma sheath. The process affects the surface properties of the substrate material.In this case the density and temperature of plasma in RF sputtering are measured and found to be approximately $6x10^{9}$ cm^{-3} and 10 eV respectively. These parameters in case of DC sputtering are $3x10^{9}$ cm^{-3} and 1 eV respectively.

Al and Cu films are deposited on glass plate at different plasma conditions by changing the power, pressure etc. The analysis is now being carried out.

1.2. Theoretical Plasma Research :

Our interest has been focused to know the salient features of non-linear waves in space plasmas with the view of explaining some natural occurrences observed by the scientific satellites. First of all, some plasma models in ionosphere, magnetosphere as well as that could be seen in other outer atmospheres have been taken under consideration. The inhomogeneity of the plasma due to density gradient along with a continuous weak ionisation as similar to the Townsend discharges has been considered too. Since the derived nonlinear wave equation does not fit well with the earlier method, a kind of new approach has been employed for finding the different acoustic modes. The observations finally resulted showing a formation of precursor to the main plasmaacoustic mode as a tail, and grows by the extraction of the energy from the main solition structures. Soliton found here is very much related what exactly observed by the satellites in space or in laboratory. The new method called as sine Gordon method shows its success for observations, and derives the results which encourage in finding further information. Further observations have been made in a generalized multicomponent plasma contaminated by different negative charges. Because of the additional negative charges, a region forming therein explosion or collapse of the solitons as well as of the tailing soliton have been derived. The precursor forms and grows as and when it enters into in homogeneous region. These observations already have enough evi-

dences in space observed by the Freja Scientific satellite as well as by order spacecrafts.

Again in connection of our study on soliton dynamics, we have described the high growth of intensifying electric field and becoming large with the formation of a narrow wave-packet in the dynamical system. The electric field pressure finds so large that a density depression has been in a very narrow band and consequently a strong source of radiation has been occurred designated as soliton radition. Such soliton radiation could be of a considerable interest to explain analogically the solar radio burst and other related phenomena in astrophysical problems.

Another exciting thrust area, found in laboratory and space plasmas, has been taken up to study the formation of sheath in plasmas. Almost in every plasma one can expect the formation of sheath and is formed in front of the electron absorbing solid surface. The solid material will be surrounded by the sheaths and it has been found in planetary rings, moon's surface, asteroids and many other atmospheric region. The study has been continued with the type of the nature of ambient plasma, type of the solid body etc. Simplest way to study the formation of sheath in plasma has been augmented through the sagdeev potential equation as :

$$\frac{1}{2}\left(\frac{d\phi}{dx}\right)^2 + V(\phi, M) = 0$$

Some investigations for finding the heuristic features of the sheath along with other nonlinear interaction in plasma waves have been made. The dust interaction with sheath resulted a surface called as dust atmospheres which are reported on moons and asteroids as a hundred of meters, has been as well observed.

2. MATHEMATICAL SCIENCES DIVISION

2.1 Function Spaces : special functions and harmonic analysis :

Efforts have been made to construct finite Universal Korovkin set in the Banach algebra of radical functions on Hesisenberg group. Some relevant materaials are studied for this purpose. The investigation is still continuing for the study of different properties of the Cesaro Operator, C^{α} via hypergeometric functions.

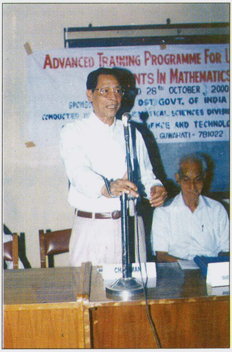
2.2 Sequences; series and summability theory:

H. Bor [Kuwait J. Sci. and Engg.23 (1996), 1-5] proved a theorem which deals with $N_3\, p_{n\,/k}$ summability factors of infinite series. This result generalizes the earlier results due to him in [proc. Amer. Math. Soc.; 118 (1993), 71 - 75] and [Rocky Mountain J. Math; 24 (2), (1994), 1263 -1271]. Still his result fails for $p_n = n^{-1}$ for all $n \in$ N, where N is the set of natural numbers. The result of Bor [1996] has been improved.

The idea of statistical convergence of sequences has been applied for the study of some limit theorems on sequences, it is proved that "if (x_n) is a bounded statistically convergent sequence with $x_n > 0$ for all $n \in N$, $\lim \{ x_1 x_2 x_3 .... \}^{1/n} = \text{stat-lim } x_n$". It is shown that the Cesáro mean of the Cauchy product as well as the term product converge to the product of the statistical limits of any two bounded statistically convergent sequences. The Cauchy's theorems on limits have been extended for statistically convergent sequences and some other results are proved.

2.3 Queueing Theory:

The opening characteristic of *M/M/C* Queuing system has been investigated with a general startup time under N-policy, where the system is turned off as soon as the system is empty. For this model when the queue size becomes $N\ (\geq C)$, the system under takes a gear up time, called startup time in order to make it operative. As soon as the startup time



PROF. K. M. PATHAK IS DELIVERING THE PRESIDENTIAL ADDRESS IN THE INAUGURAL FUNCTION OF THE "ADVANCED TRAINING PROGRAMME FOR UNDERGRADUATE STUDENTS IN MATHEMATICS OF N. E. REGION.

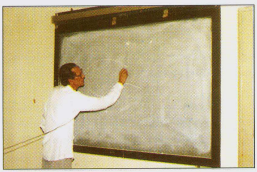
is over the servers offer actual services on

FCFS basis, till the system becomes empty again. We obtained some analytically explicit results for the queue size distribution and for performance measures. Moreover, we have developed a simple method to calculate factorial moments of the additional queue size distribution due to idle period of *M/M/1* queuing model under-policy with a random startup time.

Secondly, some Stochastic Decomposition results have been derived analytically for a class of batch arrival poisson queues with a grand vacation process, at various points of time. A grand vacation process is meant by jump process during a grand vacation, which comprises of "*m*" vacations, such that there is no arrival in the (*m*-1) vacations and there are one or more arrivals in the m^{th} vacation. Also some known and some new results as generalizations of existing results for the vacation models, which includes a broad family of service initiation disciplines have been obtained.

Thirdly, using the notion of a grand vacation process we studied the steady state behaviour of an *M/M/1* queuing model with a threshold policy with multiple vacations, where the server takes a sequence of grand vacations till he returns to find at least some pre specified number of customers observed after each grand vacation. One of the important finding for this model is that the queue size-distribution at departure as well as stationary point of time can be decomposed into the distributions of three independent random variables, one of which is the queue size of the ordinary *M/M/1* queuing system. Also, some important particular cases of this type of queuing models have been derived.

Finally, we have studied an *M/G/1* queuing system with a vacation period, which comprises an idle period and a random setup period. In this model, the server is turned off each time when the system becomes empty. At this point of time the idle period starts and as soon as a customer or a batch of customers arrive, the setup facility begins which is needed before starting each busy period. For this model we showed that the departure point queue size distribution is the convolution of the distributions of three independent random variables. Also we derive analytically explicit expressions for the system state probabilities and some performance measures of this queueing system.



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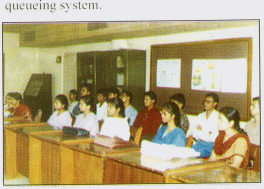


THE STUDENTS ARE LISTENING THE LECTURE DELIVERED BY THE RESOURCE PERSONAL IN THE "ADVANCED TRAINING PROGRAMME FOR UNDERGRADUTE STUDENTS IN MATHEMATICS OF N. E. REGION.

3. LIFE SCIENCES DIVISION :

3.1 Biofertilizer Unit of Life Science Division

Isolation and identification of VAM fungi of N. E. Region and their inoculam production for dual inoculation with Rhizobia have been undertaken in collaboration with Regional Biofertilizer Development Centre (RBDC) Imphal, Manipur for sustainable agricultural production in the region. 11 species of VAMF have been isolated so far and 5 of them have been used in blending with Rhizobium in Black gram and Green gram. Dual inoculation improved nodule number, nodule efficiency and mineral uptaking of Na, Mg, Fe, Mo, K including P and increased production 4 to 5 percent over sigle inoculation of Rhizobia.

Native strains of Trichoderma viridi, Trichoderma harzianium and Bacillus subtilis have been isolated, identified and studied their effect both in vitro and vivo in controlling red-rot disease of sugarcane in N.E. Region under a project Survey, collection and study on phytopathogenic fungi on cultivate crops of Assam, sponsored by the Assam Science Technology & Environment Council, Govt. Of Assam. It is found that 7% to 10% disease reduction with a 10% to 12% percent increase in crop yield over control have been achieved with the above biocontrol agents. Studies on their antagonistic properties in respect of production and assay of antifuingal antibiotics in vitro in mediating the disease control are in progress.

3.2 Sericulture

A. Mugaculture: The indoor rearing of muga culture has been continued at the IASST for standardization of relevant parameters. It is estimated that EFR of muga rearing in Indoor is 70% against the 30% of out door rearing (CSB'S report) The rate of mortality up to 3rd instar is nil. Silk ratio of muga cocoon has been found 5.4 - 9.3% denier around 5 and filament length 350 to 520 meter. The fecundity has been found higher (180-200 nos) than outdoor rearing (10-150).

At present there is a 40% gap in demend and supply of muga seed in Assam(CSB'S report) which affect the industry badly. The main factors for this problem are non synchronized and prolonged moth emergence, low percentage of successful coupling, prolonged egg laying and yield etc. It is proposed that an intergrated package will be developed for partial fulfillment of the acute shortage of seed using the indoor rearing technique developed at the IASST.

B. Ericulture: Development of Isozyme maker of different stocks of Eri Silkworm : Nine (9) ecoraces/stocks viz. Borduar, Dhanubhanga, Mendipathar, Khanapara,

Nongpoh, Sillie, Titabor, Haflong & Cochbehar have been collected so for from various parts of the North Eastern region.

Observation of some important morphological traits has been completed and it is found that superiority was exhibited by larval cocoon & seed technological traits of Borduar stocks and gradually followed by, Dhanubhanga, Khanapara, Mendipathar, Nongpoh, Sillie & Titabor.

Available literature reveals that the biochemical index like isozymes can be employed as one of the dependable parameters to compare the genetic relationship of closely related stocks or strains Analysis of four (4) hydrolases namely esterase, amylase, acid phosphatase and alkaline phosphatase using the polycrylamide electrophoresis has been completed. The gut and haemoymph of larvae (5th instar) fed on castor leaves were analyzed for this experiment and the results are as follows.

Esterase (Est): Three esterase (Est1, Est2, and Est3 in order of increasing mobility) were detected in the above 7 stocks. The result indicated that the pattern of esterase isozyme of different organs in all the stocks is consistant but showed different intensities as follows:

Est1: This band separated as a medium staining one. However in some races viz. Bordour(1), Khanapara(3), Mendipathar(4), and Titabar(7) this isozyme is well resolved while staining in Dhanubhanga(2) is week and Nongpoh(5) and Sillie(6) are very faint.

Est2: A strongly stained band immediately ahead of Est1 also existed in all the races and in all the tissues. The concentration of this band during development is highest at the last 5th instar larval stages of all the races and the according to organs was highest in midgut. These results suggest that Est2 might be a hydrolase involved in the digestion of dietary lipid.

Est3: This band was present in all ecoraces but its mobility was not uniform as shown in the repetition of the experiment is continuing to comment on this.

Acid phosphatase (ACP): Six different enzyme bands were recognized (1to 6) in the above 7 (seven) stock. The maximum six number of band were found in Bordua(1) and Dhanubhanga (2) stock and the least number 4 (four) detected in Khanapara (3), Nongpoh (5) & Sillie (6). The bands 2 and 3 were seen in all the 7 eco stocks and the intensity of these two band were more. On the other hand 1 is confined to only Bordual (1) and Dhanubhanga (2) stocks. The mobility of band 6 is not uniform althought it is seen in all the stocks.

Amylase (Amy): 4(four) bands could be differentiated in all the stocks with varied rate of mobility and intensity. The band were denoted as Amy2, Amy3, Amy4 and Amy5 according to their increasing mobility. The Amy1 shown uniform mobility in all the stocks and higher intensity than other bands. Amy2 and Amy3 seemed to have uniformity in their pattern in all the stocks while the mobility and intensity of the band Amy4 was unequal and it was very faint or absent in Khanapara (3) and (3) and Titabar(7) stock.

3.3. Biodiversity and Bioprospecting Studies on Medicinal Plants

This area of research was started from September 2000 in the IASST. Biological diversity encompasses all plants animal and micro-organism and the ecosystems of which

they are part. India with 2,4% of the world area has 8% of the world's total biodiversity and is one the 12 Megan biodiversity outlets of the world. It has 2 of the 18 identified hot spot in biodiversity outlets of the world it has 2 of the 18 identified hot spot in biodiversity of the world. They are the Western Ghats and the Eastern Himalayas.The entire northeastern region of India belongs to the Eastern Himalayas

Biological diversity increasingly being recognised as a vital parameter to assess global and local environment changes and sustainability of developmental activities. India is a Megan diversity country and total of 125.000 described and 400.000 undecided species exist in this country. Bioprospecting and molecular taxonomy of some of the identified endangered economically important plant species has been launched by the Deptt. Of Biotechnology, Govt. of India.

The North-eastern region comprises one of the twenty-five biodiversity hot spot areas of the world. Hot spots are areas that are extremely rich in species, have been endemism and are in constant threat. This region is highly rich in varieties of medicinal and flowering plants. Major threats for biodiversity are emanating from destruction of forestland and due to various development project such as minces, dams, and road and canal construction. As a result a significant number of wild and domesticated varieties are lost from this region.

One of the main objectives of the bio prospecting studied is the collection documentation and molecular characterisation of economically and medically important endangered plant species. In this area, modern molecular biological techniques such as DNA fingerprinting RAPD (Random amplified polymorphuc DNA) AFLP (Amplified fragment length polymorphism) analysis have become very useful to document and characterise species at molecular level.

Gene/biomoleualr prospecting involves isolation characterisation and cloning of potential gene(s) for a particular trait. For the location of specific trait molecular help in locating the genes of interest.

B. Study of Viral diseases of Muga Silk Worm

This project was started in September 2000. Muga silkworm is native to the North Eastern States including Assam and muga silk is world wide famous for its fine quality and strength. The production of Muga has dwindled over the years due to a number of factors such infection by virus and bacteria, invasion by virus and bacteria, invasion by birds, reptiles and environmental pollution. Among these factors, the nature and types of viral infection in muga is not yet ascertained. Like other silkworms, muga is suspected to be infected by two types virus i.e Flatchery and Polyhedrosis . Extensive studies have been done on viral diseases of mulberry and tassar silkworm. A systematic study of muga viral diseases being taken to prevent

the loss of production of this silk and help in augmenting its production. The aims of this project is to study viral infections of muga silk worm at the molecular level using cell culture.

3.4 Medicinal Plant Section :

The N. E. Region is full of Medicinal and Economic Plants. Most of these plants are used by the local indigenous people of Assam as well as other ethnic people of this region as remedies for various ailments in one or the other form to get relief of the diseases.

The work on the investigation, evaluation, standardization and development of herbal medicine, which are most effectively used by the people of this region has been initiated in this section.

A few plants had been selected in different seasons of the year from these areas with the help of the village practioners of some areas of Kamrup district. Some plants have been soround and put attention in the following plants, leaves lavendulaefolia, vitex, negrendu, Costus speciousus, sida cordifolia, Clerodendrra colebrokianum and malastoma malabathricum, which have been claimed to be effective in the treatment of liver disorder and hypertension etc.

Presently, priority has been given to liver ailments like joundice, liver cirrhosis.

The plant Sida Cerdifolia had been taken for investigation during this period of reporting for evaluating the efficacy against the liver oilments. It was studied against rats intoxicated with a proven liver toxicant, carbon tetrachloride and was challenged by feeding orally the root extract of the plant. The methanol extract showed encourahing results and protects the liver from the damage by the toxicant.

The work on the DST, Govt. of India sponsored project, entitled 'Development of Herbal remedies with special reference to hepatic disorder' has been completed and the final project completion report has been submitted to the DST, Govt. of India during this period.

The major plant of the project, lencas lavendulae folia has shown hepatoprotective activities if the damage of liver is not severe. Paracetamol, carbon letrachloride and D. Galactosamine models were studied of the evaluation and lodister albino rats were used for this entire investigation. It has been found from the enperiment that the paracetamol and Galactosamine model treated models showed positive results, whereas carbon tera chloride treated animals did not recover from the damage. Also, we have taken for plants to study the antionidant properties in colleaborative tie ups with food and drug toxicology research quantive, NIN, Hydualad, Sida cardifilia, Lenlas lavendulaefilia have shown encouraging results. The work is in progress.

A programme on food colouring sulorfance monitoring N. E. Region has been initiated in collaboration with industrial toxicology research centre, Lucknow. Samples of food colours of the entire north eastern region would be monitored and already some sample have been collected for this study.

4. RESOURCE MANAGEMENT AND ENVIRONMENT DIVISION :

The broad objectives of the division are :-

1. To study the biological resources of the NE region of the country and to manage the resources for future use.
2. To study the sustainable developmental strategies of these resources in the context of the NE region and
3. To study the environmental pollution caused due to industrialization in the NE region and to evolve remedial measures to mitigates the environmental pollution through appropriate technology.

4.1 Refinery sludge management study

Large amount of oily sludge is generated through the crude storage and also at during the petroleum operation in refinery. These sludges have been creating disposal problem due to space limitation and stringent environmental norms. This intrinsic problem has stood as a challenge to us and as such our serious attention has been drawn for solution of the problem.

For study to manage the refinery sludge of Guwahati, all the generated sludge of Guwahati refinery have been characterized and mixed separately with the garden soil of Institute campus in different concentration (10, 20, 30, 40, 50 and 100 percent). From the above concentration, 4kg samples were kept in earthen pots and rice seedling was raised in

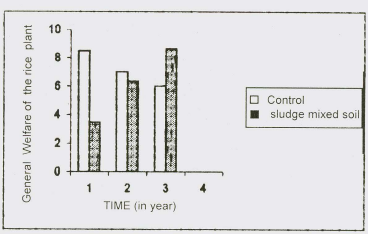


TABLE - 1
GROWTH AND DEVELOPMENT OF RICE PLANTS GROWN ON GUWAHATI REFINERY SLUDGE MIXED SOIL

each concentration. Three replications were made for each concentration. One control set without sludge were prepared accordingly to compare the effect of refinery sludge on general welfare of the rice plant. The experiment was carried out three consecutive years using the same soil samples. After harvesting the crops the physico- chemical characteristics of the soil were analyzed.

The following results have been obtained from the experiment :-

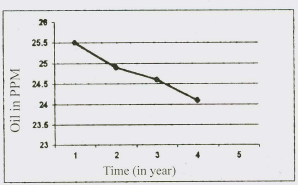


TABLE - 2
GRADUAL DECREASE OF OIL AND GRASE CONTENT OF GUWAHATI REFINERY SLUDGE MIXED SOIL AFTER HARVESTING THE CROPS

(1) General welfare of the plants was found to be increased gradually in every year (Table- 1). However, during the first and second year, the plant growth parameters were not increased as much as compared to the plant grown on control soil (without sludge). Better results were observed in third year cultivation as compared to the plants grown on control soil.
(2) The hydrocarbons present in the sludge mixed with soil were found to be decreased gradually in every year (Table-2).

4.2. Agro-potentiality study of Jagiroad paper mill wastes:

For management of paper mill wastes of Jagiroad, a study was conducted to investigate the wastes (both soiled and liquid) for use in agriculture. Both the wastes were collected from Jagiroad paper mill. Solid wastes were mixed with agricultureal soil of Khanapara at a concentration of 10,20,30,40,50,60,70,80,90, and 100 percent. For each concentration 4kg of above solid waste mixed soil were taken in earthen post in three replications. Rice seedling of Mashuri (Aijong) was raised in the pots and growth parameters of the plants were recorded. For determination of any toxic substances namely heavy metals uptake by the rice plants, husk and rice seeds were analyzed and no significant change in respect of pH, water holding capacity and organic carbon content have been noticed in the samples due to mixing wastes with the soil samples.

4.3. Entry of Polycyclic aromatic hydrocarbons into soil from oil field effluents and their natural degradation study.

During the year 2000-2001, soil samples were collected from four different group gathering station (GGS) of Rudrasagar oil field to study the entry of polycyclic aromatic hydrocarbons into soil from oil field effluents and their natural degradation. Altogether 56 soil samples from different depths and places were collected from all these four GGS. The polycyclic aromatic hydrocarbons fractions of the organic carbon in the soil samples were extracted. Other objectives of the project are on progress.

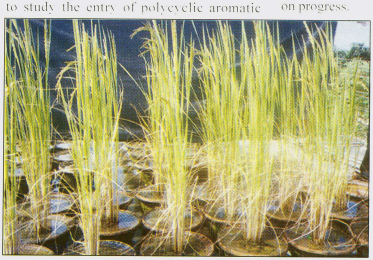


FIG - 1 RICE PLANT GROWN ON REFINERY SLUDGEMIXED SOIL AT DIFF. CONCENTRATIONS

FIG - 2 EXPERIMENT OF MANAGEMENT OF REFINERY SLUDGE

5. COMPUTER SCIENCE DIVISION:

During the session 2000-2001, the Computer Science Division conducted the following courses:-

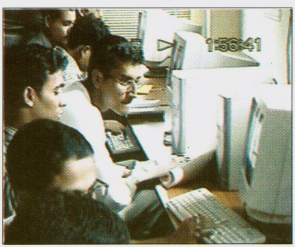
SL. No.	Name of the Course	Total Intake	No. of passed students
1.	DOEACC "CCC" Course	12	7
2.	DOEACC "CCC" Course	36	Results awaited
3.	DOEACC "A" Level Course	40	Results awaited
4.	PGDCA Course	39	Results awaited
5.	6 month Course	39	39

Apart from the above, the Coumputer Science Division has received a project from the Ministry of Information Technology (MIT), Govt. of India to conduct the DOEACC Scheme (EGTS). An amount of Rs. 15 laks only over a period of five years has been already sanctioned and received vide administrative approval diary No. 2001/1184 dated 7.3.2001.

Internet connection was provided by Coumputer Science Division to the students and faculty members of IASST and also to the Library of IASST through a Local Area Network of 25 PCs covering two buildings of IASST. The Library of IASST was also computerised with technical assistance from the faculty of IASST.

STAFF ROOM OF COMPUTER SCIENCE DIVISION

ONE OF THE TWO COMPUTER LABORATORIES OF CSD.



STUDENTS DOING PRACTICAL WORK IN LABORATORY

6. RESEARCH PUBLICATIONS (SCIENTIFIC JOURNALS):

1. Ion dynamics in sheath in Multi-component plasma with negative ions. Ram Prakash, A. Sarma and Joyanti Chutia. Review of Scientific Instruments 71 (no. 7), 1733 (2000)

2. Sheath and plasma parameters in a magnetized plasma system. Bornali Singha, A. Sarma and J. Chutia.Pramana Journal of Physics. 55 (no. 5&6), 899-910 (2000).

3. Electrostatic sheath at the boundary of a collisional dusty plasma.S. K.Baishya, G. C. Das and Joyanti Chutia.Pramana Journal of Physics. 55 (no. 5&6) 861 - 871 (2000)

4. Dynamical behaviour of the solition formation in magnetised Plasma.G. C. Das J. Sarma, Y. T. Gao & C. Uberoi Physics of Plasmas 2374 Vol.7 (2000),

5. Evolution of Ion Acoustic solitary Waves in Inhomagneous discharge Plasma. G. C. Das and M. Sarma, Physics of Plasmas, 3964 Vol 7. (2000).

6. Some aspects of shock - like nonlinear acoustic waves in magnetised Plasma. G. C. Das, J. Sarma and R. K. Roychoudhury. Physics of Plasmas 74. Vol. 8 (2000).

7. Analysis of a poisson queue with a threshold policy and grand vacation process : Ananalytic aproach ; G. Choudhury and H. K. Baruah; Sankhya Ser. -B, 62, part -2, 303-316, (2000).

8. Utilization of idle time in an M/M/1 Queue with a random setup time under N-policy; G. Choudhury : International journal of Management and systems; 16 (no.2) (2000), 229-236.

9. An Mx/G/1 queueing system with a setup period and a vacation period; G.Choudhury : Queueing Systems; 36, 23-38, (2000).

10. The stochastic decomposition results for batch arrival Poisson queue with a grand vacation process; G. Choudhury and A. Borthakur : Sankhya Ser. -B, 62 part-3, 448- 462, (2000).

11. A note on statictical limit points; B. C. Tripathy; Punjab University Journal of Mathematics (Lahore); vol. XXXIII; 75-82, (2000).

12. A note on absolute Riesz summability factors; B. C. Reipathy and M. Sen; Far East Journal of Mathematics; Vol.3 (no4), 609-64, (2001)

13. Hepatoprotective Activities of Sida cordifolia root against Carbon tetrachlo ride intoxicated rats', J. Kotoky, and P. N. Das, J. Med. Arom. Plant Sc., Vol.22(4), 104 -107 (2000).

7. RESEARCH PAPERS (PRESENTED IN CONFERENCES/SEMINARS):

1. Plasma characteristic in Magnetised Plasma Device. D. Boruah, H.Bailung and Joyanti Chutia. Proc. Plasma - 2000, (SINP) Kolkata (2000).

2. Observation of Low Frequency Instability in Magnetised Plasma. B. Handique, Bailung and Joyanti Chutia. Proc. Plasma - 2000, (SINP) Kolkata - 55 (2000).

3. Experimental observation on Plasma sheath in presence of tilted Magnetic field. Bornali Singha, A. Sharma and Joyanti Chutia. Proc. Plasma - 2000, (SINP) Kolkata - 78 (2000).

4. Double sheath formation in front of negatively biased plate in Multicomponent plasma A. R. Pal, H. Bailung and Joyanti Chutia. Proc. Plasma - 2000, (SINP) Kolkota - 84 (2000).

5. Nonlinear waves of Collapsed solitons and radiation. G. C. Das & S. Sen, Proc. Plasma - 2000 (SINP) Kolkata(2000).

6. Evolution of radiation solitons in plasmas. G. C. Das & S. Sen, Proc. Plasma - 2000 (SINP) Kolkata (2000).

7. Dynamics of dust charged grains in plasma sheath formed in space. N. Devi & G. C. Das, Proc. Plasma - 2000 (SINP) Kolkata (2000).

8. Shock - like structures in Plasma acoustic waves with dust charge grains. J. Sarma & G. C. Das, Proc. Plasma - 2000(SINP) Kolkata (2000).

9. Studies on Rhizobium Biofertilizer for improvement of pulse Production in Assam. Three Decades of research in Biofertilizers and Organic farming in North East India. P. Azad, (2001) : Pub lished on occasion of II N. E. Conference on Biofertilizer at A.A.U. Jorhat, Assam 22 to 24 th Jan, 2001.

10. Screening of native Rhizobium strains for production of pulse and rice as a subsequent crops in Assam. P. Azad, (2001) : Proceedings of II N. E. Conference on Biofertilizer, Assam, 22 to 24th Jan. 2001.

11. In virto response of Colletotrichum falcatum Went to different carbon and nitrogen sources. R. Saikia, A. K. Deka, R. Kalita and P. Azad, (2000) : Proc. National Seminar on RMSRAE of N. E. Region, 9 - 10th Feb. 2000,Pp. 137/3.

12. In vitro effect of some biocontrol agents on the growth of Colletotrichum falcatum Went causing red rot of sugarcane. R. Saikia, A. K. Deka P. Azad, New Agriculturist. 11 (1&2), 31-34 (2000).

13 Aminotransferase activity of muga sikworm (Antherea assama Ww) (Lepidoptera: saturnidae) Dipali Devi & D. K. Sharma Proceedings of the 3rd International conference on wild silkmoths. 5, pp 242 - 246. (2000).

14 "Investigation of Trace-elements in Plants". J. Kotoky Proceedings of PlaIndian Science Congress (New Delhi) Jan' 2001.

15 'Ethno-Medico-Botanical Investigation of some Tribal Dominated Pockets of Kamrup District of Assam' J. Kotoky, and P. N. Das Proceedings of the Seminar on 'Frontiers of the Research & Development on the Medicinal & Aromatic Plants', held at CIMAP, Lucknow, from 16-18, Sept. 2000.

16 The algebra of triangular conservative matrices and its maximal group: B. C. Tripathy; Proceedings of the seventh Ramanujan Symposium on potential theory and Function theory Chennai, 19-22 Jan '2000 (139-148).

8. SEMINAR/CONFERENCE/MEETING/ WORKSHOP ATTENDED

1. Prof. Joyanti Chutia gave an invited talk on "Observation of low frequency mode in laboratory plasma" in the national symposium of plasma '2000 at SINP, Kolkata.

2. Dr. H. Bailung, Ms. B Singha, Mr. D. Boruah and Mr. A. R. Pal attended the 15th national symposium of plasma '2000 and presented Contributed Papers.

3. Dr. B. C. Tripathy attended the National Conference on Recent Development in Mathematics and Applications, organised by the Department of Mathematics, Assam University, Silchar held during March 14-16, 2001 and delivered a talk entitled "On statistical Convergence"

4. Dr. G. Choudhury attended the first Joint Statistical Meeting, an International Conference organised by International Indian Statistical Associations, held at India International Center, Delhi during December 30, 2000 to January 2, 2001 and presented paper entitled "further Study on Queue With a Random Setup Time and Multiple Vacation Policy"

5. Dr. M. R. Agrawal attended the 18th Rolf nevanlinna colloquium held at University of Helsinki, FINLAND during Agust 8-12, 2000 and presented a paper entitled "Korovkin Theory in Commutative Banach algebras" in the poster session.

6. Dr. B. C. Tripathy attended the International Conference on Geometry, Analysis and Applications organised by Department of Mathematics, Banaras Hindu University, Varanasi held during August 21-24, 2000 and presented a paper entitled "A Note on statistical convergence field."

7. Dr. B. C. Tripathy attended the International conference on Analysis and its Applications organised by Foroum`d Analystes, held at Meenakshi College for Women during December 6-9, 2000 presented a paper entitled "On A New Class of Sequences"

8. Dr. (Mrs.) Dipali Devi attended the workshop on Sericulture for development of rural economy sponsored by Ministry of Rural Development, Govt of India, held at Guwahati on 16th- 18th May 2001.

9. Dr. P. Azad, visited regional Biofertilizer Development Center, Imphal, Manipur during July - 2000 for negotiation of collaborative works on Screening of efficient strains of Rhizobia and VAM fungi for dual inoculation through laboratory, and field tests in N. E. Region along with motivation and training of local farmers for using biofertilizers.

10. Dr. P. Azad, delivered series of lectures as invited speaker, in training course of the state Agriculture Officers and Extension Staff for popularization of biofertilizers, organised jointly by state Agricultural Deptt. Govt of Assam, Govt. of Meghalaya and Regional Biofertilizer Development Centre, Imphal Manipur at Nagaon Nalbari, Nongpoh and Shillong with effect 14th to 24th September and 17th to 20th October, 2000.

11. Dr. P. Azad attended national seminar on resources management for self Reliant Agricultural Economy of N. E. Region. Organised by North Eastern Regional Institue of water and Land Management, Tezpur at Guwahati on February 9-10, 2000 and "Three Decades of research in Biofertilizers and organic Farming in North East India", jointly organized by Assam Agricultural University, Jorhat, Assam andRegional Biofertilizer Development Centre, Imphal, Manipur at AAU Jorhat on January 22-24, 2001.

12. Dr. J. Kotoky participated and presented a research paper in the National Seminar on "Frontiers in the Research & Development of Medicinal and Aromatic Plants" sponsored by the CSIR, Govt. of India, held at Central Institute of Medicinal & Aromatic Plants, Lucknow from 16th to 18th september 2000.

13. Dr. J. Kotoky participated and presented a research paper in the Annual Session of the Indian Science Congress Association, held at the University of Pune, from 3rd to 7th January

14. Dr. J. Kotoky participated in the WHO sponsored National Workshop on Pre-Clinical Toxicology, held at National institute Nutrition Hyderabad from 5th to 10th February 2001.

15. Dr. J. Kotoky participated in a Seminar cum workshop on : "Water, quality and resource management" sponsored by CSIR, Govt. of India and Industrial Toxicology Research Centre, Govt. of India, Lucknow held at RRL, Jorhat on 4th August 2000.

9. DISTINGUISHED VISITORS :

1. Prof. A. K. Prasanna, Physical Research Laboratory Ahmedabad, deliverd a series of lectures on.

   (i) Story of our Universe
   (ii) Gravity-How fundamental and important is it ?

2. Prof. Sekar Iyenger, SINP, Kolkata delivered a series of lectures on Experimental work on Tokamak Plasma at SINP.

3. Prof. A. L. Brown, Retired professor, University of Newcastels, who visited the Department of Mathematics, Guwahati University as visiting Professor delivered a popular lecture entitled "Mathematics of Twenty First Century" on November 13, 2000.

4 Prof A. K. Varma, School of Life Science, Jawaharlal Nehru University, New Delhi delivered a talk on "Mycorrhiza and its biotechnological applications in sustainable environment" held on January 20, 2001.

Fellowship :

Dr. M. R. Agarwal is visiting the school of Mathematics, Mawson Lakes, Boulevards, South Australia for collaboration work availing research fellowship for one year w. e.f. March 01, 2001.

10. A ON GOING PROJECTS :

1. "Development of Plasma Physics Division, IASST" sponsored by the Department of science and Technology, Govt. of India.

    1. Prof Joyanti Chutia, Principal Investigator.
    2. Prof. G. C. Das,Co-investigator
    3. Dr.H. Bailung, Co-investigator
    4. Ms. Barnali Singha, SRF
    5. Mr. Dibyajjyoti Barua, JRF
    6. Mr. Arup Ratan Pal, JRF
    7. Ms. Putul Kalita, JRF

2. "Developing Isozyme maker for different stocks of Eri Silkworm" sponsored by the Department of Biotechnology, Govt. of India.

    1. Dr. Dipali Devi, Principal In vestigator
    2. Dr. D. K. Sharma, Co-investigator
    3. Mr. Joyanta Deka, JRF.
    4. Mr. Dilip Talukdar, Field Assistant.

3. "Low Frequency Waves in Magnetised partially ionized Plasma" (Application to Heliopause & Interplanetary space Plasmas)

    1. Prof. G. C. Das, Principal Investigator
    2. Prof. C. Uberoi, Co-investigator
    3. Mr. Shuvam Sen, Research Assistant.
    4. Mrs. Ajanta Dutta, Research Assistant.

4. "Entry of Polycyclic aromatic hydrocarbons into from oil field effluents and their natural degradation" sponsored by DST, Govt. of India under young scientist scheme.

    Principal Investigator :- Dr. Arundhati Devi.

5. "Development of Mathematical and Statistical Sciences Division, IASST (Guwahati)" "sponsored by Development of Science and Technology, Govt. of India.

    1. Dr. Binod Chandra Tripathy, Principal Investigator
    2. Dr. Manju Rani Agarwal, Co-Investigator
    3. Dr. Gautam Choudhury, Co-In vestigator
    4. Ms. Sangita Kalita, Senior Research Fellow.
    5. Mrs. Mausumi Sen, Senior Research Fellow.

10.B PROJECT COMPLETED :

1. "Development of herbal Medicine with special reference to hepatic disorder" a DST, Govt. of India sponsored project has been completed and final report has been submitted in the month of Sept. 2000.

2. The project on the performance of S&T students of the Universities of NE Region in selected National Eligibility Tests, sponsored by the Department of Science & Technology, Govt. of India, has been completed and the Report was submitted to DST.

The study has two components : (1) Performance of S&T students of the NE Universities in NET, GATE and ARS-NET, and (2) Career choice of the Final Year PG Science students of NE Universities.

The Report has brought out tremendous gaps (I) in the instructions imparted as far as performances of the students of NE in various eligibility tests are concerned, and (ii) in the Career choice of students, which underline the importance of special training and coaching as well as of setting up of students' information and counselling centres.

The DST has suggested that a half-day seminar to discuss the findings of the project, which was of 24 months duration and for which the DST sanctioned a sum of Rs. 7,77,940/.

11. SYMPOSIUM, SEMINAR ORGANIZED BY IASST :

11.1 Advanced training programme for undergraduate students in Mathematics :

The Mathematical Science Division, IASST conducted an Advanced Training programme for undergraduate students in Mathematics of North East Region during October 16-28, 2000. It was sponsored by the Department of Science and Technology, Govt. of India. The motivation behind the training programme was to introduce to the students to new techniques for solving basic mathematical problems and to create awareness about research among them. Seventeen students from different colleges and universities participated in the programme where they could interact with the reputed mathematicians and statisticians of the country.

12. SEMINAR/ CONFERENCE ORGANISED :

1. Mr. Pranab Kumar Sarma, Research Fellow, Resource management & Environmental Division, IASST delivered talk on "Biodegradation of refinery sludge" held on July 21, 2000

2. Dr. H. Bailung, Assistant Professeor,Plasma Physics Division, IASST delivered talk on ''Plasma characteristics in magnetised Plasma device of IASST" held on August 25, 2000.

3. Dr. (Mrs.) M. R. Agarwal, Assistant Professor Mathematical Science Division, IASST delivered talk on "Korovkintheoryin commutative branch Algebras" held on September 22, 2000.

4. Dr. J. Kotoky, Assistant Professor,Life Science Division, IASST delivered talk on "Bio-assay guided search for new plant based remedy" held on October 20, 2000.

5. Professor Aldric Loughman Brown,Rtd, Professor University of Newcastle, U. K. Delivered talk on "Mathematics of twenty first century" held on November 13, 2000.

6. Dr. A. K. Varma, Professor Jawaharlal Nehru University, New Delhi delivered talk on "Mysorrhiza and its biotechnological applications in sustainable environment" held on January 20, 2001.

7. Dr. S. K. Sarma, Rtd. Professor and Head, Deptt. Of Environmental Science, Gauhati University, Guwahati delivered talk on Earthquake Prediction" held on February 23, 2001.

8. Dr. N. Deka, Professor Life ScienceDivision, IASST delivered talk on "Beyond Sequencing human DNA functional genomics" held on March 23, 2001.

13. LIBRARY AND INFORMATION CENTRE

The Library and Information Center of Institute of Advanced Study in Science and Technology (IASST) is being developed with rich knowledge based resources including printing and electronic sources to meet the varied information requirements of all scientists. The library of the Institute is concentrating on collection of books, booklets, journals, publications and reports etc. Relating to research fields. The documents in the library cover the latest and important publications in Computer Science, Plasma Physics, medical plants Biotechnology, Sericulture, Bioprospecting, Biofertilizer, Virology, Environmental Science, Mathematics, Statistics etc.

Library automation is in the process of completion. Presently catalouge entries are being prepared by the SOUL software. It is planned to prepare a computerised database of S&T documents available in NE India for scientists and technologists. Efforts are being made for subscription of the electronic journals. Moreover, it has also decided to prepare database of science-reading materials available in greater Guwahati.

Following services are being provided by the IASST Library & Information Centre to the users :-

- Reference & Information Service.
- Current Awareness Service.
- Selective Dissemination & Information Service.
- Referal Service
- Computerised Information Service where database search service (SOUL), Internet search service and E-mail service are available.
- Reprographic service service
- Circulation service.

Bonafied library members during the year 2000-2001 : 171

Non bonafied library members during the year 2000-2001 : 55

Collection status of the Library :

- Books : 5990
- Journals subscription during the year 2000-2001 (Including Foreign & Indian) : 58
- Journals (Bound Volumes) : 579
- Thesis, Dissertations : 122
- Research paper : 120
- Bulletin, Annual Report, News letter etc. : 400

14. CONSTRUCTION OF IASST CAMPUS :

The Govt. of Assam had allotted to the Institute a plot of land measuring 20 acres at Pashim Boragaon in greater Guwahati to set up its complex. The Department of Science and Technology, Govt of India had sanctioned an amount of Rs. 9,55,00,000/ (Rupees nine corers fifty five lakhs only) for upgrading the Institute. Out of the sanctioned amount of Rs. 9.55 crore. an amount of Rs. 6.50 crore (Rs. Six crore and fifty lakh) only had been earmarked for the construction of building components.

The construction of the IASST complex has been initiated with effect from December 1999. The items to be constructed under this project include the construction Approach Road, Boundary walls and Earth filling on the site, Deep tube well & Water supply etc. The construction of the Approach Road has been completed upto WBM level and that of the boundary walls is nearing completion. About 85% of the proposed site has been filled up with earth and 35% of the total job of the construction of the Academic-cum-Administrative Building of the IASST has been completed. The construction works of the Administrative-cum-Academic Building are going on in full swing. The construction of Research Scholars' Hostel Building will be started in November 2001. It is expected that the construction works of the first phase of IASST complex under the project will be completed around March, 2004

CONSTRUCTION OF IASST - COMPLEX IS IN PROGRESS.

COUNCIL OF THE INSTITUTE OF ADVANCED STUDY IN SCIENCE & TECHNOLOGY (2000 - 2001)

1. **Prof. K. M. Pathak,**
   Chairman-cum-Director
   IASST.
2. **Dr. R. C. Srivastava,**
   Ministry of Science & Technology,
   DST, GOI, New Delhi, Member.
3. **The Director, RRL,**
   Jorhat, Member.
4. **The Director,**
   ASTEC, Silpukhuri,
   Guwahati, Member.
5. **Dr. M. C. Kalita,**
   General Secretary,
   Assam Science Society,
   Latasil, Guwahati, Member.
6. **Dr. B. K. Tamuli,**
   Former professor,
   Deptt. of Mathematics, G. U.
   Gotanagar, Maligaon, Guwahati.
   Member.
7. **Dr. N. N. Dass,**
   Prof. Deptt. of Chemistry,
   D. U. Dibrugarh, Member.
8. **Sri J. K. Baruah,**
   C/o Eastern Tea Brokers Pvt. Ltd.,
   Chandmari, Guwahati - 3, Member.
9. **Dr. K. Pathak,**
   Former Prof. of Physics,
   Cotton College, Guwahati, Member.
10. **Prof. P. Sen,**
    Saha Institute of Nuclear Physics,
    Bidhan Nagar, Calcutta, Member.
11. **Dr. C. M. Sarma,**
    President, Assam Science Society,Member.
12. **Dr. B. P. Chetia,**
    Prof. Deptt. of Methematics,
    G. U. Guwahati, Member.
13. **Dr. G. Barua,**
    Prof. & Head, Deptt. of Computer
    Science & Engineering IIT,
    Guwahati, Member.
14. **Commissioner & Secretary,**
    Deptt. of STE, Govt. of Assam,
    Dispur, Guwahati, Member.
15. **Dr. J. Medhi,**
    Emeritus Prof., G. U.
    Silpukhuri, Guwahati, Member.
16. **Dr. P. Azad,**
    Asstt. Prof., LSD, IASST.
    Member.
17. **Dr. G. C. Das.**
    Prof. PPD, IASST.
18. **Dr. M. K. Kalita,**
    Registrar, IASST, Member Secretary.

Project/Division wise. Summary of Receipt and Payment Account

SL. No.	Heads of Accounts	Opening Balance as on		Receipt During the Year	
		Rs.	P.	Rs.	P.
1.	Development of Mathematical Science Division.	(-) 1,30,507	80	10,00,000	80
2.	Development of Plasma Physics Division.	2,35,469	90	12,00,000	00
3.	Herbal Medicine	(-) 38,088	50		
4.	Development of Isozyme Marketes for different stock of Eri Silkworm	35,742	00	1,02,000	00
5.	Study on the performance of Students of the Universities in the N.E. Resion in selected National eligibility Test.	76,586	00	NIL	
6.	Low frequency waves in magnet-ised partially ionized plasma project.	98,962	00	1,91,000	00
7.	Upgrading the IASST.	2,50,14,329	00	NIL	
8.	Entry of polycicle aromatic hydrocarbons into the soil from oil field effluent and their natural degradation.	NIL		1,25,000	00
9.	General Management	(-) 44,96,432	48	15,00,000	00
10.	Education & Library	(-) 67	00	4,00,000	00
11.	IASST, General Fund.	48,93,803	36	50,81,847	13
12.	Land & Building	18,64,010	00	NIL	
	Total	2,75,53,806	48	95,99,847	13
	Reserve Fund.	7,06,000	00		
	Grand Total	282,59,806	48	95,99,847	13

of 2000 - 2001

of the Institute for the Year Ended 31st March, 2001. (2000-2001)

Total Amount		Payment during the Year		Closing Balance as on 31st March 2001	
Rs.	P.	Rs.	P.	Rs.	P.
8,69,492	20	8,69,492	20	NIL	
14,35,469	90	13,14,092	00	1,21,377	90
(-) 38,088	50			(-) 38,088	50
1,37,742	00	1,31,507	00	6235	00
76,586	00	3,28,190	00	(-) 2,51,604	00
2,89,962		1,89,444	00	100518	00
2,50,14,329	00	2,68,02,938	00	(-) 17,88,609	00
	00	8,688	00	1,16,312	00
(-) 29,96,432	48	44,20,364	00	(-) 74,16,796	48
3,99,933	00	3,99,977	00	(-) 44	00
99,75,650	49	5,45,637	00	94,03,013	49
18,64,010	00	7,40,654	00	11,23,356	00
3,71,53,653	61	3,57,50,983	20	14,02,670	41
7,06,000	00			7,06,000	00
3,78,59,653	61	3,57,50,983	20	21,08,670	41