Treasure Trove

A compilation of Research Papers

B. H. COLLEGE, HOWLY

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Principal's Column

Higher Education without quality research is quite incomplete. The teachers are to be actively engaged in research whereby they can contribute not only academically but also socially. Rastriya Uchhatar Siksha Abhiyan (RUSA) also focuses on creating an enabling atmosphere in institutions to facilitate research and innovation. Tuning with this sort of objective and for providing congenial research atmosphere, this project was undertaken in the forum of Research Cell, B. H. College, Howly last year. The idea was to share the insightful findings of the completed or ongoing research works of the faculty members undertaken at different points of time. The researchers were requested to write research papers on their topic or on an aspect of their topic of research. In total 20 researchers complied with our request and as a result we are going to publish "Treasure Trove" - a compilation of research papers in this maiden attempt of research works. It is expected that this compilation of research papers of the concerned researchers might be of use to academicians and future researchers.

I must express my sincerest thanks to Governing Body, B. H. College, Howly for providing financial support. Dr. Sambhu Saran Singh, Chief Editor, Dr. Ganga Dhar Das , Dr. Dipmani Das, Dr. Nabajit Das, the members of the Editorial Board and the members of the Research Cell, B. H. College, Howly deserve appreciation for their integrated effort in materialsing this project.

(Dr. B. C. Pathak)
Principal
B. H. College, Howly

From the Desk of Editors

Research is an important dimension of higher education. Of course, research should be quality research in all branches through the outcome of which a society is guided, oriented and empowered. Hence, quality research is a challenging academic exercise and it must go hand in hand with higher education. In today's market oriented higher education the status of research is more precarious as it entails resource, innovation and relevancy of the areas of study to make it more meaningful in terms of fulfillments of the objectives concerned. Taking this into consideration, promotion of quality research is a collective responsibility of all the stakeholders of higher education. Keeping this noble objectives in view the Research Cell, B. H. College, Howly has made this venture to augment research environment in terms of publishing books containing research papers/ articles on the topic of research or on an aspect from those researchers who have already completed their M. Phil. or Ph. D. or from those who are still pursuing M. Phil. or Ph. D. in Social Sciences, Humanities, Commerce and Science discipline.

The purpose of publishing such a book on their topic of research is to promote research environment in the college in particular and in the academics in general. The compilation of research papers, it is expected will certainly enthuse and inspire the future as well as the current scholars engaged in research in pursuing their research works.

The book has been published in two languages – English and Assamese. The English section accommodates 19 articles/ papers and the Assamese section accommodates only one. Although bilingual publication, this book has accommodated only one research paper in Assamese for which this paper is placed in the middle of the book indicating no separate section.

Sir Syed Muhammad Saadulla and Government and Politics in Assam, 1921-1947

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Introduction :

Few leaders from the early days of the Provincial Legislative Council to the eve of independence have had a more prominent place or a longer period in Government and politics than Sir Syed Muhammad Saadulla in Assam. A successful teacher and a lawyer Saadulla showed an early interest in public life. He became a member of the Legislative Council established after Assam was reconstituted as a Chief Commissioner's province in 1912. It was in the Council debates that he came into prominence as a legislator. He remained member of the Council throughout the period of Dyarchy eventually becoming Minister and Executive Councillor. From 1937 to 1946 he was, except for two short breaks, Premier of Assam under the Government of India Act 1935.

Yet curiously, Saadulla has attracted little scholarly attention so far. Recent studies on the political and constitutional development of Assam have largely relegated him to secondary importance. The absence of Saadulla's own writings or even a standard Biography makes understanding of the man and his policies no less difficult.

Sir Saadulla is today chiefly known as a pro-British Muslim leader who had promoted large scale immigration into Assam of Muslims from Eastern Bengal and who sought the inclusion of the province in Eastern Pakistan.

The present study aims at an objective assessment of the role of Sir Syed Muhammad Saadulla in the government and politics in Assam from 1921 with the introduction of Dyarchy to transfer of power and partition in 1947. An attempt has also been made to critically examine his views and policies on immigration and Muslim League demands, the main issues of controversy. This work is based on related archival sources preserved in the Assam State Archives, Guwahati. Contemporary reports and accounts and the relevant secondary materials have also been utilised. A Select Bibliography is appended.

Syed Muhammad Saadulla was born on 21st May, 1885 at Lakhtokia of Gauhati in the house of his father Syed Muhammad Taibulla. Taibulla worked as a teacher in Sonaram High School, Guwahati and settled at Lakhtokia. He had four sons. Saadulla was the second.

Syed Muhammad Saadulla had his early education, primary and religious, under as much mass contact as the non-official chairman had.

In his years in the Council Saadulla worked closely with the Assam Association though he was not a member. Rather, Saadulla was a member of the Anjuman-i-Islamia of which he became the local secretary at Gauhati. In 1919 he was elected chairman of the Gauhati Municipal Board. A resolution was moved in a public meeting under the chairmanship of Tarun Ram Phookan on 16th February, 1919 at the Public Hall expressing deep sense of regret and disappointment at the action of the Government in proceeding with the Rowlatt Bill and urging the Government to drop it. The resolution was moved by Saadulla. On 19th March "Khilafat Day" was observed at Gauhati with Hartal and public meeting presided over by Tarun Ram Phookan. Thereafter, Saadulla took leading role in preventing the Municipal Board from presenting an address of welcome to the Viceroy Lord Chelmsford. In 1920, Saadulla left for Calcutta to practice law at the Calcutta High Court. He remained there for most of the next three years.

Saadulla and Dyarchy :

With the inauguration of Montagu-Chelmsford reforms in Assam on 3 January, 1921, Dyarchy was introduced with reserved and transferred subjects. The reserved half was administered by an Executive Council of two members, one a distinguished civil servant and the other a distinguished politician.

Elections to the first Council was held in November, 1920. The Assam Association now increasingly associating itself within the National Congress responded to the latter's call to boycott the elections. The Europeans and the Assamese moderates contested and as many as 16 were returned unopposed. By the time elections to the second Council was held in November, 1923 the situation had changed.

The sudden and unilateral suspension of the non-cooperation movement by Mahatma Gandhi in February, 1922 turned many Congressmen towards Council politics with the object of carrying on the battle inside the Legislature. Thereupon, Chitta Ranjan Das resigned from the Congress Presidentship and in January next he and Motilal Nehru formed the Swarajya Party. The Assam Association meanwhile merged itself with the Assam Provincial Congress Committee when the latter was formed in 1921. Under Tarun Ram Phookan almost all the Assam Congress men joined the Swarajist Party.

The Assam Swarajists contested all the seats during the elections to the second Reformed Council in November 1923 but failed to get a majority in the Council. The local Assamese and the immigrants sought to devise their own methods to prevent conflict. In areas where immigration was highest or likely to be so lands were divided into three classes : first, those in which immigrants might settle freely; second, those in which they could not settle and finally, lands where a line was drawn on the map or on the ground only on one side of which the immigrants could settle. These restrictions were imposed not through Government or legislative sanction but through executive orders of Deputy Commissioners during 1920-23 in Nowgong and in the Barpeta Sub-Division of Kamrup district and which became the well known Line system. Still there was no proposal to restrict inter-provincial migration and in 1924 a Secretary to the Government remarked that there was land enough for the Assamese and the immigrants.

Nevertheless a meeting of the Government was held on Ocotber 31, 1924 to thrash out the whole immigration problem. There was no unanimity of view and the conference broke up with a decision to ascertain public opinion during the ensuing cold weather tours by Government members. Executive Councilor WJ Reid found in Nowgong in January 1925 the most divergent views on the subject. Saadulla wrote on February 6 that one section of the people saw the immigrants as criminals and sought their expulsion, while another saw them as "saviours". His own opinion was that the immigrants had added greatly to the prosperity of the district. In this Sadulla was of course echoing official opinion.

I think the settlement of these immigrants is on the whole beneficial (Secretary G.E. Soames had declared). They may be more lawless and more criminal, although I am not one of those who regard every Mymensingh immigrant as a black guard. They are undoubtedly magnificent cultivators who should be of the greatest value of the Assamese, if the latter were enterprising and energetic enough to wish to learn from them. Moreover, they have brought under cultivation classes of land which the Assamese would not look at. They have brought in and are bringing in a very welcome addition to the land revenue of the province.

Kutubuddin Ahmad, the second Executive Councillor observed that tide of Assamese public opinion was very strong in favour of some legislation to restrict encroachments. He said that he was informed at Barpeta that the public would soon approach the Government to take steps to protect the children of the soil.

In the Council opinions were just as sharply divided. Kutubuddin Ahmad apparently pro-British outlook made him a natural choice to succeed Kutubuddin Ahmad and Sir Syed Muhammad Saadulla took oath of allegiance and office of the Executive Councillor of the Governor on 1st April, 1929. Saadulla was given the "Law" portfolio. Subsequently, the departments of Home and Finance in addition to Law were added to his charge.

The Governor of Assam was in favour of amending the anti-terrorist law to curb the growing violence. Such Acts had already been passed in Bengal and had been in operation since 1925. The police and district authorities in Assam had been pressing for such legislation since 1929 but could make no headway owing to Saadulla's resistance. Barely three weeks before he retired as Executive Councillor, Saadulla was compelled by the Governor to introduce and pass the Assam Criminal Law Amendment Bill, 1934, in the House.

Saadulla had become in 1932 the Vice President of the Executive Council and the leader of the Legislative Council. On March 31, 1934, he retired on completion of his term as Executive Councillor. But till then he was neither a member of any political party nor was affiliated to any political group. With the passing of the Government of India Act in July, 1935 in Assam, like the rest of the country, entered a new phase in its constitutional history. A little later Saadulla formed the "Assam Valley Muslim Party."

Ministry Making : Coalitions and Alignments

Elections were held in Assam in February 1937. The Congress success in securing thirty three seats in an Assembly of 108 came as a surprise to many. Saadulla's own Assam Valley Muslim Party had secured five seats, though Muslims as a whole representing various groups had secured thirty four seats. The Congress High Command had already decided against attempts at forming Government in provinces where they did not have a clear majority. The choice thus narrowed down in the Governor Sir Michael Keane's perception to Saadulla.

The third Assamese ever to hold a Master's degree and a distinguished lawyer at the Calcutta High Court Saadulla was an experienced legislator with unbroken administrative experience of a full decade, from 1924 to 1934. He enjoyed the confidence not only of the successive Governors and the bureaucracy but also of a section of the people. But Saadulla at this time was at Calcutta practising law at the High Court. Sir Michael Keane sent feelers to him to return to Assam and try and form the Government. Saadulla was expecting for a seat in the bench of the High Court.

day the fourth Saadulla ministry was installed amidst unprecedented turmoil in the province. The Europeans had now proposed to Saadulla that Arnold Whittaker, the leader of the European group should be included in this ministry. Whittaker himself met Saadulla and promised the support of his group, provided there was no remission of land revenue and he was given a berth in the ministry. Saadulla declined telling Whittaker that he could not include any European in his Cabinet. When he met the Governor on July 4, Saadulla told him that Whittaker's demand was not acceptable to him. Further, that the majority of the members in the Assembly would be satisfied if at least 50 percent of the land revenue was remitted, although there was a demand of hundred percent remission.

Saadulla, as the leader of the Parliamentary wing of the League did not have any mass support and his strength lay in the middle class Muslims. But the President of the Provincial League organisation, Maulana Abdul Hamid Khan Bhasani, an immigrant leader, had tremendous influence upon the masses, particularly the immigrant Muslims. This was clear at the Provincial League Conference at Barpeta in April, 1944 where Bhasani's strength was driven home to Saadulla. What transpired at that meeting is thus described by a recent writer :

"Ministers give us land or resign" were literally the writings on the walls of the Pandal to greet Saadulla. Replying to Bhasani's long harangue, Saadulla charged that the greedy headmen of immigrant villages, dewanis and matbors, had unceremoniously managed to get for themselves pattas for seventy to hundred acres of land each, with a view of induct sub-tenants thereupon. It was their greed which was at the root of the evil of the Line system. He cited instances of their driving out even Assamese Muslims from newly reclaimed lands.

Inspite of Saadulla's opposition, the conference adopted a resolution demanding abolition of the Line system. That the rift was not just between Saadulla and Bhasani at the leadership level but that differences existed between him and the majority of the Provincial League was soon confirmed.

The Grow More Food Campaign and its corollary Land Settlement Scheme satisfied neither the Congress nor the militant Leaguers led by Abdul Hamid Khan Bhasani. The latter continued to harp on the total abolition of the Line system. Gopinath Bardoloi and Rohini Kumar Choudhri's offer of support to a coalition ministry to be headed by Saadulla at the stage came in very handy. The result was Saadulla's fifth ministry with five ministers out of ten nominated by the Congress. It was a pact which had no official sanction either of the

Commission which fixed Central Subvention to Assam after the Simon Commission Saadulla further said :

This is the cruelest joke that could be perpetrated upon a poor province like Assam for you will be surprised to hear that Assam is contributing to the Central coffer to the tune of Rs 10 crores every year whereas we get the small pittance of Rs. 30 lakhs as annual subvention. It is on account of these man-made laws which have left Assam in the poorest condition, with the barest of institutions that go for a self government. But Assam is not poor in her natural resources. If Assam was allowed to run her own course she would be in the fore-front of all the Indian provinces. In spite of the poverty of its exchequer Assam stands fourth in the matter of literacy throughout India.

This spirit of belongingness to Assam perhaps could not induce him to join the most prestigious post of Governorship of East Pakistan though it was offered by Muhammad Ali Jinnah after partition of India, as is said by some people. Later events need only to be summarised. After completion of his work in the Constituent Assembly Saadulla turned his attention to the Muslims in Assam on the eve of the first General elections of 1952. He was instrumental in getting the former Leaguers to join the Congress in August-September 1951. He himself joined the party towards the close of the year but left soon afterwards when he found that he was denied a ticket for an Assembly seat. He filed his nomination as an independent candidate from South Salmara constituency, but his papers were rejected on technical grounds. Saadulla thereafter withdrew from public life. He died at his Guwahati residence on 8th January at the age of 70 Years.

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Chemical Synthesis of Cu_2S/ PVA quantum dots

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Abstract

Thin films of nanoparticles were deposited on glass substrates through chemical route. The formation of nanoparticle was confirmed by using UV-visible absorption measurements. Typical HRTEM images showed well defined hexagonal faced Cu_2S nanocrystals of average size 25 nm at room temperature. The UV-vis absorption analysis of as grown nanostructures showed the dominant chalcocite phase corresponding to absorption at 375 nm along with a small absorption at 624nm for the covellite type phase. The band gap was estimated as 3.33eV which exhibited an enhancement with respect to that of bulk for indirect transition. The PL emission shows at 520 nm.

Keywards: CuS, Cu_2S, quantum confinement

Introduction

Nanostructures materials have unique characteristics that can't be dotained from conventional macroscopic materials. The nanoparticle can display novel optical, electrical, magnetic, chemical and structural properties owing to its quantum size effects and surface effects that might find important technological applications (Boey et al. 2007; Brelle et al. 2000; Jiang et al. 2000 & Wu et al. 2008). Copper sulfide has fairly complex crystal chemistry owing to its ability to form sub- stochiometric compounds (Gautam & Mukharjee 2006). The CuS phase exists in two forms, the amorphous brown CuS and green crystalline covellite (Brelle et al. 2000). The CuS is a P-type material. So, it has a wide scope in photovoltaic device application such as solar cells. Its band gap is 1.27eV. So in this nano-region CuS may exhibit its potential in the visible region (Gautam & Mukherjee 2006; Boey et al. 2007 & Li et al. 2009). Keeping above aspects, an experimental work on the chemical synthesis of copper sulfide nanoparticle has been undertaken and presented in this paper. In our present study, we employed a simple chemical technique to prepare polycrystalline copper sulfides in aqueous alkaline medium at room temperature.

Experimental

Thin films of CuS nanoparticles were deposited on glass substrates by reacting copper acetate monohydrate (Cu $(ac)_2$) with thiourea (Tu) (H_2NCSNH_2) in the presence of polyvinyl alcohol (PVA) as capping agents. A 3% PVA solution was taken for preparation. eqivolume and eqimolar (0.01M) solution of copper acetate and thiourea were used for the synthesis. Ammonia was added to the copper acetate

Optical properties

The optical absorption spectra of the nanoparticles were measured using USB-2000 UV-vis spectrometer. The nanocrystallites thin film was suspended in glycerol using magnetic stirrer and their optical absorption spectra were recorded at room temperature over the range 350nm to 800nm. Figure 2 shows the absorption spectra of a typical sample. The UV-vis spectra depend on Cu/S composition of copper sulphide nanocrystals. Generally CuS shows a characteristics absorption band near IR region. Cu_2S shows weaker absorption peak and exhibits a large red shift with respect to CuS. The UV-vis measurements exhibit an absorption peak at 375nm and a shoulder around 624nm at room temperature. The broad absorption in the short wavelength side at 375nm corresponds to that of chalcocite phase (Gautam & Mukherjee 2006) and that of small absorption at 624nm is owing to that of the covellite phase (Zou et al. 2007 & Xu et al. 2008) of copper sulfide. This clearly shows that the absorption edges are blue shifted with respect to the bulk Cu_2S (1.5eV) and CuS (1.27eV) respectively. Similar results were also reported by other workers for the chemical bath deposited copper sulphide nanoparticles. The optical absorption characteristics of the present work therefore suggest that the synthesised samples are predominantly composed of Cu_2S which is also confirmed by HRTEM measurement. The band gap energy of the synthesized Cu_2S calculated as 3.33eV which is enhanced with respect to those of bulks. The observed blue shift and corresponding increase in band gap confirms the quantum confinement amongst the nanopatrticles. This clearly indicates the presence of both CuS and Cu_2S in the prepared samples (Gautam & Mukherjee 2006 & Boey et al. 2007).

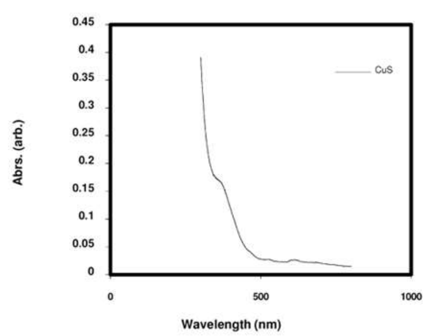

Figure 2: UV- vis absorption spectrum of a typical Cu_2S

PL spectroscopy

Fluorescence spectroscopy is a kind of electromagnetic spectroscopy which analyses fluorescence from a sample. It involves using a beam of light, usually UV light that excites the electrons in the molecules of certain compounds and causes them to emit light of a lower energy, typically but not

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include Assamese, Bengali, Bodo, Nepali, Rabha, Tea tribe etc.

Methodology

Several field trips were made during the year 2007-2008 to collect the information and on the spot study of plants that are used as medicine to cure various human diseases. Information has been collected from local inhabitants who are considered to have fair knowledge about different herbs and plants. The local medicine experts like "Vaid" and "Kabiraj" have also provided their knowledge on the importance of medicinal plants, their methods of preparation and mode of application. The vernacular names of the plants have been assigned with the help of local people who are familiar with the herbal medicine. The botanical names have been assigned by proper taxonomic study with the help of Flora of Assam, Flora of Maharashtra etc.

Results and Discussion

The medicinal herbs and plants are enumerated in table-1. All the plants are enumerated alphabetically in column-1; the family names are given in parenthesis. Assamese names are below the family. The plant parts used are given in column 2, disesses and ailments in column-3 and methods of preparation and mode of application are given in column -4.

A total number of thirty (30) medicinal plants belonging to twenty (20) families have been recorded from different localities of Barpeta district of Assam. These plants are traditionally used by different tribal and non tribal communities for curing various human diseases and ailments. The medicinal plants enumerated in the table are used to cure a wide variety of diseases. From the survey it has been observed that in addition to "vaid" and "kabiraj", the common people are also aware of some important medicinal plants and their uses. In remote areas, people still depend on the local medicine experts for curing their diseases due to lack of communication and absence of modern medical facilities. The district is very rich in biodiversity. Some important medicinal plants are found in wild condition. Therefore it is the call of the hour to create awareness among the common people regarding the conservation of important medicinal plants in their wild habitat as well as in medicinal plant gardens, botanical gardens etc. and sustainable utilization of biodiversity.

Acknowledgement

Author is thankful to the villagers of the study areas especially to the "Vaid" and "Kabiraj" for their kind co-operation during the survey work.

Sl. No.	Botanical names (family) Local name	Plant parts used	Diseases/ ailments	Method of preparation and mode of application
12	Clerodendrom colebrokianum L. (verbenaceae), Nefafu.	leaf	High blood pressure Dysentery	Leaf used as vegetable. Leaf juice mixed with small amount of sugar and given 2 teaspoonfuls 3 times daily.
13	Clerodendrum viscosum Gaertn. (Verbenaceae), Dhopa tita	Leaf	Dysentery	Crushed young leaf juice 3 teaspoonfuls given 3 times daily.
14	Commelina benghalensis L. (commelinaceae), Konasimolu	Latex	Boil	Latex of the plant applied externally.
15	Cynodon dactylon (L.) Pers. (Poaceae), Dubori ban	Whole plant	Minor cut	Plant crushed with polished rice and applied externally
16	Cyperus rotundus L. (Cyperaceae), Motha	Rhizome	Dysentery Stomach disorder Epilepsy	Crushed rhizome extract 2-teaspoonfuls given 3- times daily. Rhizome extract given as tonic. 1-teaspoonful root extract given 2-times daily.
17	Eclipta prostrate L. (Asteraceae), Khehraj ban	Leaf, root	Itching, Scabies Hair falling Ear disease	Crushed leaf paste applied externally. Leaf paste applied externally on hair. Few drops of leaf juice applied in ear.
18	Enhydra fluctuans Lour. (Asteraceae), Halochi	Whole plant	Prickly heat, Gonorrhea	Crushed plant juice applied externally. About 50ml. plant juice given once daily for 7-10 days.
19	Erythrina variegate L. (Papilionaceae), Modar	Leaf	Worm trouble, Boil	Young leaf juice 2-teaspoonfuls given 2-3 times daily. Leaf warmed and applied externally.
20	Euphoria neriifolia L. (Euphorbiaceae), Siju	Leaf, stem	Ear pain, Boil	Leaf juice warmed slightly and few drops applied on ear. Crushed stem juice applied externally.
21	Euphorbia Gaudichaudi Boise. (Euphorbiaceae), Gakhir ban	Whole plant	Wound, Vomiting Bronchitis	Milky juice of the plant applied externally. Plant decoction given orally to stop vomiting. Plant juice given as syrup.
22	Jatropha curcas L. (Euphorbiaceae), Bangali era	Leaf, Stem, Root	Toothache Itching and other skin diseases	Brushes with young branches of the plant. Crushed seed paste applied externally. Latex of the plant mixed with coconut oil and applied in infected areas.

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ranging temporarily or permanently, during different times of the day, different seasons and years, besides showing spatial differences across habitats (Haskell et al. 2002).

The infra-order lorisiformes of order primate is the 'least known of all primate' (Nekaris & Bearder 2011) having 34 recognized nocturnal species under three subfamilies Galaginae (galagos), Perodicticinae (pottos and angwantibos) and Lorisidae (lorises). The Lorisidae represented by two species in India - *Loris lydekkerianus* (Slender loris) and *Nycticebus bengalensis* (Bengal slow loris) which is endemic to South and Southeast Asia. The genus *Nycticebus*, native to South and Southeast Asia is one of the least studied Asian primates, owing to its nocturnal lifestyle, cryptic and its small body size (Groves 1998, 2004; Srivastava & Mohnot 2001). Bengal slow loris *Nycticebus bengalensis* has the largest geographic range among the all 8 species of slow lorises and this species remains very poorly researched, both in the wild and in captivity. No intensive study is reported on the behavioural aspect of this species, thus causing lack of understanding in the behavioural ecology with ranging pattern of Bengal slow loris in Northeastern part of India. Keeping in view the lack of scientific data on different aspects of the species particularly on the ranging behaviour which is essential factor for understanding the ecology and behaviour of the species, the present study of the ranging behaviour of Bengal slow loris has been done in Hollongapar Gibbon Wildlife Sanctuary (hereafter HGWLS) in Assam form .

Study site

We conducted the eco-behavioural study on Bengal slow loris from June 2008 to December 2010 in HGWLS, in Assam, India. HGWLS (Figure 1) situated at 26° 40' to 26° 45' N and 94° 20' to 94° 25' E, at an altitude of 100 to 120 m, and has an area of 20.98 km2. It is located on the south side of the Brahmaputra River in the district of Jorhat, Assam. The vegetation type in HGWLS is Assam plains alluvial semi evergreen forests, sparsely interspersed with wet evergreen forest patches (Champion & Seth 1968). The vegetation is composed of several canopy layers; most of the components are evergreen in character (Champion & Seth 1968). The top canopy is predominated by *Dipterocarpus macrocarpus* and *Artocarpus chama; Mesua ferrea* is the dominant species in the middle canopy, whereas the lower and ground layers consist of a variety of evergreen shrubs and herbs, the most common being *Teinosstachyum dulloa* and *Pseudosta chyum polymorphum*. HGWLS is an isolated forest fragment, and the ecology and the behaviour of a species, including the Bengal slow loris, may be influenced by fragment-mediated changes. Based on differences in minimum daytime

Fashing et al. 2007). No record of GPS readings were made unless the estimated position error displayed on the GPS unit was < 20m. The night range length was determined for the focal loris based on the shortest point-to-point movements of the loris between consecutive GPS locations during night follows from 18:00 h to 04:00 h. As per Radhakrishna and Singh (2002), period of the loris observation is considered a 'Full night' if a focal animal that followed continuously from its sleeping site at dusk to its sleeping site at dawn and also if a following the focal animal did not last the whole night (if disappeared the animal), but more than five continuous hours considered a 'Partial night' observation was included. Sample sizes of all 'night-follows' were very small for some months, thus seasonal data were calculated, rather than monthly mean night range lengths. For maintaining statistical independence, recording 'one focal loris' in each night was observed.

Home range

Before analysis, all GPS co-ordinates (degree-minute-seconds) was converted into metric co-ordinates format (UTM: Universal Traverse Mercator) where map Datum used as WGS-84 (World Geodetic System). Following two methods were followed for estimating the home range:

a) Minimum Convex Polygon (MCP): The earliest, most intuitive and still most commonly used method of estimating home range size is the Minimum Convex Polygon (MCP), which links up the outermost location points of a home range of an individual (MCP; Mohr 1947; Seaman et al. 1999). It is the most commonly used method of estimating the size of the home range of nocturnal prosimian (Bearder & Martin 1980; Radespiel 2000; Nekaris 2003). The area estimated by MCP method, is completely covered all location points recorded in such a way that the outer locations create a convex polygon.

b) Fixed-Kernel Analysis (FKA): Estimating size of the home range based on densities of location points is another method known as 'Kernel' and assesses an animal's probability of occurrence at each point in space (Worton 1995). Examination of the utilization plots revealed 95% of fixes gave reliable Kernel home range estimates, with occasional movements excluded from the range area (Kenward 1987).

RANGES 7 Software programme was used to determine the home range sizes of Bengal slow loris through the Minimum Convex Polygon method (MCP) and Fixed-Kernel Analysis (FKA) methods. Home range sizes were estimated 100% for MCP and 95% for Kernel analysis of the focal loris for each season and for the entire study period.

Seasonal variation in home range

The average home range size is bigger in winter than summer. It is 12.98 ± SD 0.05 ha (MCP) and 11.83 ± SD 2.74 ha (95% FKA) in summer, 18.22 ± SD 3.48 ha (MCP) and 13.57 ± SD 0.21ha (95% FKA) in winter (Table 1).

Table 1: Seasonal home range size of Bengal slow loris

Season	Individual	M C P	95% FKA
Summer	LB-Male & LB-Female	12.98 ± SD 0.05 ha	11.83 ± SD 2.74 ha
Winter	LB-Male & LB-Female	18.22 ± SD 3.48 ha	13.57 ± SD 0.21ha

Home range overlaps

Overlap was measured as percentage of one total home range overlapping the total home range of another individual. Due to differences in home range size, male sometimes overlapped a larger proportion of the female's home range and vice-versa (Table 2). Female overlapped about 60.18 % of male home range. Male home range however, overlapped approximately 58.40 % of female's home range (Figure 4). A higher percentage of overlapped was recorded during winter i.e. 79.84 % (female over male) and 60.85 % (male over female). But during summer both male and female overlapped each other by 23.54% (female over male) and 23.41 % (male over female) respectively. However, the difference was not significant (=0.06, df=1, p=0.430; Kruskal-Wallis test H=2.4, df=1, p=0.121).

Table 2 : Home range overlap between male and female Bengal slow loris

Yearly home range overlap				
Individual	LB-Female		LB-Male	
LB-Female	-		60.18 %	
LB-Male	58.40 %		—	
Seasonal home range overlap				
Season	Summer	Winter		
Individual	LB-Female	LB-male	LB-Female	LB-male
LB-Female	-	23.54 %	-	79.84 %
LB-Male	23.41 %	-	60.85 %	-

throughout the year as well as suitable sleeping sites for Bengal slow loris. Although food availability may be the main factor to explain the difference in home range sizes of different species of genus *Nycticebus*, future works is needed to focus on other parameters to explain ranging behaviour.

A suitable habitat is clearly required for HGWLS, as safe sleeping sites is important for this animals and other nocturnal primates to avoid predators like python, civet etc. Thus appropriate structure of suitable habitat for sleeping sites has an importance for primate's home range size. In HGWLS, the sleeping sites of the study animal consisted of thick bushes, climbers, or tangles of climbers in heavily branched tree canopies.

The high degree of inter-sexual overlap between the animal under study showed a certain degree of territorial defense. The fact that males and females both defended their territories may be indicative of high competition for resources. However, results on social interactions between animals show that very few direct negative interactions (such as fighting) occurred and that instead territory defense was passive rather than active.

This study however, hints at a more complex social organization in Bengal slow loris than other primate with multi-male social organizational system. Thus the social system in Bengal slow loris is more likely to be characterized as a "pair-living but solitary foraging at night" which is similar to some Malagasy lemurs (Schülke & Kappeler 2003).

Acknowledgements

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Study of electronic, magnetic and optical properties of BiSe and BiTe using FP-LAPW method

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Abstract

The electronic, magnetic and optical properties of BiSe and BiTe have been investigated by first principles full potential-linearized augmented plane wave (FP-LAPW) method with Generalized Gradient Approximation (GGA). The calculated density of states (DOS) and band structures show semiconducting behavior of BiSe and BiTe with a narrow direct energy band gaps of 0.2 eV and 0.7 eV respectively. The real and imaginary parts of dielectric function, refractive index, extinction coefficient, optical conductivity, reflectivity, energy loss function etc. are also calculated to understand the optical properties of BiSe and BiTe.

Keywords : DFT, FP-LAPW, DOS, energy band structure, optical property.

Introduction

At present semiconductors can be grown with various compositions from monoatomic layer to nano-scale islands, rows, arrays, in the art of quantum technologies and the numbers of conceivable new electronic devices are manufactured (Erbarut 2003). Narrow gap semiconductors BiSe and BiTe are classic room temperature thermoelectric materials (Kanatzidis 2001). Their excellent thermoelectric performance has been attributed to the details of the near-gap electronic structure combined with low lattice thermal conductivity. BiSe and BiTe are the chalcogenides of transition metal having applications in the field of opto-electronic devices like photodiodes, solar cells, LED and semiconductor lasers. They have NaCl structures at room temperature with Wyckoff positions as Bi (0, 0, 0) and Se & Te (0.5, 0.5, 0.5) (Wyckoff 1963). In this report, we would like to present a systematic study of DOS, energy band structures and optical properties by calculating The real and imaginary parts of dielectric function, refractive index, extinction coefficient, optical conductivity, reflectivity, energy loss function etc. (Hughes et al. 1998; Labidi et al. 2010 and Okoye 2004) of BiSe and BiTe using FP-LAPW method.

coefficient, optical conductivity, reflectivity, energy loss function etc. are related to real part (ε_1) and imaginary part (ε_2) of dielectric function with some relations.

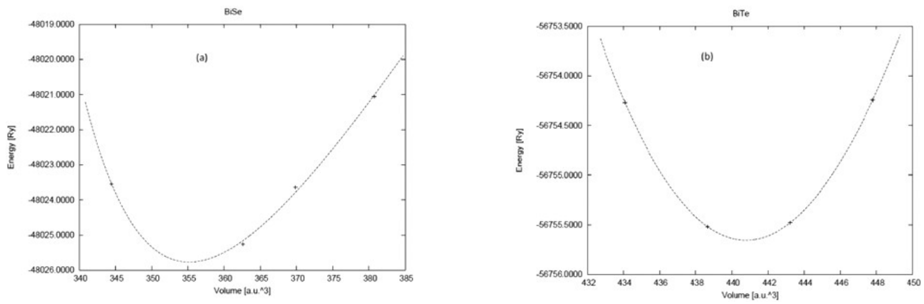

Fig.1: Volume optimization for BiSe and BiTe

Results and Discussions

Fig.2 (a & b) show total DOS for both spin up and spin down channels of BiSe and BiTe, and it is observed that DOS plots are symmetrical in both the channels. This symmetrical nature reveals that the semiconductors BiSe and BiTe are non magnetic compounds. The calculated spin magnetic moments are 0 μ_B for BiSe and -0.00014 μ_B for BiTe.

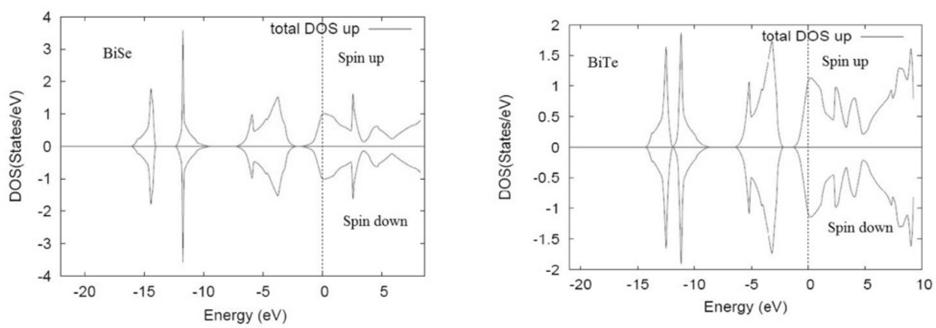

Fig.2: Total DOS with spin up and spin down channels for BiSe and BiTe

The total DOS plots of BiSe and BiTe are shown in Fig.3. From Fig.3(a) we found that the contribution to total DOS are from Bi-6*p* and Se- 4*p* electron states . In the core region, 6*p* states of Bi shows sharp peak at -11.0 eV. In the valence region, we have observed, Se-4*p* states contributing to total DOS. From Fig.3(b) we found that the contribution to total DOS are from Bi-6*p* and Te- 5*p* electron states. In the core region, 6*p* states of Bi shows sharp peak at -11.0 eV. In the valence region, we have observed, Te -5*p* states contributing to total DOS.

These are followed by some small structures. The peaks reproduced in our calculation are the general form of the spectra. The trend in ε_2 may be linked to the trends observed in the DOS and band structures. Our band-resolved optical calculations show that the transition between highest lying valance band (HVB) and lowest lying conduction band (LCB) account for almost all structures in the optical spectra at energies below 10 eV. Optical transitions between bands that are parallel or nearly so in an appreciable part of the BZ tend to result in peaks in the optical spectrum. The real parts of the total dielectric function ε_1, presented in Figs.5(a) and 5(b), are obtained from the imaginary parts by the Kramers- Kronig relation (Kiang 1976) leading to the features consistent with ε_2. In this study, we have found similar type of results in both the chalcogenides.

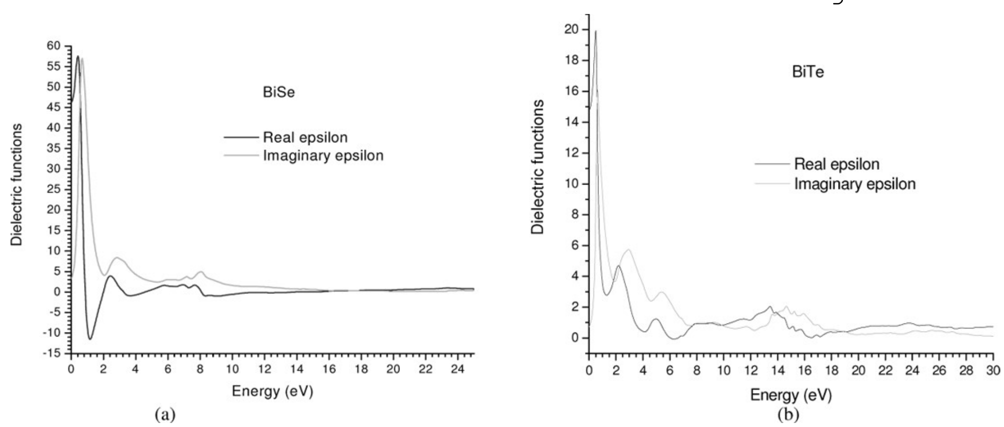

Fig. 5: Real and imaginary parts of dielectric functions of BiSe and BiTe

In Figures 6(a) & 6(b), the calculated refractive index and the extinction coefficient are plotted. The general profiles of the refractive index and extinction coefficient spectra of the compounds are quite similar. However, the energy at which the refractive index and extinction coefficient cross in the two compounds increases from BiSe to BiTe. The refractive index and extinction coefficient spectra of the two compounds have resonance in the infrared region which corresponds to the interband transitions. We also note that the refractive index of the two compounds lie between 3.8 and 7.8 in the far infrared region, while in the ultraviolet region, the refractive index has normal dispersion with some fluctuations.

spectrum in these small band gap semiconductors. The reflectivity spectra obtained for the two compounds show that the reflectivity is on the average in between 0% and 0.68% up to 30eV for both BiSe and BiTe including some small peaks. The behavior of the reflectivities between 2-20 eV make the compounds particularly good for applications in visible and ultra violet region.

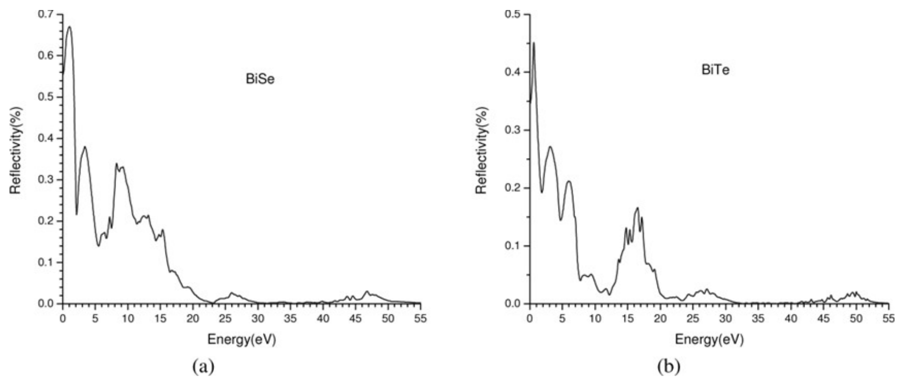

Fig.8: Reflectivity of BiSe and BiTe

The electron loss function for BiSe and BiTe are displayed in Figures 9(a) & 9(b). The spectra displayed in Figures 9(a) and 9(b) show that the loss functions for both the compounds are almost similar. This function is usually large at the plasmon energy whose position corresponds to $\varepsilon_1(\omega)=0$, provided $\varepsilon_2(\omega)$ is reasonably smooth in these regions. In these compounds, at around 15eV and 18eV for BiSe and BiTe respectively, the energy loss spectra exhibit a large peak.

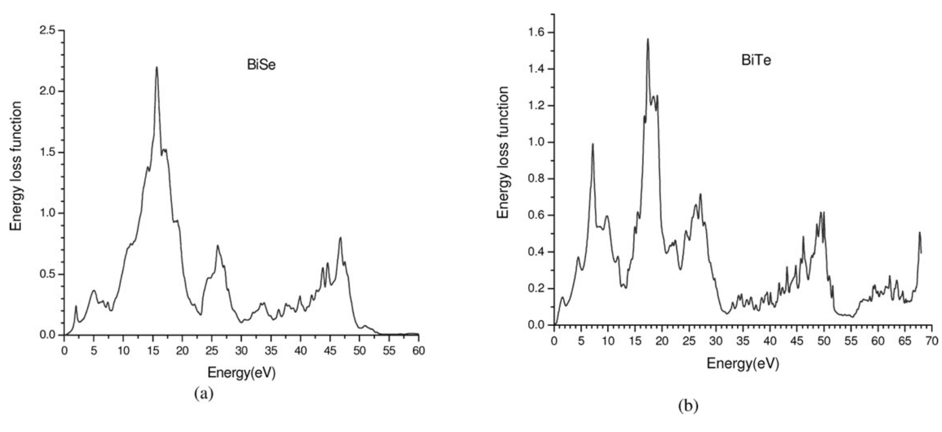

Fig.9: Energy loss functions of BiSe and BiTe

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practical, thought in the beginning the soul of man was nothing but breath. The "Holy Bible" reads:

"And the Lord God formed man of the dust of the ground, and breathed into his nostrils the breath of life and man became a living soul."

In fact, 'soul' is means life and death, which is oozing out of the life of the animal. As life and soul were understood precious, so blood, which is found in the sacrificial animal, was understood sacred. Hence, soul means 'blood'.

Definition of soul:

According to the most historians, the soul is the basic ingredient of religion. To the founder of modern anthropology, E.B.Tylor, the conception of the soul was, as he states, "the very funs erotic of the conceptions of spirit and deity in general."

From the practical point of view, it is seen that everyone has followed Tyler's footsteps. A.E.Crowley, was very insistent that we owe to it the idea of "an order of spiritual beings and of a spiritual world existing now and hereafter" and he quotes the Dutch Sinologist, de Grout, to the effect that the human soul is the original form of all kinds of beings of higher order.

Classification of soul:

According to Bacon, there are two kinds of souls, one is divine which is meant for religion and the other is irrational which is meant for scientific study. Such soul is known as invisible, material, living in the head and moving along the nerves to the different parts of the body. This is the seat of mental functions.

In Christianity, the soul is all-important. However, because the Bible does not give a formal definition of the concept, Christian interpretations vary greatly. Under the influence of the Neo-Platonists, the soul often came to be set over against the body in a dualistic concept that posited a God-given soul distinct from an inferior, earth-bound body. Scholasticism (specifically that of St. Thomas Aquinas) studied the soul in great elaboration and the scholastic definition of the soul as "substantial form of the body" obviates many philosophical difficulties. The nature of humanity is involved in the whole consideration of the soul; hence the term "rational soul" for the distinctive soul of humans. The soul of beasts is called the "animal soul" and that of plants the "vegetative soul". The scholastics considered the rational soul alone as immortal and capable of union with God.

addition, it departs by the mouth or open wound of the dying. The soul in the mystery-religions played an important role in schemes of personal redemption and mystic union with the Gods. Orphic set forth a theology teaching the doctrine of its distinct nature. The Pythagoreans set forth the purification rites. According to Plato the soul is immortal self-moving, which comprehends to eternal truth and is independent of the fluctuations of the senses.

According to Aristotle, all material things are to be soul. Soul is a vital principle pervading the world of life and mind. The world is not a split separation between two things of soul and body; the two are intermingled.

It is noteworthy that the religious philosophical cults in the Greco-Roman world gave more emphasis on the practical than on the theoretical interests. Stoicism taught the doctrine of the logos, the world-reason, and the soul being an offshoot of five material substances. The stoics introduced the world pleura, a kind of pervasive spirit. Thus, a tracheotomy was re-introduced into the stream of thought. The Hebrew and Greek thought began to be mingled in the third century B.C. especially among the Jews of Alexandria in Egypt. Philo, a liberal theologian as well as the forerunner of the platonic mystic Plotinus joined Platonism and stoicism. The Pentateuch adopted the view of pre-existence of souls and he believed that the logos were the intermediary between the Supreme Being and the world, speaking of the sojourn in human flesh as an unfortunate descent of the soul.

Immortality of soul:

The soul in many religious, philosophical and mythological traditions, is the incorporeal and, in many conceptions, immortal essence of a living thing. Belief in the immortality of the soul was an important aspect of ancient thought espoused by the Greek philosophers Socrates, Plato and Aristotle. Socrates explained that the immortal soul, once freed from the body is rewarded according to good deeds or punished for evil.

From the collection of evidences by Dr. Raymond Moody and Dr. Stevenson it is obvious that when a person dies, his soul continues like a separate invisible being and it may reincarnate as a new living person in various times. It shows that soul is an eternal and immortal being and it becomes a living being repeatedly, at various intervals. Apparently, the doctrine of the immortal soul caused much controversy in the early Catholic Church. However, in case of immortality St. Thomas followed the old Platonic arguments, which was the common view of changes consciousness, then a causal role for that brain activity can be inferred. Two of the most common types of manipulation experiments are loss-of-function and gain-of-function experiments. In a loss-of-function (also called "necessity") experiment, a part of the nervous system is diminished or removed in an attempt to determine if it is necessary for a certain process to occur, and in a gain-of-function (also called "sufficiency") experiment, an aspect of the nervous system is increased relative to normal. Manipulations of brain activity can be performed with direct electrical brain stimulation, magnetic brain stimulation using transcranial magnetic stimulation, psychopharmacological manipulation and by studying the symptoms of brain damage (case studies) and lesions. In addition, neuroscientists are also investigating how the mind develops with the development of the brain.

Physics and the soul

Physicist Sean M. Carroll has written that the idea of a soul is in opposition to quantum field theory (QFT). He writes that for a soul to exist "Not only is new physics required, but dramatically new physics. Within QFT, there can't be a new collection of "spirit particles" and "spirit forces" that interact with our regular atoms, because we would have detected them in existing experiments."

Parapsychology

Some parapsychologists have attempted to establish by scientific experiment whether a soul separated from the brain, as more commonly defined in religion rather than as a synonym of psyche or mind, exists. Melbourne Christopher (1979) and Mary Roach (2010) have argued that none of the attempts by parapsychologists have yet succeeded.

Conclusion:

However, in the Bible there is no such division. All of life is sacred, and all is under God's judgment. Modern psychology has emphasized the wholeness of life and thus helps us understand the Hebrew concept.

A seminary professor shocked his students by saying: "Jesus never went on a 'soul-saving' mission in his life." Then after a pause, he declared: "He was much too busy saving men." It is not just some immaterial "soul" that is lost; men are lost. And it is not just "that eternal part" that is saved; the whole man is saved! Salvation brings wholeness through a new relationship with God. Much bad religion is rooted in a misconception of the nature of man, and at the root of this misunderstanding is an unbiblical concept of the soul.

Jumping Spiders (Araneae: Salticidae) of Barpeta District, Assam, India

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Abstract :

The diversity of spider fauna especially of Assam has not been studied in a comprehensive manner. The objective of the study is to document the jumping spiders in four habitats of Barpeta District, Assam. Visual search sampling method was adopted in this study to sample the spider fauna. Aerial hand, ground hand and beat sheet collection methods were followed. Specimens were collected, preserved in 70 % ethyl alcohol and identified in ZSI, Kolkata. After two years of collections, 10 species of jumping spiders belonging to 09 genera of family Salticidae of order Araneae were documented. As no previous work on spiders was conducted in this area, the present study represents new distribution records for all species recorded.

Key words: Spider, salticidae, diversity, habitats.

Introduction

Spiders are an ancient and successful group of invertebrate animals, found in all types of habitats (Turnbull 1973). Though all spiders produce silk but many don't spin web. The jumping spiders are one of these webless spiders, who move by walking, running, jumping or leaping. They are diurnal in activities and hunt their prey by stalking, chasing and leaping on it. The jumping spider (family - Salticidae) is the largest family of spiders with about 13% of all species. Though Northeastern India is often called India's forgotten corner yet the remoteness of the area has helped preserve its biodiversity. But much of its diversity is being lost without any record. So, there is a paucity of exploration and research concerning the fauna of Northeast India. As spider species of Assam are poorly documented, thus in an attempt to assemble a comprehensive spider fauna list, the proposed study was carried out to document the jumping spiders of Barpeta District, Assam and which will also fill the existing void of Arachnology literature for the state and apprise future investigators of the spider fauna of Assam.

Study Area

Barpeta district of state Assam, India covers an area of 3245 square kilometers. The tree stems, logs, rocks, and the ground surface etc.

3. **Beat Sheet Method:**
This method of collection was performed by stretching out a light-coloured cloth under the tree branch or other low vegetation and grabbing the branch and shaking it vigorously. Spiders resting or nesting in this vegetation fall onto the cloth.

Preservation technique

The spiders collected from each site were preserved in 70% ethyl alcohol (Sebastian et al. 2005). The specimens were photographed either in the field or as soon as they are brought to the laboratory and stored in dark dry place.

Identification

Specimens were identified in ZSI, Kolkata by Dr. B.K. Biswas, Retired Scientist and also by using primary taxonomic literature- 'Handbook of spiders' by B.K Tikader (1987) and 'Spiders of India' by P.A. Sebastian and K.V. Peter (2009). The immature spiders were identified only to the generic level. The study was made using Advanced Binocular Research Microscope (Unilab) Model No. RH-85A UXL (Serial no. 35692).

Results

After two years of collections (June 2008 - May 2010), 10 species belonging to 09 genera were collected. The list is prepared alphabetically in Table 1.

Table 1: Jumping spiders (Family: Salticidae Blackwall, 1841) collected from Barpeta District, Assam.

Sl. No.	Species	Sl. No.	Species
1.	Asemonea tenuipes	6	Menemerus bivittatus
2.	Carrhotus viduus	7	Phidippus yashodharae
3.	Epeus tener	8	Plexippus paykulli
4.	Hasarius adansoni	9	Plexippus petersi
5.	Hyllus semicupreus	10	Telamonia dimidiata

Family Salticidae Blackwall, 1841 (Jumping spider)

Jumping spiders are of median or small size with a short body and stout legs which are furnished with two tarsal claws. Jumping spiders are among the easiest to distinguish from similar spider families because of the shape of the cephalothorax and their eye patterns. All jumping spiders have four pairs of eyes with one pair being their yellowish brown with inconspicuous chevron marks and spots on the dorsum of the abdomen.

5. ***Hyllus semicupreus*** Simon, 1885 (Heavy bodied jumper)

Habitat : Foliage and tree trunks.

Distribution : India, Sri Lanka.

Cephalothorax dark brown to dull black in colour with dull yellow hair on the cephalothorax. Abdomen of male dark brown to dull black in colour with a covering of golden yellow flat setae. Female with oval abdomen covered with chevrons in white and brown hair along mid dorsal line.

6. ***Menemerus bivittatus*** Dufour, 1831 (Common wall jumper)

Habitat : Walls of buildings and tree trunks.

Distribution : Common in Tropical countries; India.

Cephalothorax U shaped. In male cephalothorax is dull black having a white hairy band along the margins and a broad light brown patch immediately behind cephalothorax and dull brown bands along the margins. Legs dark brown with some light brown patches and rings. Abdomen in male are black in colour, broad, oval, with a blunt anterior end and pointed posterior end. Abdomen with a broad band along the mid line flanked with broad bands in light brown colour. Abdomen in female is light brown in colour with dull brown bands along the margins.

7. ***Phidippus yashodharae*** Tikader, 1977

Habitat : Foliage.

Distribution : India (Endemic).

Cephalothorax, abdomen and legs brownish red. Cephalothorax longer than wide. Base of eyes encircled with black patch. Legs I and II are more robust than other two, covered with hair and spines. Abdomen longer than wide and pointed behind. Dorsally decorated with some light patch. Ventral side uniform pale in colour.

8. ***Plexippus paykulli*** Audouin, 1826 (Pantropical jumper)

Habitat : Walls of buildings and tree trunks.

Distribution : Cosmopolitan in warm climate.

Cephalothorax light brown in colour. In male, Cephalothorax is U shaped convex with a broad dull white longitudinal band along the entire length of the body through the mid dorsal line, which is lined with broad dark brown or dull black areas. Along the lateral margins of the cephalothorax dull white band is present. Cephalothorax of female with light yellow colour with an inconspicuous mid dorsal band are in the cephalic region. Abdomen is longer than wide, oval with a narrowing posterior end. Abdomen of male is light brown in colour, whereas female with a mid dorsal row of chevrons on the abdomen is flanked with a conspicuous white spot about the middle.

family Salticidae is abundantly found in the district. As no previous work on spiders has been conducted in this area, the present study represents new distribution records for all species recorded.

In order to get good representation of all areas, the study was conducted in diversity of habitats. During the study, distribution of spider is found more in jungle followed by agricultural area, moderate in residential area and lower in marshy area. This is possibly due to nearly 28% undisturbed forest covering the district. Species diversity would possibly be reported more in the agricultural area, if there is judicious use of pesticides and fertilizers in agricultural fields.

The present study brings out only a portion of the diversity of the spider wealth that remains concealed in the landscape of Assam (Barpeta district). The further prospective study will indeed raise the number of spider species exponentially. There is a need to realize the importance of our biological wealth and continue the research and document them. As an inhabitant of the Barpeta district, the study is done in the area of Barpeta district, but it is the representation of the state Assam and further research is needed to be planned in the other districts of Assam as well.

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Statistician also use multiple regression models with two or more X-values e.g. $y = \alpha + \beta_1 X_1 + \beta_2 X_2$ and may also use multiple regression models like $y = \alpha + \beta_1 X_1 + \beta_2 X_2^2$. Both of these are linear models, being 'linear in the coefficients'. A frequently encountered non-linear model is $y = \alpha e^{-\beta X}$. This model can, however, be transformed in to a linear model by taking logarithms (usually with e-base), giving $\log_e y = \log \alpha - \beta X$. But these are said to be originally nonlinear, because a simple transformation will not convert it to a linear version. Dealing with such models becomes difficult and they are most often fitted with nonlinear least squares. The linear version of the regression models are often fitted with ordinary least squares and the bootstrap least square is the basic interest of the study.

In this project the application of the bootstrap in linear regression models has been studied. The bootstrap method was first proposed by Efron (1979) and further together with Tibshirani (1993), he has written much about the method and its generalization since then. This is a re-sampling statistical method for estimating the sampling distribution of an estimator by sampling with replacement from the original sample, most often with the purpose of deriving robust estimates of standard error and confidence intervals of a population parameter like a mean, median, proportions, correlation or regression coefficient etc. The use of the bootstrap technique to estimate the sampling distribution of parameter estimates in linear regression was first proposed by Efron (1979) and further developed by Freedman (1981). The process involves approximating the distribution of unobserved errors with the empirical distribution of the centered residuals. According to Brownstone and Valletta (2000), the bootstrap method may also be used for constructing hypothesis tests.

The bootstrap is conceptually the simplest of all re-sampling techniques. It is by now a standard method in modern Statistics. The idea of bootstrap is to develop a set of more artificial (Pseudo) data using the information of the original data. True underlying sample properties are reproduced as closely as possible and unknown model characteristics are replaced by sample estimates. In this paper an attempt has been made to illustrate the bootstrap technique and the bootstrap estimate of regression parameters are computed using some artificial data set.

Regression Models in Bootstrapping

In this section we have discussed the bootstrap technique for the regression models with some artificial data. Here the procedure of residual bootstrapping is only considered.

Using the data set in table 1.1, the bootstrapping linear regression model is fitted in the following subsection:

Calculation of the Bootstrapping Regression Parameters

The use of the bootstrap technique to estimate the sampling distribution of parameter estimates in linear regression was first proposed by Efron (1979), and further developed by Freedman (1981) and Bickel and Freedman (1981). The process involves approximating the distribution of undobserved errors with the empirical distribution of the centered residuals.

In this subsection of the study the calculation of bootstrapping regression parameters are presented using the artificial data following the computational steps given in the previous section. According to initial step, the estimates of regression parameters are first calculated using the original data in usual manner as follows.

Step 1: From the given data of X and Y we have the 10×2 matrix of explanatory variables and the vector of response variables with order 10×1, respectively as

$$X = \begin{bmatrix} 1 & 10 \\ 1 & 12 \\ 1 & 14 \\ 1 & 15 \\ 1 & 17 \\ 1 & 21 \\ 1 & 23 \\ 1 & 28 \\ 1 & 30 \\ 1 & 35 \end{bmatrix} \qquad Y = \begin{bmatrix} 12.67 \\ 8.94 \\ 13.93 \\ 16.38 \\ 13.25 \\ 19.12 \\ 17.82 \\ 17.88 \\ 21.05 \\ 25.21 \end{bmatrix}$$

In matrix notation and calculation made in MATLAB we have

$$\hat{\beta}_{LS} = \begin{bmatrix} \hat{\beta}_0 \\ \hat{\beta}_1 \end{bmatrix} = \begin{bmatrix} 6.1516 \\ 0.5158 \end{bmatrix}$$

And the regression line, we have as $\hat{Y} = 6.1516 + 0.5158X$, from the original data set. Using this model, the residuals are predicted and presented in the table 1.2.

Step2: The predicted residuals are calculated as $\hat{e} = Y - X\hat{\beta}_{LS}$ and are tabulated in the table 1.2.

Table 1.4: Calculation of Bootstrap Regressions

i	X_i	$\hat{Y}_i$	$\hat{Y}_i$ + Random samples drawn from $\hat{e}_i$, with replacement.									
			Y^*_1	Y^*_2	Y^*_3	Y^*_4	Y^*_5	Y^*_6	Y^*_7	Y^*_8	Y^*_9	Y^*_{10}
1	10	11.31	12.31	9.6	13.80	11.11	7.91	12.67	11.87	12.67	12.67	13.80
2	12	12.34	14.83	14.83	11.76	8.94	13.70	13.70	14.83	11.76	14.83	8.94
3	14	13.37	11.66	9.97	15.51	11.70	11.70	12.79	13.93	13.93	14.73	12.79
4	15	13.89	15.25	15.25	12.22	16.38	14.89	12.18	12.22	16.03	12.22	13.31
5	17	14.92	13.21	15.92	17.41	17.06	14.72	15.92	13.25	16.28	14.34	15.48
6	21	16.98	17.89	13.58	16.78	15.31	19.12	19.12	15.27	17.54	15.27	19.47
7	23	18.02	17.82	16.31	16.35	16.31	16.35	19.02	16.31	17.44	14.62	16.35
8	28	20.59	21.95	21.59	18.92	21.59	20.01	17.19	21.59	21.59	18.88	21.15
9	30	21.63	22.99	19.96	24.12	19.96	22.99	22.19	24.12	21.05	22.99	19.92
10	35	24.21	22.54	22.50	25.21	20.81	24.01	22.54	26.35	22.54	24.77	22.50

Step 5: In this step, we estimate $\hat{\beta}^*_{LS}$ (bootstrap least square) using the data X and Y^* for each of these new sets. Here we have ten new data sets as considering B = 10 only, i.e. the residuals are resampled 10 times with replacement from $\hat{e}_i$. This gives 10 values of each intercept $(\hat{\beta}_0)$ and slope $(\hat{\beta}_1)$ and are calculated exactly as given in Step 1 just replacing Y by Y_1^* and so on. Using MATLAB we have the bootstrapping intercepts and slopes as follows:

$$\hat{\beta}^*_{LS(1)} = \begin{bmatrix} \hat{\beta}^*_0 \\ \hat{\beta}^*_1 \end{bmatrix} = \begin{bmatrix} 7.2286 \\ 0.4793 \end{bmatrix} \qquad \hat{\beta}^*_{LS(2)} = \begin{bmatrix} \hat{\beta}^*_0 \\ \hat{\beta}^*_1 \end{bmatrix} = \begin{bmatrix} 6.2120 \\ 0.4731 \end{bmatrix}$$

$$\hat{\beta}^*_{LS(3)} = \begin{bmatrix} \hat{\beta}^*_0 \\ \hat{\beta}^*_1 \end{bmatrix} = \begin{bmatrix} 7.0627 \\ 0.4949 \end{bmatrix} \qquad \hat{\beta}^*_{LS(4)} = \begin{bmatrix} \hat{\beta}^*_0 \\ \hat{\beta}^*_1 \end{bmatrix} = \begin{bmatrix} 6.7083 \\ 0.4492 \end{bmatrix}$$

$$\hat{\beta}^*_{LS(5)} = \begin{bmatrix} \hat{\beta}^*_0 \\ \hat{\beta}^*_1 \end{bmatrix} = \begin{bmatrix} 4.8971 \\ 0.5680 \end{bmatrix} \qquad \hat{\beta}^*_{LS(6)} = \begin{bmatrix} \hat{\beta}^*_0 \\ \hat{\beta}^*_1 \end{bmatrix} = \begin{bmatrix} 8.0072 \\ 0.4256 \end{bmatrix}$$

$$\hat{\beta}^*_{LS(7)} = \begin{bmatrix} \hat{\beta}^*_0 \\ \hat{\beta}^*_1 \end{bmatrix} = \begin{bmatrix} 5.0502 \\ 0.5817 \end{bmatrix} \qquad \hat{\beta}^*_{LS(8)} = \begin{bmatrix} \hat{\beta}^*_0 \\ \hat{\beta}^*_1 \end{bmatrix} = \begin{bmatrix} 8.2257 \\ 0.4321 \end{bmatrix}$$

Here, $Var\left(\hat{\beta}_{1LS}\right) = \dfrac{0.025017}{10-1} = 0.0028$. Now the standard error of the slope parameter β_1 under the bootstrap approach is calculated as

$$Se_*\left(\hat{\beta}^*{}_{1LS}\right) = \sqrt{Var_*\left(\hat{\beta}^*{}_{1LS}\right)} = \sqrt{0.0082} = 0.0529$$

On the other hand the usual standard error of the slope parameter β_1 from the EXCEL worksheet is found as

$$Se\left(\hat{\beta}_{1LS}\right) = \sqrt{Var\left(\hat{\beta}_{1LS}\right)} = \sqrt{0.0082} = 0.0904$$

Also to test the null hypothesis against the alternative , the bootstrap t-test statistic given by Brownstone and Valletta [2000] may be calculated as

$$t^* = \frac{\hat{\beta}^*{}_{1LS}}{Se_*\left(\hat{\beta}^*{}_{1LS}\right)} = \frac{0.4831}{0.0529} = 9.1323$$

Now the tabulated value with $n-2=10-2=8$ d.f is 2.13 at 5% significance level and hence the null hypothesis $H_0 : \beta_1 = 0$ is rejected. Thus the values of X explain the variability in *Y* or there is a linear effect of *X* on *Y*.

Conclusion :

The method of bootstrapping and its technique leads to results that are quite general in nature when the classical methods of statistical inference are failed due to the violation of normality assumption etc.

The bootstrap can be applied in many different ways in regression problem. The main two approaches consist of resampling residuals or resampling pairs, called residual bootstrap and paired bootstrap respectively. The residual bootstrap rests upon the i.i.d assumption of the errors and is more efficient than the paired bootstrap when this assumption is valid. For estimating the variance of the least squares estimates, residual bootstrap leads to a variance estimator that is almost same as the traditional variance estimator. The paired bootstrap is the same as the bootstrap in the i.i.d case if the pairs $\left(Y_i, X_i\right)$ are i.i.d and is robust against the heteroscedasticity. The wild or external bootstrap, proposed by Wu [1986], is another important approach which can be applied in regression problem. This is robust against the heteroscedasticity and may also be efficient if the distribution for the bootstrap sampling is suitably chosen. For cross-section linear and

Etiology of the Incidence of Fungal diseases of Pineapple [(*Ananas comosus* L. (Merr)] Fuits in Kew variety

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Abstract

Pineapple [(*Ananas comosus* L. (Merr)] is widely cultivated in North East India. Various reports regarding spoilage of pineapple fruit in the field as well as in the market condition were reported by farmers and the researchers. A study on etiology of the incidence of fungal diseases of pineapple (var. Kew) fruit in the different markets of Barpeta district of Assam was carried out. The report revealed that rotting of the pineapple fruit in post harvest condition was caused by different phytopathogenic fungi like *Alternaria alternata* Nees., *Aspergillus flavus* Link., *A. niger* Van. Tieg., *Fusarium moniliforme* Shel., *F. oxysporum* Schl., *Mucor mucedo* (Linne) Brefeld., *Penicillium funiculosum* Thom. and *Rhizopus nigricans* Ehren. The climatic factors *viz.* temperature and relative humidity were found to be responsible for development of pineapple fruit diseases in post harvest condition. Pathogenicity test revealed that all the isolated fungi were pathogenic.

Key words: etiology, pathogenicity, symptoms, post harvest, phytopathogenic

Introduction

Pineapple (*Ananas comosus* L. Merr) under the family Bromiliaceae is one of the most important commercial fruits of North East India. It is delicious, nutritive and very good source of minerals, vitamin A, vitamin B and vitamin C (Sing & Singh 1974). The high level of sugar, minerals and nutrient elements and low p^H value make the fruit susceptible for fungal attack (Singh & Sharma 2007). Fungi not only cause rot to a number of fruits but also reduce their market value (Arya 2004). The post harvest pineapple fruits are contaminated with a number of phytopathogenic fungi during the transportation and storage condition. Prolonged period of storage and long distance exports are other factors for decay (Akamine et al. 1975). Degradation of fruits due to micro-organisms was reported from Australia (Smith 1983), Japan (Mijuno et al. 1982), India and Malaysia (Abdulla & Rohaya 1983). The pathogenicity test of the isolated fungi such as *Aspergillus*, *Fusarium*, *Rhizopus* and *Penicillium* on fresh pineapple fruit was done at Eke Awaka at Anambra State by post harvest decay of fruits was ascertained by the following formula (Van Der Plank, 1975).

$$\text{Disease Incidence (I)} = \frac{\text{Number of infected fruits}}{\text{Total number of fruits}} \times 100$$
$$(\text{Frequency})$$

Statistical analysis

Pearson's correlation was employed to analyse the data related to study of etiology of the diseases. The Coefficient of correlation (r) was estimated by using the following formula.

$$r = \frac{\frac{1}{n-1}\sum (x-\bar{x})(y-\bar{y})}{\sqrt{\sum x^2 - \frac{(\sum x)^2}{n}}\sqrt{\sum y^2 - \frac{(\sum y)^2}{n}}}$$

Where, x = number of replication

y = number of treatment

n = number of sample

For calculation of 't' value, the following formula was used.

$$t = \frac{r}{\sqrt{\frac{1-r^2}{(n-2)}}}$$

Where, r = Coefficient of correlation

n = number of sample

Results and Discussion

A total 8 (eight) numbers of micro fungi *viz. Alternaria alternata* Nees., *Aspergillus flavus* Link., A. *niger* Van. Tieg., *Fusarium moniliforme* Shel., *F. oxysporum* Schl., *Mucor mucedo* (Linne) Brefeld., *Penicillium funiculosum* Thom. and *Rhizopus nigricans* Ehren. were isolated from infected post harvest fruits of pineapple which were collected from different markets.

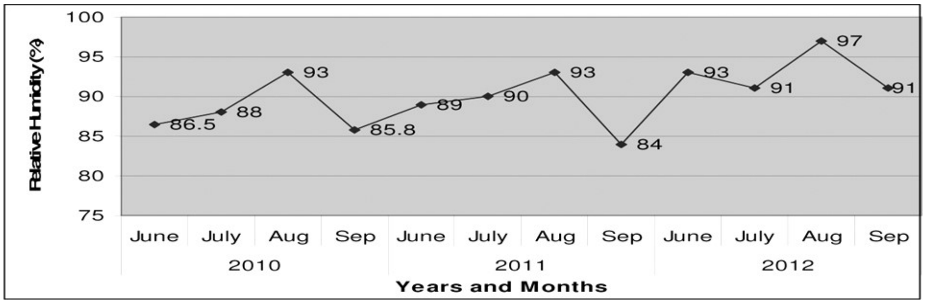

Fig 2: Monthly Relative Humidity (%) during the study period (from 2010 to 2012) in Barpeta district

The percent of disease incidence for the Kew variety of pineapple changed with the changed in temperature and relative humidity during the study period (2010 - 2012) in Barpeta district were presented in Table 1. From the Table 1, we found that the percentage of disease incidence in Kew variety during 2010 was the maximum in the month of August (52.0 %) and it was caused by *Aspergillus flavus* and the minimum disease incidence was recorded in the month of September (34.0 %) which was caused by Mucor mucedo. Similarly, the percentage of highest disease incidence during 2011 (48.0%) and 2012 (46.0%) were also caused by *Aspergillus flavus* and the minimum was caused by *Rhizopus stolonifer* which were accounted as 32.0% and 31.0% respectively. From Figure 1 and Figure 2, it was clear that the temperature and relative humidity were recorded the highest in the month of August during the study period and the minimum were recorded in the month of September.

From the above statistical analysis (Table 2), it was observed that 't' was significant at $\alpha = 0.05$ and 10 degrees of freedom (df). Thus, it could be concluded that the relative humidity (%) was significantly correlated with the percentage of disease incidence in pineapple fruits in post harvest condition in Barpeta district at 0.05 levels. The 't' value was found non-significant at $\alpha = 0.05$ and 10 degrees of freedom (df) in case of *Alternaria alternata* in the district.

Thus, it might be concluded that the percentage of disease incidence was more in the months of July and August due to more temperature and relative humidity during that period than the other two months. These temperature and relative humidity were found to be most conducive for rapid growth and development of the fungi. Sharma and Razak (2003) reported a similar result and they inferred that the optimum temperature for growth and development of most of the fungi were 25 - 30^{0}C.

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Lakṣaṇā and *Vyañjanā* as referred by *Viśvanātha Kavirāja* and *Mammaṭabhaṭṭa*.

Viśvanātha Kavirāja in his *Sāhityadarpaṇa* says about the *Tātparya* function as:

> *tātparyākhyaṁ vṛttimāhuḥ*
> *padārthānvayabodhane/*
> *tātparyākhyaṁ tadarthaṁ ca vākyaṁ*
> *tadvodhakaṁ pare//* II.V.20

The plain meaning of the verse is that-"others say that there is a function called Purport (*Tātparya*) which consist in making one apprehend the connection among the meanings of the words, the sense from the Purport being the 'Drift' and the sentence as a whole being what conveys that drift by the said function."

Methodology :

1. Traditional method is used to prepare this paper.
2. Texual study is also done.
3. Primary as well as secondary methods are applied.

Objectives of the study :

1. To highlight the concept of *Śabdavyāpāras*
2. To highlight the different views of the *Ālaṁkārikas*
3. To discuss the *Tātparya* as a meaning of the sentence as a whole.

Contents :

Viśvanātha says that *Tātparya* is also recognised as *śabdavyāpāra* in the *Abhihitānvaya* theory. *Viśvanātha* again says that in the opinion of the followers of *Abhihitānvayavāda*, a function is called *Tātparya*, which conveys the idea of the syntactical relation of the words, the relational meaning is conveyed like the sentence-meaning by the sentence with the help of *Tātparyaśakti*. It will be discussed later on.

The power of denotation ceases after conveying the meanings of the several words used in a sentence. Then a function called Purport comes into force, which leads us to apprehend the connection among the meanings of the words. It is used in the form of the sense of the whole sentence. The sense coming from the function called *Tātparya* is the 'Drift'. The whole sentence i.e. a sentence as a whole conveys the *Tātparyārtha* through the power called *Tātparya*. This is the opinion of the *Abhihitānvayavādin*. It is understood from this theory that there is a fourth function called *Tātparya* in addition to other three functions, viz., *Abhidhā*, *Lakṣaṇā* and *Vyañjanā*. The forth function is different from the former three. It conveys the connected meaning of several words. Hence it is not like the other three functions. These functions convey the meaning of a particular word. As the meaning conveyed by *Lakṣaṇā* by this function. Their views are stated clearly in the fifth *ullāsa* of *kāvyaprakāśa*.

According to the *Mīmāṁsakas*, the term *Tātparya* means the purport of a passage dealing with a topic. While the *Naiyāyikas* used *Tātparya* for the desire of the speaker. The *abhihitānvayavādin* advocates that the function of *Abhidhā* can give only the individual word meanings. And these word meanings convey the additional significance of a sentence through the power of *Lakṣaṇā* on the strength of *Tātparya* based on the other three factors also. These are, expectancy, consistency and contiguity of words. This purport or the drift is nothing but a connecting factor for the individual word and meaning in a sentence. Here the primary denotation gives only the unrelated meanings. It cannot fulfill the ultimate purpose of conveying a total meaning of a sentence.

Naiyāyikas view is different. They explain the term *Tātparya* differently. According to them *Tātparya* means the intention of the speaker. So according to them *Tātparya* is essential for a clear comprehension of any verbal statement. Modern *Naiyāyikas* accept another view. According to them a knowledge of the meaning is understood or intended by the speaker is very necessary. It is not only important but also an indispensable factor in respect of the statements involving homonymous words. The *Naiyāyikas* regard that a sentence is the only significant unit of speech. And they put attention on the point that *śābdabodha* is produced by words. It is done only when they are logically united in significant sentence.

Naiyāyikas however, do not give importance to the intention of the speaker in case of verbal comprehension. The cause is that, the *Naiyāyikas* accept the 'natural relationsip' regarding the primary significance of a word. Hence, for them, *Tātparya* need not be accepted in the sense of the intention of the speaker.

Jayantabhaṭṭa is the first *Naiyāyika*, who recognizes *Tātparya* as a separate *vṛtti* like *Abhidhā* and *Lakṣaṇā*. He discusses the various theories regarding the verbal testimony in detail in his *Nyāyamañjarī*. He explains different schools of Indian philosophy. He analyses the views of the two schools of *Mīmāṁsa* also, *viz.*, the *Prābhākara* school and the *Bhāṭṭa* school. He discusses the opinions of these schools critically and finally advocates a modified theory on the basis of the views of the said schools. This theory is named as *Abhihitānvayavāda*. The later *Ālaṁkārikās* like *Mammaṭa* and *Viśvanātha* perhaps refer to this modified view of *Jayanṭabhaṭṭa* when they say that *Tātparya* is also a *vṛtti* according to the *Abhihitānvayavādin*.

nvayavāda postulated by *Jayantabhaṭṭa* and supported by Abhinavagupta which recognised *Tātparya* as *śabdavyāpāra*.

Viśvanātha Kavirāja not only discusses the fundamental rules for composing good poetry but also rules of Dramaturgy which other authors on poetics left the topic from their discussion. He also treats the topic on *śabdavyāpāras* so elaborately and systematically that he has endorsed all the views expressed by earlier authors. He also treats the subject in a scientific manner.

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Brahma reflect the sorrows and pain, hunger and thirst, poverty and lack, weaknesses and strengths, love and hatred, etc. of the poor peoples' attributes and characters."

Materials of the study :

The present research work has been entitled as "Women Characters in the short stories of Nilkamal Brahma: A critical study". As a source of materials for the research paper, both the primary and the secondary sources have been used.

Primary Source :

As primary source the published short story books of Nilkamal Brahma have been gathered for study of the present research work such as- *Hagragudunimwi*, *Sirinaimandar*, *Silingkhar*, *Sakhondra* and *Maamdaondwi*. The main focus is on women characters and social aspects reflected in different stories witten by Nilkamal Brahma.

Secondary Source:

As secondary source all related topics, reviews and treatise of Bodo short stories which are available have been studied for this research work. The history of Boro literature and all existing published materials and books on short story have been collected for the study of research work. The library of B.H. College, G.U. Library, Bodoland University Kokrajhar Library and District Library of Kokrajhar were visited and references and other related books for this research work have been used.

Method of Research:

Analytical method has been used for the purpose of writing this paper.

Objective of the Study:

This is an attempt to make a critical study of Nilkamal Brahma's short stories. Boro short stories generally reflect all the socio economic, cultural, political and religious aspects of the Boros. In this study on "Social Status of Bodo Women reflected in Nilkamal Brahma's Short Stories", attempt has been made to project all the relevant women characters connected with the Boro community, particularly their culture, religion, social life, customs and traditions, beliefs and superstitions, that has been amply reflected and depicted in the short stories of Nilkamal Brahma. In the writings of Nil Kamal Brahma, there are a myriad of human characters as evident from his versatile plots in his short stories. However, the researcher shall limit herself to the discussion on women characters alone within the ambit of the present study. In majority of his short stories, the lead protagonists are basically women.

Being ultra-modern, she entered into a live-in relationship with a forest ranger who was from another community. This short-lived relationship frustrated her to the extent that she turned suicidal. However, she was finally married to Dr. Boro who was an alcoholic and a very abusive husband.

Through the characterisation of Bidisa, Nilkamal Brahma also illuminates the realisation and repentance of women who were once proud, contemptuous of Bodo men, and entered into an exogamous relationship. Bidisa resigns to her fate of insignificant and miserable life with Dr. Boro, while realising all the time that the likes of Bikrom who have been steadfast in their love and service for the community are the true heroes and deserve appreciation as they prove meaningful in the lives of other people.

In the story *Udrainai* (Sraddha), Bonsri is a Master of Arts. Contrary to the character of Balangsri, Bonsri is characterised as a pious, devoted and dedicated woman who foregoes all the happiness and joys of life to attend to the needs of her father who has been jailed in order to afford her dowry. She sacrifices her marriage and enters into a nunnery eventually, distraught with the unpredictable ways in which fate tossed her around.

Through the character of Bonsri, Brahma illuminates the strength of a woman and its durability in the event of tragedies and insurmountable odds in life. She has been portrayed as a woman who can bear the pressures of life and familial responsibilities unflinchingly and repay the debts of a fallen parent.

Dr. Santona Baglari is outstanding as a character, though soft spoken, quiet and shy in nature, in the story *Print guganai photograph* (print untied out of scene type), where her steady resolution and will to escape from the clutches of social norms, customs and ties finally free her from her bondage to an abusive relationship with her husband. In the words of Santona, "I will not let my identity die away. I can't afford to waste away my life by feeding it to the likes of monstrous Biraj."

Another worth mentioning issue, which has been highlighted by Brahma, is the conflict of an educated woman. Despite her outstanding educational qualifications, she has no escape from the traditional role of the wife, that is, she is expected to carry out all the household chores besides serving her husband devotedly. In the opinion of the protagonist, such arrangement afforded to her by the institution of marriage that accounts her a subordinate position is not a fair deal. She resolves to break away from the bondage and finally succeeds.

Again, in the story *Sakhondra*, the

with her mother, instead, spilling the vegetables that were in the basket held by her mother. Thus the aforesaid rebuke is an admonishment as well as an advice.

On the otherhand, Hamfe, the maidservant is an illiterate simpleton, unaffected by troubles and worries in life. When Somila asked Hamfe about her love life, she forthrightly narrated to her all her secrets, withholding nothing. In her words, "Somedays he would hold me in a tight embrace close to his heart, lovingly caress my hair, and hold my hands clasped onto his." Besides these, she would narrate everything that transpired in their affair without an ounce of shame or guilt. Thus, in Hamfe, one finds a character that typifies a simple, humble, honest and unsuspecting woman.

Jwngha Nongamwnbla illuminates the characters of three house-wives, namely, Gindri, Mwnbari and Fedab, who are boastful of their respective husbands. As it turns out in the story, Gindri's husband Bankho is said to have got himself a role in the folk-theatre performance of Jaoliya Jwhwlao. He has not informed about his role in the theatre to his wife, Gindri, who has also not bothered to ask him about the role out of her excitement. She is boastful of it in front of her friend Mwnbari, "So is it. If the role is not given to him, the play is incomplete." Mwnbari retorted saying, "How lucky you people are! Let's sit closer to one another. Take enough betel nuts… gather it during the day-time… lest you forget in your hurry to watch the play."

Daya Swrni depicts a unique woman character in the form of Ooshi who is simple at heart, loving and doting. Patience is the central theme of this story. Being a remarkably beautiful girl, she was unable to venture out of her house because she was disturbed by man folk. Everybody tries to woo her. This led her parents to marry her off quickly to the person who proposed her hand in marriage at first. She patiently bore all the sorrows and suffering inflicted upon her in her husband's house. However, when her patience gradually waned out, she murdered her husband and had to undergo a penitentiary term in a jail.

The crux of the story is that Brahma, the author, does not depict Oboshi as a rebellious character but as a person who was by all means stripped off every ounce of patience she could endure. It is a stark reminder what oppressive regimes, systems and institutions can make of simple, unsuspecting and loving persons like Ooshi- turning them into criminals.

Laisri, the wife of *Mahajwn*, and Swmbaosri, their maid servant are two women characters in the story *Horgejemi Tragedy* (tragedy of midnight). Through this intimate with the friend of Ilima's uncle. However, failed in their attempt. The problem here lies in the fact that it is considered an unacceptable behaviour in Bodo society to try to seduce a man who is an uncle by relation.

Similarly, in the story, *Bibarnisu* (Thorns of flowers), Himadri tries to seduce a *dahwna* (a paid helper in the house) to gratify her sexual desires. On failing to lure Furen to do the job, she dismisses him from the house. Again, the wife of an exiled political leader Gunjet, in the story *Angnidiarynimwntham outline* (Three outlines of My Diary), is portrayed as trying to engage in an illicit affair with her nephew.

These characters expose the weaknesses of women towards sensual pleasures and their drive to gratify themselves with socially unacceptable relations, namely, with a *dahwna* or, an uncle or a nephew.

On the other hand, the author also reveals the illicit physical relationships that existed among the housemaids and their male house owners in the Bodo society. In some cases, the relationship existed because of the lustful desires of the housemaids themselves or in their aspirations to become the mistress of the rich house owner, while in other instances, it also occurred due to the unfulfilled libido of the house-owners.

In the story *Horgejeni tragic comedy* (Tragedy of midnight) the housemaid offered herself for gratification of the sexual desires of the house owner in the hope of becoming his second wife in a polygamous family. On the other hand, it was also the desire of the house-owner to have children and see his grand children before his death. In this case, the story has an amicable ending where both the house-owner and the housemaids are united through marriage as polygamous relationships were possible in exceptional cases in the Bodo society.

In another story, *Beher* (Mudwater Area), the character Mwirathi, a bonded labour is made to pay the debts of her father. She is not only physically exploited but also sexually exploited by the rich house-owner who pays her off a pittance for engaging in sexual relationship with him.

Brahma delineated a picture of the lives of sex-workers. In this regard, he portrays them as engaging in the trade not for the fulfilment of their lust but due to circumstances that have coerced them into opting for this profession.

Brahma also portrayed the lives of those who committed the folly of engaging in pre-marital sex in an environment of its strong social prohibition among the Bodos. For instance, in the story *Hagrani Bifa*, Dr. Digambar Narzary impregnates a young nurse and does not marry her, thus, leaving her in a different men as her husband punishes her if she does not comply with. Herein, the author presents a case of physical and sexual exploitation of women by men.

Durmao in the story, *Aabo Durmao* (Sister Durmao), is deserted by her husband. In order to bring up two children and to bring enough food to the table, she get engaged in prostitution. She is very much aware of the social stigma and discrimination that might befall her for engaging in prostitution; she has no other alternative though. On her death-bed, she confesses that she does not approve of what she has to do to make both ends meet and does not want the stigma to pass on to her children. Thus she pleades those who around to bring them up with dignity and respect.

Exploitation of the poor by the rich is the central theme of the story *Beher*. In this story, there are two women characters, namely, Rombasi, the wife of Horbilash *Mahajwn*, and Mwirathi, a bonded maid. Mwirathi's father had borrowed some money from Horbilash *Mahajwn* when he fell ill, and was unable to repay it due to his poverty. Thus, Mwirathi, a young girl was put in Horbilash's house as a bonded-labour to repay her father's debt. She had no respite no rest, be it day or night, and had to offer services for rich couple. Rombasi used and abused her, and put her to do all the household chores. In the meantime, Horbilash *Mahajwn's* libido and lust were directed towards the vulnerable bonded maid. Thus, he exploited her sexually in the absence of Rombasi and silenced her by offering an insignificant sum of money. The girl was unable to fathom the gravity of the offence, and was thus satisfied with the money, as she had never ever found money in her life.

Conclusion

From the stories described here, it may be summarised that Nilkamal Brahma ventured skilfully into both the traditional and modern aspects of Bodo society. Majority of his characters were set in the middle class background. These middle class families were used to illustrate the rural as well as urban ways among the Bodos. They may also be depicted as the avant-garde of modernity.

The settings of his plots depicted livelihood options that were mostly accentuated with the modern ways of life. At the same time, we come across rural and traditional livelihoods of the people such as agricultural practices who were yet to be influenced by the modern means and thoughts. It may be maintained here that despite this depiction by the author, major portion of the Bodo society, or for that matter, the Indian society comprises traditional values, beliefs and practices. Folk

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চিত্ৰকল্পবাদী আন্দোলন প্ৰমুখ্যে পাশ্চাত্য সাহিত্যৰ বিভিন্ন কাব্যিক অভিব্যক্তিৰ প্ৰভাৱ পৰিছে। ইয়াৰোপৰি চীনা কবিতা, জাপানী হাইকু, পাবলো নেৰুদা, ফেডেৰিকো গাৰ্থিয়া লৰকা, বদলেয়াৰ, মালাৰ্মে আদি কবিৰ কাব্য প্ৰভাৱৰ পৰাও অসমীয়া কবিতা আঁতৰি যাব পৰা নাই। বিভিন্ন উৎস আৰু উপাদানৰ প্ৰভাৱ আৰু সংযোজনে আধুনিক অসমীয়া কবিতাক এক আৰ্ন্তজাতিক পৰিচয় দান কৰিছে।

লক্ষ্যণীয় বিষয় এয়ে যে বিভিন্ন প্ৰভাৱ আৰু প্ৰেৰণাই ভুমুকিয়াই গ'লেও অসমীয়া কবিতাই চিৰকাল নিজস্ব বৈশিষ্ট্য অটুট ৰাখিবলৈ নিজৰ মাটিৰ মাজতেই আত্মপৰিচয়ৰ সন্ধান কৰি আহিছে। আধুনিক কবিসকলে বিষয়বস্তু আৰু আঙ্গিকৰ ক্ষেত্ৰত গুৰুত্ব প্ৰদানৰ হেতু বিহুগীত-বনঘোষা, হুঁচৰি, আইনাম, নিচুকনি গীত, দেহ বিচাৰৰ গীত, যোজনা, পটন্তৰ, মালিতা, সাধুকথা, মন্ত্ৰ সাহিত্য, প্ৰমুখ্যে লোকগাঁথা সমূহৰ পৰা উপাদান আহৰণ কৰি সংমিশ্ৰণ আৰু সংযোজনৰ যোগেদি নতুনত্ব সঞ্চাৰৰ প্ৰয়াস কৰা দেখা যায়। কবিতাৰ প্ৰতীক, চিত্ৰকল্প, লয়-সুৰ আৰু ভাষাৰ ওপৰিও বিষয়বস্তুৰ মাজত লোকসাহিত্যৰ উপাদানৰ সহায়ত এক আত্মিক পৰিচয় সন্ধানৰ প্ৰয়াস দেখা যায়। আনহাতে, ঐতিহ্যৰ প্ৰতি থকা আকৰ্ষণেও তেওঁলোকক এনে ধৰণৰ পৰীক্ষা -নিৰীক্ষাৰ প্ৰতি আগ্ৰহী কৰি তুলিছে। যেতিয়াই আধুনিক মনন দ্বিধা আৰু সংশয়গ্ৰস্ততাৰে বেষ্টিত হৈ পৰিছে, তেতিয়াই তেওঁলোকে মৌখিক পৰম্পৰাত সৃষ্ট আৰু সংৰক্ষিত এই সাহিত্য ৰাজিৰ মাজত প্ৰশান্তি আৰু সমাধানৰ বাট বিচাৰি পাইছে। বিশেষকৈ লোক সাহিত্যৰ সুৰীয়া প্ৰকাশভঙ্গী আৰু অকৃত্ৰিম আবেগৰ প্ৰকাশে তেওঁলোকক চিৰদিন আকৰ্ষিত কৰি আহিছে। বিষয়বস্তু আৰু আঙ্গিকৰ ভিন্নতা পৰিলক্ষিত হ'লেও আধুনিক অসমীয়া কবিতাৰ ঘাই সুঁতিটোত লোক সাহিত্যৰ সুৰীয়া ৰূপটোৰ উপস্থিতি সততে অনুভৱ কৰা যায়। প্ৰকৃতিৰ সৌন্দৰ্য্যময় স্পৰ্শই লোকসাহিত্যৰাজিক মোহনীয় কৰি তুলিছে। বহু সময়ত ৰোমান্টিক কবিসকলৰ দৰে আধুনিক অসমীয়া কবিতাইও এই দিশটো এৰাই যাব পৰা নাই। বাস্তৱৰ নিৰ্মম প্ৰতিচ্ছবি আৰু কঠোৰ জীৱন সংগ্ৰামৰ দিনচৰ্যাই তেওঁলোকক লোক সাহিত্যৰ মাজত নিহিত হৈ থকা কল্পনাপ্ৰৱণ মনোজগতৰ প্ৰতি আকৰ্ষিত কৰাত সহায় কৰি আহিছে। লোক সাহিত্য আৰু আধুনিক কবিতাৰ সংমিশ্ৰণে প্ৰায় ক্ষেত্ৰতেই বক্তব্য বিষয়ক উজ্জ্বলতৰ ৰূপত উপস্থাপন কৰাত সহায় কৰিছে। অধিকাংশ কবিৰ ক্ষেত্ৰতেই আধুনিক কবিতাৰ সৈতে লোক সাহিত্যৰ উপস্থাপনৰ দিশটো উল্লেখযোগ্য বিষয়। এনেবোৰ দিশ পৰ্য্যালোচনা কৰিলে সময় সাপেক্ষে দূৰত্ব থকা সত্বেও লোক সাহিত্য আৰু আধুনিক অসমীয়া কবিতাৰ মাজত নিবিড় যোগসূত্ৰ বিচাৰি পোৱা যায়।

গৱেষণাৰ পদ্ধতি আৰু সামগ্ৰী ঃ

আমাৰ এই অধ্যয়নত যুদ্ধোত্তৰ অসমীয়া কবিতা, যাক আধুনিক বা সাম্প্ৰতিক কবিতা বুলি অভিহিত কৰা হয়, সেই ৰচনাৰাজিত লোক সাহিত্যৰ প্ৰভাৱ কিদৰে আৰু কিমানখিনি নিহিত হৈ আছে, সেই বিষয়ে চালি-জাৰি চাবলৈ চেষ্টা কৰা হৈছে। আধুনিক অসমীয়া কবিতাৰ বিষয়বস্তু, আঙ্গিক, সুৰ, শব্দ-ভাষা আৰু উপস্থাপন ৰীতিত অসমীয়া লোকসাহিত্যই কেনেদৰে অৰিহণা আগবঢ়াইছে, সেই বিষয়েও এই আলোচনাত বিশ্লেষণ কৰা হৈছে। উক্ত বিশ্লেষণত আধুনিক কবিতাৰ মাজত লোকসাহিত্যৰ প্ৰভাৱ পৰা অন্তৰঙ্গ আৰু বৰ্হিৰঙ্গ দিশ দুটিও সামৰি লোৱা হৈছে। লোকসাহিত্যৰ কোনবোৰ উৎসৰ পৰা আধুনিক কবিসকলে সমল আহৰণ কৰি কাব্যচৰ্চাত ব্ৰতী হৈছে, সেই বিষয়েও ফঁহিয়াই চাবলৈ চেষ্টা কৰা হৈছে। অধ্যয়নৰ বাবে মূলতঃ বিশ্লেষণাত্মক পদ্ধতি (Analytical Method) ৰ সহায় লোৱা হৈছে।

এই অধ্যয়নত যুদ্ধোত্তৰ আধুনিক অসমীয়া কবিতাৰ পৰিসৰ অৰ্থাৎ বিংশ শতিকাৰ চতুৰ্থ দশকৰ পৰা অন্তিম দশক পৰ্য্যন্ত প্ৰকাশিত আধুনিক অসমীয়া কবিসকলৰ কবিতাক সামৰি লোৱা হৈছে। কিন্তু বিষয়বস্তুৰ পৰিসৰ আৰু গুৰুত্বৰ বিশালতালৈ চাই উক্ত কালছোৱাৰ ভিতৰত আত্মপ্ৰকাশ কৰি কাব্যচৰ্চাত ব্ৰতী হোৱা প্ৰতিগৰাকী কবিৰ

অদম্য অনুৰাগেও কবিতাত তেখেতক লোক সাহিত্যৰ উপাদান আহৰণ আৰু ব্যৱহাৰৰ প্ৰতি আগ্ৰহী কৰি তুলিছে। এই প্ৰসঙ্গত তেখেতে কৈছে যে, তেখেতৰ কবি সত্তাক জীয়াই ৰখাত লোকজীৱন ধাৰাই যথেষ্ট অৰিহণা যোগাইছে আৰু কাব্যচৰ্চাৰ ক্ষেত্ৰত দিগ্‌দৰ্শন দিছে।[5] দেশ-বিদেশৰ কাব্য আন্দোলন আৰু কাব্য সাহিত্যই তেওঁৰ কাব্যধাৰাক উজ্জীৱিত কৰাত আগভাগ ল'লেও এইক্ষেত্ৰত অসমীয়া লোকসাহিত্যৰ ঐতিহ্যক তেওঁ উলাই কৰিব খোজা নাই। বৰঞ্চ প্ৰয়োজন সাপেক্ষে লোকজীৱন আৰু সাহিত্যৰ উপাদানৰাজিক মৰ্য্যাদাসহকাৰে কবিতাত স্থান দিছে।

আধুনিক অসমীয়া কবিতাক অসমৰ জাতীয় জীৱন আৰু লোকসাহিত্যৰ সৈতে সম্পৃক্ত কৰাত কবি কেশৱ মহন্তৰ অৱদান উল্লেখযোগ্য। মূলতঃ প্ৰগতিবাদী চেতনাৰে সমৃদ্ধ এইগৰাকী কবিৰ কবিতাত সততে অসমৰ লোকজীৱনে বিশেষ স্থান লাভ কৰিছে। যাৰ বাবে তেখেতৰ কবিতা পাঠৰ অভিজ্ঞতাই পঢ়ুৱৈক লোক প্ৰাণৰ আবেগ-অনুভূতিৰ সৈতে চিনাকি হোৱাত সহায় কৰে। লোকজীৱনৰ সৈতে থকা গভীৰ চিনাকিয়ে তেওঁক লোকসাহিত্যৰ উপাদানসমূহ ব্যৱহাৰৰ ক্ষেত্ৰত বিশেষভাৱে সহায় কৰিছে আৰু লোকসাহিত্যৰ প্ৰতিটো শাখাৰ পৰাই উপাদানৰাজি আহৰণ কৰিছে। সহজ-সৰল প্ৰকাশভঙ্গী, বিষয়বস্তুৰ সৰলতম উপস্থাপন, ভাষা আৰু সুৰৰ মন্ময়ধৰ্মীতাৰে গঢ় লোৱা তেখেতৰ কবিতাই পঢ়ুৱৈক অতি সহজেই অসমৰ লোকজীৱন আৰু লোকপ্ৰাণৰ অনুভূতিৰ জগতখনৰ ওচৰ চপাই নিয়ে। সমাজৰ আৰ্ত্তজনৰ প্ৰতি থকা সহৃদয়তা আৰু সহমৰ্মিতাই তেওঁৰ কবিতাৰ সৈতে লোক উপাদানসমূহক জীণ নিওৱাত বিশেষভাৱে সহায় কৰিছে। তেওঁৰ কবিতাৰ বিষয়বস্তু, আঙ্গিক আদি সকলোতে নিপীড়িত অথচ সংগ্ৰামশীল মানৱাত্মাৰ আকুতি শুনা যায়। জীৱনৰ সপক্ষে মাত মতা এই কণ্ঠস্বৰত দীৰ্ঘনিশ্বাস নাই। বৰঞ্চ পৃথিৱীৰ হৃদস্পন্দন শুনাৰ অধীৰ আবেগহে তাত পোৱা যায়।[6] মাটিৰ সুৰক প্ৰাধান্য দিয়া তেখেতৰ কবিতা সমূহত অসমৰ লোকজীৱনৰ ভাবাবেগে আগস্থান পাইছে। কিয়নো, কবিগৰাকীয়ে বিশ্বাস কৰে যে, লোকপ্ৰাণৰ মাজতেই পৃথিৱীৰ সঁচা সুৰ নিহিত হৈ আছে। এনে চিন্তাৰ ফলস্বৰূপে তেওঁ লোকসাহিত্যৰ উপাদানসমূহক আধুনিক কবিতাত স্থান দিছে আৰু লোকপ্ৰাণৰ সহজাত অথচ সহজ-সৰল আবেগেৰে আধুনিক পৃথিৱীৰ জটিলতাক পৰিহাৰ কৰিব খুজিছে। লগতে সৰ্বসাধাৰণজনৰ প্ৰতি শ্ৰদ্ধা প্ৰদৰ্শন কৰিছে।

আধুনিক অসমীয়া কবিতাত বৌদ্ধিক মননশীলতা আৰু সংহত শব্দৰ প্ৰয়োগেৰে ব্যঞ্জনা প্ৰকাশৰ ক্ষেত্ৰত কবি অজিৎ বৰুৱাৰ নাম উল্লেখযোগ্য। ইলিয়টী ধাৰণা আৰু হপ্‌কিন্সীয় কনচিট্‌ৰে (Conceit) প্ৰভাৱিত বৰুৱাৰ কাব্য সমগ্ৰত দেশ-বিদেশৰ কাব্য সাহিত্যৰ অধ্যয়নলব্ধ অভিজ্ঞতাৰ স্বাক্ষৰ লক্ষ্য কৰা যায়। বিশেষকৈ ফৰাচী কবিতাৰ বিস্তৃত অধ্যয়নে প্ৰতীকবাদী আৰু চিত্ৰকল্পবাদী ধ্যান-ধাৰণাৰে তেওঁৰ কাব্যচৰ্চা সমৃদ্ধ কৰাত বিশেষভাৱে সহায় কৰিছে। চল্লিশ আৰু পঞ্চাশৰ দশকত আত্মপ্ৰকাশ কৰা কবিসকলৰ ভিতৰত অজিৎ বৰুৱাৰ ওপৰতেই ইলিয়টৰ কাব্য ধৰ্মৰ প্ৰভাৱ ব্যাপক।[7] দেশ-বিদেশৰ কবিতা আৰু বিভিন্ন কাব্য ধাৰাৰ অধ্যয়নেৰে পৰিপুষ্ট অজিৎ বৰুৱাৰ কাব্যচৰ্চাই অসমৰ জাতীয় জীৱনৰ ভাবাবেগকো এৰাই যোৱা নাই। বৰঞ্চ পাশ্চাত্যৰ কাব্য আন্দোলন সমূহৰ সৈতে জীণ যোৱাকৈ লোক সাহিত্যৰ উপাদানৰাজিৰ সংশ্ৰৱ আৰু সংমিশ্ৰণ ঘটাইছে। সেয়েহে তেখেতৰ কাব্যপাঠে এক অবুজ অভিব্যক্তিৰ জন্ম দিলেও পঢ়ুৱৈয়ে একে সময়তে লোক জীৱনৰ সৈতে সংপৃক্ত ৰূপ এটাও অনুভৱ নকৰাকৈ নাথাকে। অসমৰ লোকজীৱনৰ গভীৰ পৰ্য্যবেক্ষণ আৰু লোকসাহিত্যৰাশিৰ সু-নিৰ্বাচিত অধ্যয়নে তেওঁৰ কাব্যচৰ্চাৰ পৰিপুষ্টি লাভত বিশেষভাৱে সহায় কৰিছে। সামগ্ৰিকভাৱে কব পাৰি যে, কবিতাৰ পাঠকৰূপে আমাৰ বাবে এই ক্ষেত্ৰত উপলব্ধি কৰিবলগীয়া প্ৰকৃত কথাটো হ'ল যে, বিহুগীতৰ লেখীয়া সৰল চহা জীৱনৰ এই ভাষাত তেওঁৰ তৃপ্ত মনৰ জটিলতাহীন

জগতখনেই তেখেতৰ সন্মুখত মুকলি কৰি দিছিল কাব্যিক অনুভৱ আৰু সৃষ্টিৰ বাটচ'ৰা।[11]

লোকগীত বিশেষকৈ আইনাম, ধাইনাম, নিচুকনি গীত, বিহুনাম, বিয়ানাম আদিৰ সুৰধৰ্মী প্ৰকাশভঙ্গীমাই ফুকনৰ কাব্যৰীতিক সমৃদ্ধ কৰিছে। ইয়াৰোপৰি লোককথা বা সাধুৰ অৰ্ন্তনিহিত তাৎপৰ্য্য আৰু চৰিত্ৰসমূহৰ প্ৰতীকী উপস্থাপনাই তেওঁৰ কবিতাৰ সোণত সুৱগা চৰাইছে। আধুনিক কাব্য সাহিত্যৰ সামগ্ৰিক উপাদানসমৃদ্ধ তেওঁৰ কাব্যসংগ্ৰহত সেয়েহে অসমৰ মাটিৰ চিনাকি সুৰৰ অনুৰণন বিচাৰি পোৱা যায়। সময়ে সময়ে তেখেতৰ কবিতাসমূহত প্ৰতীকী আৰু চিত্ৰকল্পবাদী ৰীতিৰ প্ৰৱেশ ঘটা হেতুকে সেইবোৰ সৰ্বসাধাৰণ পঢুৱৈৰ দৃষ্টিত দুৰ্বোধ্য হ'লেও ইয়াৰ বিষয়বস্তু অচিনাকি নহয়। যাৰ বাবে লোককথাৰ চৰিত্ৰৰাজি যেনে— তেজীমলা, কমলাকুঁৱৰী, চম্পাৱতী, তুলা আৰু তেজা আদিয়ে নতুন মাত্ৰা লাভ কৰিবলৈ সক্ষম হৈছে। তদ্ৰূপ মালিতাসমূহৰ পৰা তুলি অনা ফুলকোঁৱৰ, মণিকোঁৱৰ, গৌৰীনাথ সিংহ, ভোটাই ডেকা আদিৰ দৰে কিংবদন্তীমূলক আৰু ঐতিহাসিক চৰিত্ৰই ফুকনৰ বিভিন্ন কবিতাত নতুন ভাৱনাৰ সৈতে প্ৰতীকী ৰূপত আত্মপ্ৰকাশ কৰিছে। প্ৰতীকৰ দৰেই তেওঁৰ কবিতাৰ চিত্ৰকল্পসমূহতো লোকসাহিত্যৰ এই চৰিত্ৰসমূহৰ সমাবেশ ঘটিছে।

অসমৰ লোকজীৱনৰ সৈতে থকা গভীৰ চিনাকি আৰু আত্মীয়তাই নীলমণি ফুকনক কাব্যচৰ্চাৰ ক্ষেত্ৰত লোক সাহিত্যৰ উপাদান সমূহৰ প্ৰতি আগ্ৰহী কৰি তুলিছে। লোক সাহিত্যৰ ভাৱ-ভাষা আৰু সুৱীয়া উপস্থাপন শৈলীয়ে তেওঁৰ কবিতাৰ গহীন-গম্ভীৰ সুৰটোক প্ৰকট কৰি তোলাত বিশেষ অৰিহণা যোগাইছে। স্পেইনৰ কবি গাৰ্থিয়া লৰকাৰ আদৰ্শৰে অনুপ্ৰাণিত নীলমণি ফুকনৰ কবিতাৰ মূল সুৰটোৰ মাজতেই অসমৰ মাটিৰ গোন্ধসিক্ত লোক সাহিত্যৰ সুৰটো সোমাই আছে। দেশ-বিদেশৰ কাব্যিক উপাদানৰ অধ্যয়নেও তেওঁক এনে অনুৰাগৰ পৰা বিতাড়িত কৰিব পৰা নাই। বৰঞ্চ বিষয়বস্তুৰ প্ৰতি থকা গভীৰ দায়বদ্ধতাই তেওঁক লোক সাহিত্যৰ বিশেষকৈ লোক কবিতাৰ বিষয়বস্তু, ভাষা আৰু আঙ্গিকৰ সৈতে সম্পৰ্ক ৰখাত সহায় কৰিছে।

অসমৰ লোকজীৱন তথা লোক সাহিত্যৰ ঐতিহ্যৰে অনুপ্ৰাণিত কবি হীৰেন্দ্ৰ নাথ দত্তৰ কাব্য সমগ্ৰত অসমৰ গ্ৰাম্য জীৱনৰ আটাইতকৈ নিবিড়তম ৰূপটোৰ সাৰ্থক ৰূপায়ণ ঘটিছে। তেওঁৰ কবিতাত লোকজীৱনৰ পৰা ক্ৰমাৎ বিলুপ্তপ্ৰায় শব্দসম্ভাৰ, সংগীতধৰ্মীতা আৰু লোক সাহিত্য তথা লোকপ্ৰাণৰ সৰল প্ৰাণৱন্ত অভিব্যক্তি, লোকজীৱন আৰু প্ৰকৃতিৰ চিত্ৰময়তাৰ জীৱন্ত প্ৰতিফলন ঘটিছে। সৰল আৰু বৰ্ণনাধৰ্মী কবিতাবোৰত সততে চকুত পৰা দিশটো হ'ল তেওঁৰ কবিতাৰ বিষয়বস্তুৰ লোকজীৱনৰ সৈতে থকা ওতঃপ্ৰোত সম্পৰ্ক। তেওঁৰ কবিতাত সহজ গঞা মানুহৰ মুখৰ ঘৰুৱা প্ৰাণময় শব্দই কাব্যিক ৰূপলৈ এটা বিশিষ্ট জুতিৰ সৃষ্টি কৰে। আধুনিক অসমীয়া কবিতাত পৰম্পৰাৰ পৰা সাৰ্থক গ্ৰহণ আৰু ৰূপান্তৰ তেওঁৰ অন্যতম সিদ্ধি।[12] লোকজীৱনৰ ভাৱ-ভাষা আৰু লোকসাহিত্যৰ সুৱীয়া অভিব্যক্তি সমৃদ্ধ তেওঁৰ কবিতাসমূহত অসমৰ গঞা জীৱনৰ সাৰ্থক প্ৰতিফলন ঘটিছে। যদিও তেওঁৰ অধিকাংশ কবিতাৰ বিষয়বস্তুত নিহিত হৈ আছে নাগৰিক জীৱনত লাভ কৰা দ্বিধা-দ্বন্দ্ব-সংশয় আৰু সমস্যাই সৃষ্টি কৰা জটিলৱস্থা আৰু অৱসাদৰ বিচিত্ৰ প্ৰকৃতি, তথাপিও লোকজীৱন আৰু লোক সাহিত্যৰ পৰা লাভ কৰা সহজ-সৰল অনুভূতি আৰু প্ৰকাশৰীতিৰ সহায়ত বিষয়বস্তুৰ ঘনত্ব তুলি ধৰাত তেওঁ সফল হৈছে। অনুভূতিৰ সূক্ষ্ম প্ৰাণময় প্ৰকাশ দত্তৰ কাব্য সাধনাৰ ঘাই লক্ষণ।[13] কাব্য চৰ্চাৰ ক্ষেত্ৰত হীৰেন্দ্ৰনাথ দত্তৰ অন্যতম বৈশিষ্ট্য হ'ল লোকজীৱন আৰু সমাজত প্ৰচলিত অথচ বিলুপ্তপ্ৰায় হোৱাৰ উপক্ৰম হোৱা এমুঠি শব্দৰে কৰা সম্পৰীক্ষা আৰু সংগীতধৰ্মীতা ৰক্ষাৰ চেষ্টা। বিষয়বস্তুৰ মন্ময়ধৰ্মী বিস্তাৰৰ মাজতেই নিহিত হৈ আছে তেওঁৰ কাব্যকৃতিৰ নিভাজ সুৰধৰ্মীতা। আৰম্ভণিৰ পৰা সমাপ্তিলৈ একেটা সুৰতে গঁথা তেওঁৰ কবিতাৰ স্তৱকে পঢুৱৈক অসমৰ লোকজীৱনৰ চিনাকি ৰূপটোৰ প্ৰতি নিবিষ্ট কৰি ৰাখিবলৈ

<u>সহায়ক গ্ৰন্থপঞ্জী ঃ</u>

গোহাঁই, হীৰেন ঃ ***<u>বিশ্বায়তন</u>*** **;** জাৰ্নাল এম্পৰিয়াম, নলবাৰী, 1983 (দ্বিতীয় সংস্কৰণ)।

গোহাঁই, হীৰেন (সম্পাঃ) ঃ ***<u>সাগৰতলিৰ শংখ</u>*** ; লয়াৰ্চ বুক ষ্টল, গুৱাহাটী, 1997 (দ্বিতীয় সংস্কৰণ)।

নেওগ, মহেশ্বৰ ঃ ***<u>অসমীয়া সাহিত্যৰ ৰূপৰেখা</u>,*** চন্দ্ৰ প্ৰকাশ, গুৱাহাটী, 1990।

ফুকন, কবীন ঃ ***<u>অসমীয়া কবিতাৰ প্ৰবাহ</u>*** **(প্ৰথম খণ্ড) ;** ষ্টুডেণ্টচ্ ষ্ট'ৰচ, গুৱাহাটী, 1995।

বৰগোহাঞি, হোমেন আৰু অন্যান্য (সম্পাঃ) ঃ ***<u>বিংশ শতাব্দীৰ অসমীয়া সাহিত্য</u>*** **;** অসম সাহিত্য সভা, যোৰহাট, (দ্বিতীয় সংস্কৰণ) 1987।

বৰগোহাঞি, হোমেন আৰু অন্যান্য (সম্পাঃ) ঃ ***<u>অসমীয়া সাহিত্যৰ বুৰঞ্জী</u>*** **(ষষ্ঠ খণ্ড) ;** আনন্দৰাম বৰুৱা ভাষা কলা-সংস্কৃতি গৱেষণা সংস্থা, গুৱাহাটী, 1993।

বৰুৱা, নৰকান্ত ঃ ***<u>অসমীয়া লোককবিতাৰ সৌন্দৰ্য্য বিচাৰ</u>*** ; অসমীয়া বিভাগ, ডিব্ৰুগড় বিশ্ববিদ্যালয়, ডিব্ৰুগড়, 1996।

বৰুৱা, ভবেন ঃ ***<u>অসমীয়া কবিতা ঃ ৰূপান্তৰৰ পৰ্ব</u>*** **;** গ্ৰন্থ, গুৱাহাটী, 2002।

বৰা, মহেন্দ্ৰ (সম্পাঃ) ঃ ***<u>নতুন কবিতা</u>,*** বনলতা, গুৱাহাটী, 2002।

বৰা, ধনী ঃ ***<u>আধুনিক ব্যাখ্যা</u>,*** গুৱাহাটী, 1992।

in its deeper and more radical forms."

Moreover as a manifestation of human creativity, religion elevates man to spiritual heights and fulfills his emotional needs in an enlightened way. Therefore religion needs full appreciation. Religion is basically a human experience, but it is very high type of experience. It consists of the spirit of detachment towards the finite and perishable values, together with a sense of mysterious possibilities of value bearing consciousness is expanded, enriched and get progressive refinement with help of religion. Therefore it is said that "Religious attitude is that which expresses itself in saintly life and character. It should be mentioned here again that though humanist philosophers accept the possibility of mysterious element in case of religion, but this element of mystery in religions objective, should never be superhuman or supernatural in essence. This religious objective should be a part of human interest, knowledge and aspiration.

Thus, in creative humanism God is replaced by the well being and the onward march of humanity as its objectives. Obviously, such process knows no full-stop the concepts of human welt being are modifiable and also improvable. Such possibility should be welcomed by all right-minded people. Religious life is the creative life of the highest order; its essence lies in going beyond the biological existence. Progress consists in going from the competitive values to the intrinsic and widely sharable values and in qualitative advance and enrichment of human consciousness.

Some definitions of religion given by different thinkers are as follows :

"Religion is (subjectively regarded) the recognition of all duties as divine commands'' (Kant)

(Religion is) the knowledge possessed by the finite mind of its nature as absolute mind'' (Hegel)

"The minimum definition of religion is : A belief in spiritual beings'' (Tylor)

"Religion is a belief in an ever-living God, that is, a Divine Mind and Will ruling the universe and holding moral relations with mankind.'' (Martineau)

"(Religion is) a mental faculty or disposition which enables man to apprehend the infinite.'' (Max Muller)

"Religion is what an individual does with his own soliteriness'' (Whitehead)

"The common element in all expressions of religion, no matter how different, whereby they are distinguished from all other feelings, the permanent identical essence of religion, is that we are conscious of ourselves as absolutely dependent'' (Schleirmacher)

Though the different thinkers define religion differently mentioned above yet no definition is fully satisfactory. The difficulty monographs, but also on cognitive processes underlying their acquisition and representation by individual subjects. Here I will consider the limited domain of mentally represented ontological assumptions, that is, partly tacit assumptions concerning the existence and specific causal properties of supernatural entities. Other types of assumptions are involved in the representation of religious categories, to do for instance with the specific powers of particular human agents (priests, shamans, etc.), with general ideas about ritual action, with particular memories of such actions, etc. I will leave aside these domains, and show that the ontological assumptions which constitute the conceptual core of religious representations belong to a few recurrent types. Their variability is bounded by universal properties of the human mind which make certain conceptual representations much easier to acquire than others.

The first hypothesis is that religious ontologies generally include counter intuitive assumptions, relative to the expectations derived from intuitive ontological categories and principles. This quality is not really unfamiliar to anthropologists, and probably constitutes the intuitive basis on which we judge that a given set of representations belong to the "religious" domain. However, the counter-intuitive quality of religious representations is generally not discussed at much length in cultural anthropology. One important factor is that we generally tend to consider that apparently counter-intuitive assumptions are in fact perfectly intuitive, given a set of established cultural conventions. In other words, we assume that the criteria of the counter-intuitive might be culturally variable. What is counter-intuitive to one might be rather intuitive to other. However, this widespread anthropological conception seems to be based on several types of confusion, among which the following are particularly important

Recurrent religious representations are often described in the anthropological literature in the form of inductive generalisations on the basis of ethnographic descriptions. This method is, unfortunately, both indispensable to further research, and fraught with difficulties. One central and obvious problem is that such generalisations are not, as we would like to believe, a-theoretical and data-driven, but theory-laden in a way that is either not perceived or found too "natural" to deserve a justification. The point of a cognitive account is to integrate observed recurrence in an explicit causal framework. The hypothesis is that biases that favour certain types of representations are amenable to experimental studies, and that they probably have an important effect on the distribution of representations in a population, across groups and across delimit the "bounds of sense" and in consequence the bounds of non-sense. These results are important in that they go against a widespread assumption, that "super ordinate" ontological categories are gradually constructed by abstracting from lower-level "basic" categories. That is to say, we tend to assume that children first acquire such concepts as "dog", "car" and "orange", and then abstract some of their features to build a representation of animal, artifact and plant. This "bottom up" account of conceptual acquisition seems supported by the fact that the earliest linguistic categories acquired and used by children do indeed correspond to such "basic" categories. Experimental evidence, however, seems to suggest that unlabelled, higher order ontological categories are available to the child before he or she acquires natural language, and probably make the acquisition of basic terms easier.

Again, ontology is the philosophical study of the nature of being, becoming, existence, or reality, as well as the basic categories of being and their relations. Traditionally listed as a part of the major branch of philosophy known as metaphysics, ontology deals with questions concerning what entities exist or can be said to exist, and how such entities can be grouped, related within a hierarchy, and subdivided according to similarities and differences. Ontology, in analytic philosophy, concerns the determination whether some categories of being are fundamental and asks in what sense can the items in those categories be said to "be". It is the inquiry into being in so much as it is being ("being qua being"), or into beings insofar as they exist-and not insofar as (for instance) particular facts can be obtained about them or particular properties belong to them.

Some philosophers, specially the Platonic school, contend that all nouns (including abstract nouns) refer to existent entities. Other philosophers contend that nouns do not always name entities, but that some provide a kind of shorthand for reference to a collection of either objects or events. In this latter view, mind, instead of referring to an entity, refers to a collection of mental events experienced by a person; society refers to a collection of persons with some shared characteristics, and geometry refers to a collection of a specific kind of intellectual activity. Between these poles of realism and nominalism, stand a variety of other positions; but any ontology must give an account of which words refer to entities, which do not, why, and what categories result. Philosophy classifies ontology in various ways using criteria such as the degree of abstraction and field of application:

1. Upper ontology: concepts supporting development of an ontology, meta-ontology
2. Domain ontology: concepts relevant to a

Mastery Learning Strategy the way of Inclusive Education

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Abstract:

A teacher, faced with the job of creating an environment in which each student can develop his potential and attain competence, is confronted with a monumental task. This task may be impossible unless the teacher can employ varied instructional methods and materials sufficiently appropriate for each student to enable him to master the basics of the curriculum. Each student needs access to instruction at the level appropriate for him. Flexible scheduling is needed to allocate the amount of time each student needs to attain mastery (Torshen, 1977). Students with diverse interests and goals need instructional objectives appropriate for them. And evaluation methods must provide positive evaluation to each student when his performance is competent, even these conditions appear reasonable, they are lacking in many classroom situations at the present time.

Mastery learning (Bloom, 1968) offers a powerful new approach to school learning which can provide appropriate environment for almost all students with successful and rewarding learning experiences, now available to only a few. It operates on the proposition that almost every student can learn the school curriculum when the instruction is of good quality and appropriate for him, and when he spends adequate time in learning (Bloom, 1971: Calloll,1971).The present paper is an attempt to discuss the importance of Mastery Learning Strategy specially in Inclusive Education.

Key Words: Mastery Learning Strategy, Inclusive Education.

Introduction :

Despite great advances in knowledge about student learning and tremendous amount of investment in terms of time, effort and money, our schools still have not progressed towards the goal of efficient learning for all students. Thus the schools continue to provide successful and rewarding learning experiences for only about one third of our learners. At this moment, thousands of students at every educational level and in all types of educational facilities are working on school projects that will in due course, is to take in or consider as part or member of or embrace. Inclusion is about membership and being a part to a community. In the context of education, it is restriction schools as community where all children can learn. Teachers provide for more options for children as ways to learn. But there is no standerised procedure or recipe to make teachers and schools inclusive. The general philosophy of inclusive education provides for good teaching practices and healthy relationship between teacher and students to improve the quality of education for all children in a classroom and help the development of all children in different ways. All children can do well when the regular classroom environment is adjusted to meet their individual needs. The education system has to be reorganised to respond to the pupils' diversity.

Inclusive education means imparting education to all children regardless of their ability, disability, economic backwardness, social backwardness or of any other children who are out of formal basic education system. This concept has become very much relevant these days because in 2002 all children of the country up to the age group of 14 years in India are given education as fundamental rights.

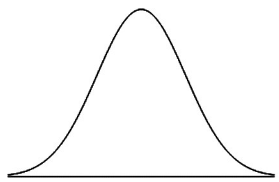
The importance for both integration and inclusion comes largely from concern for the rights of children and young people with special education needs.

Meaningful inclusion cannot be accomplished by special education teachers working alone, it also does not help in having temporary 'deal' with the regular school teacher to 'take care' of their students meaningful inclusion in schools requires that teachers and parents not only value diversity, but also question the traditional ways we segregated students are difficult, collaboration on going mutual and active exchange within a team is the spark that ignites, successful inclusion, the ideas that come from teams supply the full to make inclusion operate, teams involve members who, share their many skills and perspectives, are special education, parents, professionals, related services personal administrators, the students and the peers.

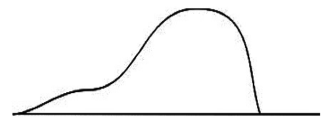
I.II. Objectives of The Study

- The study is designed to discuss the concept of Mastery Learning Strategy and Inclusive Education.
- To analyse the significance of Mastery Learning Strategy in school learning which can provide almost all students with successful and rewarding learning experiences.
- To analyse the research support of Mastery Learning Strategy in universal Learning.
- To provide suggestion.

But, if the students are normally distributed with respect to aptitude but the kind and quality of instruction and learning time are allowed to vary to suit the characteristics and needs of each learner, the majority of students will achieve mastery.



Aptitude



Achievement

(Uniform Instruction per Learner)

1 . Time allowed 2. Perseverance

Degree of learning = f ....

3. Aptitude X 4. Quality of Instruction

5. Ability to understand instruction

Where:

Opportunity to learn: Amount of time allocated to the learner for learning of a given task which is under the control of teacher.

Perseverance: Time the learner is willing to spend on the task controlled by the student. It can be increased by providing high quality of instruction and frequent feedback.

Aptitude is the amount of time needed to master the task under ideal conditions.

Quality of instruction is the degree to which the presentation, explanation and ordering of elements of the learning task optimises for given learner.

Ability to understand instruction based on general intelligence and verbal ability is the ability of the learner to under-stand the nature of the task he/she is to learn and the procedures he is to follow in his learning (Block, 1971).

Bloom (1966) transformed Carroll's model into a working model for mastery learning where, in the context of group based teaching, individualisation of instruction is attempted. Bloom (1971) based his approach on some of the elements in the Winnetka plan of Washburse (1922) and on Morrison's ideas (1926). The ideas were further refined and elaborated by Block (1973) and Anderson (1975). Learning through Bloom's MLS is group-based and teacher-paced. Another model of ML used for college courses (Burns, 1977) such as Keller's personalised system of instruction (1968) is Individual-based and student-paced.

Some modified MLS have also been

➢Mediocre learning for all conceivable objectives (coverage is emphasis)

€ Final summative test is prepared:

➢To asses degree of learning over entire course

➢To evaluate (grade) the overall quality of student learning

€ Set the level of acceptable performance:

€ Divide the entire course into a series of smaller learning units:

➢Set of objective for each unit are prepared to allow sufficient time for students to learn interrelated set of facts, concepts, principles, skills etc.

➢closely monitor each student's learning

€ Sequence the units

➢Such that facts, concepts, principles, skills acquired in one unit are used over and over again in subsequent units

€ Decide what constitutes mastery for each unit Tests vis-a-vis unit objectives are designed (formative tests)

€ to identify errors of learners,

€ to improve student learning rather than to evaluate,

€ to classify students.

b) Planning for mastery

€ Design a general plan for students to master the unit objectives (referred to as original instructional plan).

€ Preparing of methods for interpreting and using information of formative test.

€ Set of alternative instructional material and learning activities keyed to each objective on the unit's formative test are developed.

These correctives are used to re-teach each unit's objective - in a way different from original instruction viz.

➢Co-operative small groups

➢Small group study sessions

➢Peer tutoring

➢Different text books

➢work books and

➢A.V. materials

€ ***Using Correctives: Teacher has 4 options***

Option I: Use initial 'masters' as tutors for non masters (Willingness of students, having specific tutorial material are essential)

Option II: initial masters be permitted to complete work in other subject areas

Option III: engage initial masters in structured independent study

Option IV: allow the masters to engage in "Vertical enrichment"

€ ***Planning of time***

Approximate amount of time must be allocated in the original instruction, corrective instruction and testing.

c) Teaching for mastery

- Orientation of students:

➢ Students are informed of what they are expected to learn,

➢How will they learn it

➢How will they demonstrate learning

➢How the adequacy of their learning w~1I be judged.

- Teaching each learning unit in sequence using the original instructional plan.
- Administering unit's formative test

Meverech, 1985; Patadia, 1987).

€ First to sixth grade English Grammer (West, 1979; Bacon, 1985, Hefner, 1985).

€ Physics (Srivastva 1983; Kishore, 1986).

€ High School Civics (Nicholson 1982).

€ Ninth Grade Algebra (Tenenbaum, 1986); Language syntax (Anutora, 1987) Language Arts (Johnson, 1990).

€ Tenth Grade Chemistry (Salim, 1988).

€ English Grammar (Vaidya & Panda, 1988).

€ Elementary Grades Hindi (Chaudhary& Vaidya, 1990).

€ Eighth Grade Chemistry (Des pandey & Bhatt, 1994).

€ High School Education course (Whiting & others, 1995).

€ First & Second Grade Economics Concepts (Laney & others, 1996).

€ High School Biology (Ahuja & Sharma, 1998).

€ Cooperative Mastery Learning Strategy on Fifth Grade Language Learning (Ali, S, 1999)

At College Level

Mastery procedures have been used in numerous college courses. High performance of mastery learning group as compared to non-mastery group was reported in the various subject areas viz.:-

€ Vocabulary skill (Melemore, -1981), Music (Debroski, 1981) ..

€ French (Holden, 1983), -Basic Arithmetic (Shrum, 1985).

€ Male students' Maths (Pitts, 1985),-Chemistry (Rosing, 1985).

€ Nursing Course (Jones, 1986), -Hotel Management Courses (De France, 1993).

At University level

Effectiveness of MLS at University level have been proved in the subjects. viz:

€ Test theory (Airasian, 1967), Psychology (Sherman, 1967),

€ Philosophy (Moore-1968) , Algebra (EI-Far and Wikeit, 1981),

€ Statistics (Mather, 1988), Grammar Teaching and Communication (Takashiwa, 1995).

Retention of experimental group is significantly more than that of students in the control
group viz;

€ First to sixth grade Mathematics (Anderson, Scott & Hutlock, 1976),

€ Science (Brooks, 1982) , High School chemistry (Cottey, 1983).

€ Language Arts (1985), Physics (Srivastava, 1983).

€ Algebra (Sawhney, 1993), Biology (Ahuja & Sharma, 1998).

I.IV.II. (ii) Research on MLS and Affective Outcomes

(a) Attitudes & Interest

Among researches investigating students' affective consequences associated with mastery model implementation, the chaipetta,1981 ; Dillashaw and Okey, 1983; Deshpandey and Handli,1994).

Modified MLS with different advance organizers in initial instruction resulted into higher performance as compared to MLS or conventional instruction (Ahuja and Ogogo, 1996)

When, initial instruction in MLS is imparted through Gagne's events of instruction (Ahuja and Sharma, 1998)

Suggestions

From the above discussion it reveals that in majority of research studies Mastery Learning strategy (MLS) is more effective than conventional teaching strategies. So to achieve in the goal of teaching learning process (Universal development or Inclusive Education) a teacher should apply the MLS in school Learning. Mastery learning offers a new powerful approach to school learning which can provide almost all students with successful and rewarding learning experiences. It operates on the proposition that almost every student can learn in the school curriculum when the instruction is of good quality and appropriate for him, and when he spends adequate time in learning.

Conclusion

Inclusive education means imparting education to all children regardless of their ability, disability, economic backwardness, social backwardness or of any other children who are out of formal basic education system. This concept has become very much relevant these days because in 2002 all the children of the country up to the age group of 14 years in India are given education as fundamental rights and the result of Right to Education Act of 2009. So to succeed the policy of inclusive education the Mastery Learning Strategy should be very appropriate to fulfill the varied needs of the learners.

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These three principles serve as the fundamental of Gandhi's concept of *Sarvodaya*. The first principle enunciated here is nothing but a reflection of the same basic spiritual conviction of Gandhi according to which there is a basic unity amongst all creatures. When all are basically one, there is no real question of mine and thine and thus there is no question of serving one's own interest parting from the interest of others. Therefore one's own good is associated with the good of all. The second principle reflects Gandhi's firm conviction in the ideal of Swadharma which is found in the Gita. Whatever status one has got in the society by virtue of his varana or quality of action, he has to work in accordance with that. There is no question of any one's work being superior or inferior to that of the other i.e. all works are equally valuable. The second principle based on a conviction is the principle of the dignity of labour. Again the third principle reflects Gandhi's love for those who perform manual labour and who are generally the downtrodden - the poor and the hungry in the society. No doubt the concept Sarvodaya implies the upliftment and good of all, but the upliftment of the downtrodden poor was Gandhi's primary concern and he wanted this to convey through his principle of Sarvodaya.

According to Gandhi all the problems faced by human beings are moral problems. All the conflicts appeared among the human beings are the result of suppression of rational thinking by the selfish and the animal element. The ideal of Sarvodaya insists upon the moral character as a solution of all evils - economic, social and political.

Sarvodaya means welfare of all and not of any particular class which makes the difference between *Sarvodaya* and Communism. Of course, there are some similarities between these two ideals. Both these ideologies are dissatisfied with the present economic, social and political injustice and inequality. Both Gandhi and Marx considered state as a mere means and not an end. According to the both ideologies, state is a necessary evil which sometimes becomes an instrument of repression. Both *Sarvodaya* and Communism aims at a classless society in different ways. Communism seeks to achieve the ideal by realizing perfect co-operation and harmony between all the classes. Again both the ideologies support the weaker section in society.

Gandhi's *Sarvodaya* aimed at all round development or welfare of man as a whole. This all-round development included man's social, political, economic and spiritual development. Gandhi always fought for the economic freedom of the poor and the needy. He preached equitable distribution of property and wealth so that the poorest and the most neglected could get their due share.

concentration of economic and political power in all powerful state. The vision of *Sarvodaya* with its emphasis on love and co-operation, containment of material wants, self-reliance, decentralization of political power, decentralized type of economy and equality would certainly help people by pointing out the direction along which India should move if there is to be peace and all people are to live a contented and happy life.

In 1963, after more than a decade of planning, Mr. Nehru, the first Prime Minister of India, noted that still there was a good number of people in India had not been profited by planning and whose poverty was not painful. He said "I do think that some method should be found to remedy the situation" In that context, he observed, "I begin to think more and more of Gandhi's approach."

It is often thought that Mahatma Gandhi was essentially a religious ascetic who was adverse to the fruits of modern science and technology. It is an unfortunate misconception. He was not against machinery as such. All that he meant was that in a country like India where capital was scare and labour abundant it would be profitable to use labour intensive industries. He was afraid that use of machinery on a large scale would result in technical unemployment. Gandhi said, "If the Government could provide full employment to our people without the help of Khadi and village industries, I shall be prepared to wind up my Constructive Programme in this sphere."

In his 'Asian Drama,' Gunnar Myrdal has proudly supported Gandhi's emphasis on village and cottage industries, because "South Asian Countries now run the risk of creating petty islands of highly organised western-type industries that will remain surrounded by a sea of stagnation." He has further observed that "the development of Industries in direct competition with existing cottage industries would take work and bread away from millions with no immediate alternative source of employment or income. This would not be rational from a planning point of view. As for the workers in the South-Asian cottage industry, there is no prospect of any large scale adjustment for decades to come, particularly as the labour force will increase rapidly until the end of the Century."

Gandhi was a practical idealist. Having set the goal, he also worked out schemes for achieving it. The Sarvodaya scheme includes: (a) Full attention to the cultivators and the labourers, (b) the cultivators would organize their own committees and labourers would form their own unions, (c) All person would receive education, whether technical, or basic, (d) Special attention would be provided to the development of village industries, sanitation and hygiene. Hand spinning would be carried

1.03. Interdisciplinary relevances:

Mahatma Gandhi is one of the most prominent personalities of the twentieth century. Gandhi will continue to be studied from various points of view and by variety of people. His protean personality, his integrated life, thought, action, his experiences as expressed in his profile writing are so comprehensive that practically no subject/discipline or aspect of genuine human interest has been left untouched by him. And whatever he touched, he made it easier and knowledgeable.

Though the present researcher belongs to Philosophy, the title of the study indicates that the study will highlight economic and political aspect of Gandhian Philosophy, specially 'the *Sarvodaya*.'

1.04. Significance of the study:

Gandhi was neither an economist in the professional sense nor a political thinker like 'Plato' and 'Aristotle'. His economic and political ideas lack systematization and lay scattered here and there in his writings. Whatever he wrote or spoke in Economics and Political Science in *Sarvodaya* was the natural outburst of his ethico-philosophical thought and was not adopted from any book.

The main purpose of the proposed study would be to provide philosophical interpretation of *'Sarvodaya'* and highlight its economic and political relevance in the context of present situation of India. This will not only help to systematise his economic and political aspect of *'Sarvodaya'* in a concise form but also help in suggesting measures for policy making authorities.

1.06. Objectives

The proposed study is planned with the following objectives:

1. To highlight a philosophical, economic and political interpretation of *'Sarvodaya'*
2. To analyse the constraints and feasibility of *'Sarvodaya'* in the post- globalisation period of India.
3. To reiterate Gandhian values of *'Sarvodaya'* and suggest strategies to translate Gandhian ideals (*Sarvodaya*) into real life and to make rural India into 21st century free from hunger, poverty and exploitation.

1.07. Research Question

Keeping in view the issues identified in the review of literature the research questions may be tested on the basis of discussion to be carried out.

1. Is Gandhian Philosophy of *Sarvodaya* valueless and useless?
2. Is it applicable in our present globalised situation?
3. Can *'Sarvodaya'* be translated to make rural India a prosperous one?

means of sophisticated technology. Man may be able to see and talk with others belonging to different continents while at home or even while travelling. All these developments explain physical nature of the human beings only. They do not satisfy the goal of entire mankind. Entire mankind consists of spiritual perfection which can only in the end through the life of moral action. Gandhiji was rationalist as well as moralist in his religious outlook. Gandhiji said that Economics, Ethics and Religion constitute indivisible whole, Economics is the science of human welfare, hence its goal is ought to be *Sarvodaya* - the welfare of all. The world today needs peace and *Sarvodaya* is the only social order which can give us peace and it shows us the right way through which we can reach our destination namely freedom, peace and brotherhood.

4. Today we have seen that terrorist activities are rising day by day. Sometimes it is supplemented with fundamentalism. Ethnic violence is also rising. Assam, Manipur, Nagaland, Jammu Kashmir are all in fire. Therefore only with the help of Gandhian idea of *Sarvodaya*, which believes self-sufficient and self-governing village can minimise such terrorist activities and demand for separate homeland.

5. The programme of *Sarvodaya* is a wide ranged programme. *Sarvodaya* signifies the welfare and service of all. It signifies the worth of humanism. It serves as a combat of all evil forces.

6. The *Sarvodaya* philosophy appears as the very attractive and effective alternative to both the economic systems, namely capitalism and communism. Its strength lies in its two main features. In the first place that philosophy is based on Indian culture and tradition that contentment lies in extinguishing extra and superficial wants and not in multiplying them. Secondly, the *Sarvodaya* philosophy embodies the idea of liberty, equality and fraternity made popular by the French Revolution.

7. *Sarvodaya* is opposed to concentration of political authority at the centre, because this would result in various restrictions and restraints and to that extent hamper individual initiative and curtain individual freedom. As a part of political decentralisation, *Sarvodaya* envisaged a five tier system of Village Panchayats, Taluka Panchayats, District Panchayats, Provincial Panchayats and All India Panchayats.

1.10. Conclusion

Sarvodaya may be said to be a utopian concept. But then utopias have their uses and values. *Sarvodaya* based on the insights and experiences of Gandhi is a reassertion of the valuational and moral approach to the problems of mankind, which has been a part of ancient Indian culture for

Thus, while the other forms of literature are more or less monologic — they reduce the world to a monologic existence - they novel does the opposite — it opens up the world to a dialogic unfinalizability. Bakhtin's philosophic position is that this dialogic unfinalizability is the reality of the world and hence the novel is the most realistic form of literature. By examining the time and space factor in a novel, Bakhtin confirms the realistic character of the novel. Making a comparison between the Romance and the novel - Bakhtin establishes that the time-scheme and space position in the Romances are unrealistic - they do not commensurate with the lives and activities of the characters. But in a novel - both time and space are realistically presented and they provide credibility to the narrative. Besides, Bakhtin's exposition of the ideas of polyphony and heteroglossia is so elaborate and substantive, one can hardly ignore their importance along with the overall contribution of Bakhtin to the theory of the novel. Bakhtin has undoubtedly emerged as a leading thinker in the late twentieth century whose various theories and concepts on the novel constitute a significant contribution to the theoretical discourses on the novel.

The objective of the present paper is to make an analysis of the development of Assamese novel from a Bakhtinian perspective. There has been wide discussion on the origin and development of the Assamese novelistic genre from different angles. However, an analysis applying Bakhtin's insight has been made made in the present paper.

The novel emerged in Assamese literature in the late nineteenth century. This considerably late rise of novel must be understood in its socio-historical background. The emergence of novel in every society is connected with the stage of the historical development of that society. The socio-economic background which conditioned the rising of the novel in the West was almost absent in Indian society in general and the Assamese society in particular.

The Indian Society came into contact with modern Western ideas and thought only after the occupation of the various parts of India by the Britishers. Since Bengal was the first Indian province to have come under British territory, so the modern Western education started in Bengal first. As a result, Bengali literature began to be influenced by English and other Western literatures. Consequently, some attempts were made to write novels in Bengali. According to Prof. Satyndra Nath Sarma, the rise of the novel in Bengali literature was the consequence of the confluence of Western and Oriental atmospheres brought about by the introduction of English education in the province of Bengal.1 It must be mentioned in this connection that during the nineteenth century, Assam had close administrative and political links with Bengal. The officials appointed by the British Government to run

Pilgrim's Progress with the title Jatrikor Jatra.4 Since it was a translated work it cannot be taken as the first Assamese novel.

Kamini Kanta occupies an important place in the history of Assamese novel. The novel depicts the love between Kamini Kanta and his newly married wife Sarala. As Kaminikant converts to Christianity, so he decides to live in a church away from his home and his wife. His family members and in-laws make a desperate attempt to reconvert him to Hinduism but fail. But when he is informed of the miserable condition of Sarala, he starts writing letters to her which eventually causes a change of heart in her and she converts herself to Christianity. Since, there is some focus on the development of characters like Kamini Kanta and Sarala, so it possesses some of the qualities of the novel. But the main purpose of writing this novel was to propagate the Christian religion and therefore it cannot be called a successful and good Assamese novel. Sudhormar Upakhayan (1884) by Padmabati Devi Phukononi is narrated in modern Assamese and the characters like Sudhorma and Lilaboti are developed to a certain extent. But it fails to rise above that category of literary genre which is called 'Romance' in English and other literature. It resembles the ancient Greek Romances where the heroes and heroines undergo trails and tribulations that come up suddenly and finally they get united with the divine intervention or in such an atmosphere. Therefore it cannot called a novel in the proper sense of the word. Pramila by Karunabhiram Barua was serialized in Assamese periodical Assam Bandhu in 1885 but it remained an unfinished novel as only the first two chapters had seen the light of the day. However, the opening of this novel was quite impressive with a lucid prose-style. The most significant fact is that the Assamese term "Uponyas", which means 'novel' in English was first used in connection with Pramila in the periodical Assam Bandhu.[5]

The general view among the Assamese critics and literary historians is that Padmanath Gohain Barua's Bhanumoti (1891) can be called the first Assamese novel in the true sense of the word.6 It tells the story of Bhanumoti, a young girl and daughter of an Assamese prestigious family and her love for Charu Gohain, son of a noble family. The background of the story is the rivalry in the royal family of the Ahom Kingdom. Though the story is set against a historical background but it is not a historical novel par se and it focuses on the indomitable character of Bhanumoti. Gohain Barua's second novel Lahori was also published at the same time (1892) and according to Dr. Hiren Gohain, Lahori is the first Assamese novel.[7] In the preface to this novel, the writer himself described it as the first attempt in the writing of novel in Assamese. Like Bhanumoti, Lahori is also set in a historical background although that background is hardly indispensable for the development of the love story between Lahori and Kamal as well as *anything approaching a plot, was Hemchandra Barua's Bahire Rang-chong Bhitare Kua Bhaturi (Playing in the parlour, empty is the larder). As this is a novel with a purpose directed against the social and religious evils of the time, here for the first time realism and characterization find fuller development.*[10]

Therefore, from Bakhtinain perspective, the Assamese novel starts with Bahire Rang-chong Bhitare Kua Bhaturi as it represents an attempt to expose the hypocrisy of false ideals and practices by the so-called noble class people of the society. It depicts a pre-British Assamese society in which there was a class of people who were full of corruption, immorality and hypocrisy. There are some typical characters in the novel who represent a particular vice in an exaggerated way and through these characters, the writer ridicules those particular vices. The novelist is inspired by the humanism and rationalism of European enlightenment and so he comes down heavily on the traditional society for its patronage of superstitions, evil practices and out-of-date social customs.

If the novel is considered as a literary genre which defies tradition and authority, then almost each and every novel written in the early stage of Assamese literature falls in that category. It is quite significant that Padmanath Gohain Barua's two novels Bhanumoti and Lahori are named after the female protagonists of those novels - like the early English novelist Samuel Richardson's Pamela and Clarissa. That the first novels in Assamese were written focusing on the female protagonists is itself an act which goes against tradition and established social practice. In Sudhormar Upakhyan, Bhanumoti, Lahori and Bezbarua's Padum Kunwari (1905), the female protagonists are not only the most important characters - but they assert their independence and identity by expressing their love towards their male counterparts against all odds. It is not for nothing that the novels are named after their heroines.

Another important Assamese novel which celebrates the violation of established social norm and authority is Rajani Kanta Bordoloi's Miri Jiyari (1895) [The Daughter of the Mising]. The subject-matter of the novel is the spontaneous romantic love of a young Mising pair which does not receive social approval. The whole society rises against this relationship as the society is to uphold the traditional social customs and practices. The conflict between individual love and the society takes a tragic turn with the death of the protagonists. But the portrayal of this conflict with all the sympathy of the author towards the young pair is a significant step towards the dismantling of social barrier and ushering in of a new liberal and humane society.

Thus it can be seen from the beginnings that the novel in Assamese literature has focused on new ideas and themes which has only corroborated the Bakhtinian concept of the novel. The Assamese writers who wanted to put their *voices - they simply say what the novelist supplies to them.*[12]

Goswami's view on the role of voices vis-à-vis character has strong similarity with the view of Bakhtin.

In volume I Number II of Ramdhenu, Hemanta Kumar Sarma pens an article on the novel Kaminikanta and in his title he asserts that this is the first Assamese novel. However, his view is that if Sudhormar Upakhayan is called a novel despite so many deficiencies, then Kaminikanta, is also a novel; and as Kaminikanta got published earlier so it is the first Assameses novel.[13] The essay recounts the story of the novel in brief and critically brings out the didactic and religious elements in the novel. In another issue of the same magazine, Dandiram Saikia makes an interesting comparison between Assamese novelist Rajani Kanta Bordoloi and Bengali novelist Bankim Chandra Chattopadhyay as historical novelists.[14] However, the most notable thing about Ramdhenu is that the magazine was instrumental in the making of two critics, namely Dr. Hiren Gohain and Professor Bhaben Barua, who later acquired much eminence in the field of criticism. Prof. Bhaben Barua's incisive treatise "Homen Borgohainr Uponyas" (Homen Borgohain's novel) was published in Ramdhenu, Vol. III, No. 2. In this essay Prof. Barua mostly concentrates on Borgohain's first novel Subala in which the protagonist is a professional female sex-worker. Prof. Barua, applying his vast knowledge of various literatures, especially of English literature, makes a threadbare and detailed analysis of the novel pointing out its strength and exposing its limitations.

Prof. Barua later makes a detailed analysis of Bina Barua's (Dr. Brinchi Kumar Barua's) Jibonor Batot largely from a moral perspective and recognizes it as the best Assamese novel written till then.[15] Almost at the same time Dr. Hiren Gohain starts the work of analyzing and criticizing Assamese literature by applying his vast knowledge of English literature in particular and the world literature in general. He makes a revaluation of Assamese literary tradition and identifies Bina Barua's Jibonor Batot as an important novel in Assamese literature. He makes an indepth analysis of the novel and comes to the conclusion that the novel is not simply a tragic story of one woman but it brings to the fore different aspects of the Assamese society. According to Dr. Gohain, the novelist was such an insightful and visionary person that he could comprehend the Assamese society in its totality with the strengths and the weaknesses.[16] Besides, Dr. Gohain comes up with a very important book in Assamese in which he makes an attempt to introduce the Assamese readers with the modern theories of novel that emerged in Europe and America in the wake of the advent of modernism. His Uponyasor Adhunik Samalochona in two volumes makes a brief sometimes restrict the freedom of the character. His view stems from the assumption that the characters' voices should enjoy more importance in a novel than the voice of the author. This is a very significant observation if considered from Bakhtinian viewpoint.

Dr. Shailen Bharali makes an analytical study of Assamese historical novel in his Asomiya Sahityor Oitihasik Upanyas (1975). Dr. Umesh Deka's Post-War Assamese Novel is probably the first comprehensive book written on Assamese novel in the English language. Dr. Deka's book is the edited version of his doctoral thesis in which he assesses and evaluates the Assamese novel published during the period from 1945 to 1960 in terms of content and other aspects.

Dr. Gobinda Prasad Sarma, an Assamese critic specializing in novel and imbued with the knowledge of English literature has been contributing to news papers and journals by writing critical works on Assamese novel. His book Uponyas aru Asomiya Uponyas (1993) is an important book incorporating his various articles and papers. The book is both a theoretical discourse on the form and art of the novel in the light of western thought and also a critical review of some English and Assamese novels in the backdrop of the recent developments in the West. In this book, Dr. Sarma makes an attempt to analyze a few Assamese novels in the light of Western critical concepts such as stream of consciousness novel, psycho-analytical novel, post-modernist novel, autobiographical novel etc. Significantly, this book takes up the question of post-modernism in Assamese novel and throws some light on it.

The Assamese novel completes 100 (one hundred) years in 2000 (from the publication of Rajanikanta Bordoloi's Miri Jiyori in 1900) and a critical volume was published jointly by Sahitya Akademi and Gauhati University containing research papers on various aspects of the Assamese novel. This is a compendium volume where there are essays of on almost every aspect of the Assamese novel. Dr. Nagen Saikia traces the general trends of Assamese novel from the beginning to the present. Dr. Parixit Hazarika recounts the early phase of Assamese novel writing. Dr. Shailen Bharali discusses the tradition of Assamese historical novel. Shashi Sarma analyses the presence of progressive and socialist ideas in Assamese novel. Dr. Jogendra Saikia makes a review of the rise of social consciousness in Assamese novel before the Second World War. Dr. Hem Bora assesses the contribution of women writers to the enrichment of Assamese novelistic tradition. Dr. Jitanjali Borpujari evaluates the contribution of tribal writers to the corpus of the Assamese novel. Dr. Dilip Bora discusses the depiction and portrayal of tribal lives in the Assamese novel during the hundred years period. Dr. Pradipta Borgohain makes a review of

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the main quest. The objectives of the paper have been outlined thus:

€ To understand the East-West dichotomy in the context of R.P. Jhabvala's approach to it.

€ To reveal the stereotypical signification of conflict between the culture and to explore the scope of assimilation.

€ To posit East-West encounter as a parameter in understanding the novelist as a detached observer of life.

€ To approach East-West encounter from different angles like political, social, cultural, religious etc.

Ruth Prawer Jhabvala was born in 1927 into a middle class German Jewish family. She came to England in 1939 and graduated from Queen Mary College, London University and married an Indian architect, C.S.H. Jhabvala. They lived in Delhi from 1951 to 1975 and after that she stayed in American till her death in 2013. During her stay in India, she wrote eight novels-namely-*To whom she will*, *The Nature of Passion*, *Esmond in India*", *The Householder*, *Get Ready for Battle*, *A Backward Place*, *A New Dominion* and *Heat and Dust*. The novels written in India showcase her engagement in Indian domestic and social problems and interrogation of the way India acts on westerners, particularly women. The paper discusses the theme of East and West encounter as figured in her Booker Prize winning novel *Heat and Dust*.

Heat and Dust is a tale of misadventures of two English women - Olivia and her step granddaughter, the narrator-in India. Olivia Rivers comes to India in the traditional role of a life partner to the sub-collector of Satipur. Being frustrated she falls in love with Nawab, an Indian. She becomes pregnant but she aborts. Finally deserted by Douglas, her husband, she lives with Nawab. The narrator, her step-grand daughter, after a gap of fifty years comes to India with a bunch of letters to unravel the mystery of Olivia's existence and the dismal oddities of life-resulting in her escapades with young Muslim Nawab. But interestingly in the narrators life also the same scandal was enacted. She becomes intimate with Inder Lal and becomes pregnant but this time unlike Olivia, she gives birth to a baby. The novel offers ample narratives to examine those in the light of East-West encounter.

Traditionally the Indian response over the years to this East- West dichotomy goes like this: the West becomes at once the repository of progressive value and a threat to spiritual tradition of the East and the resultant incompatibles in R.K. Narayan's *The vendor of Sweets*, and in Kamala Markandaya's *A Silence of Desire*.

through the young narrator's story. The narrator is first warned to look after her possessions carefully lest they be stolen. Thereby Jhabvala provides a pen picture of chaotic situation in Post-independent India.

Again, the parallel stories of Olivia and the English narrator the dilemmas of the West towards the East seem to emphasise what has always been and what will ever be. The issue of reconciliation or exploring chances of assimilation can be interpreted such: It is Olivia who tries to negotiate with Indian reality- "I don't know India. It's true I don't, but what's that got to do with it? People can still be friends, can't they? Even if it is in India.(H.D.P-103).In this light the question of assimilation on the part of Olivia is pertinent. Olivia aborts for the apprehension that the baby will bear black hair. It is right. It implies that she is inclined to India no doubt but a dilemma persists still. On the other hand, the narrator prefers to raise no curtains between Inder Lal and her and deliberately tries to assimilate. The narrator sleeps in the open courtyard like the Indians. It is seen that the narrator seems to merge with India successfully, possibly because she, like Judy and Miss Charlotte, has a purpose for being in India and is prepared to accept India without needing to throw of her own identity. (Ralph J.Crane:71).Ramlal Agarwal is partly right when he suggests that the theme of the last three Indian novels is that India overwhelms Westerners. (Agarwal: 1990:70)

In the Heat and Dust there are two time zones-the 1920s and the 1970s, both of which witness two cultures, the British and the Indian meeting together. In the first story the political philosophy reins- Douglas acts as colonial 'Burrra Sahib'. The question of cultural interaction makes little sense where political agenda gets the better of. Still Olivia initiates the process of assimilation in spite of all odds at personal level. In the second zone we notice that the narrator comments-"India always changes people and I have been no exception."(H.D.-P-2).The narrator has carried on the process of assimilation initiated by Olivia and she transgresses the social code and gives birth to the baby unlike Olivia. Olivia couldn't get rid of the colonial cap completely. But the narrator decides to stay in an ashram to give birth to hre baby- a cultural byproduct.

Ruth Prawer Jhabvala in her total conception of the gamut of East-West relations touches also upon the religio-philosophical encounter. Generally the western philosophy of pragmatism, rationality, materialism and individualism is pitted against the Indian philosophy of portraiture of political encounter, however, R.p. Jhabvala cuts a sorry figure. But in case of religious encounter Jhabvala appears to adopt a post-modern approach. What is important is that as a detached observer of life, Jhabvala is equally critical of the West and the East in her ironical presentation of situations. Thus "Heat and Dust" becomes a site of contention and interrogation of two cultures and the superiority tag of the West as well as its counterpart is challenged. Under the light it is pertinent to see whether India is a viable place to live in or not for an outsider. The world is a village-what Olivia couldn't deliver the baby, the narrator did so in India. A note of assimilation is observed in this narrative. Finally, the act of going to mountain to seek sanctuary both by Olivia and the narrator strengthens this note of assimilation in Jhabvala's "Heat and Dust", although irony and ambiguity blur in transmitting a clear-cut message. It is a matter of perspective now. Kipling's assertion of'East is East and West is West' is no longer functional and feasible in today's multi-cultural ambience. Hence it is undesirable too. Undoing Kipling, R.P.Jhabvala offers India-the narrator's India- as a viable place to live in without losing own legacy.

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imagery, forest area in the State constitutes around 81.90 per cent of the total area, of the State. This is one of the highest among the States of North East India. An analysis reveals that in around 2.5 per cent of India's total land area the State of Arunachal Pradesh contains 16 per cent of total timber growing stock of the country and 20 per cent fauna of India. As a result, forest is one of the most important sources of livelihood for the indigenous people of the State. As per Census Report of India (2001), around 87 per cent of the rural households and 32.36 per cent of the urban households of Arunachal Pradesh use fuelwood for cooking. A significant per cent of the urban households (56.30 per cent) use LPG for cooking. However, the use of LPG among the rural households is not significant being 9.67 per cent only. The extreme dependency of the people on fuelwood can be attributed to a numbers of reasons such as their food habit, livelihood strategy, easy access to the forest resources, poor communication facilities, non-availability of other types of fuels at a reasonable prices, etc. Therefore, excessive pressure on forest may be expected, owing to these factors along with extreme dependency of the people for survival, which may bring about significant changes to the stock of forest resource leading to depletion and degradation[4] of these resources. Under the circumstances this paper attempts to analyse the nature of household energy consumption in Arunachal Pradesh based on an economic framework. The paper is structured to comprise four sections including the present introductory one. Section II describes the methodologies of the study. Section III elicited the survey results. Finally section IV concludes.

2 Data Base and Methodology of the Study

Present study is a part of the Ph. D. work of the author which was completed in 2009. The data were collected during 2008. The households are the ultimate unit of observation. A multi-stage sampling technique was used for selection of households of the selected villages. The different stages under the technique are as follows:

Stage I : Selection of districts

Stage II : Selection of circles

Stage III : Selection of villages

Stage IV : Selection of households

In the first stage, two districts namely Papum Pape and West Kameng were selected purposively from the Eastern Himalayas State Arunachal Pradesh. The districts were selected to represent two different altitude areas of the State. The Papum Pare district was selected from relatively low altitude areas of the State whereas West Kameng district was selected from high altitude[5] areas of the State. At stage II, two circles namely Doimukh, and Sagalee were selected from Papum Pare district and another two circles namely Bomdila and Dirang were selected from West Kameng District purposively. In the third stage, eight and four villages were selected from Papum poor and relatively non-poor. The study revealed that in both the surveyed areas the poor households consumed more fuelwood in comparison to that of non-poor households. This may be due to high installation cost involved in commercial sources energy like LPG. As a result the poor households continued to depend upon traditional sources of fuels like fuelwood. The details are shown in Table 2.

Table-2: Per Capita Daily Fuelwood Consumption in the Surveyed Districts (Based on Economic Criteria)

Surveyed Districts	Economic Classes	Per capita Fuelwood Consumption				
		Maximum	Minimum	Average	Standard Deviation	Coefficient of Variation
Papum Pare (Low Altitude Area)	Poor	8.26	0.52	4.06	1.46	278.08
	Non-poor	6.41	0	2.62	1.36	192.65
	Total	8.26	0	3.20	1.57	208.28
West Kameng (High Altitude Area)	Poor	13.81	3.70	7.37	2.48	297.18
	Non-poor	13.81	3.70	7.37	2.48	297.18
	Total	14.79	2.88	6.38	2.22	305.40

Source: Field Survey, 2008.

So far we have discussed regarding the per capita consumption of fuelwood based on climatic, demographic and economic criterions. However, it was observed that the demand for fuels, particularly fuelwood increases significantly in the winter seasons. So an attempt was made to estimate the season-wise variations in the consumption of fuelwood in the two different altitude areas. It was observed that there were wide variations in the consumption of fuelwood between two seasons, i. e. summer and winter and between two surveyed districts i.e. Papum Pare and West Kameng. The details are shown in Table-3

Table -3: Season Wise Fuelwood Consumption

Surveyed Districts	Seasons	Per capita Fuelwood Consumption		
		Maximum	Minimum	Average
Papum Pare (Relatively Low Altitude Area)	Summer	7.50	0	2.85
	Winter	12.50	0	4.71
West Kameng (Relatively High Altitude Area)	Summer	9.00	0	3.50
	Winter	22.50	5.00	9.72
Total	Summer	9.0	0	3.11
	Winter	22.50	0	6.68

Source: Field survey, 2008.

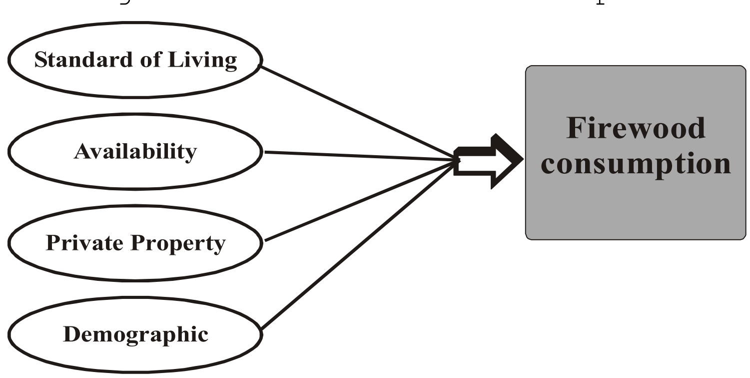
Table-5: Rotated Component Matrix

Variables	Component			
	1	2	3	4
log_anlinc	.980	-.161	-.027	.071
log_pci	.973	-.159	-.138	.060
log_condurable	.842	-.276	.076	.702
log_edn	.473	-.153	-.007	.349
log_pcfcon	-.186	.966	.018	.131
log_density	-.156	.843	.065	.026
logtime_kg	-.215	-.783	.217	-.117
log_plowned	.106	-.031	.791	-.053
log_hortland	-.121	.447	.774	-.098
log_aland	.016	.541	.759	.064
log_livstk	-.241	.173	.757	-.407
Log_fsize	-.057	-.002	.550	.781
log_sexration	-.009	-.086	.114	.783
log_inst	.045	.083	-.057	.376

Extraction Method: Principal Component Analysis.

The factor analysis reduced the number of independent variables in to important factors. The important factors determining fitewood consumption are shown below with the help of the diagram. The variables in the factor have been selected on the basis of the highest loadings for the particular factor.

Fig-1: Determinants of Firewood Consumption



Source: Explored through Factor Analysis monetary incentive for planting and maintaining trees, sharing knowledge and information with the villagers, creating awareness etc.

The dependency of rural households on fuelwood consumption can not be reduced immediately but it consumption can be reduced by popularizing scientific Chullhas. Improved wood stoves not only raise energy efficiency, typically by 30-50 per cent but also reduce indoor pollution by a factor of 20 to 100, to levels well within WHO guidelines (Anderson, 1996). In the rural areas of Arunachal Pradesh, the improved end-use technologies, which reduce the energy requirement for any given level of energy output, have the potential to reduce pressure on forest. However, this type of techniques should be adopted with special care. For example, the households often find difficulties with this type of stove because certain foods cannot be cooked on it. Thus, it implies that the technology dissemination programes need to pay careful intention to local food and cooking habits. Hence, it is suggested that steps may be taken to renovate the scientific Chullhas to meet the local needs and popularize it among the rural households inorder to save energy.

It was also observed that fuelwood is substantially used for heating purpose in the high altitude area. This is also true that in some parts of the State during winter season the temperature is so cold that it is not possible to survive without any artificial heating. So the Government should explore an alternative to fuelwood for heating purpose in order to reduce substantial deforestation. As the State is having immense potentials for hydro-electric power generation, attempts should make to harnessing full potential for hydro-generation of electricity.

Hence in order to preserve forest, the alternative option as suggested above may be implemented seriously by the State Government. The Ministry of Non-conventional Energy sources (MNES) has initiated a number of programmes in associated with Arunachal Pradesh Energy Development Agency (APEDA) in the State for harnessing the non-conventional sources of energy in the State. However, the progress is not found to be satisfactory and it is only an experimental stage. It should be noted that with small-scattered loads and good availability of renewable energy sources like hydro, solar, bio-fuels etc. the State is ideally suitable

Notes & References:

1. Energy is the ability to work. It stored in various forms including chemical energy in biomass, coal and oil, nuclear energy in uranium, gravitational energy in water used in hydroelectric plants, the wind and the sun energy, etc. there are two ways to account for energy use, viz (i) resource energy

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operations of the industry. Adequate finance is required besides the requirement of fixed and working capital for undertaking the program of extension, reorganization or expansion. In fact, the existing industrial units require substantially large amount of the capital to meet their reconstruction, modernization, expansion and diversification program so also the new industrial project. Finance can be raised through issue of shares, debenture/bond from domestic as well as international capital market and from the wide range of financial institutions. But finance is not free of cost. The suppliers of various sources of funds have a charge on the income of organization, like; dividend for shareholders, interest for bond/ debenture holder, dividend /interest for non-banking financial companies, foreign investors and so on. This charge on each source capital is known as cost of capital.

Cost of capital is regarded as one of the most important factors in the evaluation and comparison of investments to be made by the firm. From a firms perspective cost of capital is an important tool to measure the future financial performance. It determines the acceptability of investments opportunity, providing a rate that may be used to discount the future cash flows accepted for new investments.

Investments decisions are distinct from financing decisions and firms seek to obtain funds from a combination of sources that lowers its overall cost of capital. This involves consideration not only of individual cost of each source of funds, but also how the use of one source would affect the availability and the cost of other source. The optimum capital structure is therefore the combination of financing sources that minimizes the overall cost of capital.

2 Statement of the problem

However, in case of Indian companies the concept of the cost of capital is to some extent has not received much attention over the years. The survey (Prasanna Chandra, 1975) found that concept of cost of capital is misunderstood in Indian economy. Industry like chemical, fertilizer, toothpaste, diversified believed that the calculation of cost of capital is academic and impractical, so they do not consider cost of capital for any of business decisions.

Therefore, the thrust of the present study lies with to see the nature of cost of capital of different industries along with the different firms and its impact on capital structure and on companies' financial performance.

3 Review of literature

A comprehensive review of literature in respect of the parameters pertaining to financial performance, determinants of capital structure and interrelationship between cost

4 Objectives

The major objectives of the study are framed in below

i) To examine the existence or non existence of inter company variation within different sector in respect of cost of capital.

ii) To examine the existence or non existence of inter company variation within different sector in respect cost of equity.

iii) To examine the existence or non existence of inter company variation within different sector in respect cost of debt capital.

iv) To study interrelationship between Cost of capital and variables determining companies performance.

5 Major Hypotheses

€ Cost of capital of different companies within an industrial sector is similar with each other.

€ Costs of equity capital of different companies within an industrial sector are similar with each other.

€ Costs of debt capital of different companies within an industrial sector are similar with each other.

€ Cost of capital is not influenced by size, growth, liquidity, profitability and dividend payout of the companies.

6 Research Methodology

€ **Sampling Designing:** Top 500 companies were selected on the basis of rank of market capitalization as on March 2007. Finally on the basis of availability of comparable data 151 companies included in the study and classified under 13 industrial groups.

€ **Study Period:** The study covers a period of 5 years from the year 2004 to 2008. For the brevity of the analysis and make in comparison of financial data pertaining into individual firm and also maintaining the parity we restrict our analysis for five years.

€ **Collection of Data:** The study based on secondary data. The data mainly collected from Capitalline database 2007 , website entitled to www.indiainfoline.com and annual reports of companies has also been used.

€ **Tools & Techniques:** To analyse the data financial as well as statistical tools has been used. The financial tools like ratio analysis and statistical tools such as average, ANOVA, correlation coefficient and multiple regressions were used. The statistical results were verified by applying t-test, F-test, Z-test in appropriate cases

7. Methodology of Computation Cost of capital:

Following are the steps that are used in evaluating the Cost of capital for the companies taken for study.

*Estimation of the cost of the specific sources of funds. Due to the non availability of data Earning Price method is applied to evaluate a firm can grow only when investors to provide finance to it. For study purpose average value of the capital employed for the period considered.

Profitability: Profitability implies profit-making ability of business unit. Howard (1961) articulated that the term profitability is a combination of two ward profits and ability. Profitability may be defined as the ability of a given investment to earn a return from its use. We used return on net worth (RNW) as determinants of profitability and Geometric Mean of the ratio considered for study period.

Liquidity: Liquidity refers to the ability of a concern to meet its current obligation as and when these become due. Therefore to account for the short-term risk of the firms, liquidity ratio has been included in the models. It is calculated by dividing current assets by current liabilities. Geometric Mean of the current ratio calculated for the study period.

Dividend pay out ratio: - It measures the relationship between the earnings belonging to the ordinary shareholders and the dividend paid to them. Dividend pay out ratio is calculated by using the following formula. DPR= (Equity Dividend/ Adjusted Profit after Tax - Preference Dividend - Dividend Tax) × 100. Geometric Mean of the ratio calculated for the period 2004-2008.

9 Analysis & Findings

9.1 Inter company variation within different sector in respect cost of capital

To study the inter companies variation in respect of cost of capital within the industry we used ANOVA technique. We considered the null hypothesis that there is no significant difference between the overall costs of capital of companies within a particular industry. The calculations were performed for each of industry separately and the result of all such ANOVA is compiled into the table-1.The observed F-values for all the selected industrial sectors were found to be greater than the table values. Therefore the null hypothesis that the cost of capital of firm in an industrial sector is similar was rejected. This implies over all cost of capital of different companies are varying with each other due to variation of nature of industry and different components of cost of capital are not similar.

9.2 Inter company variation within different sector in respect cost of equity

We considered the null hypothesis that there is no significant difference between the costs of equity capital of companies within a particular industry. The calculations were performed for each of industry separately. The result of all such ANOVA is compiled into the table-2. The observed F-values for all the selected industrial sectors statistically significant. But when we classified the data over different industrial group on the basis of nature of industry the table of correlation coefficient shows that the relationship is not specific. The relationship varies because of nature of industry are not same. However in most cases of the sample we have seen capital structure decision is more important for the companies. The result shows that leverage is negatively affected the overall cost of capital of the companies.

Now to confirm the correlation result, multiple regression equation has been fitted taking cost of capital as dependent variable. The results exhibited in table-5.

$Y = x + b_1 \text{size} + b_2 \text{ leverage} + b_3 \text{ liquidity} + b_4 \text{ growth} + b_5 \text{ dividend} + b_6 \text{ profitability}$

Y= cost of capital, an independent variable

From the table-5, it is observed that, leverage becomes the major factor or influential factor of the cost of capital. Except Construction, Electricity, Engineering, Steel, Auto, Personal Care and Financial Service, it has been seen that leverage is negatively related with the cost of capital and statistically significant. It signifies the cost of capital declines with the inclusion of debt capital in the capital structure. The sectors of Construction, Electricity, Steel, Auto group are including almost two times of equity capital in form of borrowed capital in the capital structure. Where as the sector like Engineering and personal care are maintaining least level of borrowed capital in the capital structure resulting into no affect on cost of capital. It implies capital structure decision is playing important role for declining overall cost of capital of the companies. But the companies must have to maintain optimum level of capital structure based on nature of industrial group. On the other hand the relationship with growth, dividend, liquidity and profitability in regard to Indian sample companies are not be confirmed since their beta coefficients are not statistically significant. The regression coefficient of Size and cost of capital is 3.65 implying that there is positive association between the variables. The positive beta value of size implies that the larger Indian firms are not able to use their resources effectively compare to small size companies and possibly not being able to raise funds at cheaper rate by taking the advantage of their large scale funds collection.

It is evident from the above exhibits table a few, not all variables were detected as explanatory for the cost of capital across industrial sectors. Much of this is accountable to the nature of the industry.

Cost of capital and Size

There is no relationship between the cost of capital and size of the companies across industrial sectors. The companies when classified under different industrial group, no relationship has been found in between cost

ii. The components of cost of capital that is cost of equity and cost of debt capital are also varying from company to company and industry to industry.

iii. The study observed among the variables of financial performance; size, leverage and profitability become significant factor of affecting cost of capital. The positive relationship of size and cost of capital implies the Indian larger companies are not able to procure the capital at cheaper cost by taking the advantages of large resources. The negative relationship between cost of capital and leverage signifying that with the increase of leverage (proportion of debt equity capital), the overall cost of capital declining. But the maintenance of optimum level of debt capital is mandatory; otherwise, the excess level of debt capital further leads to increase of overall cost of capital. Whereas the existence of negative relationship between cost of capital and profitability indicating the cost of capital have negative impact on profitability of the companies. With the increase of cost of capital, profit of the companies will automatically fall.

iv. The cost of capital of diversified companies are negatively related with the growth of companies implying cost of capital are declining because of constant growth of companies.

v. The I.T. sector companies cost of capital is negatively related with the dividend whereas dividend is positively related with the cost of capital for finance and investments sector. The positive relationship signifies that the investors have no preference for current dividend in general; rather they prefer future growth of their investment on shares, where as, the negative coefficient of the payout variable suggests that investors have preference for current dividend

vi. In the study liquidity taken as for measuring the risk of the companies from the point of view of shareholders investment concerned. It has been observed in case of energy and cement industries the cost of capital is negatively related with liquidity. It implies less risky companies that is keeping larger amount of funds in form of liquidity able to procure the funds at cheaper cost.

vii. The study observed overall cost of capital has negative impact on the firm's profitability that is with the increase of overall cost of capital the companies' profitability is decreasing. The companies under energy sector with high cost of capital are earning comparatively lower amount of profit whereas companies under chemical and electricity sector earning optimum or satisfactory level of profit because of maintaining a standard level of cost of capital.

11. Conclusion

The overall cost of capital is affected by the designing of capital structure of Indian

Table 2: Result of ANOVA analysis

Industry	F value	$F_{.05}$	No.of companies in the sample
Energy	3.88961	2.258518	12
Computer	2.817856	2.347878	12
Construction	2.940628	1.67895	12
Pharmaceutical	4.205632	2.063541	16
Cement	3.219052	2.591096	10
Electric	2.81652	2.347878	12
Engines	4.725904	2.591096	10
Steel	2.843857	2.119166	15
Auto	5.789304	2.258518	13
Chemical	3.178042	2.456281	11
Personal Care	3.873041	2.99612	8
Finance & Investment	4.782618	2.591096	10
Diversified	3.88961	2.591096	10

Figures in bold indicate significant at 5% level, k = Number of companies

Table 3: Result of ANOVA analysis

Industry	F value	$F_{.05}$	No.of companies in the sample
Energy	3.142905	2.591096	12
Computer	3.111723	2.347878	12
Construction	4.762941	1.67895	12
Pharmaceutical	2.975298	2.063541	16
Cement	4.102752	2.591096	10
Electricity	3.741381	2.347878	12
Engineering	3.289652	2.591096	10
Steel	3.029284	2.119166	15
Auto	3.889273	2.258518	13
Chemical	3.554409	2.456281	11
Personal Care	3.458169	2.99612	8
Finance & Inv.	3.852059	2.591096	10
Diversified	3.142905	2.591096	10

Figures in bold indicate significant at 5% level, k = Number of companies

Table 5: Regression Result: COST OF CAPITAL as dependent variable

Industry	size	leverage	liquidity	growth	dividend	Profitability	R^2	F
Aggregate	3.65* (1.970) [.041]	-.108* (-1.227) [.024]	-.069 (-.810) [.419]	.034 (.418) [.677]	.029 (.346) [.730]	-.490* (-1.061) [.041]	.452	1.334* [.024]
Energy	-.557 (-2.57) [.052]	-.677* (-2.993) [.030]	-.614* (-2.717) [.042]	-.342 (-1.46) [.202]	.121 (.551) [.605]	-.267* (-1.263) [.039]	.834	4.195* [.049]
Computer	-.193 (-.504) [.636]	-.786* (-1.748) [.041]	-.127 (-.406) [.701]	.444 (.869) [.424]	-.581* (-1.798) [.032]	.382 (1.240) [.270]	.616	1.334* [.049]
Construction	.543 (1.634) [.163]	-.603 (-1.656) [.159]	-.154 (-.424) [.690]	-1.041 (-1.97) [.105]	-.545 (-1.522) [.189]	1.134 (2.235) [.076]	.413	1.320 [.449]
Pharmaceutical	.188 (.543) [.600]	-.910* (-2.952) [.016]	-.761 (-2.226) [.053]	.494 (1.530) [.160]	-.148 (-.393) [.704]	.391 (1.275) [.234]	.593	2.189* [.040]
Cement	-.095 (-.287) [.793]	-.701* (-1.791) [.045]	-.408* (-.883) [.042]	-.244 (-.720) [.524]	-.424 (-.806) [.479]	-.129 (-.228) [.834]	.746	1.466* [.036]
Electricity	-.096 (-.332) [.753]	-.082 (-.286) [.788]	.463 (1.491) [.196]	-.094 (-.299) [.777]	.034 (.103) [.922]	-.669* (1.996) [.048]	.617	1.343* [.049]
Engineering	-.116 (-.333) [.761]	-.107 (-.207) [.849]	.462 (1.260) [.297]	-.878 (-2.26) [.108]	-.388 (-.833) [.466]	-.443* (1.438) [.046]	.332	1.492* [.049]
Steel	-.119 (-.356) [.731]	.549 (1.008) [.343]	-.524 (-1.024) [.336]	-.430 (-1.15) [.281]	-.380 (-1.110) [.299]	-.067 (-.174) [.866]	.221	1.379 [.749]
Auto	-.105 (-.310) [.767]	-.535 (-1.736) [.133]	-.577 (-1.277) [.249]	.039 (.101) [.923]	-1.040 (-1.904) [.106]	.417 (.949) [.379]	.523	.997 [.649]
Chemical	.020 (.122) [.909]	-.296* (-1.451) [.042]	-.197 (-1.393) [.236]	-.097 (-.429) [.690]	.271 (1.175) [.305]	-.987** (4.740) [.009]	.732	9.096* [.025]
Personal care	-.519 (-.545) [.682]	-.488 (.722) [.602]	-1.307 (-.586) [.662]	-1.482 (-.769) [.583]	.076 (.056) [.964]	-.255 (-.450) [.731]	.343	.559 [.844]
Finance & Inv.	-.476 (-.563) [.613]	.134 (.296) [.786]	.396 (.392) [.721]	.251 (.292) [.789]	.601* (1.505) [.048]	.080 (.142) [.896]	.421	1.284* [.047]
Diversified	.507 (1.948) [.123]	-.700* (-1.129) [.037]	.985 (1.530) [.201]	-.576* (-2.05) [.039]	-.161 (-.481) [.656]	-.257 (-.861) [.438]	.542	2.395* [.044]

Figures in () indicate t value and figures in [] indicate value at $t_{.05}$