ACADEMIC JOURNAL OF SONARI COLLEGE

Vol.-I, Issue-I June, 2004

SONARI COLLEGE TEACHERS' UNIT
SONARI COLLEGE
Sonari - 785690
Sivasagar, Assam

ACADEMIC JOURNAL OF SONARI COLLEGE

Vol.-I, Issue-I
June, 2004

SONARI COLLEGE TEACHERS' UNIT
SONARI COLLEGE
Sonari - 785690
Sivasagar, Assam

ACADEMIC JOURNAL OF SONARI COLLEGE

CONTENTS ~

BIODIVERSITY OF SILKWORM RACES IN THE NORTH-EASTERN REGION OF INDIA

Dr. Buddhin Gogoi

The North-Eastern Region of India is one of the most focal region of the world having maximum genetic diversity due to its congenial sub-tropical, eco-climatic and geographical position. The region has a distinctive position in the world sericulture map because of its commercial culture of all the four silkworm races namely Muga (Antheraea assama Westwood), Eri (Philosamia ricini Boisduval), Tasar (Antheraea mylitta Drury) and Mulberry (Bombyx mori L.). Among these, golden yellow muga silkworm is found nowhere in the world except in Assam, a state of the North-Eastern Region. It is noteworthy to emphasize that the Region is the homeland of all the wild counterparts of the domesticated forms of silkworms and their various host plants. Moreover, other wild silkworm races are also available in the Region. This has made this Region the most potential for sericultural development in the world.

The paper deals with the distribution pattern, intensity, collection, identification, rearing and evaluation of certain wild silkworm races and the domesticated forms. The findings of this study may help in breeding and conservation of silkworm races in the Region.

INTRODUCTION

The North-Eastern Region of India comprises of 7 states namely Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland and Tripura lies between 21°57′ degree to 29°28′ North latitude and between 89°40′ to 97°55′ East longitude. The total geographical area of the region is 2.55 lakh square kilometre, which is about 8% of India's total area. The physiography of

Acknowledgment : I express my sincere gratitude to Dr. B. C. Goswami, formerly professor and Head, Department of Botany, Guwahati University for his able guidance and valuable suggestions during the tenure of my research work.

the region is divided into three divisions namely Megalaya plateau, the North-East Hills and Basin and the Brahmaputra valley (Borthakur, 1992). The relative humidity in the North-East India rarely goes below 75%. Annual rainfall varies from about 2,000mm to 4,000mm. Altitude ranging from mean sea level to over 5000m. Moreover, the North-Eastern Region is characterised by undulating topography with spread out hills interspersed by fertile plains, inhabited by a large number of ethnic groups with diverse socio-economic features. All these make the region a unique biosphere with vast biological diversity— being included under the tropic centers of diversity of both flora and fauna.

Vivilov, a great scientist, developed the concept of "Geographic centres of variability" also commonly referred to as "Gene centres" or "Vavilov centres". He demarcated Asia as a major centre of genetic diversity in the world. Within Asia, there are four such centres, namely— 1. The Chinese centre, 2. The Indo-Malayan centre, 3. Central Asiatic centre and 4. Indian centre. The North-Eastern region is one of the most important area within the Indian centre. Sources from the Botanical Survey of India report that 10,000 species of plants are found in this region which is equal to 50% of the total flora of the country. Among these vast plant genetic diversity, various flood plants of different wild and domesticated silkworm races are abundantly distributed in the natural habitat of the region. Due to the availability of great number of sericigenous plant species, all the four commercial varieties of silkworm races namely— eri, muga, mulberry and tasar and their wild counterparts are naturally conserved in this region. Among these, muga silkworm culture is a traditional speciality of the people of Brahmaputra valley and some parts of Meghalaya. Eri and mulberry silkworm culture have also got its traditional outfit in the region. Of course, tasar culture is a recent introduction to this region considering the availability of food plant potential. This has given the region a distinctive position in the world sericultural map. Moreover, other silkworm races are also available in the region. This has made this region the most potential place for sericultural development in the world, both from the point of view of research and development because of the genetic diversity obtaining in the region.

Table 1. Silkworm races of the North-Eastern Region

Genus	Species	Local/ English name	Distribution
		I. Muga silkworm races	
Antheraea	assama	domesticated muga	N. E. Region
A.	assama	wild muga	,,
A.	compta	wild muga	,,
A.	helferi	wild muga	,,
		II. Eri silkworm races	
Philosamia	ricini	domesticated eri	,,
P.	cynthia	wild eri	,,
P.	obscura	wild eri	,,
P.	lunuloids	wild eri	,,
		III. Tasar silkworm races	
Antheraes	mylitta	domesticated tasar	,,
A.	frithii	wild tasar	,,
A.	knyvetti	wild tasar	,,
A.	roylei	wild tasar	,,
		IV. Mulberry silkworm races	
Bombyx	mori	domesticated mulberry silkworm	N. E. Region
B.	mori texor	borpat	Assam
B.	mori fortunatus	harupat	Assam
B.	mori arracanensis	burmapolu	N. E. Region
		V. Other silkworm races	
Attacus	atlas	kotkari muga	,,
A.	edwardsi	,,	Meghalaya
Acteas	selene	moon moth	,,
A.	leto	moon moth	,,
Cricula	trifenestrata	Amphutukoni muga	Assam
C.	andrei	,,	,,
Leopa	katinka	-	N. E. Region
L.	anthera	-	,,
Salassa	lola	-	,,
S.	megastica	-	Meghalaya
S.	masosa	-	,,
Caligula	zuleika	-	Khasi Hills
C.	extensa	-	N. E. region
C.	simla	-	Meghalaya
C.	cachara	-	Assam

Theophila	religiosae	-	N. E. Region
Andraca	bipunctata	-	,,
Ocinara	diaphana	-	Meghalaya
Mustilia	phaepara	-	,,

PAST AND PRESENT STATUS OF THE SILKWORM RACES IN THE REGION

B. C. Allen (1899) mentioned seventeen indigenous silkworm varieties of Assam in his monograph on the silk cloths of Assam. According to him, out of these, three silkworm varieties namely Eri (Attacus ricini), Muga (Antheraea assamoea) and Pat (mulberry silkworm) of which there were two kinds : the Borpolu (Bombyx texor) and the horupolu (Bombyx creaesi) were used by that time for production of silk. The Bombyx texor is univoltime and B. creaesi is multivoltine indigenous races.

The area of distribution of Antheraea assama species in wild state extends from eastern Himalayas to Nagaland. Cachar district of Assam and the forest of south Tripura. Other muga species like Antheraea compta, A. helferi are also distributed in wild state in the region. Antheraes mylitta and A. frithii exist in wild state in the forest areas of N. E. region of India. Other tasar species like A. roylei and A. knyvetti are also found wild in the region, various other Saturniid species like Acteas selene, A. lcto, Attacus atlas, A. edwardsi are also abundantly found in the region (Chaudhary, 1981).

Bi and tri-voltine Antheraea assama, A. compta, A. helferi, A. frithii, A. roylei, Acteas selene, bi-voltine Philosamia cynthia, Attacus atlas, A. edwardsi, Bombyx religiosae, B. textor, B. cresae, B. moria, are found in the wild state in the N. E. region of India (Gogoi, 1984).

A number of wild silkworms like Acteas selene, Attacus atlas, wild mulberry silkworm races, wild taser silkworm Antheraea roylei, A. knyvetti are also available in the N. E. region of India (Borthakur, 1992).

The genetic variability among the domesticated races of silkworm is also prominent like that of the wild counterparts mentioned above. Muga silkworm has got three strain namely — yellow, green and blue. Eri silkworm has got 6 strains and 6 eco-races. Domesticated mulberry silkworm have distinctly three eco-races found in the North-Eastern region of India. These are Borpat (Bombyx mori textor) Sarupat (B. mori fortunatus) and Burmapolu (B. mori arracanensis).

The wide variability of the germplasm occurring in the region indicate that the region is a natural home for all the silkworm races. Therefore, there is

greater scope for development of sericultural research in the region including foreign collaboration. Despite tremendous potentialities for development, sericulture remained as an age old cottage industry in the region. The great genetic diversity of the silkworm races of the region has so far been in the oblivion and could not be fully exploited for sericultural research and development.

It is a matter of great concern that due to environmental degradation and other reasons the distribution of the wild silkworm races of the region is declining quickly (Gogoi & Goswami, 1995). After 2/ 3 years of continuous searching, a few cocoons of wild eri, wild muga and wild tasar could be collected for the present investigation from the pockets where it was reported to be available earlier.

COLLECTION, IDENTIFICATION, REARING AND EVALUATION

Some wild type caterpillars were observed in the forest areas under in situ condition in the 5th instar stage on dighloti plants. After spinning of cocoons these were collected in the month of Nov. 1992. After collection it was observed that the pupae inside the cocoons practically hibernated from Nov. 1992 to April 1993 for about 5 months. The insect was identified as Philosamia cynthia after moth emergence. Then normal procedure of rearing was followed as in the case of muga silkworm and reared on dighloti (Litsaea salicifolia) under domestic conditions for four generations. Strict observations were made and the data analysed (Table 2).

Wild muga silkworms were collected from the forest areas in 1994 and rearing was simultaneously conducted with domesticated muga silkworm in domestic conditions, to evaluate the rearing performances (Table 3).

Some dark green coloured wild silkworms were observed in the 5th instar stage on phutuka (Melastoma malabathricm) plant in the forest on 13th Nov. 1994. The cocoons were collected and kept carefully inside the domestic condition. The pupae inside the cocoons practically underwent a period of hiberration for about 5 months. After moth emergence the insect was identified as Antheraea mylitta Drury. The silkworms reared outdoor for 2 generations and rearing performances analysed (Table 4). ❑❑

A COMPARATIVE MOLECULAR ORBITAL STUDY OF CARBON MONOXIDE AND NITRIC OXIDE : A CLASSROOM PROJECT

Anindita Paul, Pankaj Hazarika
Rana Konwar, A. K. Borpuzari & S. N. Rajkhowa

Introduction :

Carbon monoxide, CO and nitric oxide, NO, are two important and versatile ligands in the organometallic chemistry of transition elements[1]. Both of these molecules can bind in monodentate or multidentate fashion to a host of charged and uncharges metal atom. In addition to the complexes containing only nitrosyl and carbonyl ligands[2-4], many mixed carbonyl-nitrosyl complexes are also reported[5]. Although NO has an excess of only one electron compared to CO, yet the molecules differ widely from each other in exhibiting various properties like thermal stability[4], mode of coordination with transition metals[6], polarization[7] etc. The present work includes an attempt to search and justify the reasons for such varied behaviour of these two species through a comparative molecular orbital (MO) study.

Method of Calculation :

Extended Huckel Calculation Program[8], a major revision of the original SIMCON program of R. Hoffmann has been used to carry out the MO calculation. Data for the internal coordinates (bond lengths) are obtained from published literature.

Results and Discussion :

Being heterodiatomic CO and NO belong to the ccco point group. Obviously the molecular orbitals of these molecules have either A type of E type symmetry. The highest occupied molecular orbital (HOMO) and the lowest unoccupied molecular orbital (LUMO) of CO have one electron energies of –13.608ev and –9.763ev respectively with ◁E (HOMO – LUMO) = 3.845ev. The HOMO is

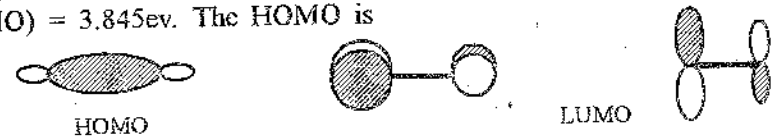

Fig. 1 : Frontier orbitals of Carbon Monoxide

found to be a bonding A_1 type MO while the LUMOs are degenerate antibonding MOs having E_1 summetry (Fig. 1). The HOMO has substantial 's' and 'p' characters while the LUMOs have contributions only from pure 'p' atomic orbitals (AO). The pairing of the electrons in HOMO makes the CO molecule diamagnetic. The frontire orbitals of NO are degenerate, each with one electron energy of –11.223ev. These two antibonding orbitals are of E symmetry and have only 'p' atomic

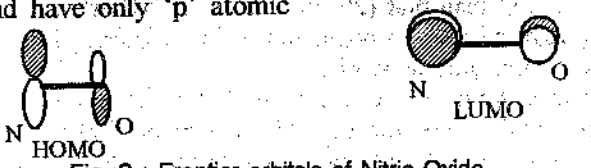

Fig. 2 : Frontier orbitals of Nitric Oxide

orbital character (Fig. 2). The NO molecule is paramagnetic due to the odd electron in its HOMO.

The contributions of carbon atomic orbitals to the two degenerate antibonding molecular orbitals of CO are found to be approximately twice those of oxygen atom (LCAOs 1&2).

ψ^*_2 (CO) = 0.962 p_y (C) – 0.549 p_y (O) —— (1)

ψ^*_3 (CO) = 0.962 p_z (C) – 0.549 p_z (O) —— (2)

This leads to the possibility of more population of electron density towards the carbon atom in comparison to the oxygen atom. This is justified by the fact that the carbon monoxide molecule assumes a peculiar $C^{-\delta+\delta}O$ polarization pattern inspite of the more electronegativity of oxygen atom[7]. The antibonding frontier orbitals of NO also have greater AO contribution from nitrogen than from oxygen (LCAOs 3 &4), although by an extent

ψ^*_2(NO) = 0.882 p_y (N) – 0.688 p_y (O) —— (3)

ψ^*_3(NO) = 0.882 p_z (N) – 0.688 p_z (O) —— (4)

of 12% only. This is thus insufficient to predominate over the -I effect of oxygen.

The carbon-metal (M) bond in corbonyls may be represented as the donation of an electron pair from carbon to the metal, O≡C→M[3]. This pair goes from the bonding HOMO ($\sigma 2p_z$) making the original σ bond weak. A stronger dative π-bond is formed from sideways overlap of a filled d_{xy} orbital on the metal with the empty antibonding $\pi^* 2p_y$ orbital of the carbon. However, these two process are synergic.

In contrast to CO which donates two electrons, NO offten acts as a three electron donor[3]. Thus three CO groups in $[Fe(CO)_5]$ may be replaced by two NO groups giving $[Fe(CO)_2(NO)_2]$. NO also forms stable adducts 9, 10 with complexes of transition metals specially of Fe and Co. The replacement of CO in $[Fe(CO)_5]$ by NO may be assumed due to preferential flow of the odd π electron from the antibonding HOMO of NO to iron 3d orbital, thus making NO more stabilized than CO. The spectral and magnetic studies of a number of typical iron complexes 11, 12 such as $[Fe(CN)_5NO]^2$, $[Fe(H_2O)_5NO]^{2+}$ and $[Fe(NO)\{S_2CN(CH_3)_2\}_2]$ also revealed that nitrosyl bonds formally as NO^+, thus

suggesting a NO → metal flow of elecrton. However, in some complexes viz. $[Co(NH_3)_5NO]^{2+}$ and $[Co(NO)\{S_2CN(C_2H_5)_2\}_2]$, a dative π-bonding is observed[13]. But it causes a profound M-N-O bending which is not observed in M-C-O system.

Unlike CO, which can be used in excess at high temperatures and pressures, NO in excess can cause unfavorable oxidation and at high temperatures and pressures, it decomposes[4]. This indicates the greater bond strength (1072 KJ/ mol)[4] of CO than that (201 KJ/ mol)[4] of NO which is substantiated by the respective reduced overlap population values (ROP_{CO}=1.195 and ROP_{NO}=1.135) calculated in the present work.

NO is found to be unusually stable for other odd electron molecules which are usually very reactive[3]. This may be due to the degeneracy of the frontier orbitals of NO molecule which restricts the pairing of the odd electron of NO with that of another odd electron species through a proper, symmetrically allowed orbital overlap.

Acknowledgement :

We acknowledge Prof. P. K. Gogoi, HOD, Depaartment of Chemistry, DU for his suggestion and inspiration to carry out such a classroom project.

References :

1. R. H. Crabtree, "The Organometallic Chemistry of the Transition Metal", 2nd Ed. JohnWiley & Sons, 1994.
2. F. A. Cotton & G. Wilkinson, "Advanced Inorganic Chemistry", 5th Ed. Wiley E. Ltd.
3. J. D. Lee, "Concise Inorganic Chemistry", ELBS, Chapmann & Hall, 1993
4. J. E. Huheey, E. A. Keiter & R. L. Keiter, "Inorganic Chemistry : Principle of Structure and Reactivity", 4th Ed., Addison-Wesley Pub. Company, 1993.
5. M. F. Guest, I. H. Hillier, M. Vincent, M. Rosi, J. Chem. Soc. Chem. Commun., 1986 (438-439)
6. J. Mason, J. Chem, Soc., Chem. Commun., 1983 (125-126)
7. D. F. Shriva & P. W. Atkins, C. H. Langford, ELBS, Oxford University Press, 1990.
8. C. Mealli & D. M. Proserpio, J. Chem. Education, 1990, 67 (399)
9. G. R. Davies, R. H. B. Mais & P. G. Owston, J. Chem. Soc., Chem., Commun., 1986 (81)
10. P. R. H. Aldermann, P. G. Owston & J. M. Rowe, J. Chem. Soc. (A), 1962 (668)
11. W. L. Jolly, "The Inorganic Chemistry of Nitrogen", W. A. Benzamin Inc., New York, 1964
12. H. B. Gray, I. Bernal & E. Billig, J. Amer. Chem. Soc., 1962, 84 (3404)
13. P. K. Gogoi & R. Konwar, Proc. Nat. Acad. Sci. India, 2003, 73(A), No. 1 (37). ❑❑

DIVISIBILITY AND CONGRUENCIES : APPLICATIONS TO SOME PROBLEMS

Tankeswar Boruah and Muhidhar Chetia

Introduction :

The concept of congruence was first introduced by the great German mathematician Gauss (1777-1855) [1]. His book Disquisitions Arithmetica on number theory was published in 1801. An attempt has been doing to solve some problem with the help of congruencies in connection with division algorithm, Euclidean algorithms [3] applied to Fermate's theorem. Earlier, Sharma [2] discussed some applications of congruencies, some more solution of different problems has been introduced here to extend the applications of divisibility and congruencies.

Preliminaries :

An integer a is said to be divisible by an integer b(≠0) if a=bq for some integer q. (if 5/15 = 15=5×3). The statement that a is divisible by b can be written in any of the following alternative forms :

i) b divides a
ii) b is a divisor of a
iii) b/a
iv) a is a multiple of b

Examples : 1, 2, 3, 4, 6, 9, 12, 18 and 36 are all the divisor of 36.

Theorem 1 :

i) If a/b and b/c then a/c
ii) if a/b and a/c then a/bx + cy for any integers x and y.
iii) If a/b and –a<b<a then b=0

Theorem 2 : Division Algorithm

Suppose a and b are integers a>0, then there exist unique integers q and r ; $0 \leq r < a$ such that b=aq + r

Example : 12 | 77 | 6 , $77 = 12 \times 6 + 5$, $0<5<12$

72

5

Definition :

We say d is the greatest common divisor (ged) if d is the largest of all the integers dividing both a and b and are write d = (a, b)

Examples : Divisors of 4 : 1, –1, 2, –2, 4, –4

Divisors of 6 : 1, –1, 2, –2, 3, –3, 6, –6

d = (4, 6) = 2

Theorem 3 : if a = bq + r then (a,b) = (b, r)

Theorem 4 : The Euclidean Algorothm.

Let a>b both positive integers apply th2 repeatedly as follows

$a = ba_1 + r_1 \quad 0<r_1<b$

$b = r_1a_2 + r_2 \quad 0<r_2<r_1$

$r_1 = r_2a_3 + r_3 \quad 0<r_3<r_2$

.....

.....

$r_{n-2} = r_{n-1}a_n + r_n \quad 0<r_n<r_{n-1}$

$r_{n-1} = r_n a_{n-1} + 0 \quad a>b>r_1>r_2 \ldots\ldots r_{n-1}>r_n>0$

Thus $(a,b) = r_n$

Example : Find g. c. d. of 117 and 45

by th4

45 | 117 | 2 — $117 = 45\times2+27$

90

27 | 45 | 1 — $45 = 27\times1+18$

27

18 | 27 | 1 — $27 = 18\times1+9$

18

9 | 18 | 2 — $18 = 9\times2+0$

18

0

Thus (45, 177) = 9

Congruence :

Let a and b be two integers. If a positive integer m divides a–b then we say that a is congruent to b modulo m.

This is written as $a \equiv b \pmod m$ if m/b–a we say that a and b are congruent (mod m), m is called modulous of the congruence and b is called a residue of a (mod m)

Example : 11/98–65 = $98 \equiv 65 \pmod{11}$

$7=13 \pmod 3 = 3/7–13$

Theorem 5 : a, b, c, d be integers and m a natural number. then.

i) $a \equiv a \pmod m$

ii) If $a \equiv b \pmod m$ then $b \equiv a \pmod m$

iii) If $a \equiv b \pmod m$ and $b \equiv c \pmod m$ then $a \equiv c \pmod m$

iv) If $a \equiv b \pmod m$ then $a+c=b+c \pmod m$ and $ac = bc \pmod m$

v) If $a \equiv b \pmod m$ and $c \equiv d \pmod m$ then $a+c \equiv b+d \pmod m$ and $ac \equiv bd \pmod m$ moreover for any integers x and y. $ax + cy \equiv by + by \pmod m$

vi) If $a \equiv b \pmod m$ therefore any $n\geq1$, $a^n \equiv b^n \pmod m$

Now let us discuss some important related problems.

Problem 1 :

If a natural number is not a multiple of 3 then show that its square is not a multiple of 3.

Solution :

Let n be natural number, suppose that n is not multiple of 3. Then n will leave remainder 1 or 2 when divisible by 3. Accordingly

$n \equiv 1$ or $2 \pmod 3$

if $n \equiv 1 \pmod 3 = n^2 \equiv 1^2 \pmod 3 = n^2 \equiv 1 \pmod 3$

and if $n \equiv 2 \pmod 3 = n^2 \equiv 2^2 \pmod 3 = n^2 \equiv 4 \pmod 3$

$= n^2 \equiv 1 \pmod 3$

Since $4 \equiv 1 \pmod 3$. In both the cases $n^2 \equiv 1 \pmod 3$ that's n^2 leaves remainder 1 when divisible by 3. This show is that n^2 is not a multiple of 3.

Problem 2 :

If a perfect square is divisible by a prime P it must be divisible by P^2

Solution :

a, b are two integers, P is prime if P | ab = P | a or P | b.

Let P | n^2 = P | nn, P is prime

= P | n or P | n

$= P \mid n$
$= P^2 \mid n^2$

Problem 3 :

Prove that non of the integers in the following sequence is a perfect square.

II, III, IIII, ...

Solution :

By Th2 we have

II = 2×4+3, III = 27×4+3 etc —— (a)

each of the terms in the given sequence leaves remainder 3 when divided by 4. Let n be natural numbers then n leaves remainder 0, 1, 2, 3 divided by 4, therefore

$n \equiv 0, 1, 2, 3 \pmod 4$
$= n^2 \equiv 0^2, 1^2, 2^2, 3^2 \pmod 4$
$= n^2 \equiv 0, 1, 4, 9 \pmod 4$ $\{9 \equiv 1 \pmod 4\}$
$= n^2 \equiv 0, 1, 0, 1 \pmod 4$ $\{4 \equiv 0 \pmod 4\}$
$= n^2 \equiv 0, 1 \pmod 4$ —— (b)

Remainder 3 in (a) but 0, 1 in (b). Thus none of the terms in the given sequence is a perfect square.

Problem 4 :

What is the remainder when 3^{287} is divided by 23.

Solution :

We have 287 = 256+16+8+4+2+1

Since $3^2 \equiv 9 \pmod{23} = 3^4 \equiv 81 \equiv -11 \pmod{23}$
$38 \equiv 121 \equiv 6 \pmod{23}$, $3^{16} \equiv 36 \equiv -10 \pmod{23}$
$3^{32} \equiv 100 \equiv 8 \pmod{23}$, $3^{64} \equiv 64 \equiv -5 \pmod{23}$
$3^{128} \equiv 25 \equiv 2 \pmod{23}$, $3^{256} \equiv 4 \pmod{23}$

Now

$3^{287} = 3^{256} \times 3^{16} \times 3^8 \times 3^4 \times 3^2 \times 3$
$\equiv 4 \times (-10) \times 6 \times (-11) \times 9 \times 3 \pmod{23}$
$\equiv 4 \times 6 \times 3 \times 990 \pmod{23}$
$\equiv 24 \times 3 \times 1 \pmod{23}$, $990 \equiv 1 \pmod{23}$
$\equiv 1 \times 3 \times 1 \pmod{23}$
$\equiv 3 \pmod{23}$

Here the required remainder is 3 when divided by 23.

Fermat's Theorem :

Let p be a prime. Then for any integer a, $a^p \equiv a \pmod p$, where a is not a multiple of p.

This imply $p \mid a^p - a$
$= p \mid a(a^{p-1} - 1)$
$= p \mid a$ or $p \mid (a^{p-1} - 1)$, since a is not multiple pf p = p/a
$= p \mid a^{p-1} - 1$
$= a^{p-1} \equiv 1 \pmod p$

Problem 5 :

Prove that $5555^{2222} + 2222^{5555}$ is a multiple of 7 (ie divisible by 7)

Solution :

Dividing both 5555 and 2222 by 7 we have

$5555 \equiv 4 \pmod 7$ and $2222 \equiv 3 \pmod{\text{mode } 7}$

Now

$5555^{2222} \equiv 4^{2222} \pmod 7$
$\equiv (4^6)^{370} \cdot 4^2 \pmod 7$ Since 2222 = 6×370+2
$\equiv 1^{370} \cdot 4^2 \pmod 7$ By Fermat's theorem 7 is prime,
$\equiv 16 \pmod 7$ 4 is not multiple of 7
$\equiv 2 \pmod 7$ $\therefore 4^{7-1} \equiv 1 \pmod 7$
$= 46 \equiv 1 \pmod 7$
since $16 \equiv 2 \pmod 7$

Also from

$2222 \equiv 3 \pmod 7$
$2222^{5555} \equiv 3^{5555} \pmod 7$, By Fermat's Th
$= 2222^{5555} \equiv (3^6)^{925} \cdot 3^5 \pmod 7$ $3^{7-1} \equiv 1 \pmod 7$
$= 1^{925} \cdot 3^5 \pmod 7$ $3^6 = 1 \pmod 7$
$= 3^2 \times 3^2 \pmod 7$ By Th2
$= 2 \times 3 \pmod 7$ 5555 = 6×925+5
$= 6 \pmod 7$
$= 5 \pmod 7$, $12 \equiv 5 \pmod 7$
$7 \equiv 0 \pmod 7$

Therefor we have

$5555^{2222} + 2222^{5555} \equiv 2+5 \pmod 7$
$\equiv 7 \pmod 7$
$\equiv 0 \pmod 7$

Thus remainder is 0 which shows that the given number is divisible by 7.

Problem :

Show that the Fermat number F5 = $2^{2^5} + 1$ is divisively by 641.

Solution :

$2^4 \equiv 16 \pmod{641}$

$2^8 \equiv 256 \pmod{641}$

$2^{16} \equiv 256^2 \equiv 154 \pmod{641}$

$2^{32} \equiv 154^2 \equiv 640 \equiv -1 \pmod{641}$

$= 2^{32} + 1 \equiv 0 \pmod{641}$

$= 2^{2^5} + 1 \equiv 0 \pmod{641}$

This means $2^{2^5} + 1$ is divisible by 641.

Problem 7 :

Since 5 is prime and 2 is not multiple of 5 therefore by Fermat's Theorem

$2^{5-1} \equiv 1 \pmod{5}$

$= 2^4 \equiv 1 \pmod{5}$

$= 2^{400} \equiv 1^{100} \pmod{5}$

$= 2^{400} \equiv 1 \pmod{5}$

2^{400} leaves remainder 1 when divided by 5.

Thus the unit's place digit of the decimal representation of 2^{400} is either 1 or 6 as indicated by (a). Again 2^{400} is even and so the digit in the unit's place is even. Thus the required digit is 6.

References :

1. TELANG S. G. Divisibility, congruencies, number theory, Tata Mc. Graa Hill pub. comp. Ltd. (1996) 3-5, 344-345.
2. Sarma B. K. congruence of integers, Ganit Bikash vol-2 (1997) 50-53
3. Eynden C. V. The Eucliden Algorithm, Elementary Number Theory, The Random House, Math. Series, New York (1987) 18-19
4. DEVASUNDARAM. Mrs. S. Test of Divisibility, Math. Today, Jan. (1989), 19-18.

GLOBAL WARNING ON POLYTHENE AND PLASTICS

Dr. (Mrs.) Jyotima Phukon

In modern era, should the famous scientist Dr. Alexander parkes—inventor of the first synthetic plastic in 1856 be congratulated or rethink ! Since then the superior materials such as epoxies, polycarbonates, teflon, silicons and polysulfones have greatly increased. They have great advantage in creating number of plastics because of their bonding properties and chemical versatility of carbon. Presently, the whole global ecosystem is greatly affected by these varieties of plastics and polythenes. They are established as the most challenging pollutant of environment. Even though pollution could be overcome to some extent through recycling the plastic bags collected from the garbage are not suitable for recycling. If they are process or reprocess cause air pollution. Dias (2003), chief of a factory of manufacturing degradable polythene in Ratmalana was one of the opinion that combustion of polythene produce carbon di-oxide and water and other deadly compounds which affect our atmosphere. Another expert on polythene, namely Shahriar (2003) revealed that combustion of polythene bags destroy the ozone layer, which protect the earth from the harmful ultra-violet rays of the sun causing skin cancer. Without the ozone layer, skin cancer like harmful diseases would break out and all the living civilizations and all species on earth would be in jeopardy. Apart from this, the widespread deposition of plastic bottles and polythenes clog the sewage and drains causing water logging, artificial flood, germination of parasites, water born germs, spread of mosquitoes, destruction of useful plankton etc. and has now become a new threat to health and environment. Sometimes the birds and animals mislead by polythene as food leading to their death also. On the otherhand, it has been observed that polythene not only change the physico-chemical characteristics of water but also block the water body that obstruct the aquatic animals (mainly fishes) to move freely and due to this reason there is delayed development, retardation in reproduction, increased mortality rate, reduction in size, diseases etc.

On a visit to main market in Sonari and other areas this correspondent observed that both shopkeepers and shoppers use the polythene bags openly to sell fish, meat, biscuits, cakes, different types of spices, even cooking oil. People go to the market empty-handed and return home with a number of polythene bags containing goods because it is cheap and easily available. Most people do not know that polythene wrapped fish or meat or other food items produces a kind of heat that generate radiation which ultimately makes the food poisonous. These begs get infected by anaerobic bacteria which causes skin diseases and cancer. In our city more than 250 tones of plastics waste come out in each colony every day. Some poor people burn the polythenes as fuel in the open space for cooking, warming etc. but by doing this they produce hydrogen cyanide and other poisonous gases that pollute air as well as affect health of them.

A country-wide consumer awareness programme should be launched from time to time through media, exhibitions, newsletters, publications, video films, posters etc. to educate the people, environmentalists, trade associations, educational institutions, Govt. etc. In order to prevent plastics & polythenes incentives should be provided by the plastic industry to ragpickers and NGO for increased collection of these waste from public places. Recently, after years of research environmentalists invent the eco-friendly plastics and polythene products. They are biodegradable, can be broken down and dissolves in water and in soil forming a source of manures. Plastic eco-foam loose fill (99% cornstarch) not agents of CFC, natural polymers (PHA) are recent eco-friendly new link. Besides these other plastics is Green sack film made from biodegradable polymers and it is a good compost which enrich the soil. Biopol, another biodegradable plastics and polythene made from cotton seeds and corn starch. These plastics are far better than conventional plastics and polythenes. It can resist rain and bad weather and transparent. Besides these, the fiber of feathers from any bird and commercial chickens which are more absorbent can replace more expansive plastics and fiberglass. The paper, cloth or jute made bags carrying practice can save the environment—our natural greenery, water quality, health, atmosphere etc. in some extent. We should conduct various activities to educate the public about alternatives to non degradable plastics and polythene bags.

Nature does not offer the right to people to destroy it. So, can we think that "in todays lies our tomorrow."

Source :

1. Daily Mirror Online (2003)
2. Parivesh, a newsletter (2003) ❑❑

ENVIRONMENTAL AWARENESS THAT REFLECTED IN SANSKRIT LITERATURE AND PRESENT DAY EDUCATION

Mrs. Ranu Mohan

Our earth is the only planet so far known with an environment necessary for sustainable life. But we have exploited the natural environment to our will. Today we are face to face with a severe environmental crises. The problem of environmental degradation is not limited to any particular country or region; it is global. This global problem is arose as a consequence of the increased industrialisation, deforestation and modernisation of the agriculture under the heads of Green Revolution. The advent of the deterioration and destruction of the environment which include air, water and land requires attention today. Therefore, creating environmental awareness among the citizens is a must in the present day situation and it could be done efficiently in the classroom education.

Now what is 'Awareness about Environment' ? Awareness about environment means to be aware towards the protection of different components of the environment such as plants, animals, air, water, soil etc. Awareness is the most important objective of 'Environmental Education'. It refers to helping individuals and social groups to acquire an awareness of sensitivity to the total environment and its allied problems. It is an attempt to maintain a sound environment in which a sound mind can be created in a sound body.

We know, literature is the reflection of a society. With its help we come to know about the social circumstances and the natural environments of its times. So in the light of Sanskrit Literature, which is a great treasurer of knowledge, we come to know about environmental awareness of the people of ancient times ie. of vedic and classical ages. But certainly we must not treat all these as the textbooks of environmental science in which we find chapter wise information on the environmental problems. The subject-matter of these texts may be religion, medicine, low or literature. In these texts we may not get direct references like "Do not kill animals, killing animals means

killing variety of nature." However we do get references as "Do not kill animals, it may lead to 'Addarm'. Like this we have to unveil the masks by pointing out to the logical reasons behind the vivid references.

In vedic age though the people did not face the problems such as pollution, pollution explosion, imbalance in environmental cycles etc., still they were aware of their environment. Here it is note worthy that man in vedic age treated himself as a part of nature. It is said that with the whole world Jajaya-purusa (a person born from the sacrifice) had created air, water, light, space, various creatures— like horse, goat, cow etc. Along with all these elements of the environment he had created human beings also (Sukla Yajurveda). But here we do not find any special concession given to human beings to surpass or to master the other factor of nature. This natural balance between human life and the surrounding should not be lost. This is the basic requirement for any life to flourish specially for human life. And environmental awareness means that one should be aware of his surroundings or nature so that this surrounding is not disturbed. This natural balance between human life and the surroundings is the key-theme of environmental science of recent years. So also environmental awareness in Sanskrit literature is reflected in many Sutras. They are regarding

1. Description of house construction (A.V. 7-83-1)
2. Selection of land for building a house (AV)
3. Air (AV. iv-5-25.1)
4. Water (AV. vi 9-96-1)
5. Worship of nature (Grhya Sutras)
6. Application of better surroundings (GSs)
7. Cleanliness which is necessary for rituals. (GSc)
8. Close observation of specific aspects of nature; for enriching the rituals (GSs)
9. Observance of Silence (GSs) etc.

Again in Mahabharata we find that Vyasa was very sensitive to nature. He calls upon men to keep environment pure and clean.

In vedic texts water is considered to be a powerful curing substance, a great healer and remedy. So far as awareness regarding water and its utility, preservation etc. are concerned a huge number of references are found in the Vedic literature. The Tai Aranyaka (1-26.5-7) makes a very important mentioning in this regard. It advises everybody not to pass excreta in water. It also prohibits passing of urine in water. Even spitting is strictly forbidden. It says, "napsu mutrapurisam kuryat, na nisthivet, na vivasanah snayat,

gudyo vaesognih" {No one should pass excreta in water, nor should one pass urine, nor even have a nude-bath. It is fire that secretly remains inside (the water)}. Since water is thought to be having fire energy, nude bath in water has been strictly prohibited. Thus it shows in all clear cut terms that they did take some natural precautions to preserve water from pollution. Such example explicitly state about their awareness regarding the preservation as well as knowledge regarding the capacity of water to clean the environmental.

Regarding plan it is not only the supporter of environment, but also serves as the best component of it. Plant is the balancing component of the eco-system. We know that the eco-system in the environment is an inter-depending phenomenon. Nature has fixed certain rules and conditions to maintain the cycles of each component of the environment. Any fluctuation or disturmabce in one component directly or indirectly affects the another one. To maintain the harmony plants were probably created by the creator. This concept that the destruction of plant will lead to the destruction of environment was also understood by the ancient people, may be not scientifically but with some experiences. They were aware to protect the plants and the environment.

Air or wind also plays important role in the environment. The Vedic Rsis recognises air as a vital cosmic constituent and included it in five elements. viz. -

1. Ksiti (earth)
2. Apah (water)
3. Tezah (light)
4. Marut (air) and
5. Vyoma (ether)

according to Vedic Rsts air inherits the intrinsic quality of mentralising pollution.

In this way many references are found in Sanskrit Literature. By examining all these references of environments is needed reflected in this traditional literature. Although the present environmental problems like air pollution, noise pollution etc. are not even touched upon anywhere in this literature, we certainly find that other aspects of environmental science like natural balance protection of trees, forests and animals have been indirectly referred to awareness about environment.

In recent days when everybody talks about environmental development and balancing the shattered eco-system either in terms of scientific programmes or natural process, surprisingly it has been observed from Sanskrit Literature

(as well as grammars) that since time immemorial, people were aware of the importance of environment and its constituents etc.

So, environmental awareness that reflected in Sanskrit Literature should be included in the present day formal educational syllabus in a well planned manner from primary level onwards. It is known to all that to make a change in the society there need a change of human ideas and values and here education plays an important role in this direction. So through formal educational institutions, environmental awareness can be developed among the children of different stages and they can be encouraged to expand environmental education. The creation of awareness of environmental problems and consequences through education is the first and foremost need of to-day.

Sources :

1. Publication of the Centre of Advanced Study in Sanskrit. Class E, No. II, Edited by - V. N. Jha.
2. Environmental Science Education, A. Panneerselvam Mohana Ramakrishnan.

❑❑

ENVIRONMENTAL POLLUTION

Rina Borthakur

What is pollution ? Very simply pollution can be define as the accumulation of something where it is not wanted. This unnecessary accumulation disturbs our environment as well as our human life. In the 19th century in Great Britain, more than 20,000 people killed in 'Cholera'. It was found that Thames river is responsible for the disease. At the same time 'Typhoid' epidemics hit many cities in the United State. Now a days, cancer, birth defects and other disease are also increases. Even the oceans and atmosphere have been effected. These events are not natural, rather they are examples of worldwide pollution.

During the early years of rapid industrial growth, most cities drew drinking water from the same river into which they dumped raw sewage and other municipal wastes, resulting many water born diseases. The ever increasing human population has also reacted other problems as well. Land and other natural resources have been used unwisely. The draining system have disrupted coastal wild life. Housing and other land development is encroaching on many fragile ecosystems. The construction process and increased human population along the coasts have damaged dunes, destroyed stabilizing vegetation, created erosion and displaced wild life. With the growth of industry, waterways suddenly become overloaded with wastes. Though water is the most precious natural resource on the earth, yet pollution began having serious effect on it.

Toxic chemicals are the most harmful of all human waste products. PBC (Polychlorinated Biphenyls) and dioxins are such type of chemicals. It was found that at high levels of depositions of it in the baby, it can cause cancer also.

Most scientists agreed that carbon-dioxide is responsible for global warming. But question arises, is our earth warming ? It is found that average global temperature has risen in the past century by about 1^{0}F. From

probability, it can be said that, at least some of that increase is the result of industrial and agricultural activities.

It is expected that, the average temperature of earth's surface could increase 2°F to 9°F by the year 2050. A few degree increase in temperature will have an enormous impact on the oceans, forests etc. In Antarctica, ice shelves hundreds of feet thick cover the surrounding oceans and help to cool the interior of the continent. If even 10% of Antarctica's ice were to melt, ocean levels around the world would rise 12 to 30 feet. Many coastal cities would be flooded and tiny islands will disappear. Similarly a warming world could effect on forests as well. Forest in Northern Canada, Alaska, Russia could be lost if the climate warms a few degree. The trees would fall victim to increase forest fires or by insect pests.

Ozone, a relatively rare gas can be regarded as both 'bad' gas and 'good' gas simultaneously. Natural ozone is found in the stratosphere (the layer of atmosphere about 6 to 30 miles above the sea levels), where it forms a protective barrier against harmful ultraviolet radiation from the sun. But in the lower atmosphere, ozone is a by product of motor vehicles exhaust, the primary ingredient of photochemical, which is the cause of the watering eyes and burning throats.

Certain chemicals (like halocarbons) is trying to destroy the ozone layers in the stratosphere region, which protects us from ultraviolet radiation. In halocarbon family chlorofluoro carbons (CFCs) and halons are most destructive chemicals. A small amount of CFC or halon pollution can do an immense amount of damage in ozone layers.

In 1985 many industrial nations took part in the Vienna convention for the protection of ozone layers. Several steps were taken for improving the situation of pollution. In 1986 president Ronald Reagan, endorsed 'National Academy of Science', (NAC) as it have taken steps for research program to develop new technology for cleaning coal. But in nations like India, the programs are not necessarily taken, hence our environment is polluted yet. If we not take steps properly, the unseen devil may destroy us.

❑❑

ROLE OF LIBRARY IN HIGHER EDUCATION

Mrs. Bani Devi

Meaning of Higher Education :

According to the Greek philosopher Plato, "Education is the capacity to feel pleasure and pain at the right moment. It develops in the body and in the soul of the pupil all the beauty and all the perfection which he is capable off." Education is a process of change, growth and development. It is a process in and by which the knowledge, character and behaviour of the young are shaped and moulded. It is a tripolar process. The pupil who receives education, the educator or teacher who imported— all these three factors are combined and involved in the process. Education in the wider sense is more than instruction. Education means the process of development from infancy to maturity. It begins and continues till death. It includes all the knowledge and experiences which we acquire through educational institutions home society etc. Education is also an art. The art of education is the skill that is acquired by a teacher through sustained practice in teaching. Moreover education is a philosophy. The process of education are directed towards some goal or end. When we discuss the end and goal of education we are landed in philosophy. According to Herbert Spencer education is a preparation for complete living. It gives necessary knowledge , power and training to face the problems of adult life.

Through the intrinsic meaning of education was remained the same throughout all ages of human civilization its aim was varied with time and place. At different times different philosophers have defined the aim of education from different points of view. Now coming to higher education, we find that though the objectives of higher education should be aligned to the general aim of education, there are variations in ideas regarding the purpose and pattern of higher education. Pandit Jawaharlal Nehru once said that a university should stand for humanism for tolerance, for reason for adventure of ideas and for search for truth. It stands for onward march of

human race for even higher objectives. The Kothari Commission (1966) holds the view that Indian Universities/ Colleges have special responsibilities in the present state of our social and educational development.

The National Policy on Education 1986 (NPE) incorporates the following clauses with regard to the higher education. "Higher education provides people with an opportunity to reflect on the critical social economic, cultural, moral and spiritual issues facing humanity. It contributes to national development through dissemination of specialized knowledge and skills. It is therefore a crucial factor for survival. Being at the apex of the educational pyramid. It was also a key role in producing teachers for the educational system.

In the context of the unprecedented explosion of knowledge, higher education has to become dynamic as never before, constantly entering uncharted areas.

Place of libraries in higher education :

Thus to achieve the aims and objectives of higher education colleges/ universities have to play a major role. To produce good citizens a college or a university must depend not only on well-trained faculties and carefully selected students but also on providing for all members of the college/ university community, easy access to the recorded knowledge which man has accumulated through centuries of experience. So, library is the best agency of higher institution for throwing open his wealth of knowledge for effective use. Library can be described as the heart of the college/ university. It is a means of promoting "communication" and advancement of knowledge. It is an inseparable part of academic programme and institutions. Paul Buck, presented to the followings credo—

(a) The library is the heart of knowledge;

(b) Quality faculty is not possible without a quality library;

(c) Quality education is not possible without a quality library;

(d) A library is vital to proper exploitation of our intellectual resources

(e) A library is essential to maintain free access to ideas and to the functioning of the free mind.

Universities are an integral part of the society. So, universities have a social obligation to solve social, economic and political problems. As a part of university set up a university library exists to serve the objectives of its parent organization. Every library programme must support universities total programme. In other word, a university/ a college library should aim

to advance the functions of its university/ college. A modern university library aims to functions as a dynamic instrument of education. It was significant role to play in the fulfillment of objectives of higher education.

The new values attached to higher education and the reorientation of the university system brought the libraries and librarious into a light hitter to unknown. It was realized that the aims and objectives of higher education are to be achieved quickly and effectively the place of libraries in the university/ college structure has to be reassessed, which cannot be anything else that the "Heart of the University/ College".

Organization of Libraries in College/ University :

Organization means establishment of a formal structure of authority, which is well defined and co-ordinated towards the attainment of specific objectives. The objectives are achieved by the combined efforts of different specialists belonging to the organization. Pattern of library organization varies from library to library. Pattern of organizational system to be followed in a library should be examined from the point of its efficiency. If the aim is to achieve efficiency then the pattern should be a simple one. Librarians and administrator should be aware of those patterns which are expensive as well lead to inadequate services.

The type of organizational system to be chosen would depend upon different factors as given below :

(a) Objectives of library

(b) Types of users served

(c) Nature of documents

(d) Nature of library building

(e) Library personnel

(f) Extent of library automation

(g) Financial support

We may recognizes the following patterns of organization in college and university libraries.

(1) *Functional Arrangement* :- It provides for acquisitions, classification, cataloguing, reference service, circulation and maintenance sections. In addition to these may be periodicals, accounts, administration section, departmental libraries, special reading rooms and collections.

(2) *Subject Arrangement* :- Subject sections are generally open shelf study areas, with stacks adjacent to study areas. Subject departments serve as special libraries for the users. Many libraries adopt divisional pattern where major grouping are the humanities, social science and sciences. In this

approach, it is expected that a senior staff member is made incharge of each of the subject department or division. He should have background in the subject (s) forming field of specialization.

(3) *Arrangement by area* :- Libraries have used arrangement by area or territory in their organizational structure. As for example, Delhi University library system has set up South Campus library to take care of the requirements of students and teachers from South Campus.

(4) *Arrangement by person served* :- It provides organized services to serve different categories of groups.

(5) *Arrangement by materials* :- It leads to following section or departments—

i) Book section
ii) Map section
iii) Periodical section
iv) Film section
v) Govt. publication section etc.

(6) *Centralization Vs Decentralization* : Whether a college or university library should be centralized or not has been continued to be a controversial topic. Teachers are always infavour of complete decentralization. They would like to have everything within their easy approach. But librarians are generally opposed to complete decentralization. It is available to avoid decentralization as far as possible, if resources are limited. From the point of control, it is desirable that all libraries in a university set up should belong to a university library system. The chief librarian should have a complete control over all the libraries belonging to the university. Experience shows that acquisition, cataloguing and classification should be centralizes and service should be decentralized.

Service of Libraries :

A library is a service institution and the college or university library is no exception to it. The nature and efficiency of services provided vary from library to library. With the coming of computer all libraries are in a position to provide a variety of services over a wide range of areas which were not possible previously.

The services provided by a university library are given below :

i) Lending services
ii) Library orientation and bibliographic instruction
iii) Provision of general and specific information
iv) Assistance in the location (searching) of documents or use.

v) Literature search
vi) Reader's advisory service, Selective Dissemination of Information SDI
vii) Compilation of bibliographic, preparation of indexing and abstracting service.
viii) List of additions
ix) Reservation of documents
x) Inter library loan
xi) Holding of library exhibitions including display of new additions in the library.
xii) Maintenance of clipping
xiii) Maintenance of vertical files containing pamphlets like prospectuses, report etc.
xiv) Reprographic service
xv) Translation service

Impact on Research :

A library has a great impact on research programmes. The research scholars are expected to search for information on their own. However in the beginning of their research as well as the stage of writing of their theses they would require greater assistance from reference staff of library. The needs of research scholars and teachers doing advanced research are highly specialized in nature. Theoretically speaking they should be provided with high level services like selective dissemination of information literature search etc. just as done in many of the special libraries. At present some of the universities have appointed full time subject bibliographers to offer scholars to request selected bibliographies on special topics of research. Thus the libraries can be properly utilized for compilation of bibliographies and documentation by he research scholars in their respective fields.

Status of Library Personnel :

Library is a growing organization. The growth may be very well controlled and administered by a competent man in administration. Thus librarians play an important role. There is no doubt that without them, the quality of teaching and research would suffer considerably. He malease an intellectual contribution. He is produce of a higher degree of academic and professional training. Therefore, he should be recognized as an equal partner in the educational process and should get all the facilities which rightly belong to him.

As the library staff holds a pivotal position in the matter of providing

effective service, a well qualified and trained librarian and an adequate number of assistants are required to run the library. A university library is a service institution and the quality of the service depends on the quality and quantity of staff. The library staff could no longer consist of book lifters as they were who could just read the spines of book or clerlas working under the direct on of the university office, library services can develop only when librarians with good academic and professionally qualifications suitable for their jobs are selected and are given proper status in society. They should be treated at per with academic staff for all matters relating to their conditions of work and pay. The UNESCO regional seminar on library development in South Asia held at New Delhi in 1960 suggested that "Librarianship is a profession calling for special training the only way to attract and hold suitable talent for the developing of library services would be by assuring librarians appropriate status and pay. It therefore, follows that the status pay and hierarchy of librarians in academic institutions should correspond to those of the academic staff".

While it is necessary that the staff provided in university library should be properly trained and qualified, it is all the more necessary that the staff sanctioned to work should also be adequate. The member and size of the staff may very and be effected by such factors as the number of students, faculties and other elieutele the library may be expected to serve the size and design of the main library building, the character and condition of the library collection, the number of departmental faculty and institute. Libraries under the control of the main library, the teaching method of the faculty and the number of hours the library is open for service. On the field of higher education libraries must under their services through integration with administrative and educational policies with community state, regional national and international library resources for which adequate financial support and technical co-operation are essential.

Problems of Librarian :

Most of the universities in India still look upon the university library as a section of the general administration and continued to get it administered by the Register of the university. They don't realise the specialised professional nature of the work in a progressive library according to R. P. M. Roy "Typically the librarian of an Indian university feels that he was a second class citizenship status within the university capacities for organization and management. He must have qualifications corresponding to a doctor in library science. But the UGC abolished it. In 1973 the UGC decided to receive the

pay scales of university and college teachers but unfortunately it has not included university and college librarians in the scheme of revision of pay scale. Thus it down graded the librarians in status and pay scales. Which they have enjoyed since 1961. This has naturally created considerable dissatisfaction and frarstration among the librarians of all over the country. Of course at present the UGC is generous enough to treat the librarians equivalent to professors as regards status and pay scale.

Lastly, selection, training and supervision of the staff are among the major responsibilities of the librarian. But often it is found that he is not given absolute authority for selecting his subordinate. If not, he should at least be consulted because good selection is essential for effective library services. just as it is for effective teaching and research.

Conclusion :

From the above discussion it is clear that libraries play a vital role in the attainment of the aims and objectives of a university in the field of higher education. But unfortunately we find that our university libraries have not be able to fulfil their obligations to the objectives of higher education because they have inadequate resources, insufficient financial support and they lack dynamic leadership, too through we have produced stalwarts like Dr. S. R. Ranganathan, Prof. S. Bashiruddin, Mr. B. S. Kesavan and many others. There is lack of co-operation among the libraries. Each library is trying to build up its own collection in isolation of others without establishing channels of communication and co-operation with others. Such attitudes beliefs and convictions must be changed. We must be prepared to shoulder the responsibility that the academic community has assigned to us. Our primary role lies in helping to provide intellectual substance to the vision of a new society. If the society has an obligation to feed, cloths and house the people comfortably, the moral duty of the libraries rest in educating them and to feed them intellectually through its services. The government of India announced a New Education Policy in 1986. But no such policy can succeed fully unless library component of an educational system is strengthened to play its role in the scheme of things. Fortunately there is some indication of the same from the fact that national policy on library and information system finds a mention within the framework of New Education Policy. The major thrust of the new policy is taking education to the disadvantaged sections of the society in the backward hilly and tribal areas. From this is follows that the major trust of Indian libraries should be to give special attention to the need of these section of society. In the field of higher

education libraries must render their services through intregation with administrative and educational policies with community, states, regional, national and international library resources for which adequate financial support and technical co-operation are essential.

A modern college library has a great role to play in higher education consequently, the college librarian should be a good administrator or executive and leader in the library. He was great administrative responsibility in respect of supervision of staff, proper budgeting and expenditure of library funds and maintenance and care of the library building. There is considerable increase in the number of colleges in India since 1947. But only a few of the new colleges have been able to develop and buildup a first rate library. In most of the new college libraries the collections have just growth in size but without a plan. As the library will became living part of the college it will be entirely under the control of the librarian.

At last theoritically speaking the library constitutes the heart of a university/ college. But in our country the picture was and still to same extent is a different. The university librarior/ college librarian must have the qualities of head and heart. His status must be at a per with the professors. Centralization or decentralization of library services depends on local conditions. University or college is a temple of learning. In a university or college library the place of librarian is a very responsible. ❑❑

OF MYTHS, LEGENDS & MYTHOLOGY

Deepanjali Gogoi

Myths and legends are popular the world ever. Infact they form an integral part of the development of the human race. Webster's Dictionary defines Myth as 'A story, presented as historical, dealing with the cosmological and supernatural tradition of a people, their gods, culture, heroes, religion beliefs etc." Legends on the other hand are defined as "An unauthenticated story from early time presented by tradition and popularly thought to be historical." Mythology is the science on study of myths. In the words of C. Rajagopalachari "Mythology is an integral part of religion. It is as necessary for religion and national culture as the skin and skeleton that preserve a fruit with its juice and its taste."

Perhaps myths were own ancestors way of explaining the world around them. Man tried to rationalized the good and evil which befell him. Thus emerged a number of gods, devils and heroes Mythology searches for a plausible answer for the creation of the world, the formation of earth, water and air, about relation between humans and animals, about the origins of crops etc.

Every country has its own rich and varied mythology. African mythology has a number of stories which deal with spirits of the storm. Africa has to face tropical tornadoes which are accompanied by slashing rain, thunder and lightning. Tornadoes though necessary for rain also brought in its wabe a huge amount of destruction. Thus emerged SHANGO, the storm deity of the Yoruba of Nigeria. Legend has it that this deity was once a man. He was a good ruler and doctor but unfortunately tyrannical. He literally breathed fire and killed people. His tyrannical rule was however challenged by two ministers. Shango turned them one against the other, hoping hat both would meet their and in the ensuing struggle. However only one was slain and to escape the wrath of the other shango fled to the forest on horseback accompanied by his three waves and a small loyal group. After wandering

for some time shango hanged himself from a tree at koso.

His death caused a great deal of commotion. His friends had to bear the brunt of his enemies mockery. In retaliation shango's friends sought the advise of a great magician in order to rain fire on their enemies houses. Some say they made fire descend from heaven where as other's believe that they threw small gourds filled with gunpowder on to the roofs during the storms. Shango's followers spread the rumour that the fires proved that shango did 'not hang' (ko-so) and was raining fire as a sign of his displeasure. This called for a sacrifice which in turn led to the construction of a temple. Another version said that shango had ridden off to the forest on a hero. However the search for shango revealed only his horse and a voice from the sky revealed that shango did not hung, but had gone to heaven by a chain and would rule from the sky with the aid of thunder.

Chinese mythology has an interesting story about the introduction of rice. One myth has it that the rice plant existed from the very beginning but its ears were not full. Now people in these days depended for their livelihood on hunting and gathering. The goddess Guan Yin observant about the hardship caused to the people decided to secretly lend a helping hand. She visited the rice fields and squeezed her breasts and filled milk in the ears of the rice plant. She succeeded in her task but her endeavour required her to press so hard that a mixture of milk and blood flowed into the rice plants. Thus it is believed that two varieties of rice emerged, the write from milk and red from milk and blood.

In Anglo-Saxon England there exists the myth of a fiery dragon. This dragon dwelled in the grave mound and guarded the treasure buried with the dead. In part II of the famous poem BEOWULF, such a dragon angered by the loss of a rich cup attached the people by dropping fire on their houses. Ultimately Beowulf the old king had to deliver the people from the dragon. Inspite of having a premonition of death Beowulf bought with the fire dark. In this fire Beowulf wrapped in fire and smoke, helped by wiglaf. Beowulf succeeded in overpowering the drag on but the fire entered his lungs, resulting in his heroic end.

One African legend has the story of the Golden Stool. Stools were traditional seats and symbols sometimes stools were highly carved out of one block of wood. In the 18th C, OS ai Tutu. (4th king of Ashanti) transformed his people into a great nation. They had been subordinated by a neighbouring kingdom, whose ruler had a clansman called Amotchi. Amotchi incurred the wrath of his rular and fled. In time he studied medicine and magic and

become a great doctor. He said that Nyame, the supreme god had given him the mission to transform Ashanti into a grate race. Amotchi went to Osai Tutu and using his magical prowess brought down from the sky enclosed in a black cloud and accompanied by thunder and dust, a gold .... wooden stool. The stool rested on the kings knees and he in turn had four bells made to hang on each side of the stool. Amotchi declared that the stool was the protector of the health and welfare of the Ashanti people, Amotchi took a few hairs and parings from the forefinger nails of the king, queen and chief and converted them into magical powder. A part of this was drunk and a part buried on the stool Amotchi revealed that the stool must not be sat upon. Only on exceptional occasion the king might pretend to sit on it, three times and rest his arm on it. The stool was carried in procession once a year under umbrellas. The Ashanti rooted their oppressors. It was believed that the king was sitting playing WAR (mankala, a popular African game) with one of his wives, we worn gold chain on his wrists when the Ashanti soldiers bust in and executed the royal couple. The golden chains worn by the king soon adorned the golden stool.

When the British attacked Ashanti in 1896, they submitted fearing the destruction of the stool. However the British unaware of the legend of the stool demanded to sit on it. This resulted in a 2nd was in which the stool disappeared only to reappean years later in 1921. Later, greedy people who tried to sell the golden ornaments attached to the stool. This often led to a revolution. The significance of the golden stool was realised and it was restored to the royal palace at Kumagi where it still remains.

Thus myths and legends reveal detailed concepts of man in relation to the world. Stories of animals, human sacrifice and cruelties of god and supernatural powers comprise the enchanting world of mythology. ❑❑

ড° বাণীকান্ত কাকতি ঃ ভাষা শৈলী আৰু সাহিত্যিক সুষমা

ৰঘুনাথ কাগ্‌য়ুং

সাহিত্য জাতিৰ সপোন। ভাষা হ'ল সাহিত্যৰ জন্ম পত্রিকা। সাহিত্য অবিহনে কোনো এটা জাতি বর্তি থাকিব নোৱাৰে। সাহিত্য বিহীন জাতিক কোনেও জাতি হিচাবে স্বীকৃতি নিদিয়ে। যি জাতিৰ এখন সুস্থ-সবল সাহিত্য আছে সেই জাতিক সকলো জাতিয়েই শ্রদ্ধা আৰু সন্মান কৰে। কিন্তু অকল সুস্থ-সবল সাহিত্য হ'লেই নহ'ব, এই সাহিত্য হ'ব লাগিব সু-সংবদ্ধ আৰু বিজ্ঞানসন্মত। সু-সংবদ্ধ আৰু বিজ্ঞানসন্মত সাহিত্যতহে কোনো এটা জাতিৰ প্রকৃত প্রতিবিম্ব প্রতিফলিত হয় আৰু তেনে সাহিত্যইহে প্রকৃত সাহিত্যৰ মর্য্যদা লাভ কৰে।

অসমীয়া ভাষা ইন্দো-ইউৰোপীয় (Indo European) ভাষা গোষ্ঠীৰ নব্য ভাৰতীয় আর্য্য (New Indo Aryan) ভাষা পৰিয়ালৰ এটা ঠাল। চতুর্থ শতিকাতে মুক্ত অবাৰিতভাৱে ববলৈ আৰম্ভ কৰা অসমীয়া ভাষাই যদিও সপ্তদশ শতিকাতে অভিনৱ ৰূপ ধাৰণ কৰে, তথাপিও, বৈজ্ঞানিক দৃষ্টি-ভংগীৰে এটি উন্নত ভাষাৰ মূল্যাংকন আৰু স্বতন্ত্রতা দান কৰে "Assamese its Formation and Development" নামৰ গৱেষণা গ্রন্থখনৰ দ্বাৰা ড° বাণীকান্ত কাকতিদেৱে। অসমীয়া ভাষাৰ মূল্যাংকন নিৰূপনত এই গ্রন্থখনেই যথেষ্ট ইন্ধন যোগায়। সেয়ে কালিফর্নিয়া বিশ্ববিদ্যালয়ৰ অধ্যাপক ভাষাতাত্বিক ড° এম. বি. এমেনুৱে "This is an important book in Indo Aryan Comparative and Historical Grammer" বুলি গ্রন্থখন বাৰ্কলিৰ পৰা প্রকাশিত আমেৰিকাৰ ভাষাতত্ব সমাজৰ মুখপাত্র Languageত (১৯৪২) প্রশংসা কৰিছে।

১৮৯৪ চনত ৰবপেটা জিলাৰ বাটিকুৰিহা গাঁৱত জন্ম গ্রহণ কৰা ড° বাণীকান্ত কাকতি আছিল একেধাৰে কবি, সাহিত্যিক, প্রবন্ধকাৰ, সমালোচক, মেধাবী ছাত্র, ভাষাবিদ আৰু নীৰৱ সাধক। কোনো এটা সাহিত্যৰ বিশাল প্রতিভূ বিকাশ পায় সাহিত্যিকজনৰ সাহিত্যৰ উপাদান বা সমলবোৰৰ সুসংহত আৰু সুসংবদ্ধ প্রয়োগৰ ওপৰত। সাহিত্যৰ সমল বা উপাদান বা ভাষাৰ ওপৰত আনহাতে প্রধানকৈ নির্ভৰ কৰে সাহিত্যিকজনৰ সাহিত্যিক সৌন্দর্য্য। ড° বাণীকান্ত কাকতিৰ সাহিত্যিক ভাষা আৰু সাহিত্যিক সৌন্দর্য্যৰ আভাষ দিয়াৰ ই এটি প্রয়াস।

ড° কাকতি প্রধানতঃ সাহিত্য সমালোচক ৰূপে চিৰ পৰিচিত। কান খোৱা, শ্রীৰাধা চৰিত্র, শংকৰদেৱৰ আধ্যাত্মিক দান আৰু বধ কাব্য আদি প্রবন্ধত তেওঁৰ ভাষাৰীতিৰ স্বকীয়তা আমি দেখিবলৈ

[illegible] থকা বাবে শাৰদীয় বাতি জোনাকৰ স্নিগ্ধতা আৰু সুন্দৰতা যি দৰে [illegible] হয়, সিদৰে উজ্জীবিত হয় প্রতিটো নিবন্ধত ড° বাণীকান্ত কাকতিৰ নিজস্বতা আৰু ব্যক্তিত্ব। [illegible] বহু কেইখন পুথি সমালোচনা কৰি ড° কাকতিয়ে নিজস্ব প্রতিভা বিকশাই তুলিছিল। [illegible] সমালোচকসকলৰ তুলনাত তেওঁৰ সমালোচনাৰ ধাৰা কিছু সুকীয়া।

স্বদেশীয় ভাষাপ্রীতি তেওঁৰ নিবন্ধৰ অন্যতম উত্তম চানেকি। তেওঁ যি দৰে সুদূৰ সাত [illegible] দেশৰ নদীৰ সিপাৰৰ ইংৰাজ কবি কীট্‌ছৰ কাব্যপ্রতিভাৰ গুণ-গৰিমা গাইছে, সেইদৰে স্বদেশীয় [illegible] কবি বদনাথ চৌধাৰীৰ কাব্য কৌশলীৰ প্রসংশাতো পঞ্চমুখ। নিশাদূত, জাতীয় চৈতন্য, কবিৰ [illegible] প্রীতি আদি প্রবন্ধবোৰ ড° কাকতিৰ স্বদেশীয় ভাষা প্রীতিৰেই সমাহাৰ মাথোন। বিদেশী [illegible] কবি-মহাৰথীসকলৰ লগত স্বদেশী সাহিত্যৰ কাণ্ডাৰীসকলক তুলনা কৰি ড° কাকতিয়ে [illegible] ভাষা প্রীতিৰেই নিদর্শন দাঙি ধৰিলে। একেদৰেই ইটালীৰ কবি ডান্টেৰ লগত স্বদেশীয় [illegible] কবি চণ্ডী দাসক তুলনা কৰি স্বদেশী ভাষা প্রীতিৰেই (স্বদেশীয় বোলোতে সমগ্র [illegible] কৰা হৈছে) অপূর্ব চানেকি দেখুৱালে আৰু এইখিনিতে ড° বাণীকান্ত কাকতিৰ হৃদয়-[illegible] আৰু সাহিত্যিক সৌন্দর্যৰ সমাগ দেখা যায়।

[illegible] ভাল নিবন্ধকাৰৰ বা সমালোচকৰ কৃতিত্বৰ অন্যতম প্রধান আহিলা হ'ল প্রকাশিকা [illegible] সুস্পষ্ট ভাষা ৰীতি। এজন নিবন্ধকাৰৰ বাবে যিমানবোৰ গুণ আৰু দক্ষতাৰ আৱশ্যক সেই [illegible] গুণ আৰু দক্ষতা ড° বাণীকান্ত কাকতিৰ চিৰ বিদ্যমান আৰু ইয়াৰ বাস্তব চানেকি দেখা যায় [illegible] প্রবন্ধবোৰ, নাৰী হৃদয়, দহিকতৰা আৰু ফুলৰ শৰাই আদি নিবন্ধবোৰত। তেওঁ আছিল [illegible] পৰা মেধাবী আৰু তীক্ষ্ণ বুদ্ধিসম্পন্ন, একান্তপতীয়া আৰু আশাশুধীয়া নীৰৱ সাধনাৰে [illegible] জ্ঞানান্বেষী বাণীকান্তই এজন যোগ্য আৰু বহুমুখী প্রতিভাৰ আকৰ স্বৰূপে নিজকে [illegible] সক্ষম হৈছিল।

[illegible] বিভিন্ন প্রবন্ধত ভাষা নৈপুন্য ফুটি উঠা পৰিলক্ষিত হয়। বেজবৰুৱা, কেতেকী, [illegible] কেতেকী প্রেমিক প্রবন্ধবোৰৰ ভাষা সহজ-সবল আৰু সাধাৰণ ঘৰুৱা ভাষাৰে পৰিপূর্ণ। গদ্য [illegible] উপমাৰ ব্যৱহাৰে তেওঁৰ প্রবন্ধবোৰ সোণত সুৰগা চৰাইছে। সংযত আৰু সংহত [illegible] সাহিত্যিক সৌন্দর্য প্রদানত যথেষ্ট ইন্ধন যোগাইছে। সুসংহত আৰু সুসংযত উপমাৰ [illegible] পাঠকৰ মন পুলকিত কৰি তুলিছে।

"হিমালয়ৰ নিভৃত-শংগৰ ওপৰত স্তূপীকৃত হৈ থকা অনন্ত তুহিন ৰাশিয়েই গলি গৈ [illegible] নদ-নদী ৰূপে অৱতীর্ণ হোৱাৰ দৰে এই তিনিও ধাৰাৰেই মূল কাৰণ হৈছে মাধৱদেৱৰ [illegible] ভক্তিৰ গভীৰ আবেগ।" (নামঘোষা)

বিশাল সমুদ্রৰ জলৰাশি সুৰুযৰ কিৰণত যিদৰে চমৎকৃত হয় সেইদৰে, প্রাণ-প্রাচুর্য্যপূর্ণ [illegible] প্রয়োগৰ ফলশ্রুতিটো বাণীকান্তৰ প্রবন্ধবোৰ মূর্তমান হয়। "কবিৰ অহৈতুকী প্রীতি"ত উপমা [illegible] ড° বাণীকান্ত কাকতিয়ে এপলক সতৃষ্ণ নয়নে ইটালিলৈ চাইছে ....।

"মৰুভূমিৰ তপত বালিৰ তলত বৈ থকা পানীৰ দৰে উত্তপ্ত পাষাণ ৰাশিৰ অন্তঃস্রোত

নিজৰাৰ দৰে মধ্যযুগৰ বিদগ্ধ পণ্ডিত আৰু ৰাজনীতিত আগৰণুৱা ডাণ্টেৰ কঠোৰ দৈনন্দিন জীৱনৰ ভিতৰেদি বিয়েট্ৰীচপ্ৰেম তেওঁৰ ন-বছৰ বয়সৰ পৰা আৰম্ভ কৰি ১৩২৯ খ্ৰীষ্টাব্দৰ তেওঁৰ মৰণলৈকে ৪৭ বছৰ কাল পাতালী গংগাৰ দৰে সঞ্জীৱনী শক্তিৰূপে বৈ আছিল।"

ড° বাণীকান্ত কাকতিৰ ভাষাৰ অন্যতম বৈশিষ্ট্য হ'ল— ৰূপকৰ ব্যৱহাৰ। তেওঁৰ কিছুমান প্ৰবন্ধত ৰূপকৰ সঘন প্ৰয়োগ দেখা যায়। ৰূপকৰ সঘন প্ৰয়োগৰ ফলত প্ৰবন্ধবোৰৰ গভীৰতা উপলব্ধি কৰাত পাঠকক যথেষ্ট ইন্ধন যোগায়। শ্ৰীকৃষ্ণৰ সঘন আগমনে পাণ্ডবৰ ৰাজসভা যিদৰে গাম্ভীৰ্য আৰু সৌষ্ঠৱতা দান কৰে একেদৰেই ৰূপকৰ সঘন প্ৰয়োগেও বাণীকান্তৰ প্ৰবন্ধবোৰ প্ৰদান কৰিছে অভিনৱ সৌন্দৰ্য আৰু সীমাহীন স্নিগ্ধতা।

"গোটেই কবিতাটো জোনাকী নিশাৰ আকাশী পৰীৰ লীলা-খেলা যেন লাগে।" (কুমাৰ হৰণ)

তুমি কাব্য বিৰাট ভাৱৰ খলকনি এটাৰ পৰা ওলাইছে, ইয়াৰ সকলো ছেদতে আশ্চৰ্য তন্ময়তাৰ ভাৱ শিলৰ ওপৰেদি তৰিৎ গতিত ছিটিকি পৰা জলপ্ৰপাতৰ তৰংগ-ভংগৰ দৰে দশাক্ষৰী ক্ষিপ্ৰ গতিত ছুটি পদবোৰ অনুভূতিৰ তীব্ৰতা বিচিত্ৰ সৌন্দৰ্যময়ী ভাষাৰে প্ৰকাশ কৰিছে।" (তুমি)

ড° কাকতিৰ শ্ৰুতিমধুৰ ৰূপকৰ সঘন প্ৰয়োগে পাঠকৰ মনত ভাৱৰ খলকনি তুলে; আৰু এইখিনিতে সাহিত্যিক সৌন্দৰ্য ড° কাকতিৰ ঘনীভূত হোৱা দেখা যায়।

ড° বাণীকান্ত কাকতিৰ ভাষা সাবলীল আৰু প্ৰকাশপূৰ্ণ। অৱশ্যে কিছু ক্ষেত্ৰত তেওঁ কল্পনাপ্ৰসু .... (Imaginative) নাম মাহাত্ম্য, তুলসী দাস, বৰ্ণীত আৰু সাহিত্যত কৰুণ ৰস আদি প্ৰকাশপূৰ্ণ সাহিত্যিক সৌন্দৰ্যৰ সাক্ষ্য দেখা যায়।

ড° কাকতিৰ অন্য এটি ভাষাৰ বৈশিষ্ট্য হ'ল— কাব্যসুলভ গদ্যৰ প্ৰয়োগ— যাক ইংৰাজীত Poetical Prose বোলা হয়। তেওঁৰ কাব্যসুলভ গদ্যৰ প্ৰয়োগ শ্ৰুতিমধুৰ আৰু চিত্তাকৰ্ষক। যাৰ ফলত পাঠকৰ সৃষ্টি হয় গভীৰ আগ্ৰহ (Eternal Interest)

"কুমাৰ হৰণৰ উষাৰ সপোন টোপনিত দেখা ৰসময়ী আদৰ্শৰ প্ৰতি হেঁপাহ মাথোন।" (কুমাৰ হৰণ)

অতি আশ্চৰ্যজনক, জঁতুৱা ঠাচ ব্যৱহাৰ নকৰিও ড° বাণীকান্ত কাকতিৰ প্ৰবন্ধবোৰৰ গাম্ভীৰ্য আৰু ৰমনীয়তা ম্লান হোৱা নাই। ড° কাকতিৰ তত্ত্বগধুৰ, চিত্তাকৰ্ষক আৰু মননশীল "পুৰণি অসমীয়া সাহিত্য", "নতুন অসমীয়া সাহিত্য", "কলিতা জাতিৰ ইতিবৃত্ত", "সাহিত্য আৰু প্ৰেম", "পখিলা" আৰু "প্ৰাচীন কামৰূপৰ ধৰ্মৰ ধাৰা" পুথি আৰু গধুৰ প্ৰবন্ধসমূহত সাহিত্যিক সৌন্দৰ্য ঘনীভূত হোৱা দেখা যায়। মুঠৰ ওপৰত জঁতুৱা ঠাচৰ বাহিৰে সাহিত্যৰ অধিকাংশ উপাদানেই ড° বাণীকান্ত কাকতিৰ ৰচনাসমূহত দেখা যায়। নানা সাহিত্যিক সৌন্দৰ্যৰ সুষমাৰে আবৃত্ত ড° বাণীকান্ত কাকতিৰ দেহাবসানত (১৯৫২ চনৰ ১৫ নবেম্বৰ) অতি মৰ্মাহত হৈ অসমৰ এজন বিদগ্ধ বুৰঞ্জীবিদ তথা সাহিত্যিক ড° সূৰ্যকুমাৰ ভূঞাই শিশুৰ দৰে উচুপিছিল— "তেওঁৰ মৃত্যুত মই এজন বন্ধুহে হেৰুৱালো, কিন্তু অসমে এজন ডাঙৰ পণ্ডিত আৰু অসমীয়া সংস্কৃতি সভ্যতাৰ দূত হেৰুৱালে, ভাৰতে এজন ডাঙৰ শব্দতত্ত্ববিদ আৰু জগতে এজন একনিষ্ঠ সাহিত্যসেৱী আৰু বিদ্বান হেৰুৱালে।" ❑❑

ROLE OF NGOs IN EMPOWERMENT OF RURAL WOMEN THROUGH SHGs IN ASSAM

(with special reference to Sivasagar District)

Paranan Konwar

Abstract

A study was conducted among SHGs formed by a leading NGO to asses the woman empowerment. The study revealed the increase in economic, political, social and psychological empowerment of women. But there were various problems confronted by women of Assam on their way of empowerment which must be solved by the SHGs themselves, the NGOs and our government. Besides, after studying the present scenario of women of Assam it was found that women of Assam were lagging far behind as compared to men in case of empowerment.

Introduction :

A woman is not only viewed as a person in her own right but is always viewed as some one's daughter, wife or mother. Specially, so far as problem of society is concerned, a rural woman not only fight for her own rights but also for the survival of her family and her society. Now, rural women are mobilized into groups that provides the women a base for self employment, empowerment and mutual benefits through group activities. In our country, these mutual help based groups are known as Self Help Group (SHGs) initiated some of them by Non-Governmental Organization (NGOs).

By the term SHG as approved by National Bank for Agriculture and Rural Development (NABARD), we mean "..... a small economically homogeneous and affinity group of rural poor, voluntarily formed to save and mutually agree to contribute to a common fund to be lent to its members as per group decision."

According to Mayoux (1998), "empowerment is a continuous

process where powerless people become conscious of their situation and organize to improve it and access opportunities: an outcome when women take control over lives; set their own agenda; gain skills; solve problems; develop self reliance." Here by empowerment we mean - economic, political, social and psychological empowerment of rural women of Assam. Because, empowerment in rural sense, not only means increase in income but also means the upliftment of their social dignity, participation in politics and become psychologically worthful in our society.

NGOs, part of civic society, play an important role in empowering women in collaboration with the Govt. departments, agencies and personnel in addition to their own innovative programms. Now, the existing NGOs in Assam have taken initiatives for setting up SHGs, consisting each of 15-20 members, among women so that they can work on a range of issues such as health, nutrition, agriculture, social awareness, environment and pollution, forestry or besides income generating activities and seeking micro-credit.

Methodology :

The study was conducted in three blocks of Sivasagar District. The name of the NGO was Santi Sadhana Ashram, under which there 190 SHGs. Total number of male and female members were 2335. Female was 944 and male was 1391. Percentage of female was 40.43%. It is notewarty that there was 102 independent female SHGs. The data were collected by using questionnaire, Focus Group Discussion (FGD), Participatory Rural Approval (PRA) technique and secondary sources which were later statistically and discussed.

Objectives :

The specific objectives of the study were -

1. To assess the performance of NGOs through SHGs in empowerment of women.
2. To identify the problems and suggest the remedial measures.

Findings & Problems : The main findings of the study were as follows

A. Non-Financial Indications :

1. Coverage of poor was 70%.
2. Married women were 60%.
3. 0.68% women were SC.

3.13% women were ST.

99.19% women were OBC.

4. 2% were illiterate. But they were made literate within 2 months by the members of the concerned SHGs.
5. Though Govt. insisted upon holding meeting weekly, the SHGs used to hold meeting monthly. Attendance on meeting was 100%.
6. Attendance on activities was 70%.
7. It was reported that whole loan system was politicalised. Bank and Govt. gave more interest to that SHGs which were formed by Govt. block i.e. Block Groups were influenced by political leaders & parties. Whereas SHGs formed by NGOs were deprived of them. In case of NGOs groups they took bribe.
8. Party-wise classification was made by government authority among the SHGs in case providing Govt. facilities.
9. There was dearth of knowledge among the SHGs about the various Govt. Schemes and Govt. departments i.e. which department did which work.
10. Lack of irrigation in village areas.
11. Mahajans (the rich person) systems were prevailing in the rural areas from whom the poor people borrow money at the time of emergency. So the SHGs were facing competition with the Mahajans in business and lending loans.
12. Easy money system was prevailing in the minds of members of the SHGs.
13. Sometime somewhere Govt. Bank provided loans under some schemes. But there were no suggestion how to use; no enquiry about rawmaterials and market centers and no training to the SHGs.
14. Lack of communication and transport facilities and storage system. No permanent shop in market center.
15. They did not participate in exhibition due to low quality of their own product.
16. Increase in tendency towards pocket NGOs i.e. NGOs those were money oriented not service oriented.

B. Financial Indications :

1. Rate of Interest was 3% to 5% per month for lending loans among the members.
2. Rate of Interest was 6% to 10% per month for lending loan to the

outsiders.

3. Maximum of loan 5000/- for 6 months.
4. 98% of total account were in Laxmi Gaonlia Bank; only 2% were in SBI.
5. Repayment was regular in case of loan provided by SHGs to own members. Sometime they faced problems while lending loans to outsiders in case of payments.
6. There was lot of misuse of Revolving Fund provided by Bank to BPL SHGs. As no interest was to be paid to the bank; so, it was misunderstanding among the SHGs that revolving fund was just a grant. Hence the members of any SHGs shared it among them and did not refund it to the bank, though it was refundable. This case was also backed by political leaders.
7. 90% of earning income came from interest. The remaining 10% from other income generating activities.
8. No new innovative income generating sources. There income generating sources were traditional, such as rearing poultry, mushroom cultivation, pickle business, bee keeping, cabbage and wheat cultivation, rearing Muga etc.

Prospects :

Economic empowerment : From the finding it was seen that income of member women increased to a great extent. They were satisfied with their earning using them for their family.

Social Empowerment : As women became economically sound like men, their social dignity raised. Windows were no longer stunned as inauspicious and considered as weak. Men also worked under the female. Woman used to enter and handle all activities where man could. In case of wearing traditional dress; restrictions were almost lifted at the time of working. Woman become confident, they used to interfere in Govt. activities where they saw illegality and misuse; and they solemanded their dues approaching to concerned authority. They become informative signess almost removed and smartness started. Environment of business was going to be created among rural woman.

Political Empowerment : The few women of SHGs extended their candidature in Panchayat Election.

Psychological Empowerment : Women were no long 'worthless' in our society. They could claim anything as individuals. They came to

[illegible] right and had a range of contraceptive choices.

[illegible] :

Before providing loan, Govt. agency should provide proper guidelines of the concerned scheme and train the beneficiaries and give information about rawmaterials and market centers.

For acquiring business motive and further knowledge Govt. and NGOs should take initiative to take the beneficiaries for foreign and outside tours.

Reduce hesitation among Assamese people to involve in business.

Enhance the habit of doing cooperative business

Arrange special awarness programme by the NGOs among SHGs to aware aboutvarious Govt. schemes and Govt. departments and translating the Govt. schemes into Assamese distribute among them.

Further exploration is needed for incorporating new avenues for better credit absorption where fund rotation is poor.

A habit of timely repayment should be inculcated by holding group discussion.

Think for new and innovative income generating source.

To plan a positive interventionist role in the empowerment of women.

To widen the excess of women in programmes of vocational and technical education.

To provide distance education to rural women.

The possible means to proper women rights awarness programme and education.

There is need to establish an information agency like Environmental Information System in villages.

Conclusion :

Since independence, a good number of innovative schemes have been launched for the upliftment and empowerment of women in Assam. All should be properly implemented. Govt. should follow the motto of "Right schemes on right persons on right time". Success stories spearheaded by women throughout our state should be identified by our media to prove that women who are poor in money terms need not necessarily be poor in terms of capacity for initiating change. We should remember that

women's empowerment and their full participation on the basis of equality in all spheres of society are fundamental for the achievement of equality development and peace. To quote Swami Vivekananda - "a nation would not march forward if the women are left behind."

Reference :

i. Indian Research Journal of Extension Education, 2002, vol. 2, No. 1
ii. Financing Agriculture, 2002, vol. 34.
iii. Kurukshetra, Sep. 2000, Aug. 1995, Oct. 1999.
iv. Yojana, Sep. 2000.
v. Preface to the Platform for Action, Fourth World Conference on Women, Beijing, 1995.
vi. PM's speech at the 6th meeting of Commonwealth Ministers Responsible for Women's Affairs, April 17, 2000.
vii. Mayoux, S, 1998. The Ethics of Development for Women, Development Bulletin.

APPENDIX - I

(Some indicators showing women empowerment in India.)

* In India, almost twice as many girls die before the age of five than boys.
* TFR (Total Fertility Rate) is 2.9 birth per female (in 1998-99) against the standard rate 2.1 [National Family Health Survey II]
  a) BIMARU states (Bihar, Madhya Pradesh, Rajasthan, Uttar Pradesh) have high TFR.
  b) Muslim females registered TFR at 3.9 while Hindu females was at 2.8 TFR level.
* 43 per cent of Indian girls attened primary school compaired to 62 per cent of boys.
* In India every 26 minutes, a woman is molested.
* In India every 34 minutes, a woman is raped.
* In India every 42 minutes, an incident of sexual harassment takes place.

* In India every 43 minutes, a woman is kidnapped.
* In India every 93 minutes, a woman is killed.

APPENDIX - II

(Indicators showing woman empowerment in Assam)

[A]

1. Percentage of total female enrollment	43.87
2. Percentage of SC female enrollment	44.36
3. Percentage of ST female enrollment	43.78
4. Percentage of female teachers in	
a. Pre-Primary	100.00
b. Primary	28.78
c. Middle	20.46
d. High School	26.27
e. Higher Secondary	28.31
f. Degree College	31.00
g. Arts/ Science/ Commece College	25.20

5. Distribution of Assam Govt. Employees in numbers

a. Class I :	Male	7432
	Female	713
b. Class II :	Male	5868
	Female	374
c. Class III :	Male	195891
	Female	41025
d. Class IV :	Male	49950
	Female	3582
Total	Male	259141
	Female	45694

6. Percentage employment of female in

a. Public Sector	14.75
b. Private Sector	47.63

7.	Total female prison population	370
	Total prison population	6141

Source :

i) (From No. I-No. 4) Directorate of Secondary Education, Assam, 2001

ii) (Only No. 5) Directorate of Economics and Statistics, Assam, 1994

iii) (Only No. 6) Directorate of Economics and Statistics, Assam, 2001

iv) (Only No. 7) Inspector General of Prison, Assam, 2001

[B]

Table - 1

States	Sex ratio Female per '000' males	Literacy			Decadal Growth rate
		Total literacy rate	Female literacy rate	Male literacy rate	
Arunachal Pradesh	901	54.74	44.24	64.07	26.21
Assam	932	64.28	56.03	71.93	18.85
Manipur	978	68.87	59.70	77.87	30.02
Meghalaya	975	63.31	60.41	66.14	29.94
Mizoram	938	88.49	86.13	90.69	29.18
Nagaland	909	67.11	61.92	71.77	64.41
Tripura	950	73.66	65.41	81.47	15.74
Sikkim	875	69.68	76.73	61.46	32.98
India	933	65.38	54.28	75.96	21.34

Source : Census of India, 2001, GOI

Table - 2

	Life expectancy at Birth (2001-06)		Infant Mortality Rate (per 1000 live births), 2000		
	Male	Female	Male	Female	Total
Assam	58.96	60.87	66	83	75
India	63.87	66.91	67	69	68

Source : Ministry of Health and Family Welfare, 2001, GOI ❑❑

CONTRIBUTORS

Dr. Buddhin Gogoi	:	Lecturer, Deparement of Botany Sonari College
Dr. Rana Konwar	:	Lecturer, Department of Chemistry Sonari College
A. K. Borpuzari	:	Lecturer, Department of Chemistry Sonari College
S. N. Rajkhowa	:	Lecturer, Department of Chemistry Sonari College
Anindita Paul	:	Student of major course Department of Chemistry, Sonari College
Pankaj Hazarika	:	Student of major course Department of Chemistry, Sonari College
Tankeshawar Baruah	:	Lecturer, Department of Mathematics Sonari College
Muhidhor Chetia	:	Lecturer, Department of Mathematics Sonari College
Dr. (Mrs.) Jyotima Phukon	:	Lecturer, Department of Zoology Sonari College
Ranu Mohan	:	Lecturer, Department of Education Sonari College
Rina Borthakur	:	Lecturer, Department of Physics Sonari College
Bani Devi	:	Librarian, Sonari Collage
Deepanjali Gogoi	:	Lecturer, Department of English Sonari College
Raghunath Kagyung	:	Lecturer, Department of Assamese Sonari College
Paranan Konwar	:	Lecturer, Department of Economics Sonari College