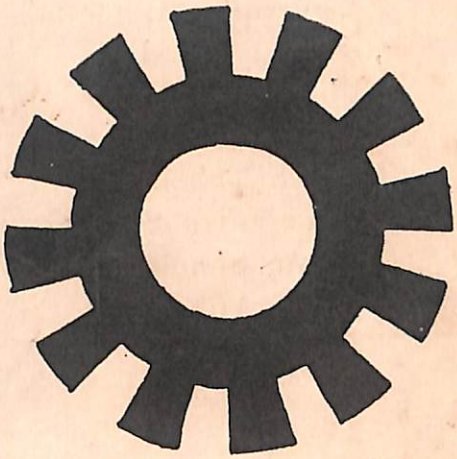
1970

Shyam Sundar Deka.



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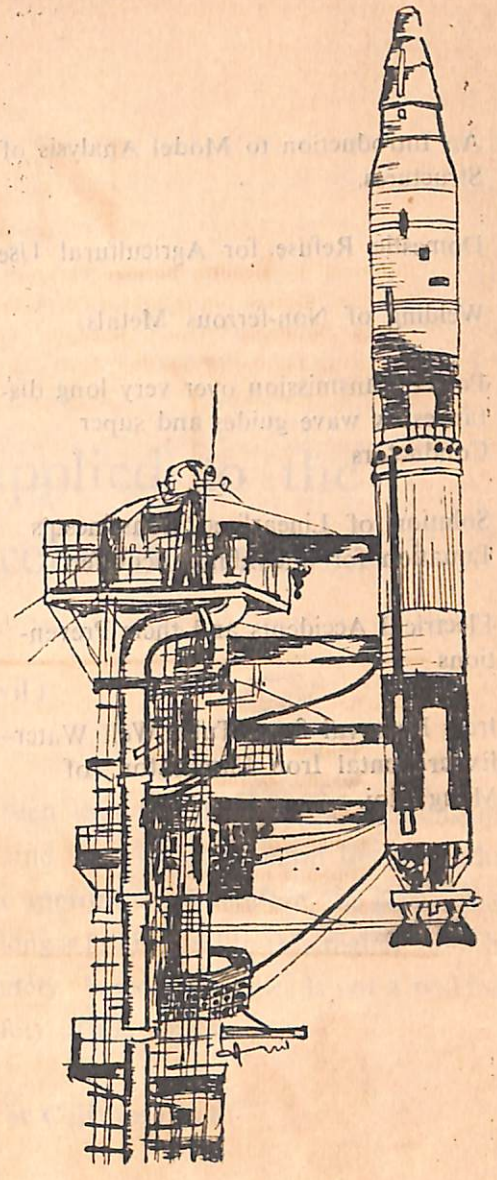

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'Technology has taken its place as a vital growth force in the economic system the world over and is considered by many economists now to outweigh in singnificance the traditional factors of production land, labour and capital Thus the technical man is not just another soul working. to make a living. In a world that relies increasingly on scientific advancement, he is the builder of the future.

—E. V. Murphee.

Ultimate Load Theory—As Applied to the Design of Reinforced Concrete Beams.

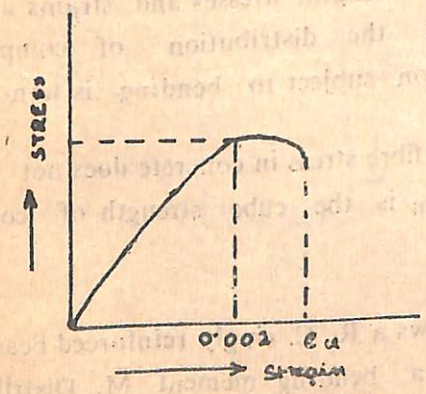
R. **Khiangte,** Final year B.E. (Civil)

In the past and till to-day, the well known Elastic Theory has been extensively used as the basis of analysing reinforced concrete structures. In this theory it is assumed that the relationship between the load and the stresses is linear within the permissible values of these stresses. The ratio of the yield or failure stress to the permissible stress has been called a factor of safety. The permissible stress of concrete is taken as $\frac{1}{3}$rd of the cube strength and that of steel as $\frac{1}{2}$ of the yield strength. But the inelastic behaviour of concrete starts from a very low stage as seen in fig. (1) ; while steel shows inelastic deformation after its elastic limit has reached as at A in fig. (2).

It is thus seen that the stress-strain relationship for both concrete and steel do not remain linear at higher loads as failure approaches. Therefore, the elastic method of analysis no longer holds good in this region ; and hence the factor of safety based on stresses is not a real indication of the safety of the structure.

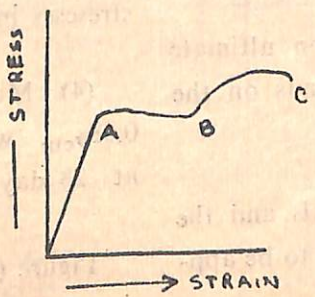
Ultimate Load or Collapse Load :—

For simplicity, let us consider a simply supported R. C. beam with a central load as shown in fig. (3). As the load is gradually increased, the beam will deflect more



Stress Strain curve for concrete

FIGURE-1



STRESS-STRAIN CURVE FOR MILD STEEL

FIGURE—2

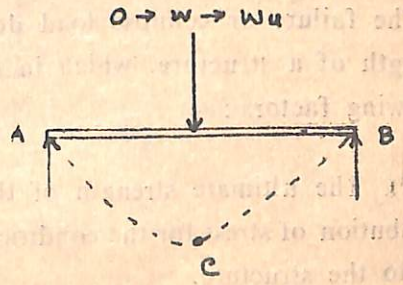


FIGURE-3

and more ; and after sometime the steel reinforcement of the beam will be wholly in a plastic state provided the beam does not fail due to excessive compression in concrete. A plastic hinge is then said to be formed at the centre of the beam, and if any further load is applied the beam will deflect indefinitely. The load which just' causes indefinite deflection of the beam is known as Ultimate Load or Collapse Load. Collapse Load may, therefore, be defined as a load which causes the failure of a structure through a mechanism due to formation of sufficient number of plastic hinges (which, in the case of a simply supported beam, is one at the centre) on the structure.

To calculate this collapse load, it is found necessary to consider the inelastic or plastic strains that occur in the materials just before failure. This method of calculation taking into account of these plastic strains near failure is called "Ultimate Load Theory." Since the primary aim in design is to prevent the failure of the structeure, this approach is a logical way of ensuring safety The ratio between the collapse load, as calculated from the ultimate load method, and the working load on the structure is called the Load Factor. The load factor varies depending upon the structure in contrast to a constant factor of safety for permissible stresses in the elastic method of design. It is found that for most reinforced concrete structures a satisfactory load factor lies between 2 and 1.25.

The failure or collapse load depends upon ultimate strength of a structure, which in turn, depends on the following factors :—

(1) The ultimate strength of the materials and the distribution of stress for the conditions of load to be applied to the structure.

(2) Ultimate movement of supports due to settlement or other causes.

(3) Increase of stress due to temperature changes, shrinkage and creep.

(4) Reduction of stress due to plasticity.

(5) Reduction in strength of materials due to fatigue.

(6) Increase of stress due to vibration or harmonic movement.

Design of R. C. Beam Section :—

The basis of design of a reinforced concrete beam is first to fix a probable working load and the desired load factor. The collapse load is obtained by multiplying the working load with the load factor. The beam is then designed for the collapse load by the use of the ultimate load theory.

The assumptions for the ultimate load (or strength) design of reinforced concrete sections are as follows :—

(1) Plane sections normal to the axis remain plane after bending.

(2) Tensile strength in concrete is neglected in sections subjected to bending.

(3) At ultimate strength, stresses and strains are not proportional and the distribution of compressive streseses in a section subject to bending is non-linear.

(4) Maximum fibre stress in concrete does not exceed $0.68\sigma_{cu}$, where σ_{cu} is the cube strength of concrete at 28 days.

Figure (4a) shows a R. C. singly reinforced beam section subjected to a bending mement M. Distribution of strains and stresses are shown in figs. (4b) and (4c) respectively. For the section to be in equilibrium, the total

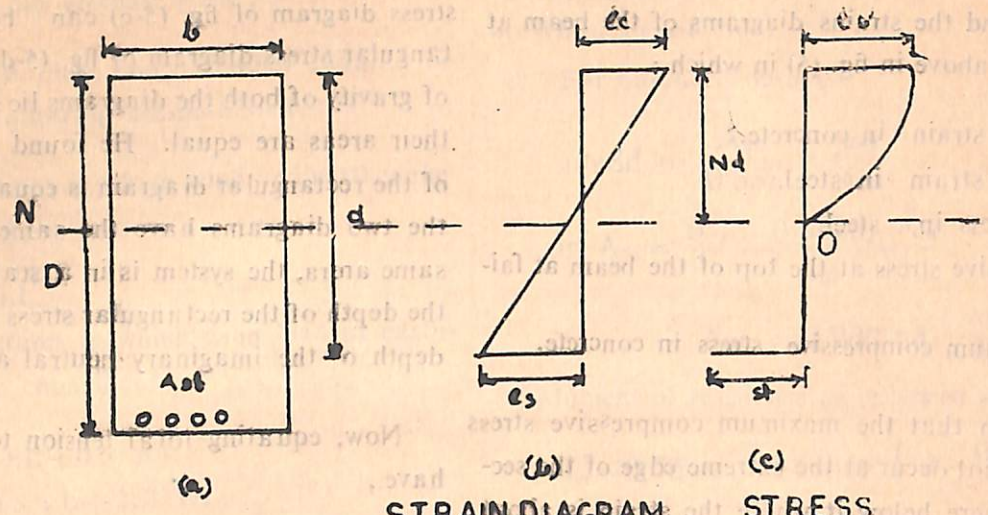


FIGURE 4

force of compression should be equal to the total force of tension, and the mement of this couple should be equal to the external bending moment. The relationship between the strains and the stresses will be such as satisfies the stress-strain curves of the two materials as shown in figs. (1) and (2).

As the bending moment is gradually increased, the stresses and the strains will go on increasing. Failure of the beam will take place only when either steel or concrete reaches its ultimate strain. The ultimate strain in steel is 0.2 to 0.3, where as that of concrete is only 0.004 to 0.005. Hence in most of the cases failure of the beam will take place due to crushing of concrete.

Beams in which steel is strained beyond its yield point at their failure are called under-reinforced beams. Beams in which steel is still in its elastic stage at failure are called over-reinforced beams. In both of these cases of failure, it will be seen that the concrete is fully strained to its ultimate limit at the extreme edge of the section and so the shape of the compression diagram will be same as the stress-strain curve of concrete as shown in fig. (1). In both of the cases, steel will be found to be still in its plastic range (i.e. in the region between A and B in fig. (2).)

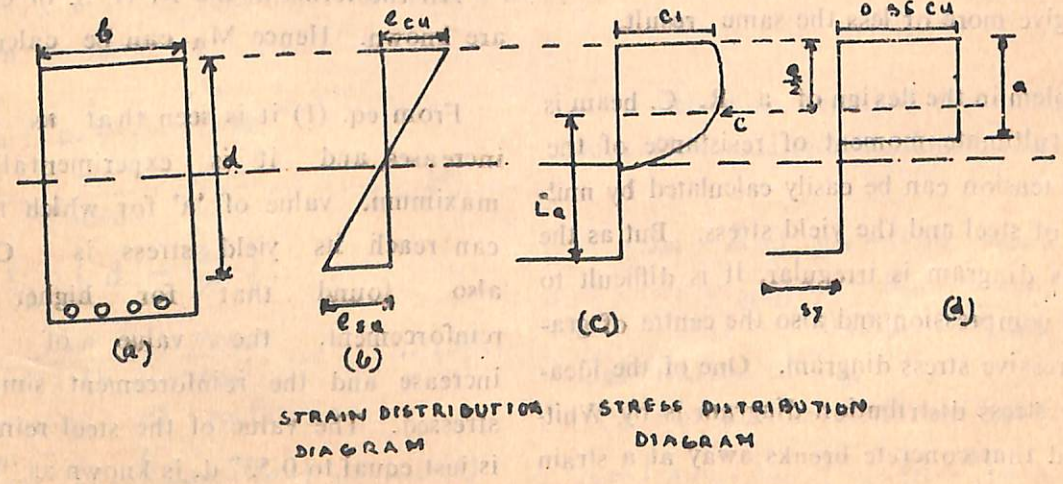


FIGURE-5

The stresses and the strains diagrams of the beam at failure are shown above in fig. (5) in which :

e_{cu}—Ultimate strain in concrete.

e_{su}—Ultimate strain in steel.

σ_{sy}—Yield stress in steel.

σ'_c—Compressive stress at the top of the beam at failure.

σc_{max}—Maximum compressive stress in concrete.

It will be seen that the maximum compressive stress in concrete does not occur at the extreme edge of the section but somewhere below it where the strain is about 0.002. It is observed from a number of test results that the maximum compressive stress of the beam at failure is equal to the cylinder strength which is about 70% to 90% of the cube strength.

The stress-strain curve of concrete and hence the compressive stress distribution curve of the beam as shown in fig. (5-c) is not very definite. In fact the maximum strain e_{cu} varies between 0.003 to O.008 depending on the quality of concrete, speed of loading etc. This leads to many ultimate load theories proposed from time to time. In all these theories an idealised stress-strain curve of concrete or compressive stress distibution diagram is assumed. It is found that though these theories are different in details, they give more or less the same result.

The main problem in the design of a R. C. beam is to determine the ultimate moment of resistance of the beam. The total tension can be easily calculated by multiplying the area of steel and the yield stress. But as the compressive stress diagram is irregular, it is difficult to find out the total compression and also the centre of gravity of the compressive stress diagram. One of the idealised compressive stress distribution diagram is by Whitney. He assumed that concrete breaks away at a strain of 0.003. With this assumption he found that the actual stress diagram of fig. (5-c) can be represented by a rectangular stress diagram of fig. (5-d) such that the centres of gravity of both the diagrams lie at the same point and their areas are equal. He found that the average stress of the rectangular diagram is equal to 0.85 σc_{max}. Since the two diagrams have the same centre of gravity and same arera, the system is in a stable condition. If 'a' is the depth of the rectangular stress diagram, then 'a' is the depth of the imaginary neutral axis.

Now, equating total tension to total compression we have,

$$A_{st} \times \sigma_{sy} = b.a.\ 0{\cdot}85\ \sigma c_{max}$$

$$\therefore a = \frac{\sigma_{sy}}{0{\cdot}85\ \sigma c_{max}} \times \frac{A_{st}}{b} \quad \ldots (1)$$

From the diagram, lever arm

$$La = d - \frac{a}{2}$$

Ultimate moment of resistance,

$$M_u = A_{st}.\ \sigma_{sy} \left(d - \frac{a}{2} \right) \quad \ldots (2)$$

or $$M_u = b.\ a \times 0{\cdot}85\ \sigma c_{max} \left(d - \frac{a}{2} \right) \quad \ldots (3)$$

All the terms in the R. H. S. of equations (2) & (3) are known. Hence M_u can be calculated.

From eq. (1) it is seen that as A_{st} increases 'a' increases, and it is experimentally found that the maximum value of 'a' for which the reinforcement can reach its yield stress is O·537d. It is also found that for higher percentage of reinforcement, the value of 'a' does not increase and the reinforcement simply remains under stressed. The value of the steel reinforcement when 'a' is just equal to 0.537 d. is known as "balanced percentage of steel."

I. S. Code Provisions for ultimate loads :—

According to I. S. 456–1964, every member should be designed to carry the following ultimate loads :—

(a) For those structures in which wind and earthquake loads can be neglected—

$U = 1.5\ DL + 2.2\ LL.$

(b) For those structures in which wind load or earthquake load should be considered—

$U = 1.5\ DL + 2.2\ LL + 0.5\ WL$

or $U = 1.5\ DL + 0.5\ LL + 2.2\ WL.$

Whichever gives critical conditions.

Where U = Ultimate load

DL = Dead Load.

LL = Live Load.

WL = Wind Load or Earthquake Load whichever is greater.

The code allows the maximum fibre stress in concrete at failure of the section to $0{\cdot}68\sigma_{cu}$ and the maximum compressive strain to 0.003. The actual stress diagram is replaced by a rectangular stress block whose height 'a' is taken as 0.78 times depth of the neutral axis. The average stress is assumed to be $0.55\ \sigma_{cu}$.

As in Whitney's method, equating total tension to total compression we have—

$$0{\cdot}55\ \sigma_{cu}\ b.\ a. = A_{st}\ \sigma_{sy}$$

$$\therefore\ a = \frac{\sigma_{sy}}{0{\cdot}55\sigma_{cu}} \times \frac{A_{st}}{b} \quad \ldots\ \ldots\ \ldots\ (4)$$

$$\text{Lever arm, } L_a = \left(d - \frac{a}{2} \right)$$

$$\text{or } La = d - \frac{A_{st}}{1{\cdot}1b} \times \frac{\sigma_{sy}}{\sigma_{cu}} \quad \ldots\ \ldots\ \ldots\ \ldots\ (5)$$

Ultimate moment of resistance,

$$M_u = A_{st} = \sigma_{sy} \left(d - \frac{A_{st}}{1{\cdot}1b} \times \frac{\sigma_{sy}}{\sigma_{cu}} \right) \quad \ldots\ \ldots\ (6)$$

The value of 'a' is limited to 0.43 d as against 0.537d in Whitney's Method.

$\therefore$ For balanced design—

$$0{\cdot}43d = \frac{A_{st}}{0{\cdot}55b} \times \frac{\sigma_{sy}}{\sigma_{cu}}$$

$$\text{or } A_{st} = \frac{0{\cdot}43 \times 0{\cdot}55bd.\ \sigma_{cu}}{\sigma_{st}}$$

$$\therefore\ A_{st} = 0{\cdot}236\ bd\ \frac{\sigma_{cu}}{\sigma_{st}} \quad \ldots\ \ldots\ (7)$$

Moment of resistance of balanced section,

$$M_u = 0{\cdot}55\ \sigma_{cu} \times 0{\cdot}43bd \times \left(d - \frac{0{\cdot}43d}{2} \right)$$

$$M_u = 0{\cdot}185\ \sigma_{cu}\ bd^2 \quad \ldots\ \ldots\ \ldots (8)$$

Provisions for Doubly Reinforced Section :—

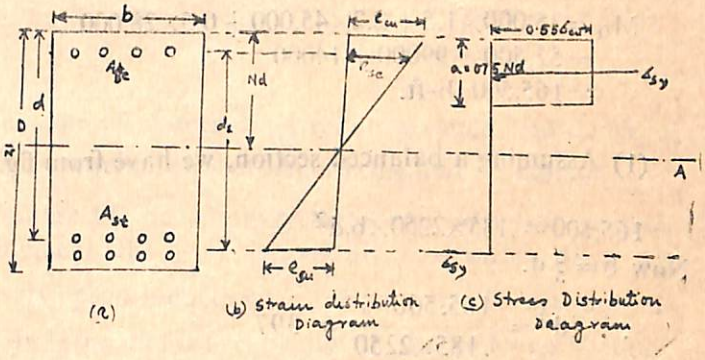


Fig. 6

To determine depth of the rectangular compressive block 'a', equate total tension to total compression.

$$(A_{st} - A_{sc})\ \sigma_{sy} = 0{\cdot}55\ \sigma_{cu}.\ a.b$$

$$\therefore\ a = \frac{A_{st} - A_{sc}}{0{\cdot}55b} \times \frac{\sigma_{sy}}{\sigma_{cu}} \quad \ldots\ \ldots\ \ldots\ (9)$$

Calculation of M_u,

(i) For under-reinforced beams i.e. $a < 0{\cdot}43d$,

$$M_u = \left(A_{st} - A_{sc} \right) \sigma_{sy} \left(d - \frac{a}{2} \right) + A_{sc}\ \sigma_{sy}.\ d_s \quad \ldots\ (10)$$

(2) For balanced or over-reinforced beams i.e. $a \geqslant 0.43d$,

$$M_u = 0{\cdot}55\sigma_{cu} \times 0{\cdot}43bd\left(d - \frac{0{\cdot}43d}{2}\right) + A_{sc}\ \sigma_{sy}\ d_s.$$

or $M_u = 0{\cdot}185\ \sigma_{cu}\ bd^2 + A_{sc}\ \sigma_{sy}\ d_s$ . . . . (11)

Where d_s = distance between centres of compressive steel and tensile steel.

The method of design may be illustrated by the following example—

Example :— Design a reinforced concrete beam which has its effective depth equal to 2^1 times its breadth. It is subjected to a dead load moment of 35,000 lb–ft., a live load moment of 45,000 lb–ft., and a wind moment of 28,000 lb.–ft.

Take $\sigma_{sy} = 36{,}000$ lb/in^2

$\sigma_{cu} = 2250$ lb/in^2.

Solution :— Ultimate moment as per IS : 456 – 1964

$M_u = 35{,}000 \times 1.5 + 2.2 \times 45{,}000 + 0.5 \times 28{,}000$

$= 52{,}500 + 99000 + 14000$

$= 165{,}500$ lb–ft.

(1) Assuming a balanced section, we have from fig.. (8)

$165{,}500 = .185 \times 2250 \times b.d^2$

Now $b = \frac{2}{5}d$.

$\therefore\ \frac{2}{5}d^2 = \dfrac{165{,}500}{.185 \times 2250} = 397$

$\therefore\ d^3 = 397 \times \frac{5}{2} = 995$

$\therefore\ d = 9.98''$

or $d \simeq 10''$ (say)

$\therefore\ b = 10 \times \frac{2}{5} = 4''$

Adopt $10'' \times 4''$ section.

From equ (7) area of steel required,

$$A_{st} = 0.236 \times \frac{2250}{36.000} \times 4 \times 10$$

$= 0.59$ in^2

Adopt 4 Nos. $\frac{7}{16}''$ ϕ bars, area 0.601 in^2

(2) If in the problem the effective depth is limited to $8''$ compressive steel will be found to be necessary because the beam will fail in crushing of concrete if it is not provided.

From equ. (11)—taking $d_s = 7''$

$M_u = 0.185 \times 2240 \times 4 \times 64 + A_{sc} \times 36000 \times 7''$

or $165{,}500 = 106{,}500 + A_{sc} \times 252{,}000$

$\therefore\ A_{sc} = \dfrac{59000}{252000} = 0.234$ in^2

Adopt 2 Nos. $\frac{7}{16}''$ ϕ bar, area $= 0.301$ in^2

Equating total tension to total compression, we have—

$(A_{st} - A_{sc})\sigma_{st} = 0.55\ \sigma_{cu} \times 0.43\ bd$

or $A_{st} - A_{sc} = \dfrac{0.55 \times 2250 \times .43 \times 4 \times 8}{36{,}000}$

$= 0.472$ in^2

$\therefore A_{st} = (0.472 + 0.234)$

$= 0.706$ in^2

$\therefore$ Adopt 5 Nos. $\frac{7}{16}''$ ϕ bar, area $= 0.752$ in^2.

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(1) Ultimate Load Analysis of Reinforced and Prestressed Concrete Structures by L. L. Jones.

(2) Ultimate Load Theory by A. L. L. Baker.

(3) Plain and Reinforced Concrete Vol. II by Jai Krishna and O. P. Jain.

(4) Indian Standered Code of Practice— I.S : 456—1464

★ ★ ★

ROUND ABOUT AND ITS DESIGN

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INTRODUCTION :

A rotary or a round about is a confluence of three or more intersection legs at which crossing and right turning (in right hand rule left turning) traffic movements weave on a one way roadway in a clockwise (in keep to the right, anti clockwise) direction around a central island. Basically, it is a series of curved weaving sections placed end to end. In it, left turning traffic remains in the lane without weaving. Right turn and through traffic weave within the section of the rotary located next to their point of entry and just prior to their point of exit. The distance between adjacent entrances and exits must be sufficient for weaving at low relative speed. Where this distance is so small that vehicles crossed at an oblique angle without weaving, the intersection is not a round about but may be called a channelised intersection.(1)

Up to a few years ago, round about design was considered to be a stage in the development of an intersection. Now a days, it is thought that they are suitable only on certain specific location. However, all the designs have their own merits and demerits and so, adoption of a certain type of intersection requires sound knowledge of the basic requirements of engineering and economics.

Because of the relatively large area required for their development, the extra travel distance within them, the necessary speed reduction on the part of all entering vehicles, and the limited capacity of the weaving sections, round abouts are not being used to day except in special instances. It is found possible to handle greater volumes of traffic than formerly was thought feasible at intersections at grade combining channelisation and traffic signal controls. It is found that partial cloverleaf grade separations are comparable in overall development and operating costs to round abouts properly designed. Thus, the range of traffic volume conditions where a round about is considered most suitable has narrowed considerably during the last decade,. Many existing round abouts in urban areas of U.K. have been made operable under increasting traffic volumes only through installation of traffic signal controls for which their overall shape is poorly suited.(2)

Nevertheless in a country like India where the volume of traffic is not so much as that in Western countries the round abouts will play an important role, at least up to a number of years in future, especially in rural areas or in the suburbs of the cities.

Royal Dawson has suggested the following general principles regarding the design of a round about.

Radiating roads should be placed at equal intervals as far as possible. The larger the number of radiating roads the larger the central island should be to avoid convergent angles greater than 45° It is probable that five ray star type expresses the limiting number of radiating roads that can be efficiently dealt with round a moderarately sized island. If there are other roads, they should preferably be merged with their nearest neighbours before entering the round about.(3)

In general, the round about has the following compoments as shown in the figure 1.

When the shape of the central island of a round about is exceptionally large or contains buildings the system of weaving section is often referred to as a gyratory system, and with large gyratory the shape of the central island becomes secondary importance, the primary being the conservation of the buildings applying the minimum standards.

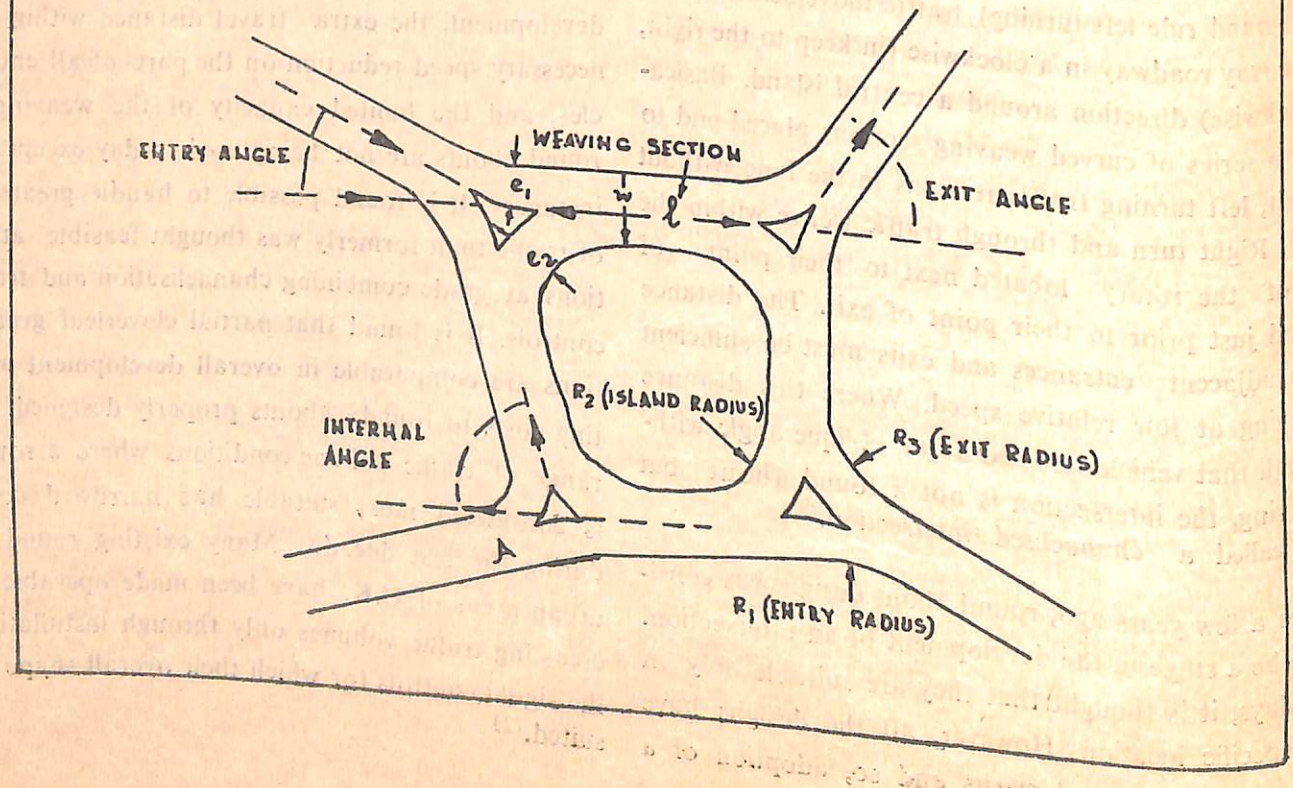
ELEMENTS OF DESIGN

Design Speed :

The efficiency of operation of a round about depends on relative speed. From theoritical view point small angles of manoeuvre and small differences in absolute speeds of weaving flows are essential to incur minimum delay with a high degree of safety. Increased length of weaving section increase the ability of such sections to accomodate weaving vehicles in greater volumes and at

FIGURE 1

ROUNDABOUT DIMENSIONS



higher speeds. But in the interest of economy, it is seldom feasible to design round abouts, so that they may accomodate weaving at the assumed design speeds of the intersecting roadways. What is needed on the assumption of the design speed is a compromise between high and low relative speed. It should not be so high as to cause danger in operation of weaving and at the same time it should not be so low as to increase the amount of delay to the traffic. The AASHO has suggested compromise values for the assumed design speed on rotaries in order to reduce cost as well as the amount of out of the way travel. These values are as follows :—

Table No-1

Approach Road Design Speed	Average Running Speed	Design Speed on Rotaries	
		Minimum	Desirable.
30 m.p.h.	27 m.p.h.	20 m.p.h.	30 m.p.h.
40 „ „	34 „ „	30 „ „	35 „
50 or more	40–50 „	35 „ „	40 „

MR. NEWLAND has suggested the following speeds on round about based on experience, comfort and driving conditions in U. K.

Table No-2

Approach Road Design Speed	Design Speed in Round About.	
	Minimum	Desirable.
30 m.p.h.	13 m.p.h.	20 m.p.h.
40 „	25 „	30 „
50 „	30 „	40 „

Radius of turning elements :

Where it is necessary to provide for turning vehicles within minimum space, the minimum paths of design vehicles should apply. In India, so far, no policy regarding the design vehicles has been fixed. In United States only four types of vehicles are assumed for the purpose of design. However, in U. K. at present, 28 Ton Gross 8 Wheel goods vehicles require the minimum turning radius of 44 ft.[4]

The above dimension is based on the condition of vehicles starting from zero speed. But, the round abouts provide paths for turning vehicles at a certain design speed. In these cases, the important factors to be considered are the co-efficient of friction and the rate of superelevation provided at the curved path. These two factors are combined by the well known equation.

$$e+f=\frac{V^2}{15R}$$

where V = the speed in m. p. h.
e = the rate of superelevation
and f = the coefficient of side friction
R = the radius of curvature in ft.

The AASHO has suggested the following values :—

Table No-3

Design Speed in m.p.h.	Maximum algebric difference in grade.
20	0.08–0.07
25–30	0.07–0.06 i.e. the
35–40	0.06–0.05 values of e

Values of f is given by the following table :—

Table No-4

Design speed in m. p. h.	15	20	25	30	35	40
f	·32	·27	·23	·20	·18	·16

Central Island :

With conventional round about at normal cross roads, the central island is usually round or square but oval shapes are sometimes used at scissors type intersections. At intersections where more than four roads converge irregularly shaped round abouts are suitable. An almost square round about would create difficulty to drivers going from one weaving section to another as well as placing them at a disadvantage with respect to traffic entering the round about. That is why, it is always preferable to round off the corners of a square round about.(5)

Exit and Entry Radius :

The design of entry and the exit radii in a rotary is critical in creating low relative speed operations within the rotary itself. The curved roadway of the entrances should be designed to produce a speed of entrance equal to the assumed design speed of the rotary. The radius of exit should be designed to produce a speed of exit equal to the assumed design speed of the rotary or a little higher, as it was found that the drivers tend to speed up as they leave the rotary. Also, to keep the round about free flowing, it is helpful to make the radius of exit as generous as possible and greater than those of the entrances. Experiences show that a minimum radius of 90 ft. at entry and that at exit of 150 ft. works quite well.

Weaving width :

In practice weaving widths tend to have standard values such as 24 ft., 30 ft., 40, 50 or 60 fts. In rural areas on busy trunk roads the usual practice is to have a weaving width of 30 ft., with a weaving length of 150 ft. although other lengths and widths are also not unsuitable. In urban areas, the dimensions are less standarised because of the reason of capacity and the economics of construction. High length/width ratio is not as economic in land usage as a lower one. However, this objection is of minor importance in rural areas, as the land value is less there than in urban areas.

Mean values of length/width ratio in round abouts of Great Britain are as follows :—

Mean values of length/width ratio :—

Table No-5

Site	Class of Roads.	
	Trunk	Non Trunk
Rural	4.8	4.4
Sub-urban	3.8	3.9
Urban	3.4	...

Entry width :

One of the factors affecting the capacity is its entry widths. The entry widths is generally taken to be the averages of two widths i.e. weaving width and the widths of the left turning paths.

Capacity :

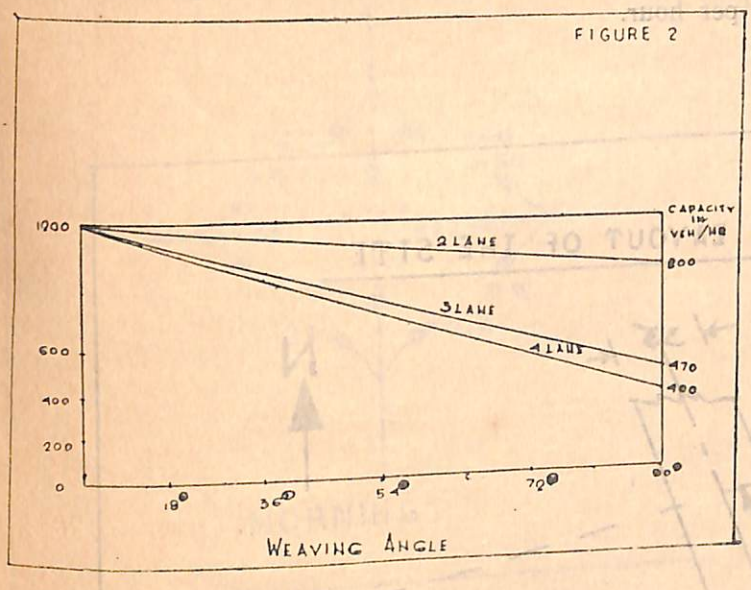
The main factors affecting the capacity are :—

(a) The weaving length (l)
(b) The weaving width (w)
(c) The entry width (e)
(d) The proportion of weaving traffic (p)

Early attempt calculate the capacity of a round about was made by A. J. H. Clayton in 1945 (6) and was incorporated as the design basis for round about in M. O. T. blue book published in 1946. Clayton used the weaving angle as a measure of weaving space and assumed that there is a linear relationship between capacity and weaving angle.

He established threlation between the weaving angle and the capacity in veh/hr per lane., which is shown in fig. no. 2.

FIGURE 2



Although it is based on somewhat doubtful assumptions, the design chart corresponds fairly well to observed flows at round abouts.

Based on the experiments carried out in Road Research Laboratory Wardrop formulated the following relation which gives the practical capacity in a weaving section (6)

$$Q_P = \frac{86w\ (1+\frac{e}{w})\ (1-\frac{p}{3})}{1+\frac{w}{l}}$$

where Q_P = Practical capacity of weaving Section of round about.

w = Width of weaving Section in Feet.

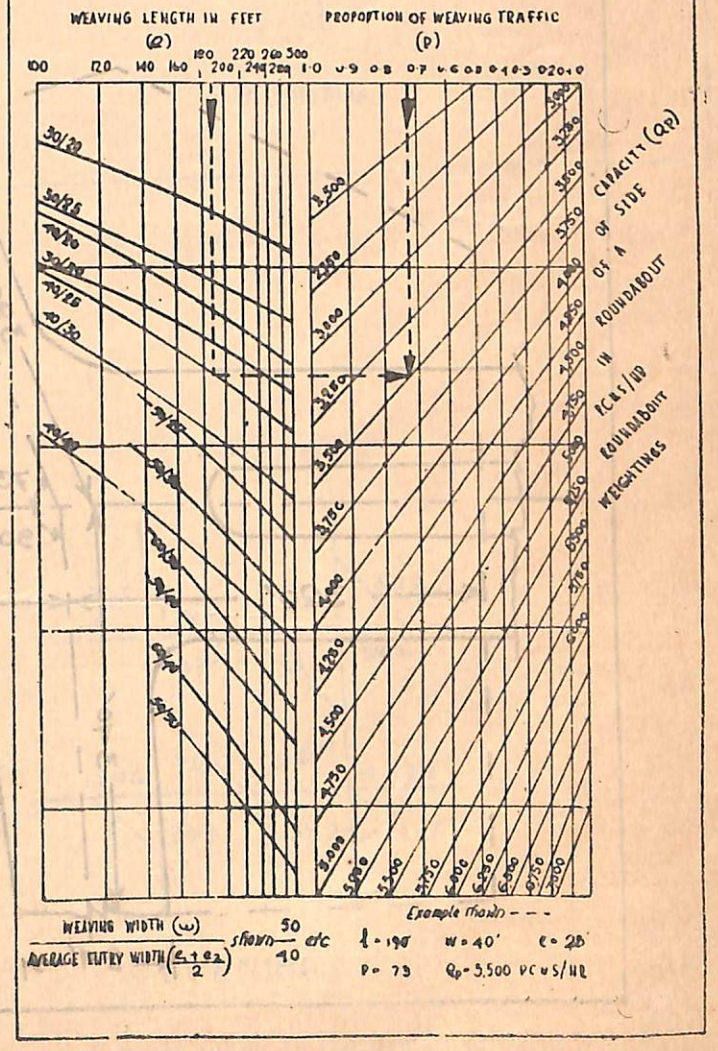
e = the average width in feet of two the two entry widths (i.e. from an approach 'e'; and within the round about 'e_2'.

l = the length of weaving section between ends of guide island.

p = Proportion of weaving traffic i.e. ratio of sum of crossing streams to the total traffic on that weaving section.

FIGURE 3

ROUNDABOUT DESIGN CHART



AN EXAMPLE OF DESIGN

The Problem :

It is proposed to design a round about in a surface intersection of a side road and a main road. The main road is a dual carriageway subjected to a speed limit of 40 miles per hour and the side road to a limit of 30 m.p.h. The site plan is shown in fig. 4.

The morning and evening peak flows on the roads connecting the proposed round about in 1990 is expected to be as shown in fig. 5. The figures are given in P.C.Us. per hour.

FIGURE 4

DESCRIPTION AND LAYOUT OF THE SITE

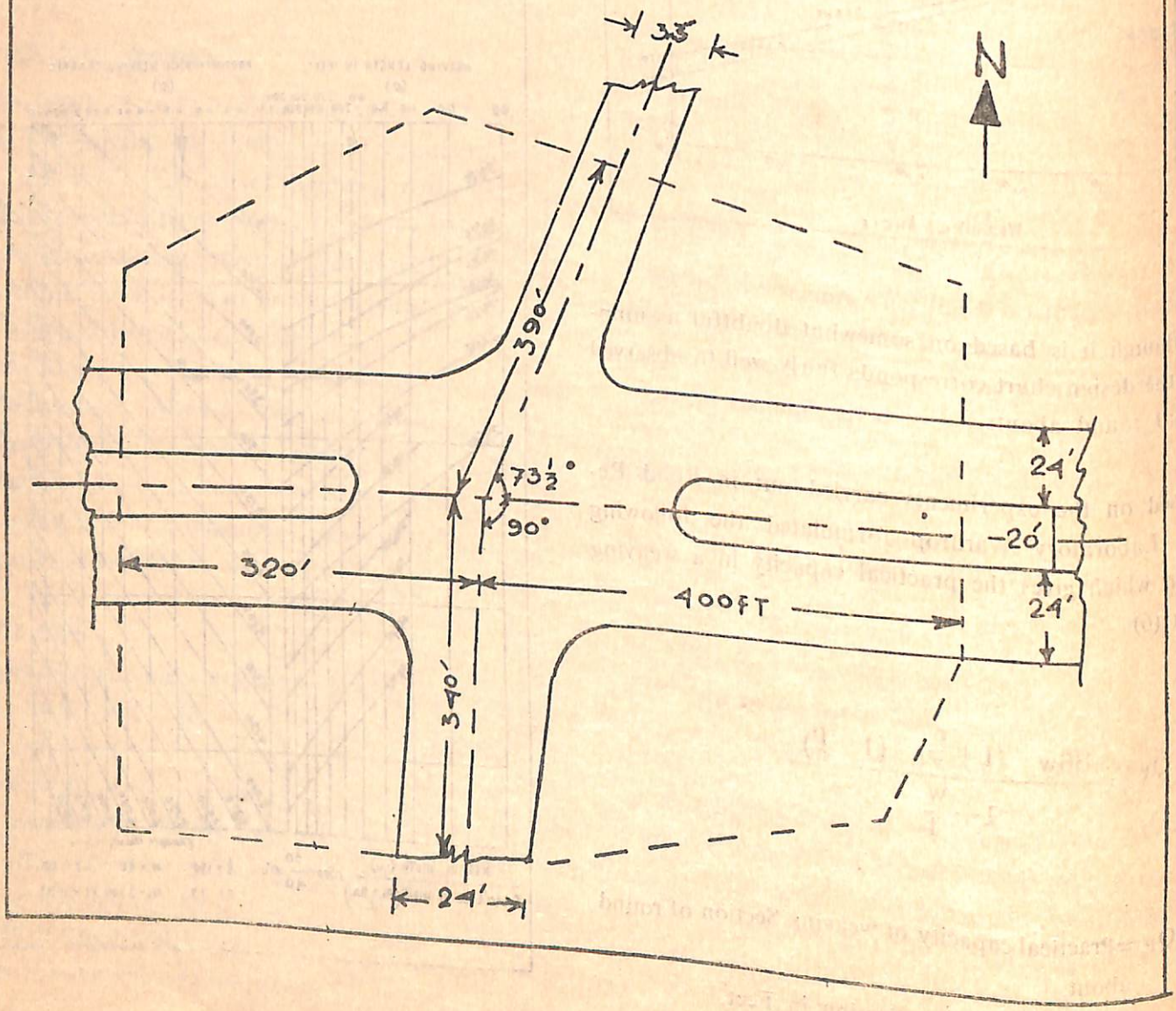
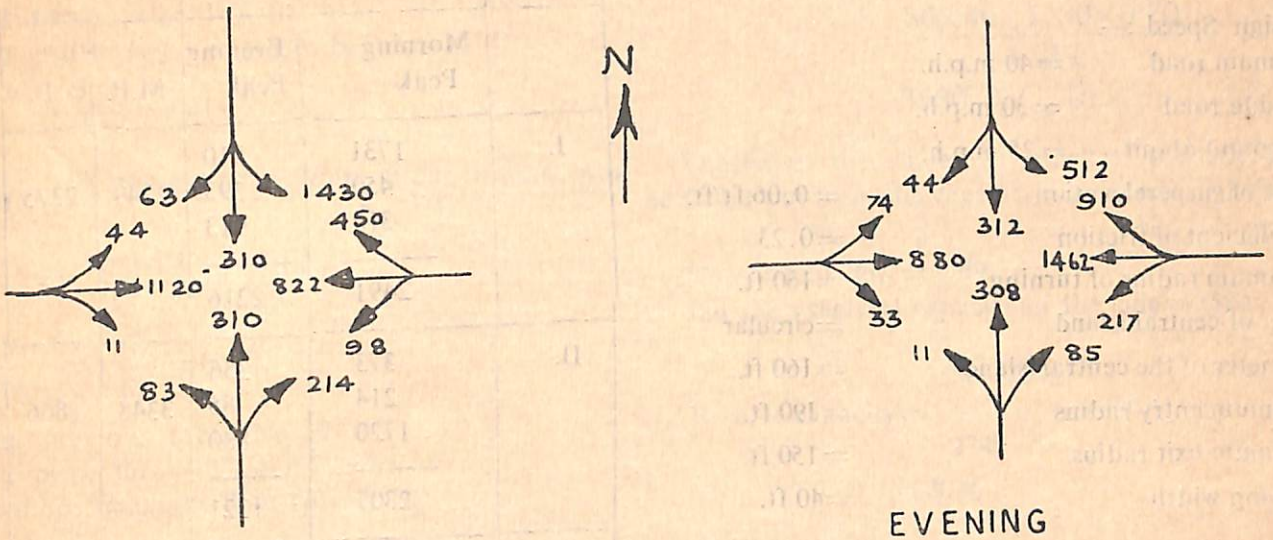


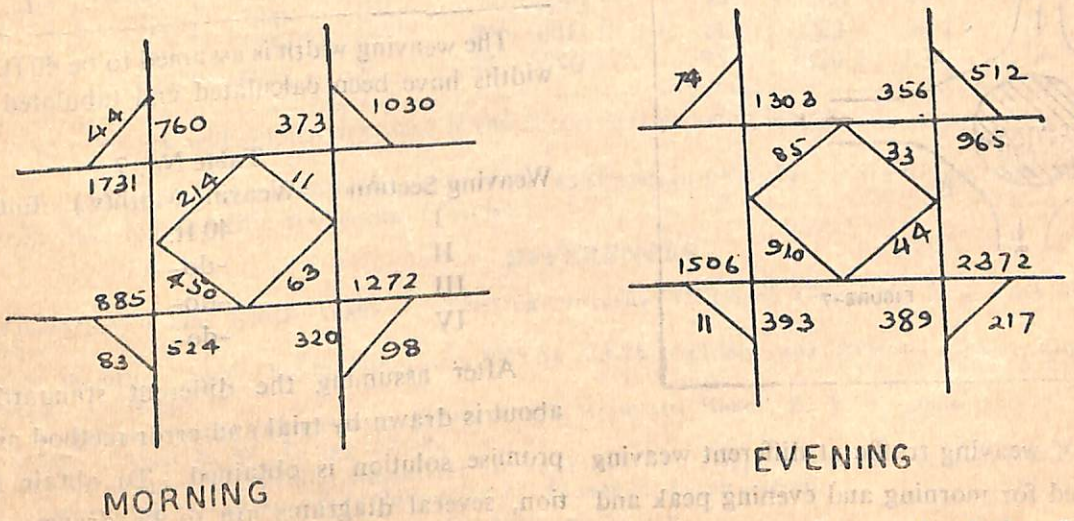
FIGURE 5



Solution :

Diagrametic representation of the traffic flows :

FIGURE 6



Both of the values are considered and the maximum values are taken as the design flows.

Adopted design standard :

Considering the points as discussed in the paragraphs of "Elements of design", the following design standards have been adopted for the present exercise.

1. Design Speed :—
   On main road =40 m.p.h.
   On side road =30 m.p.h.
   On round about =25 m.p.h.
2. Rate of surperelevation =0.06 ft/ft.
3. Co-efficient of friction =0.23
4. Minimum radius of turning =150 ft.
5. Type of central island =circular
6. Diameter of the central island =160 ft.
7. Minimum entry radius =J90 ft.
8. Minimum exit radius =150 ft.
9. Weaving width =40 ft.

For the purpose convenience, the weaving section are numbered as I, II, III, IV as shown in figure 7.

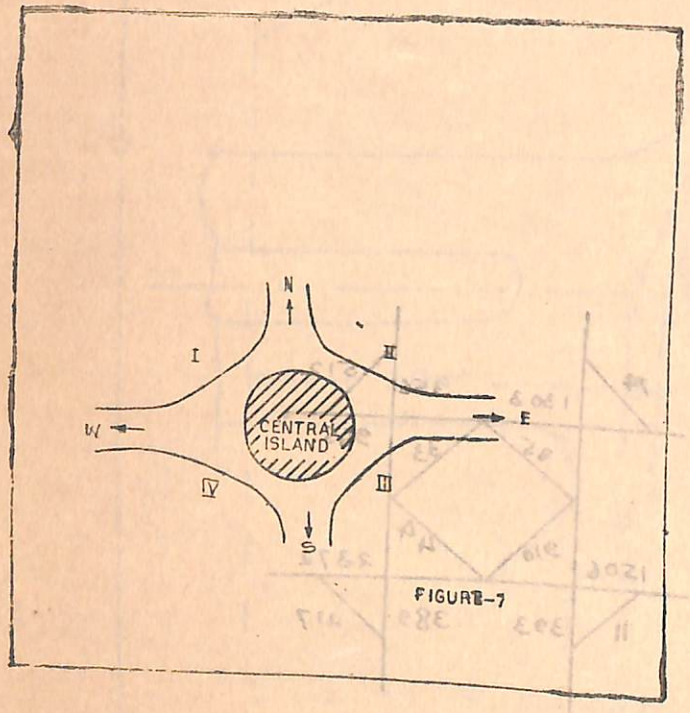


FIGURE-7

The proportion of weaving traffic at different weaving sections are calculated for morning and evening peak and tabulated below :

Table No,6

Weaving Section	Weaving flows in P. C. Us.		Total traffic in P.C.U.		Proportion of weaving traffic (P)	
	Morning Peak	Evening Peak	M.P.	E.P.	M.P.	E.P.
I.	1731 450 310 2491	910 393 913 2216	2749	2375	0.90	0.93
II.	373 214 1720 2307	356 85 880 1321	3348	1866	0.69	0.70
III.	310 11 1272 1593	2372 33 356 2761	1754	3022	0.91	0.91
IV.	63 822 524 1409	44 1462 393 1899	1492	2820	0.72	0.67

The weaving width is assumed to be 40 ft. and the entry widths have been calculated and tabulated below :

Table No, 7

Weaving Section	Weaving width(w)	Entry width (E)
I	40 ft.	32 ft.
II	-do-	27 ft.
III	-do-	32 ft.
IV	-do-	27 ft.

After assuming the different standards, the round about is drawn by trial and error method and a best compromise solution is obtained. To obtain the best solution, several diagrams are to be drawn, and each time the capacities of each section is to be calculated and tabula-

ted as shown below. A sample calculation for only one side is shown here.

For side I, from the diagram :

Weaving Length (l) = 187 ft.

Weaving width (w) = assumed before = 40 ft.

$$\therefore \frac{w}{e} = \frac{40}{187} = 0.214$$

$$\text{Entry width (e)} = \frac{\text{Weaving width} + \text{Width of left turning path}}{2}$$

$$= \frac{40+24}{2} = 32 \text{ ft.}$$

$$\therefore \frac{e}{w} = \frac{32}{40} = 0.80$$

Referring previous table No. 7

Morning peak flow = 2749 P.C.U/hr.

Proportion of weaving flow (p) = 0·90

$$\therefore \text{Practical capacity } Qp = \frac{86w\left(1+\frac{e}{w}\right)\left(1-\frac{p}{3}\right)}{1+\frac{w}{l}}$$

$$= \frac{86\times 40\ (1+0{\cdot}80)\ \left(1-\frac{{\cdot}90}{3}\right)}{1+0{\cdot}214}$$

$$= \frac{86\times 40\times 1{\cdot}80\times 0{\cdot}70}{1{\cdot}214}$$

$$= 3580 \text{ P. C. Us.}$$

Otherwise, the values of practical capacity Qp can be found out from the capacity graph (ref Fig. No. 3)

Now actual flow = 2749

and the practical capacity of the side = 3580

$$\therefore \text{Reserve capacity} = \frac{3580-2749}{2749}\times 100\%$$

$$= 30\%$$

TABLE NO. 8

Dimension				Morning peak					Evening peak				
Side	e	w/l	e/w	Flow	p	1–p/3	Qp	Reserve capacity%	Flow	p	1–p/3	Qp	Reserve Capacity%
I	187	0.214	0.80	2749	0.90	0.70	3580	30%	2375	0.93	.69	3540	49.5
II	174	0.23	.725	3348	.69	.77	4150	24	866	.70	.77	4150	122
III	196	.204	.80	1754	.91	.70	3800	11	3022	.91	.70	3800	26
IV	180	.22	.725	1942	.72	.76	3790	95	2820	.67	.78	3730	32

Note : Reserve capacity will slightly increase if the theoritical weaving lengths are taken.

The capacities of this round about with the dimension as shown in table No. 8 are found to be reasonable and so this design has been adopted for this particular exercise.

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+ + +

DESIGN OF A DRINK SELLER

By—**Pradeep Kr. Cbakrabortty,**
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The drink seller functions on the combination of principles of electromagnetic operation and hydraulic pressure of liquid column and also the property of electric conductance of coin.

The drink reservoir is fitted with a push tap whicl is operated by means of an electro-magnet. The electric circuit of this magnet is complected when the coin is in the coin slit.

Details ot the coin slit is shown in figure—2. The coin slit begins from the front face of the machine, with an entrance for the coin. The other end of the slit consists of two metal strips one of which is fixed and the other can be displaced when attracted by the "coin separating magnet."

The reservoir tap's out-let is connected to a cylinder (which acts as quantity determining device). The volume of this cylinder is made equal to the amount of drink to come out of the machine (Viz—One glass or one cup as desired) in each operation.

A hollow metallic bob which floats on the liquid surface in the cylinder, is connected through a coiled conductor to the "coin separating electromagnet." On the top of the cylinder there is one metallic plate connected to the other terminal of the magnet through the battery. The mechanism is demonstrated in figure–1. As the float touches the plate on the top the circuit of the separating magnet is completed, which then pulls the coin slit. Strip down thereby broadening the gap between the two strips and the coin falls down disconnecting the electrical circuit of the—"push tap magnet," resulting in stoppage of liquid flow from the reservoir to the cylinder.

By the time the cylinder is full of liquid which then comes out of the cylinder through the siphon provided. A glass or a cup is placed under the outlet of the siphon to collect the drink.

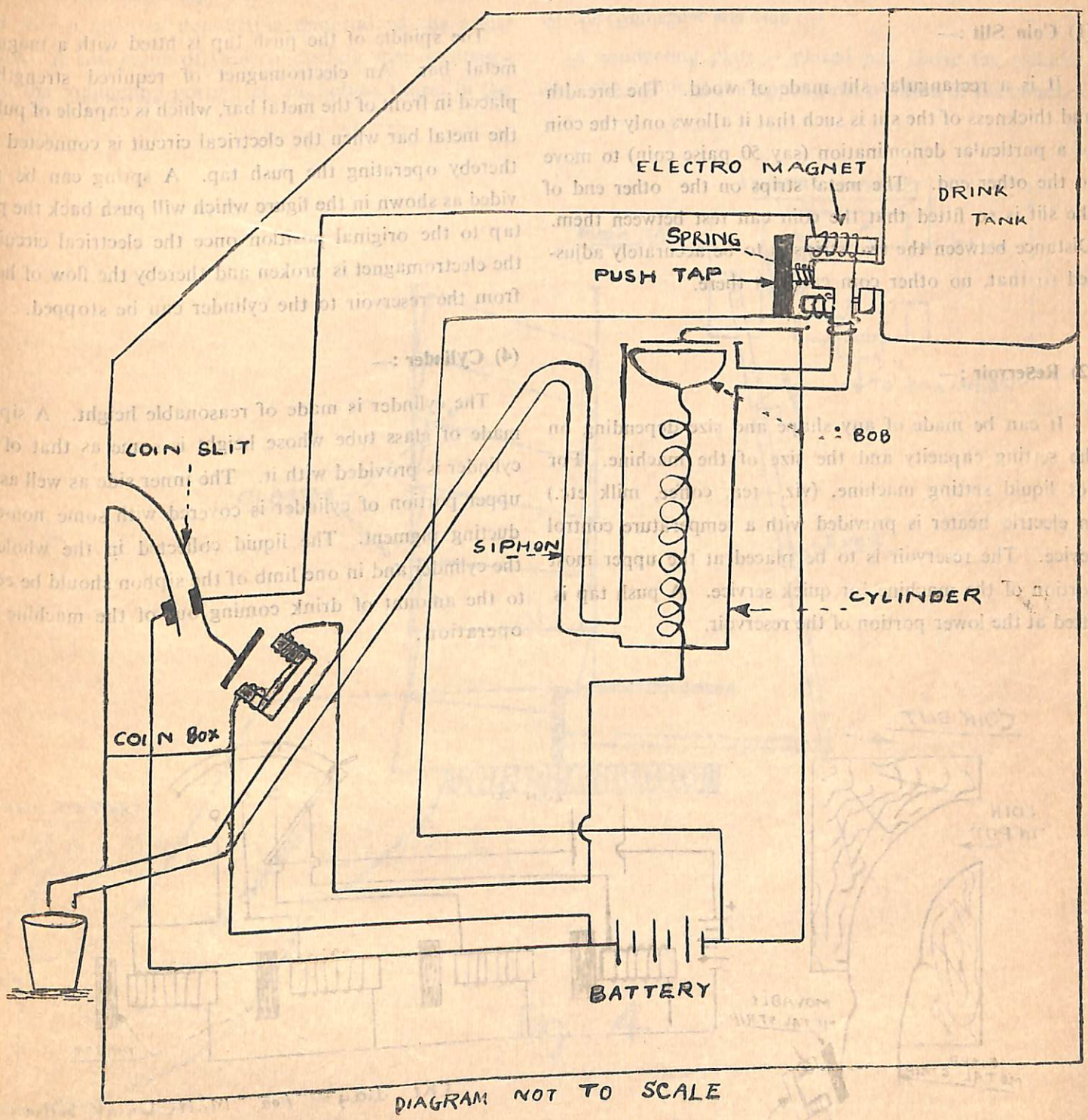

ELECTRO MAGNET
DRINK
TANK
SPRING
PUSH TAP
BOB
COIN SLIT
SIPHON
CYLINDER
COIN BOX
BATTERY
DIAGRAM NOT TO SCALE

Fig - 1

DESIGN OF THE MAIN COMPONENTS :

(1) Coin Slit :—

It is a rectangular slit made of wood. The breadth and thickness of the slit is such that it allows only the coin of a particular denomination (say 50 paise coin) to move to the other end. The metal strips on the other end of the slit is so fitted that the coin can rest between them. Distance between the two strips is to be accurately adjusted so that, no other coin can rest there.

(2) ReServoir :—

It can be made of any shape and size depending on the setting capacity and the size of the machine. For hot liquid setting machine, (viz.—tea, coffee, milk etc.) an electric heater is provided with a temperature control device. The reservoir is to be placed at the upper most portion of the machine for quick service. A push tap is fitted at the lower portion of the reservoir.

(3) Electromagnet and Push Tap :—

The spindle of the push tap is fitted with a magnetic metal bar. An electromagnet of required strength is placed in front of the metal bar, which is capable of pulling the metal bar when the electrical circuit is connected and thereby operating the push tap. A spring can be provided as shown in the figure which will push back the push tap to the original position once the electrical circuit of the electromagnet is broken and thereby the flow of liquid from the reservoir to the cylinder can be stopped.

(4) Cylinder :—

The cylinder is made of reasonable height. A siphon made of glass tube whose height is same as that of the cylinder is provided with it. The inner side as well as the upper portion of cylinder is covered with some non-conducting pigment. The liquid collected in the whole of the cylinder and in one limb of the siphon should be equal to the amount of drink coming out of the machine per operation.

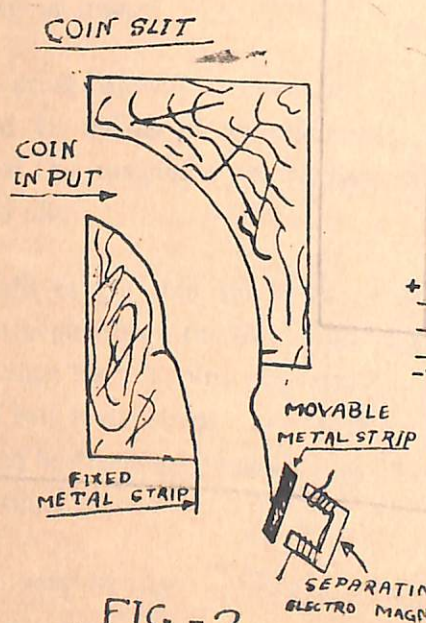
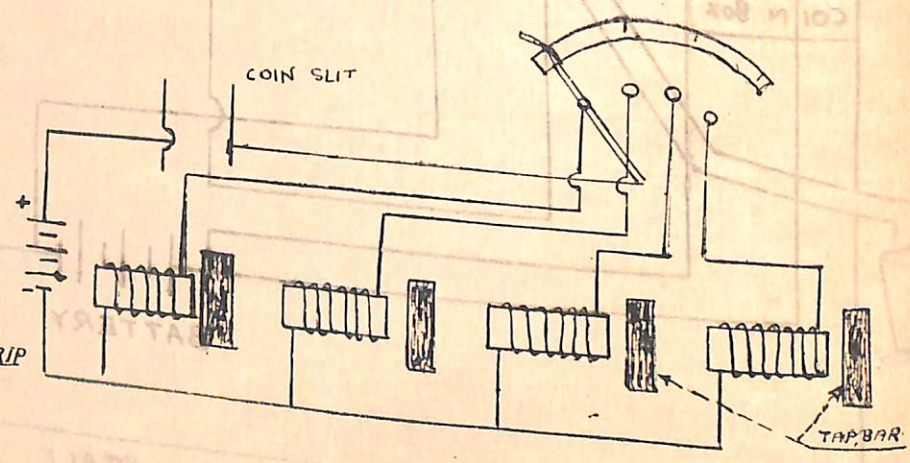


FIG - 2



CKt diagm for Multi-Drink Seller.

FIG - 3

(5) Hollow Bob :—

The hollow bob floating on the liquid on the cylinder should be reasonably height, made of aluminium or glass fitted with a layer of conducting material on the upper surface. A coil made of thin conducting wire is connected to the conducting portion of the bob as shown in the figure. Diameter of bob should be such that it can move up and down in the cylinder.

(6) Electromagnet and Bob :—

A conducting plate is placed just above the cylinder when the bob is at the upper most position of the conduc-

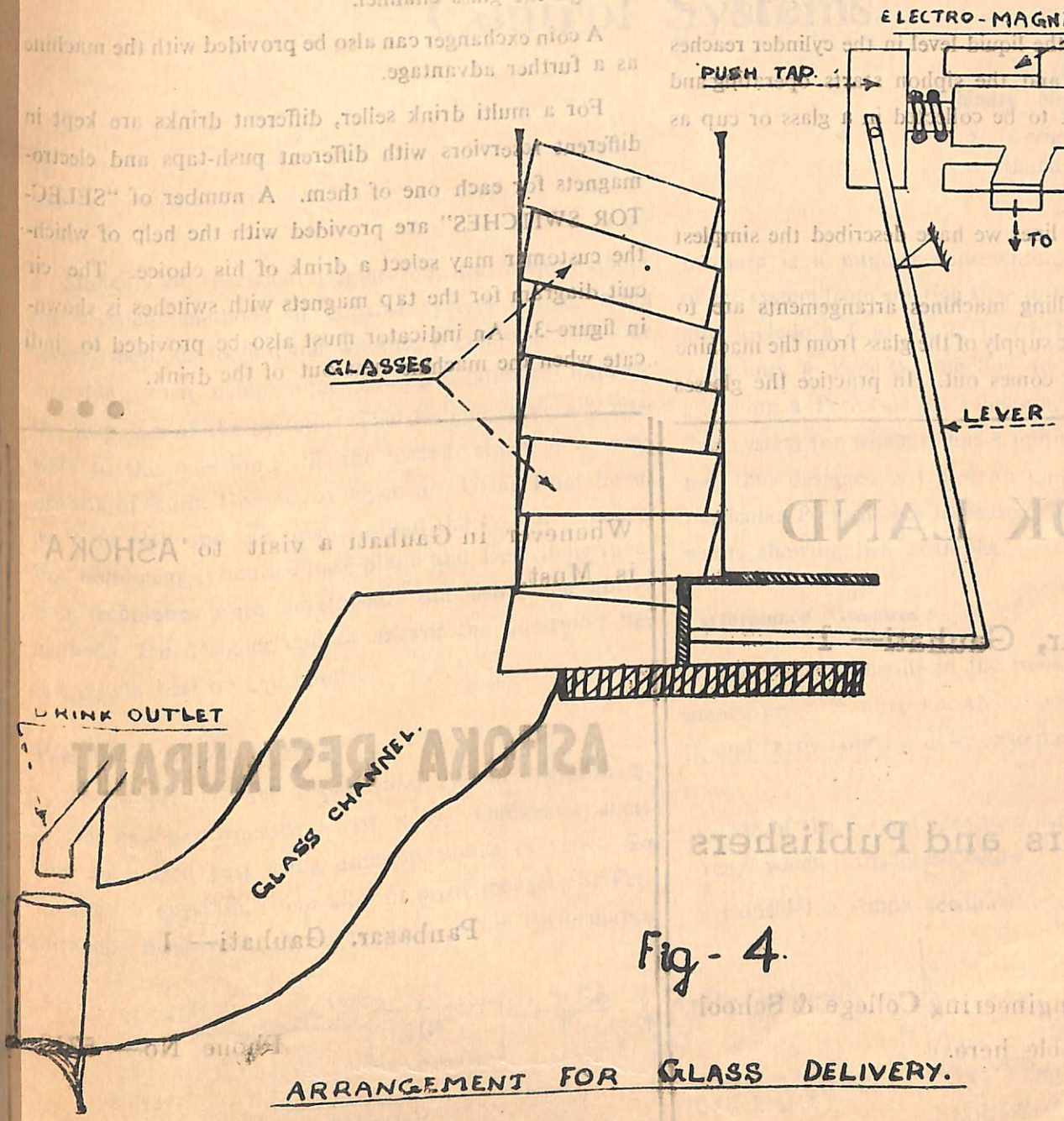


Fig - 4.

ARRANGEMENT FOR GLASS DELIVERY.

ting layer on it touches the plate and the electrical circuit of the coin separating electromagnet is closed. The electromagnet pulls the movable metal strip of the coin slit. The gap between the two strips in the coin slit is widened causing the coin to fall down which is collected in the "COIN BOX". At the same time the electrical connection of the "push tap electromagnet" is disconnected and the drink flow from the reservoir is stopped.

In the meantime the liquid level in the cylinder reaches its highest position and the siphon starts operating and the drink comes out to be collected in a glass or cup as desired.

Modification :—

In the preceeding lines we have described the simplest type of drink seller.

In commercial selling machines arrangements are to be made for automatic supply of the glass from the machine every time the drink comes out. In practice the glasses are made of paper and stored inside the machine. The glass storing arrangement depends on its shape. Glasses may be stacked one above the other in a tower of proper size. The arrangement is illustrated in the figure—4. When the electromagnet pulls the bar with push tap a lever provided with the bar is also pulled resulting in pushing of one glass by the other coin. The glass comes out through the glass channel.

A coin exchanger can also be provided with the machine as a further advantage.

For a multi drink seller, different drinks are kept in different reserviors with different push-taps and electromagnets for each one of them. A number of "SELECTOR SWITCHES" are provided with the help of which the customer may select a drink of his choice. The circuit diagram for the tap magnets with switches is shown in figure–3. An indicator must also be provided to indicate when the machine runs out of the drink.

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Optimisation Techniques In Control Systems.

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Students of Electrical Engineering are familiar about the classical methods of control system design, using several methods to find out whether a system is stable or unstable ; then using some compensations to improve the response of the system. The designer generally answers to the question : "Is the system stable ?," using criteria of Ruth, Herwitz or Nyquist. Using Root Locus or Bode plot, one can predict about the system response. For non-linear systems, Phase-plane and Describing function techniques were developed. But using the above methods, the designer cannot answer the question : "Is the system best or Optimum ?"

What is an optimum system :—

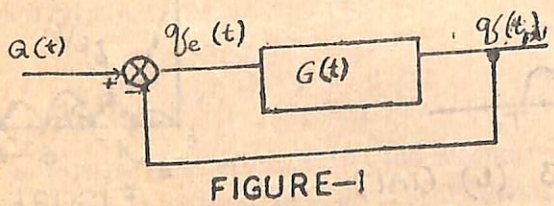
To answer whether a particular system is optimum, *i.e.* has best performance is not easy. Different systems may be judged best using different points of view. To answer the question, some kind of error measure or Performance measure is to be assumed. This Performance measure is a number representing the "Whole Error" of the system from starting time to finishing time. It may also include a Cost Function (to have a low cost) and sometimes a Penalty Function (explained later). After assuming a Performance Function, the designer tries to find system for which it has s minimum value. The system thus designed is called an Optimum system for the particular Performance measure. This is elaborated afterwards showing two examples.

Performance Measures :—

Early developments in the research about the Performance measure were known to be after the World War II, and carried out by defence departments of many countries.

One of the earliest measures used was the "Deviation Area," which is discussed below.

Consider a simple feedback system as follows.



FIGURE–1

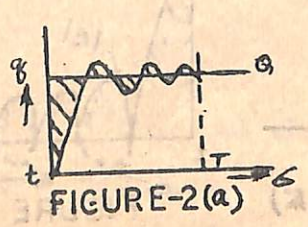


FIGURE-2(a)

FIGURE–2 (b)

Where q(t) is system response, Q(t) is reference input, $q_e(t)$ is system error, G(t) is the system transfer function. Q(t) is also the desired out put. Now look at figure 2a. 't' is present time, T is final time, σ is a dummy variable representing time. In figure 2b. the system response is shown against time. The area shown in this figure is called "Deviation Area."

Mathematically, the Deviation Area can be written as

$$e(t) = \int_t^T [Q(\sigma) - q(\sigma)]\, d\sigma = \int_t^T \epsilon(\sigma) d\sigma \ldots (1)$$

This measure could not express the performance well as evidently the positive and negative areas cancel each other.

To overcome this difficulty, other performance measures were introduced as follows.

$$\int_t^T \epsilon^2(\sigma)\, d\sigma \rightarrow \text{Integral of square of Error (ISE)} \ldots (2)$$

$$\int_t^T |\epsilon(\sigma)|\, d\sigma \rightarrow \text{Integral of absolute error (IAE)} \ldots (3)$$

These two measures are shown in the figure 3a (ISE) and fig. 3b (IAE).

ISE and IAE are respectively the marked areas of Fig. 3a and Fig. 3b. These two measures give similar results.

Some authors suggested "time-weighted" performance measures as,

$$\int_t^T \sigma\, \epsilon(\sigma)\, d\sigma \quad \text{(ITE)} \quad \ldots (4)$$

$$\int_t^T \sigma\, |\epsilon(\sigma)|\, d\sigma \quad \text{(ITAE)} \ldots (5)$$

These time-weighted measures has the advantage that the large initial error does not contribute much to the integral whereas steady-state error contribute much. The time-weighted measure ITAE is illustrated in fig. (4) (ITAE)

Some other measures were also introduced as follows :

$$\int_t^T \sigma\, \epsilon^2(\sigma)\, d\sigma, \quad \int_t^T \sigma^2\, \epsilon^2(\sigma)\, d\sigma,$$

$$\int_t^T \sigma^2\, |\epsilon(\sigma)|\, d\sigma$$

In recent years, statistical and probabilistic concepts were introduced in optimisation theory. They are not dealt with in this article.

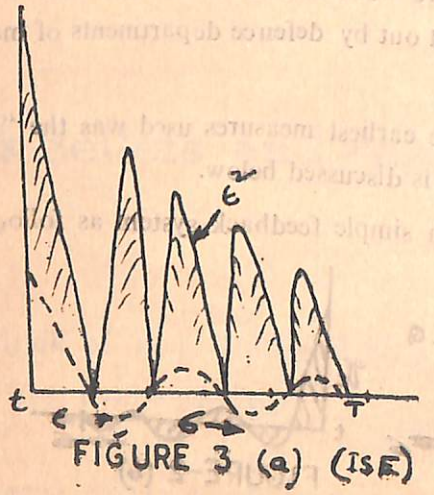


FIGURE 3 (a) (ISE)

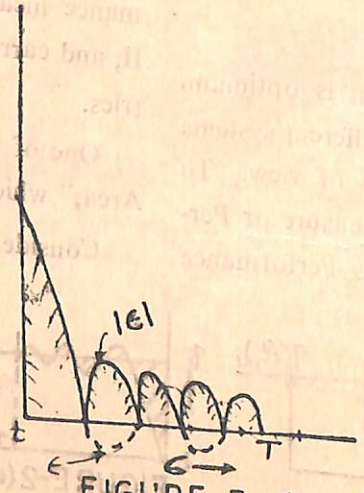


FIGURE 3 (b) (IAE)

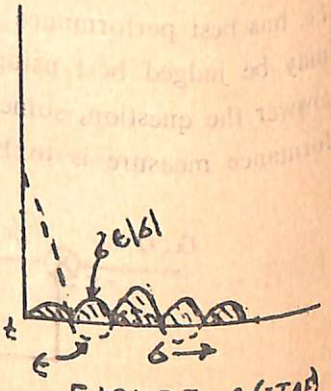


FIGURE 4 (ITAE)

Optimisation :—

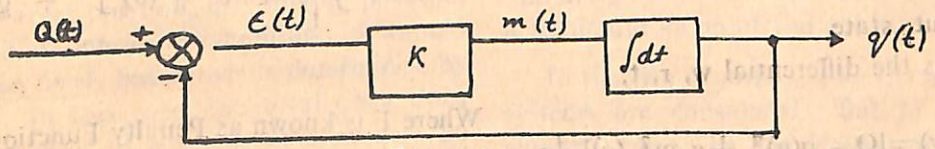
Three kinds of optimisation are generally used. The least used is "Parameter Optimisation", where the system configuration is already assumed and some constants like gain or time-constants are adjusted for minimum performance measure.

In "Impulse Response" optimisation, the response of the system to an impulse is optimised.

The most general case is "System Optimisation" which selects both the controller components and the values of its components. Using "system optimisation", one can arrive at the specific system which has the minimum performance measure.

Examples :—

A simple example of a position servo is presented here and use of parameter optimisation and system optimisation is illustrated.



FIGURE—5

Here m(t) is called the control function. Now suppose we are to find out a value for K which minimises a particular performance measure.

First thing here is to select the performance measure. Let us find a system with minimum running cost. The rate of running cost may be written as,

$$C = K_1 \epsilon^2(t) + K_2 m^2(t)$$

The first term is the cost of error and the second term is the cost of power input to the motor. Let us take the error measure as,

$$h(t) = \frac{C}{K_1} = \epsilon^2(t) + g m^2(t)$$

where $g = K_2/K_1$ a known constant.

It is assumed that desired response is a constant Q and final response time is infinity.

So the error index becomes,

$$e(t) = \int_t^{\infty} \{[Q - q(\sigma)]^2 + g\, m^2\, \sigma)\}\, d\sigma$$

Substituting $m(\sigma) = K[Q - q'\sigma)]$ we get

$$e(t) = (1+gk^2) \int_t^{\infty} \{Q - q(\sigma)\}^2\, d\sigma$$

Transient response analysis of the system will give,

$$q(\sigma) = Q\left(1 - e^{-k(\sigma - t)}\right) + q(t)\, e^{-k(\sigma - t)}, \quad \sigma \geq t$$

assuming no steady-state error.

$$\text{Thus, } e(t) = \left(1+gk^2\right) \int_t^{\infty} [Q - q(t)]^2\, e^{-2k(\sigma - t)}\, d\sigma$$

$$= [Q - q(t)]^2 \times \frac{(1+gk^2)}{2k}$$

Now, to find out the value of K which minimises e(t) is a matter of differential calculus. If K^* is the minimising value of K, then

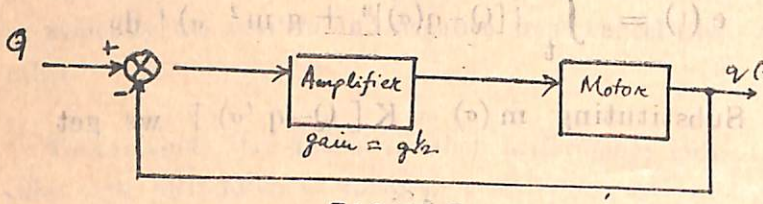
$$\left[\frac{\delta e}{\delta K}\right]_{K=K^*} = o \quad \text{and} \quad \left[\frac{\delta^2 e}{\delta K^2}\right]_{K=K^*} > o$$

Hence we get $K^* = g^{-\frac{1}{2}}$

Minimum error index is,

$$E(t) = \min e(t) = \frac{[Q - q(t)]^2}{g^{\frac{1}{2}}}$$

The oqtimum system can now be drawn as shown in fig. 5.



FIGURE—6

The same problem will be used again to show system optimisation. Now the system configuration is not known. The dynamic process of the system is,

$q(t) = x(t)$, the output state

$x'(t) = m(t)$, where x' is the differential w, r, t,

Error measure, $h(q, m, \sigma) = [Q - q(\sigma)^2 + g\, m^2(\sigma)]\, d\sigma$

$$\text{Error index, } e(t) = \int_t^T \{[Q - q(\sigma)]^2 + g\, m^2(\sigma)\}\, d\sigma$$

$$= \int_t^T \{[Q - x(\sigma)]^2 + g\,[x'(\sigma)]^2\}\, d\sigma$$

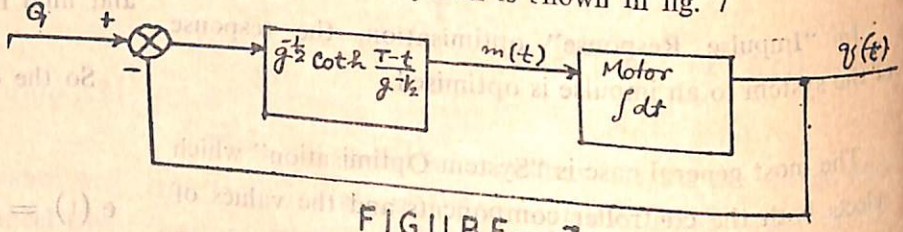
The minimising values of x and x′ are to be found out. These types of problems are studied extensively in calculus of variations. They can be solved profitably using Dynamic Programming which is a recent development. To show all the steps, for the solution of the above problem will be out of the scope of this article.

The solution is found to be;

$$m^*(t) = g^{-\frac{1}{2}} \coth \frac{T-t}{g^{\frac{1}{2}}} [Q - q(t)]$$

$$e_*(t) = g^{\frac{1}{2}} [Q - q(t)]^2 \coth \frac{T-t}{g^{\frac{1}{2}}}$$

The optimum system is shown in fig. 7



FIGURE—7

It is seen that the op imum system is a unity feed-back system.

Penalty function :—

Let us assume that input to the motor $m(\sigma)$ should never exceed a value M. In that case we can take error index as,

$$e(t) = \int_t^\infty \{[Q - q(\sigma)]^2 + g\, m^2(\sigma) + F[m(\sigma)]\}\, d\sigma$$

Where F is known as Penalty Function.

$$F = \begin{cases} \infty & \text{if } m(\sigma) > M \\ o & \text{if } |m(\sigma)| \leq M \\ \infty & \text{if } m(\sigma) < -M \end{cases} \qquad (6)$$

We have $m(\sigma) = K[Q - q(\sigma)]$

$$= [Q - q(t)]\, K e^{-K(\sigma - t)} \qquad (7)$$

From (6) and,(7). $\left| Q - q(t)\, K\, e^{-K(\sigma - t)} \right| \leq M$

$$\text{or } K \leq \frac{M}{|Q - q(t)|}$$

Putting $K = g^{-\frac{1}{2}}$, $g^{\frac{1}{2}} > \frac{|Q - q(t)|}{M}$

Thees the complete solution of the problem is,

$K^* = g^{-\frac{1}{2}}$, if $g^{\frac{1}{2}} > \frac{|Q-q(t)|}{M}$

and $K^* = \frac{M}{|Q-q(t)|}$ if $g^{\frac{1}{2}} \leq \frac{|Q-q(t)|}{M}$

I shall conclude after giving the example of a surface to air missile where the target is moving.

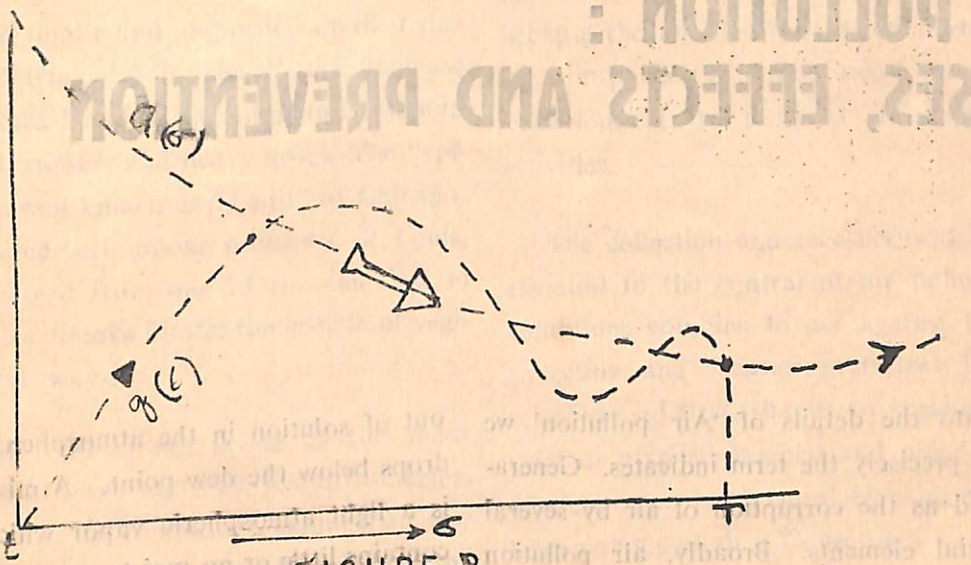


FIGURE-8

Q is the expected target position, q is missile position, t is present time and T is time of interception. It should be noted that Q is not fixed, but rather is determined by system computations. In this case, the total error does not matter. Only the error at $\sigma = T$ is of concern. So the error index is,

$$e(t) = F[Q(T) - q(T)]$$

$$= \int_t^T (u_o(\sigma - T)\, F[Q(\sigma) - q(\sigma)]\, d\sigma$$

Where Uo is one at $\sigma = T$ and zero elsewhere. If there is another requirement that the missile hits the target in the direction of target movement, than the error index can be,

$$e(t) = \int_t^T u_o(\sigma - T)\,[F(Q(\sigma) - q(\sigma)] + G[Q'(\sigma) - q'(\sigma)]\, d\sigma$$

This is minimised using variational calculus or dynamic programming. The solution will depend upon transfer function of the missile and the predicted value of $Q(\sigma)$.

The design is carried out to have a controller which gives a minimum value of the above error index.

In the two examples, considered above, only first order systems are considered. But in practice, higher order systems are to be considered ; which deal with multiple input, multiple output and multiple controllers. These problems result in solving systems of ordinary or partial differential equations of higher order. They pose great difficulty in optimisation problems. But, with the advent of high speed digital computers, they are becoming much easier to solve. At the present time computers are coming into control systems to a great extent and it can be seen that in near future computers are going to solve most of optimisation problems.

+ + +

"Science is my religion and I intend to Pursue it till the end."

—Dr. C. V. Rahman.

AIR POLLUTION : CAUSES, EFFECTS AND PREVENTION

Jahirul Islam Ahmed
Final Year (Civil)

Before going into the details of 'Air pollution' we should know what precisely the term indicates. Generally, it can be stated as the corruption of air by several natural and artificial elements. Broadly, air pollution may be divided into indoor and out-door pollution. The indoor air pollution deals with the problems of ventilation, air-conditioning, domestic, commercial and industrial air pollution. Out-door air pollution is mainly caused by smoke, dust, gases, odors, vapors, fumes, mists, smogs, and fogs. Particularly smoke and dust are the most widespread ingredients of air pollution and create the problems of greatest magnitude in air sanitation. Atmospheric pollution by fumes, smokes and smogs can be sufficiently intense to cause death. Some polluting gases in the atmosphere such as odorous vapors may create physiological effects such as sneezing, lachrymation, burning and nausea.

Smoke, fog, mist, haze and smog are caused by the suspension of fine particles of matter in air. Smoke particles are mainly unburned carbon particles called 'soot' havier than air but sustained in it by atmospheric turbulence. Fog is composed of crowd of water globules thrown out of solution in the atmosphere when its temparature drops below the dew point. A mist is a light fog. Haze is a light atmospheric vapor which impedes vision and contains little or no moisture. Smog is a mixture of both smoke and fog.

Smoke is caused mainly from the power plants, industries, railroads, steamboats and domestic users. Smallest portion of total smoke of a city from the residences which creates the nuisance in a location where it is highly objectionable to health. The principal causes of smoke may be summarised as :

1. Improper mixing of air with gases of combustion
2. Too much or too little air usually too much.
3. Too low a temperature in the combustion chamber.
4. Quenching of burning gases through cooling before combustion is complete.

A general expression for the reaction when coal is burned in air might be in the form of

$$C_m + S_n + O_{ip} + H_q = CO_2 + CO + C_m + SO_3 + SO_2 + S_{n'} + KH_2O.$$

The more nearly the amount of oxygen supplied is to the amount necessary to balance the preceding reaction, the less the probability of creation of smoke.

Damage caused by smoke includes the destruction and disfigurement of the exterior of buildings, and the soiling and rotting of the interiors and their furnishings. Certain types of building stones are attacked and corroded by the acids carried in smoke and deposited on their surfaces. Smoke being detrimental to health, will increase community medical and hospital expenses and result in less efficient industrial workers and heavy losses. The "spirit of St. Louis" is as well known as "I will" of Chicago. Both cities have mastered their smoke problems. St. Louis, in particular, has emerged from one of the smckiest to one of the cleanest cities. Smoke injures the growth of vegitation also by several ways.

In the prevention of smoke firing is the most important one. The most important objective in smokeless firing is to avoid cooling the combustion chamber to any marked degree below about 1300° F. If fuel is added to the fire intermittently, as is necessary in hand firing, only a small amount of fuel should be added at a time and, as it ignites, the air supply should slightly be increased to provide the increased oxygen demand. Emission of smoke usually means inefficient firing and waste of fuel, the big fuel consumer is easily enlisted as a smok preventer in his own plant. Even from the industries that produce smoke as a part of industrial process smoke can be reduced to escape great nuisance. The laws and ordinances controlling the smoke nuisance is applied by the city council and by the health department in some places as a preventive measure.

Dust is also a threatening to public health. Out-of-doors dust may result from the wear and abrasion of particles from unpaned and uncleaned country roads, suburban and rural highways and paned but dirty streets ; dirt and particles from open lands and rooftops etc. Dust may be blown into a city or a town over long distances from industries, surrounding fields, uncultinvted fields and roads. Particles from industries such as smelting works, cement plants, rock crushers, sand blasting and some organic dusts create uncomfortable and even physical disease. Dust in the home is due to the poor housekeeping. Dust in the industry is a common cause of industrial poisioning and occupational disease. Dusts are hygenically important because the minute sizes of the particles, resulting in a high proportion of surface area to mass., alter the physical behaviour of the particles and increase their chemical activities.

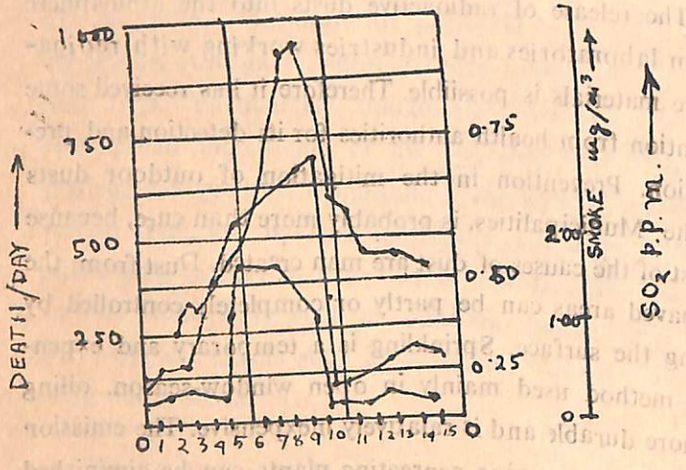
The collection and measurement of dust particles are essential to the contral of air pallution by dust. Many conditions combine to act against the accuracy of dust collecting and measuring devices. Errors arise through selectivity of sizes, shapes, or specific gravity of particles poor or atypical samples and other conditions. Quantity of dust in air is measured by aspirating and measuring a large volume of air ; Collecting a samqle of air of known volume ; and weighing the dust settling out on a gravity collector.

The release of radioactive dusts into the atmosphere from laboratories and industries working with radioactive materials is possiible. Therefore it has received some attention from health authorities for its detection and prevention. Prevention in the mitigation of outdoor dusts in the Municipalities, is probably more than cure, because most of the causes of dust are man created. Dust from the unpaved areas can be partly or completely controlled by oiling the surface. Sprinkling is a temporary and expensive method used mainly in open window-season. oiling is more durable and is ralatively inexpensive. The emission of dusts from power genreating plants can be aiminished by the installation and operation in the plant, of dust cllecting devices, therely maintaining the dust below the normal legal limit.

The industrial plants such as smelters, steel mills, paint factories and chemical works create the outdoors in the atmosphere of offensive condition. They emit the noxious and poisionous fumes and gases in the air which may be highly injurious to man, animal and vegetation. Mucous membrane irritants emitted from the industrial plants includes such substances So_2, So_3, Cl_2, and phosgence ; an eye irritants such as acrolein and other aldehydes, butadienc, Cl_2 and H_2S. Bad odors may come from rendering plants, tanneries, soap factories, glue works, oil refineries, sewage disposal plants and I. C. Engins also.

The detection of the source of fumes and gases is necessary bebore they can be successfully prevented other than by their producer. The detection of source of fumes and gases may be sufficient in an industrial centre with many potential offenders. One of the first steps in planning a campaign of fume protection is to interview complainants and residents of affected areas and attempt to correlate and clarify the data obtained.

Smog in other words as the polluted fog is a dangerous menace to health. The disastrous London smog of 1952 which caused about 4,000 deaths and much illness, was by no means the first ; records going back to the latter part of the last century show that on many occasions high mortality and morbidity have accompanied fog in large town in England. The following figure shows the mean results from 12 test sites in London area in 4-day smog in 1952 and total numbers of deaths occuring each day before, during and after the incident.



DECEMBER - 1952.

DAILY AIR POLLUTION AND DEATH

The close parallelism of the curves suggest that particular pollutents measured were necessarily the cause of deaths. The increases in pollution recorded during this smog appear rather small to account for the serious toxic effects.

There can be much damage and destruction of property but only human safety is taken into account as because property damage is considered later as a factor of public works planning. Therefore protection of a city from air pollution means the protection of human life living in the city and it vicinity. Now, control of industrial air pollution is a matter of economics as because there are no gaseous emission from industrial processes that can not be controlled if cast is no object. A method of controlling gaseous wastes is to discharge them through a stack of sufficient height to reach a stratum of air that will carry the nuisace of air away. The reasonable precautions to prevent city air pallution must be employed. The attitude of courts towards air pollution is that it is to be classed as a nuisance. A nuisance may be either a public or private or both. A person troubled by a private nuisance may secure relief through an injunction or through the enforcement of the law if the nuisance is contrary to the law. A public nuisance is a criminal offence. The creation of smoke may be either or both a public or private nuisance. smoke may be declared a nuisance by state laws or by Municipal ordinances.

Now-a-days every industrial city gets their air polluted by the causes discussed already. That is why all the possible means and measures are adopted to protect a city from its' atmospheric pollution and to get rid of the harm from them and also to secure cleaner air over our cities and industrial estates.

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A Dimensional Analysis on the Mobility of Vehicles on Dry Loose Soil

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Assam Engineering College. GAUHATI.

By dimensional analysis variables involved in a phenomenon can be reduced. Variables are combined into independent nondimensional groups and an application of the Buckingham's theorem is made with a view to obtaining a solution of a problem. But, in order to obtain a complete solution it is necessary to perform experiments. The chief gain in dimensional analysis is in the reduction of variables with the resultant simplification in experimentation.

For the purpose of this analysis we shall consider a test vehicle being pulled over dry loosely packed gravel, Obviously, soil properties such as particle size, mass density, viscous property, bulk modulus, coefficient of friction between the soil and the wheel, angle of internal friction of the soil, will influence mobility. But, for a simple solution we shall ignore these variables. The variables which will be considered are:-

V = Velocity of vehicle [L/T]
DP = Drawbar pull [ML/T^2]
M = Mass of vehicle [M]
g = acceeleration due to gravity [L/T^2]
R = Radius of wheel [L]
ω = Angular velocity of wheel $\left[\frac{1}{T}\right]$

% Slip = $(R\omega - V)/R\omega$ (nondimensional)

In this problem % slip is chosen as dependent variable of the variables DP, M, g, R, and ω.

A dimensional analysis of the above variables and the application of Buckingham's theorem yields :—

$$\% \text{ slip} = f\left[\frac{Dp}{Mg}, \frac{R\omega^2}{g}\right]$$

Such a functional relationship can be represented by plotting %slip versus $\frac{Dp}{Mg}$, using $\frac{R\omega^2}{g}$ as a parameter. It is expected to obtain a family of curves as shown in figure 1. But, data obtained from test performed on a six-wheel model operating in 1/4 inch gravel show that for varying values of $\frac{R\omega^2}{g}$ variation of slip against $\frac{Dp}{Mg}$

nearly follows a single curve. Thus the ratio of drawbar pull to weight of the vehicle for a given slip is unaffected by changing g (figure 2)

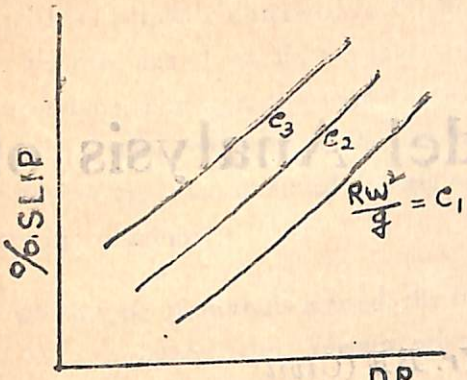
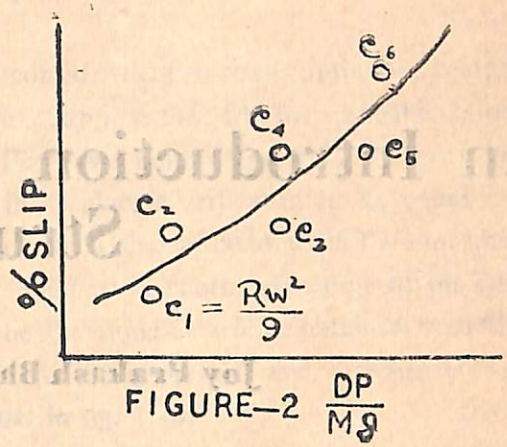


FIGURE-1

Thus we can see how dimensional analysis and experimentation have been made use of to analyse the effect of gravity on the mobility of vehicle. Consider a lunar vehicle which will obviously operate on loose dry soil of the Moon. Results of tests on mobility carried on such a vehicle in a simulated soil condition on the surface of the Earth will also be applicable when the vehicle moves on the surface of the Moon. This is a very useful finding within the limitations set forth by assumptions made.



FIGURE—2

+ + +

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An Introduction to Model Analysis of Structures

Joy Prakash Bhatta *Final Yr. BE (Civil)*

Model analysis is an experimental method of stress analysis, the importance of which has been rapidly increasing in the last 30 to 40 years. Today model analysis of structures is extremely important not only as a tool of research and development but also as an important supplement to the mothematical methods used in the actual design of structures. A model analysis is undertaken when an alternative mathematical analysis is practically impossible. Occasionally, however, it is used to verify the mathematical analysis of an unusual or complicated structure as has been the case with the many suspension bridges that have been recently built in the western countries.

CHOICE OF MATERIAL :

The first stage of carrying out a model analysis is to select a proper material for making the model. The material should be such that its structural action is suitable to its use and it is easy to fabricate for a small model. For many models the material of the prototype may be used. Steel is often used and reinforced concrete too can be used if the model sufficiently large. However, generally a material having a lower modulus of elasticity than the prototype is used so that accurately measurable distortions can be obtained without the application of forces too great. Duralumin or brass is sometimes used for steel for this reason. But the most widely used model material is celluloid. Sometimes good quality cardboard is used for rapid and approximate work.

DESIGN OF MODELS :

Whenever a reduced scale-model is used to study an actual structure it must be designed so that the behaviour of the prototype may be exactly deduced from the observations of the behaviour of the model. Unfortunately, however, it is not always possible to design and load a model so that its response will be similar to that of the prototype. For example, structural detalils such as welding or riveting do not scale up or down successfully. Another difficulty is that sometimes the various conditions which must be satisfied to achieve comete similarity between the model and the prototype may be incompatible. In such cases, a model analysis is either impossible or of doubtful value. This generally happens while dealing with dynamic loads. However, in the case of static

ds, the design principles involved and the actual testing quite simple.

There are two types of model analysis viz. (1) Indirect l (2) Direct types. In the Indirect type of analysis, the ding of the model is completly unrelated to the loading the prototype. No readings of strain are taken on the odel. In the Direct type, however, the model is usually aded in exactly the same manner as the prototype. rain measuring devices are often mounted directly on the odel and the strains obtained.

Regardless of which type of analysis is used, the model ust be designed in accordance with certain principles order to establish definite relationships or similarities etween the response of the loaded model and that of the aded prototype. The principles which establish these lationships are known as principles of similitude. Some them govern the design of model while other help in trapolating the results of the model to predict the per-rmance of the prototype.

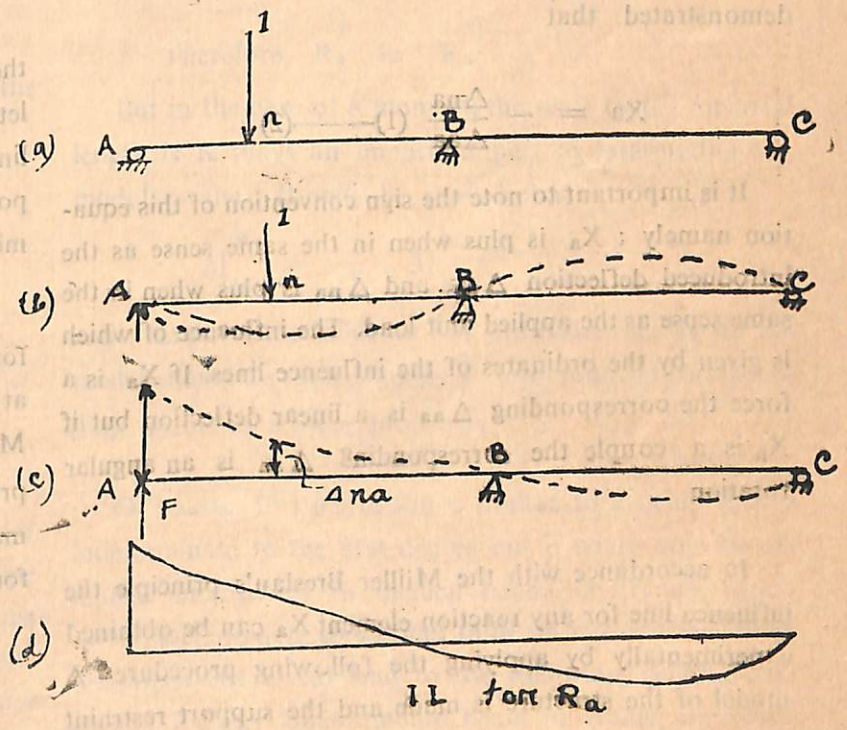
THEORY OF CERTAIN INDIRECT METHODS :

The indirect method is based on Müller. Breslau's Prin-iple of obtaining influence lines and consists essentially f physical application of the principle to scale models. he Miiller Breslau's principle may be briefly stated as ollows:—

The ordinates of the influence lines for any stress ele-nent (such as axial stress, shear, moment or reaction) of ny structure (statically determinate or indeterminate) re proportional to those of the deflection curve which s obtained by removing the restraint corresponding to hat element from the structure and introducing in its lace a corresponding deformation into the primary stru-ture which remains.

The above principle is illustrated with the help of the following example. The illustration is necessary because to understand the technique of indirect method, it is of utmost importance to have a clear conception of Miiller Breslau's Principle.

Let us consider the two-span continuous beam shown in fig. 1 (a). Suppose that I.L. for vertical reaction at A is required. First, we remove the roller support at A and introduce in its place a vertical force R_a equal in magnitude to the vertical reaction at A when the unit load is acting at any point n. The deflected shape of the beam will therefore, be the same as will be obtained with the roller support at A being present and is shown as the dotted curve ABC in fig. 1 (b)



FIGURE—1

Now we consider the primary structure (*ie*. The roller at A being removed) to be acted upon by a vertical force F at the point A. In this case, the Primary structure will deflect as shown in fig. 1(c). Thus we have considered the

primary structure under the action of two separate and distinct force systems. Applying Betti's law we may write

$$(Ra)\ (\Delta aa) - (1)(-\Delta na) = (F)(o)$$

$$\therefore\ Ra = \frac{\Delta na}{\Delta aa}\ (1). \quad \ldots\ldots\ldots (1)$$

From this equation it is apparent that the reaction R_a when the unit vertical load is at point n is proportional to the deflection Δ_{na} at that point. The shape of the influence line for R_a is therefore the same as the shape of the elastic curve of the structure when it is acted upon by a force F at the point A. The magnitude of the I.L. ordinate at any point n may be obtained by dividing the deflection at that point on this elastic curve by the deflection at point A. Similarly for any stress element X_a it may be demonstrated that

$$Xa = -\frac{\Delta na}{\Delta aa}\ (1) \text{———} (2)$$

It is important to note the sign convention of this equation namely ; X_a is plus when in the same sense as the introduced deflection Δ_{aa}, and Δ_{na} is plus when in the same sense as the applied unit load. The influence of which is given by the ordinates of the influence lines. If X_a is a force the corresponding Δ_{aa} is a linear deflection but if X_a is a couple the corresponding Δ_{aa} is an angular rotation

In accordance with the Miiller Breslau's principle the influence line for any reaction element X_a can be obtained experimentally by applying the following procedure A model of the structure is made and the support restraint that supplies this reaction element to the model is temporarily removed. Now a displacement Δ_{aa} is introduced in the direction of the removed restraint. This will distort the model into the shape of the influence line for the reaction element X_a. To obtain the absolute magnitude of any ordinate the deflection Δ_{na} which is produced at that point is measured and it is divided by the introduced displacement Δ_{aa}. Since any suitable constant Δ_{aa} may be introduced and the force necessary to produce this displacement is not involved in the calculations, influence lines may be easily determined in this manner from scale-models.

Derivation of Principles of similitude :—

The principles of similitude may be determined by either of the following two approaches :—

(1) By using established laws of structural mechanics
(2) By dimensional analysis,

Here, only the first approach will be discussed.

(1) **By laws of structural mechanics :—**To illustrate the derivation of the principle of similitude by this approach, let us consider the problem of extrapolating influence line data from a model to its prototype. For this purpose, let us consider a beam which is statically indeterminate to the first degree, such as that shown in fig. 2.

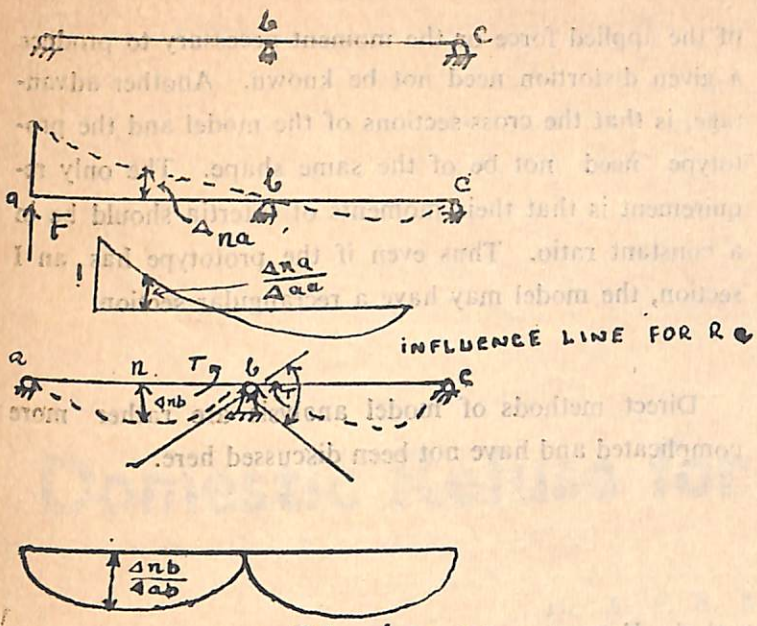
Suppose that we wished to obtain the influence lines for Ra, the vertical reaction at a and for M_b, the moment at b. In either case, we may obtain them by applying Miiller Breslau's principle as shown in fig. 2. Now, this procedure can be applied to either the prototype or its model. When applied to the prototype, the expressions for the ordinates of these two influence lines are :—

$$R_a^p = 4/\frac{\Delta_{na}^p}{\Delta_{aa}^p} \quad (1)$$

and

$$M_b^p = 4/\frac{\Delta_{nb}^p}{\Delta_{bb}^p} \quad (1)$$

where, the index p indicates that these quantities refer to the prototype.



FIGURE–2

And, by applying Miiller Breslau's principle to the model we get,

$$R_a^M = 4 \frac{\Delta_{na}^M}{\Delta_{aa}^M} \quad (1)$$

$$M_b^M = 4 \frac{\Delta_{nb}^M}{\Delta_{bb}^M} \quad (1)$$

where the index M refers to the model. Of ccurse, if the principles of similarity between model and prototype are known, the ordinates of these influence lines may be measured experimentally on a small scale model and then these results extrapolated to the prototype. In other words, to do this we need to know the relation between

R_a^M and R_a^P and M_b^M and M_b^P

Let us assume that the following scale relationships exist between the model and the prototype :

$$L^M = KL^P, \quad l^M = \alpha l^P, \quad E^M = \beta E^P, \quad F^M = \gamma F^P$$

If we obtain the influence line for any stress element X_a, for this model, we may extrapolate it to get corresponding influence line for the prototype, Now, it is apparent that the relationships between the reactions or moments on the model and those on the prototype depend upon the relationship between deflections. If, now, an investigation is made by considering the computations of such deflections by the method of virtual work, it may be demonstrated that in the case of a force the scale factors have nothing to do with interpolation of model results to get the corresponding prototype results. In fact, the influence line for any force (external reaction component or internal shear or axial thrust) induced by loading of the prototype will be indentical to the corresponding influence line obtained for the model.

Therefore, $R_a^P = R_a^M$

But in the case of a moment, the scale factor for axial length is K plays an important part in interpreting the model results. It may be proved that

$$M_b^P = \frac{1}{k} M_b^M$$

and, therefore, the influence line ordinates for M_b on the model should be multiplied by $\frac{1}{K}$ to obtain the corresponding ordinates on the prototype.

Of course, this discussion is limited to a beam that is indeterminate to the first degree but it could now be extended successively to include beams or frames which were indeterminate to second, third or any degree. Such considerations would lead to the following general conclusion for any indeterminate beam or frame, the stress analysis of which can be carried out satisfactorily by considering only the effect of bending distortion :

"A model should be dimensioned so that axial lengths of its members are K times the corresponding axial lengths of the prototype. The moments of inertia of its cross-sections are α times those of the corresponding cross-sec-

tions of the prototype, and the modulus of elasticity of the model material is β times that of the prototype. If this is done, then the ordinates of the influence line for any reactive force, shear or axial stress on the model are equal to the corresponding ordinates on the model ; but the ordinates of the influence line for any moment on the prototype are equal to $\frac{1}{K}$ times the corresponding ordinates on the model."

It is to be noted that the scale-factor for force is not at all important in indirect analysis. Since the magnitude of the applied force or the moment necessary to produce a given distortion need not be known. Another advantage, is that the cross-sections of the model and the prototype need not be of the same shape. The only requirement is that their moments of intertia should be in a constant ratio. Thus even if the prototype has an I section, the model may have a rectangular section.

Direct methods of model analysis are rather more complicated and have not been discussed here.

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Domestic Refuse for Agricultural Use

Dr. A. F. S. A. Aowal,
B.E., D.I.C., M.Sc (Lon), Ph.D. (Lon),

Hardly there is a home in our society where much thought is given towards the use of garbages daily produced in our dwellings. These garbages can be broadly classified into two classes—inorganic and organic according to their chemical composition. The inorganic fraction embraces a wide assortment of particles of various shape, size and composition such as pieces of ferrous and non-ferrous metals, tin cans, stones, broken crockery, dusts and other small inert particles of infinite variety. The organic fraction is mainly carbonaceous and consists of vegetable wastes, papers, rags and half burnt coal, char-coal etc.

The production and disposal of domestic refuses take different patterns depending on the social set up. For example urban and country refuses vary in their quality, quantity, production and dispersion. In the country side people care less towards collection of refuse in one place and an organised disposal—the usual practice being sweeping the rubbish to the front or backyard of the dwellings. Whereas in urban areas the refuses must be collected in bins and in most cases their final disposal lies with the Municipal authorities (social delinquents who dump garbages infront of their doors are excluded).

Taking the towns first, the collection and disposal of domestic refuse is a must for all municipal authorities. However, organised and scientific collection and disposal is a costly process specially when their volume is small. In a city with multistoreyed buildings collection of refuse within the dwellings themselves is a problem and various researches are going on to evolve the easiest and economic ways of collection of these refuses in the ground floor from where they can be collected by the disposal authorities. In England and the U. S. A., the use of 4" dia vertical chutes with collecting pans in each floor are found to be convenient. The next stage of the dwelling refuse is its disposal in tips outside the town limits. Present emphasis is on controlled tipping which means the provision of disposal of refuse in such a manner that all the putreseible matters are rendered innocuous and harmless. This is done by depositing the refuse in layers. Another

process usually followed in our country in utter disregard of air pollution is Incineration which means the burning of the refuse. Yet another process followed by irresponsible public bodies is the indisriminate tipping of refuse wherever found convenient.

As mentioned earlier collection and disposal of refuse is a costly process with practically no returns except in terms of Public Health. Some of the utilities of collected garbages are filling of low lands, preparing cultivable lands from waste lands etc., but the most important is it's manurial value (1) if favourable conditions are created for biological activity. The immense potential these wasted refuses hold can be illustrated with a simple example : Taking the Gauhati township as a sample the following data are assumed—Number of population—3,00,000. Per capita refuse production per day—0.25 Kg. Sp. Gr. of collected refuse—2 approxly. Then the total sewage produced annually—27×10^6 Kgms. = 27000 Metric Tons approximately. The theoretical value of this refuse at Rs. 30.00 per ton amounts to Rs. 8.1 lacs. If this refuse is used for filling purpose, it would fill an area of 14000 sq. metres upto a depth of 1 metre. The information which is provided by the above example has established that, while domestic refuse is a potential source of nuisance to Public Health, it is also a source of many of the materials required for industrial processes as well as of organic matter capable of being processed to produce manures.

Separation of Constituents of refuse :—For fully utilising the value of domestic refuse, separation of different ingredients is accomplished by first passing the refuse through rotary screens by which the fine particles under $\frac{3}{8}''$ are removed along with particles between $\frac{3}{8}''$ to $1\frac{1}{2}''$; the refuse is then transferred to a picking belt where ferrous materials are either extracted magnetically or manually. It is the fine extracts that have manural value.

Refuse dust when consists of pulverised coal, charcoal etc. is a valuable source of plant nutrient—more so if it contains a certain amount of ammonia.(2) According to Dhar(3) it's special virtue as manure lies in the fact that coal contains all the ingredients of a fertile soil and when pulverised and mixed with soil, these ingredients are slowly released and assimilated by growing crops. Arnon(4) made investigations to substantiate Dhar's(3) findings by observing growth of Asparagus and Letture in such soils enriched by refuse dusts. Experiments were also carried out to established the effect of fine dust in the growth of grass by strain(5). These researches establish beyond doubt the efficacy of refuse dust as a manure. However, farmers are reluctant to use it in the crude form as it is inconvenient is handle it as such. As an ingredient of 'composts' it makes very important contributions as mineral nutrients in addition to acting as an absorbant when mixed with wet sewage sludge.

Vegetable matters form an important source of organic domestic refuse. The relatively small quantity of vegetable wastes in refuse has practically no commercial value in it's crude form but provides a valuable source of raw-materials for the production of composts.

Rags are sometimes used for composting but their commercial value is often superior to it and hence extracted and disposed of to industry.

Bones have high commercial value. They are mostly used in pulverised form and mixed with other organic wastes to produce composts. Their presence adds small but useful amounts of organic phosphorus.

Initially the separation of domestic refuse to it's constituents was undertaken to isolate the organic wastes for incineration. This causes the bulk reduction to half and thus reduces transport charges. However the presen

trend is to exploit all conceivable ingredients from refuses inspite of high capital cost of separating plants. In a poor country like our's operation and capital costs of these plants and furnaces are economically prohibitive.

Preparation of Domestic refuse for Agricultural use :—

Use has shown that domestic refuse in a crude state has little or no value as a manure(6). It contains a large amount of useless inert material which has no agricultural value and very cumbersome to handle. The manurial value it contains lies in its' organic contents. The organic content is highly carbonaceous in character and only when it contains an abnormally high amount of organic nitrogenous matter, it has any immediate manural value. Even when provision for removal of inert materials such as stoves metals, wood, bones and rubber is made, the remaining organic matter will not suffice to grow crops immediately after it is mixed with the soil.

It is interesting to note that organic matter containing Carbon-Nitrogen ratio in excess of 20 : 1 is unsuitable for active plant growth. This is explained as due to the growth of micro-organisms of soil in great abundance in presence of carbonaceous matters which take up all the nitrogenous matters leaving practically nothing for the higher plants. In course of time, the micro-organisms will narrow the ratio below 20 : 1 when the plants will be able to assimilate the plant nutrients from the soil. Thus unless additional nitrogen are available from other sources, the carbon Nitrogen ratio is reduced to less than 20 : 1 before the wastes are applied to the land. The length of time during which fresh organic matters prevent plant growth depends on the nature of the soil, character of the fresh organic substances and soil population of micro organisms. Because of variable composition, the time required to lapse betwen incorporation of domestic refuse to soil and growing of crops vary. The controlled method of tipping is an effective method of disposing refuse hygienically, production of humans of high manural value and destruction of harmful soil micro organisation. The fact that agriculturally valuable humus can be obtained from domestic refuse merely by allowing it to decompose in heaps has been used in Holland. Various forms of composting by pulverised refuse has been largely employed in the European countries. To evolve a modern way of treeting domestic refuse of our crowded cities is a crying need of the day.

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WELDING OF NON-FERROUS METALS

Harinath Haloi,
Final Year (Mech.)

The non-ferrous metals, comprising chiefly allumi-nium, magnesium, copper, lead, tin, zinc, nickel, and the precious metals, form to-day one of the most important groups of materials available to the Engineer, particularly when the large number of their alloys is also considered. The total tonnage of all non-ferrous metals in use can not compare with the out put of iron and steel, but their true value can be assessed by referrence to the wide range of properties presented to the discerning designer. As their initial cost is very high and is greater than that of the mild steel or C. I., they are obviously employed only when their superior characterstic make them economic.

The present position of the available processes in relation to the commoner metals and alloys is summerised in the table shown in the next page, in which the methods of welding the non-ferrous metals are divided into two groups—

(i) FUSION (or pressureless) Process.

(ii) Pressure welding.

FUSION WELDING

There are five well-defined and recognised fusion welding processes, which are as follows :

1. Gas Welding.
2. Metallic Arc.
3. Carbon Arc.
4. Atomic Hydrogen.
5. Inert gas shielded Arc.

TABLE—1

Summary of welding processes applied to non-ferrous metals & alloys

R = Recommended method.
N = Not used or recommended at present.
L = Possible, but of limited use at present.

Metal or Alloy group	Fusion Welding Processes										Pressure or Resistance welding				
	oxy-acetplene	oxy-H drogen	oxy-coal gas	Air-Acetylene	Atomic-Hydrogen	Carbon-arc	Metallic-Arc	Inert-gas shielded arc	Weibel or like methods	Air-coal gas	Spot	Seam	But	Flash	Projection
Alluminium	R	R	R	N	L	L	R	R	L	N	R	L	L	L	L
Alluminium alloys case ...	R	R	R	N	L	L	R	L	N	N	N	N	N	N	N
Wrought (Heat treated) ...	L	N	N	N	L	N	L	R	L	N	R	R	L	R	L
Wrought (Non-Heat treated) ...	R	R	R	N	L	L	R	R	L	N	R	R	L	R	L
Copper	R	N	N	N	N	L	L	R	N	N	N	N	L	L	N
Copper-zinc alloy (Brasses) ...	R	R	N	N	N	L	L	R	N	N	N	N	L	L	N
Copper-tin alloy (Bronze) ...	R	L	N	N	N	L	R	R	N	N	N	N	L	N	N
Copper-alluminium alloy ...	L	L	N	N	N	R	R	L	N	N	L	N	L	N	N
Copper-Nickel	L	L	N	N	N	L	R	L	N	N	L	N	N	N	N
Lead	R	R	R	R	N	N	N	L	N	R	N	N	N	N	N
Low melting Point metals ...	R	R	R	R	N	N	N	L	L	R	N	N	N	N	N
Magnesium alloys	R	R	R	N	N	N	N	R	L	N	R	L	N	N	N
Molybdenum	N	N	N	N	L	L	N	R	L	N	R	L	L	N	L
Nickel	R	N	N	N	L	R	R	L	N	N	R	R	L	R	N
Gold	R	R	R	N	N	N	N	N	N	N	R	N	N	N	N
Titanium	N	N	N	N	N	N	N	R	N	N	R	N	N	N	N

Out of these processes, the widely used method is gas welding and we shall write only on its operation.

GAS WELDING

Welded gases

Gas	Maximum flame temperature.	
	With air °c	With oxygen °c
Acetylene ...	1755–2120	3060–3120
Hydrogen ...	1700–2000	2300–2550
Coal gas ...	1600–1840	2000
Butane ...	1750–1900	2730–2900
Propane ...	1750–1925	2500

In the table given above, a large number of fuel gases suitable for welding non-ferrous metal are given.

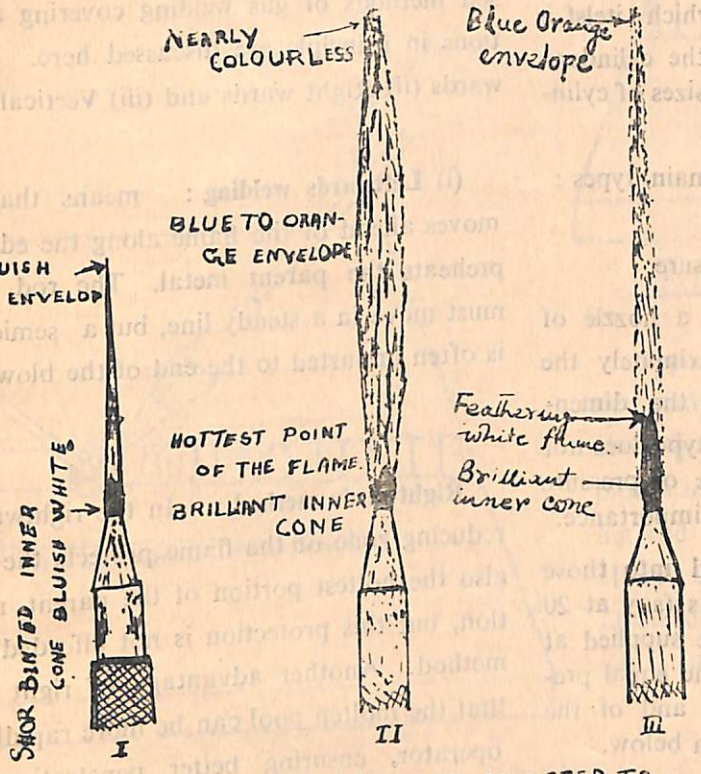
The oxy-acetylene flame is by for the most important, mainly due to its high max m tem r and also the versatile nature of flames obtainable. They are used for welding aluminium, zinc, lead, magnesium, copper, nickel, and their alloys, some of the high melting point metals and some precious metals.

Control :—

It is of fundamental importance that the type of flame most suitable for a particular metal should be maintained accurately throughout the welding operation. It is essential that the operator should realise the flame may alter slightly during welding, due to variations of in tem r of the blow pipe tip or pressure of the supply. The appearance of the reqd. flame must therefore be so familiar that

immediate readjustment is made as soon as the character of the flame under goes any change.

The appearance of these flames is indicated in fig. below and may be summarised as follows :



OXY-ACETYLENE FLAMES ADJUSTED TO (1) OXYDISING, (2) NEUTRAL & (3) REDUCING CONDITION

Fig. Oxy-acetylene flames adjusted to (i) oxidising, (ii) Neutral & (iii) reducing condition.

Acetylene flame : When acetylene is burnt without oxygen in the Acygas stream a long ragged flame is produced, yellow in colour with a sooty fringe.

Excess Acetylene flame As the flow of oxygen to the nozzle is inacased, the size of the flame decreases and a bright white cone appears at the blow pipe tip. The yellow tinge is reduced & the body of the flame become lies visible.

Neutral flame : As the Oxygen is increased still further the inner cone becomes more clearly defined and assumes an intense bluish white colour. It is surrounded by a bushy flame of a purplish blue colour streaked with red at the extremely. The length of the inner luminous cone usually varies between $\frac{1}{16}$ and $\frac{5}{8}$ inch.

Oxidising flame : When proportion of oxygen is increased beyond the neutral point the flame as a whole and the inner cone are both reduced in size and the inner portion becomes less sharply defined. The colour assumes a purple tinge and the cone becomes more pointed.

EQUIPMENT

(i) **Supply of oxygen and acetylene :** Oxygen is obtd. from steel cylinders, in which it is compressed to 2000 lb/sqin at ordinary temp^{r} i.e. at 70° F. It should be noted that the pressure of a full cylinders increases by about

5 lb/sq. in for each 1° F. increase intemp r. above 70° F. and it falls 5 lb/sq. in for each 1 F. decrease below 70 F. standard cylinders sizes in this country are 100 cuft., 200 cuft., 500 cuft.

Accetylene is drawn either from high pressure cylinders or from a generator. Acetylene in the cylinder is held in solution under pressure in acetone, which itelsf is carried in a porous material packed into the cylinders. Normal pressure is 250 PSi and the common sizes of cylinders are 60, 120, and 200 cuft.

(ii) **Blow Pipes :** Blow pipes are of two main types :

(a) Those on the injector Principle.
(b) Those depen,ding on constant gas pressure.

In the former, oxygen passing throu h a nozzle of special form draws in acetylene in approximately the correct proportion as long as the design and the dimension of the blow pipes are correct. But this type does not give a constant flame over the whole range of pressure and its use is often limited to work of minor importance.

Non-injector blow pipes may be subdivided into those using equal pressure of oxygen and fuel gas (say at 20 lb/sq. in) and those to which the gases are supplied at pressure in proportion in their densities. The equal pressure principle has proved most successful and of the available designs, a typical blow pipe is shown below.

MANIPULATION

Each material, and frequently individual applications, require a specific technique for the preparations of edges and manipulation of the blowpipe—Edge preparation is detailed under the individuals metals, but three recognised methods of gas welding covering all possible variations in principle are discussed here. They are (i) Left wards (ii) Right wards and (iii) Vertically upwards.

(i) **Leftwards welding :** means that the welding rod moves ahead of the flame along the edges and the flame preheats the parent metal. The rod as shown in fig. must move in a steady line, but a semicircluar movement is often imparted to the end of the blow pipe.

Rightwards method : In the rightwards method the reducing zone of the flame protects the molten pool and also the hottest portion of the parent metal from oxidation, but this protection is not afforded by the leftwards method. Another advantage of right wards welding is that the molten pool can be more rapidly observed by the operator, ensuring better penetration and continuity.

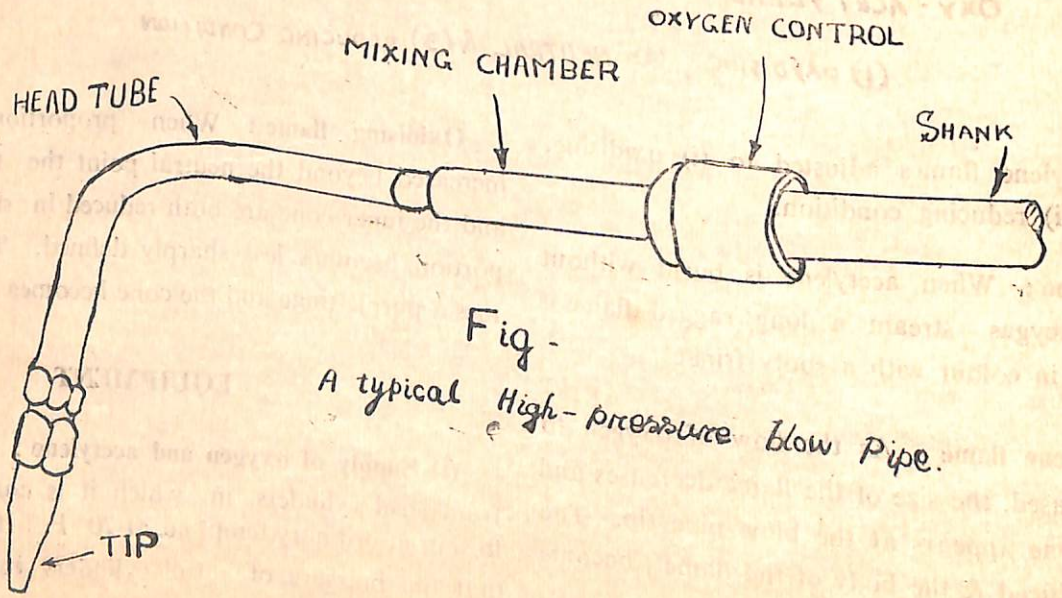
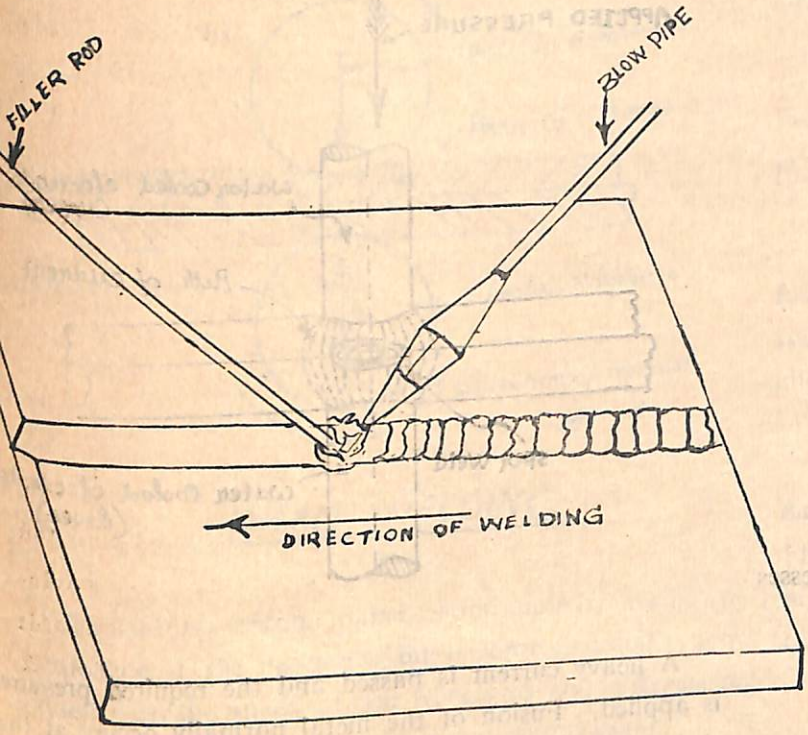
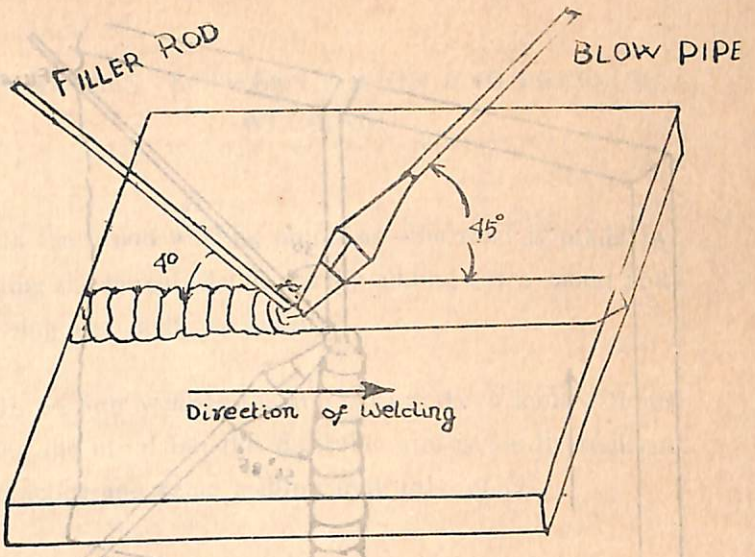


Fig -
A typical High-pressure blow Pipe.

Finally heat of the flame is utilised to the maximum extent in the rightwards technique, but the preheating value of the flame in the leftwards technique is specially important in welding the metals of high thermal conductivity.



LEFT WARDS WELDING

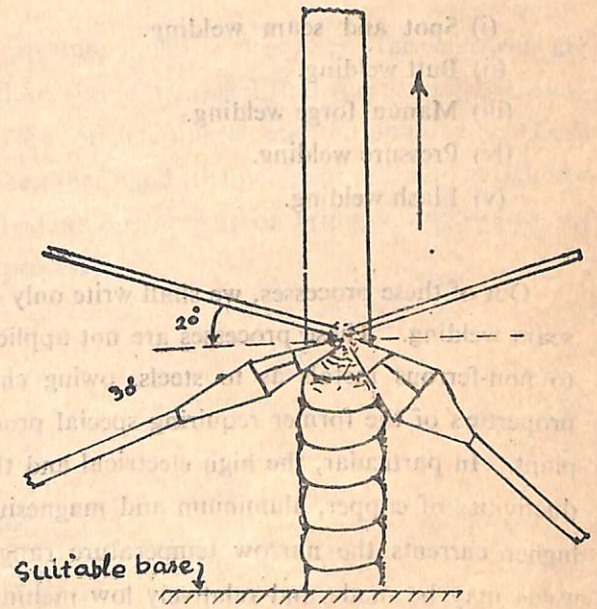


RIGHT-WARD WELDING.

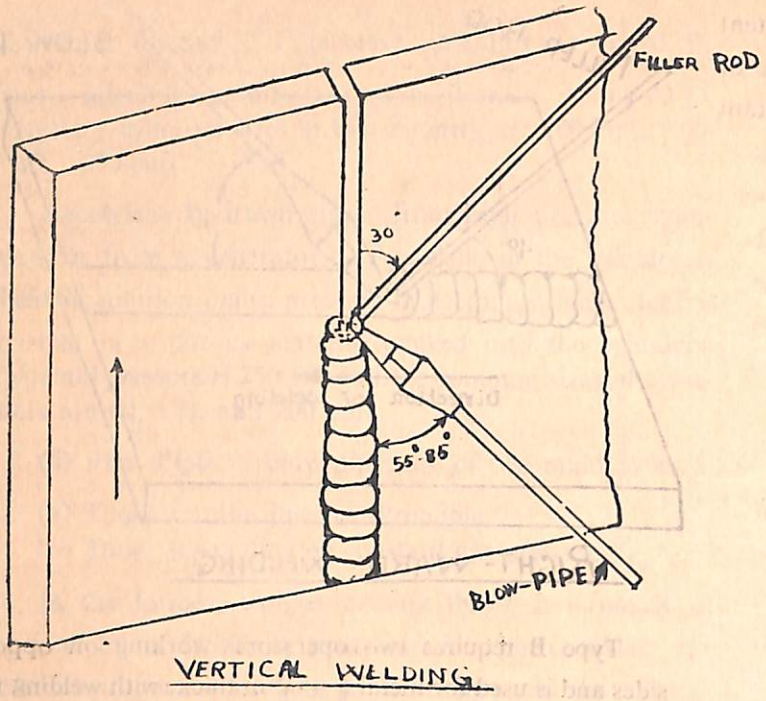
Type B requires two operators working on opposite sides and is used for metal $\frac{1}{8}$ — $\frac{5}{8}$ in thick, with welding rods about $\frac{1}{8}$ in diameter. The edges are square and the blow pipe is moved upwards in an undeviating line. The welding rod describes a semi-circular motion and the weld is always executed from the bottom to the top. Type C again requires two operators and is employed for material $\frac{1}{2}$ to $\frac{7}{8}$ inch thick.

Vertical Welding : There are three types of vertical upwards welding, the choice of the particular technique being governed by the thickness of the material weldeed. They are known as A, B & C.

Type A is used by a single operator for materials from 0.08″ to 0.4″ thick with a welding rod approximately half the thickness of the plate. The edges are left square and the blow pipe is moved upwards in an undeviating line. The welding rod describes a circular motion and the weld is always executed from the bottom to the top.



VERTICAL WLDING



VERTICAL WELDING

2. PRESSURE PROCESSES :—

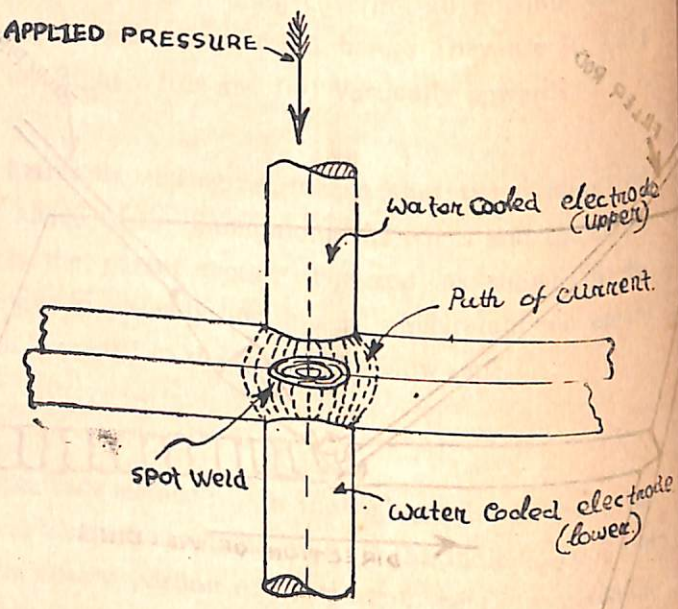
There are five recognized pressure welding processes which are as follows :

(i) Spot and seam welding.
(ii) Butt welding.
(iii) Manual forge welding.
(iv) Pressure welding.
(v) Flash welding.

Out of these processes, we shall write only on spot and seam welding. These processes are not applied as widely to non-ferrous metals as to steels, owing chiefly to the properties of the former requiring special procedures and plant. In particular, the high electrical and thermal conductivities of copper, aluminium and magnesium demand higher currents the narrow temperature range in which welds may be made and relatively low melting points of light metals, like lead, zinc etc. require very close control of the operating conditions.

(i) Spot and seam welding :

Spot welding is used for lap joints, the faces of the sheets concerned being pressed into close contact by an electrode on each side, as shown diagrammatically in fig.

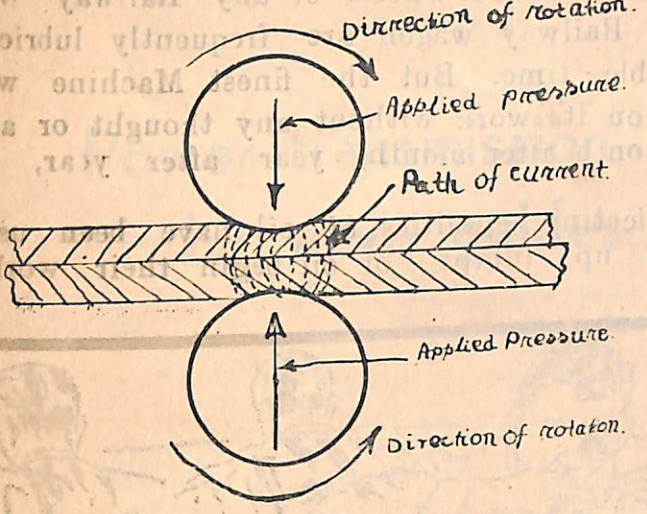


A heavy current is passed and the required pressure is applied. Fusion of the metal normally occurs at the sheet-to-sheet interface although it is possible for successful welds to be made purely by pressure welding. It can again be divided into (a) **Simple spot,** (b) **Projection,** (c) **Seam and stitch,** (d) **Cross-wire** (e) **Stud welds.**

Simple spot welds are made when the area of electrode in contact with the sheet is small, so that the passage of the current is localised and the resulting high current density produces heating within a small area only.

In projection welding, large flat electrodes are used instead of using electrodes with small contact area. This type of welding is done if the position of each spot weld is fixed by a projection or ridge formed in one or both of the sheets to be joined.

Seam and stitch welding are modifications of the spot welding process and involve the passage of the sheets to be welded between rotating wheels which function as electrodes as shown in fig.



SEAM WELDING.

The current seldom passes continuously, owing to overheating of the electrodes, but is controlled and synchronised with the speed of the wheels to give a series of spots which may overlap to give a continuous seam.

Cross wire or mash welding is used to join intersecting wires in the manufacture of wire goods.

Stud welding is used to join the ends of bolts or studs to plate or sheet.

DIFERENCES BETWEEN FUSION AND PRESSURE WELDING'

In the fusion w.lding processes—the weld is made by melting the parent metal, usually adding extra metal and allowing the melt to solidify.

In pressure welding the aim is to make a joint without fusing the metal but this desirable aim is hardly realised in practice and some melting may take place.

A major point of fundamental difference is that in fusion welding extrametal is normally added. The filler rod or metal electrode may be used as means of conveying alloying elements to the metal comprising the joint.

Slags formed by the action of the fluxes and also the flux themselves protect the parent metal before welding. Fluxes act as a cleaning agents during the actual making of the joint, but in pressure welding all such cleaning must be carried out before welding commences.

In the pressure welding processes, the controls are usually so devised and arranged that the correct operating conditions are predetermined and automatically obtained. On the other hand, the personal skill and reliability of the individual operator is of primary importance in the fusion processes.

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+ + +

Some important news about your watch

Seem to be surprising, yet it is true that, in proportion to its weight, every wheel of a Watch carries greater friction load than the wheels of any Railway wagon could possibly stand. The wearing parts of a Railway wagon are frequently lubricated, though they get complete rest for a considerable time. But the finest Machine which is fitted in your watch is allowed to carry on its work without any thought or attention. Thus you are getting non-stop service month after month, year after year, until it breaks down.

Just imagine what happens. The lubricating qualities of oil have been usedup during the whole year. Now these dired up lumps of oil begin their works of destruction. Tick by tick they cut and destroy the smooth vital parts of your watch just like grinding paste. One month of such wear will not only cut the life of your watch in half, put for all time end its accuracy.

Hence, you will realise the necessity of periodical cleaning and oiling of your watch at least once a year. If your watch was last oiled and cleaned twelve months ago, or if is not keeping correct time it should be sent to an expert Watch maker for thorough overhouling and necessary repairs.

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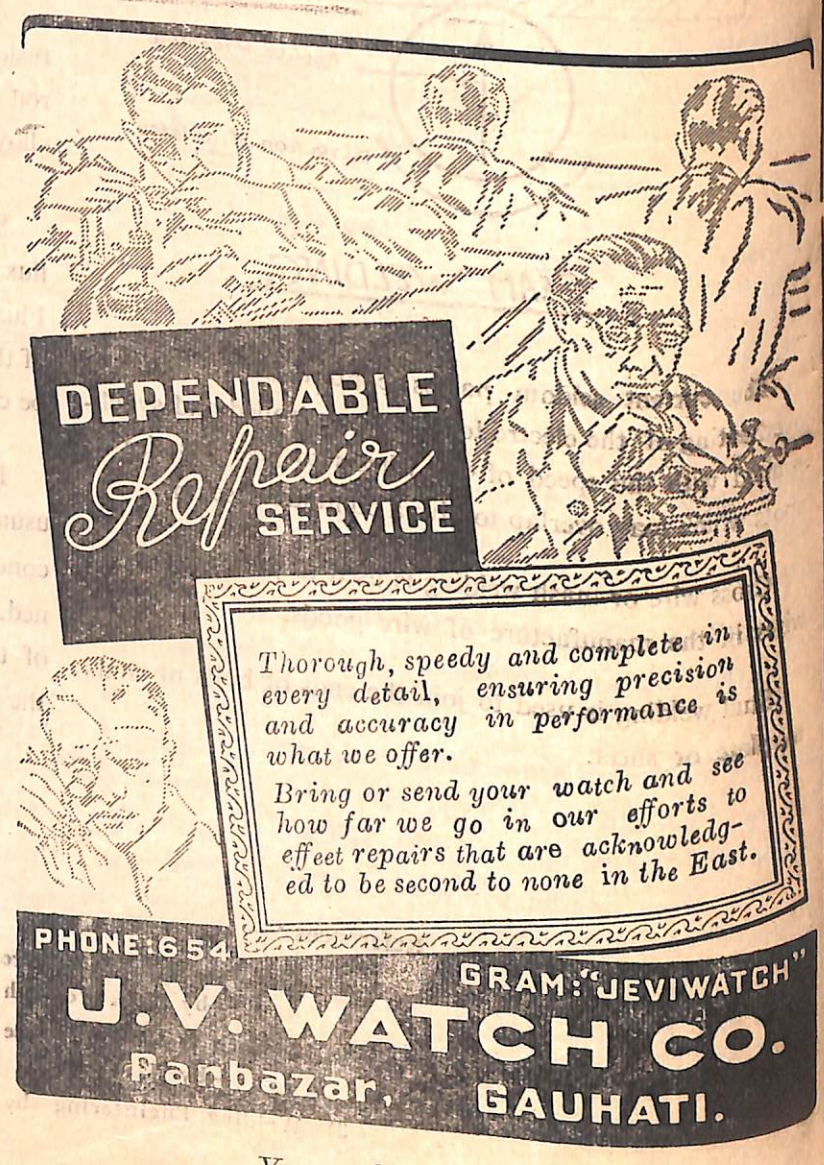

Yours faithfully.

J. V. WATCH CO.

PANBAZ R, GAUHATI

Power transmission over very long distances by wave guides and super conductors

by, *Prof :* S.K. De Purkayastha, M.Sc. (Cal), S.M. (Harvard), M.I.E.E. (U.S.A.), M.I.E.E. (U K,), A.M.I.T.E. (India), Professor and Head of the department of electrical Engg.

The long requirement of electric power for the World is increasing rapidly every decade. This will call for large power stations generating several gigawatts of electric power. Now the type of a generating station (hydel, zoal fired, nuclear etc) determines its location depending on the various economic and technical factors relevant to each case. However the centres of consumption may be far-away from the generating station giving rise to a long transmission lines. Moreover, in a country (such as our own Country India) some regions may be surplus in electric power while the some other regions may be deficit in it. The best thing for such a country is to go for regional and national grids and in our country Dr. K. L. Rao, the Central Minister for irrigation and power has recently announced that our country may consider about the national grid in the fifth five year plan.

The above will show that the world will soon require to transmit very large power (several gigawatts) over very long distances (thousands of kilometres). It has been predicted that using the classical e.h.v. (extra-high voltage) a.c. transmission, the line voltage in the seventies will exceed 750 KV and tend to reach the 1000 KV figure. We known even the line voltage of 400 KV gave rise to many difficulties regarding corona and other factors necessitating various means e.g. use of bundle conductors to overcome them), and we can imagine the technical difficulties that will be involved in the use of the extremely high line voltages mentioned above. This has given rise to proposals for new means energy transmission three of which are mentioned below :—

(i) d.c. transmission using extra-high voltage at 400 KV.

(ii) micro–wave transmission using oversize circular wave-guide in millimetre and centimetre wave lengths in TE_{01} mode.

(iii) transmission by super conducting cables carrying direct currents of several KA and having 40 KV between the conductors.

Out of these, the last two have received careful attention only recently, although the possibility of microwave transmission was discussed in the early part of the fifties and although since their discoveries many years ago the super conductors were considered ideal for transmission because of their almost zero resistance near absolute zero temperature. It is the advance of cryo-genies which has recently roused the hope of using super conducting powerline.

We shall discuss below these two possible methods of transmission in some details.

Miscrowave transmission—Metallic wave guides have long been used by communication engineers for microwave tran_mission It is the rectangular wave guide which finds more extensive use for this purpose. But for power transmission over very long distances, circular wave guides (circular hollow metal pipes) are suitable because of the property of the TE_{01} mode propagated down this guide. The wave equations for the electric and magnetic fields in cylindrical co-ordinates can be solved for such a pipe using appropriate boundary conditions at the metal wall of the guide. The solutions for the electric and magnetic fields will involve Bessel functions and will show that a doubly infinite number of TM (transverse magnetic, meaning that there is no magnetic field component in the direction of propagation i.e. along axis) waves as also a doubly infinite number of TE (transverse electric meaning that there is no electric field component in the direction of propagation) waves are possible each being known as a mode specified by two integer subscripts N, L of which describes the number of circumferencial variations and other number of radial variations.

TM waves are also known as E waves because they contain electric field in the direction of propagation. Similarly TE waves are known as H waves because they contain magnetic field in the direction of propagation. A particular wave type say for a given value of n has a cut-off frequency of wave length which can be determined from the formula, (for the TM wave),

$$(\lambda_c)_{TM_{nl}} = \frac{2\pi a}{P_{nl}} \quad \ldots\ldots\ldots(1)$$

Where λ_c denotes cut-off wave length, 'a' is the radius of the pipe and P_{nl} is the l-th root of $J_n(x)=O$ where J_n denotes the Bessel function of the first kind and order n. The corresponding formula for the T.E. wave is given by

$$(\lambda_c)_{TE_{nl}} = \frac{2\pi a}{P'_{nl}} \quad \ldots\ldots\ldots(2)$$

where p'_{nl} is the l-th root of $J'_n(x)=O$ where J'_n denotes the derivatives of J_n. from (1) & (2) it can be shown that TM_{01} wave has the lowest cut-off frequency of all transverse magnetic waves in a given circular pipe, and that TE_{11} wave has the lowest cut-off frequency of all transverse electric waves in a given circular pipe, the value of this latter cut-off frequency being smaller than that of former. The mode having the lowest cut-off frequency in known as dominant mode and thus, TE_{11} is the dominant mode in a pipe of given size. Fig. 1 shows the positions of the cut-off frequencies of some of the lower-order modes in terms of the dominant mode TE_{11}.

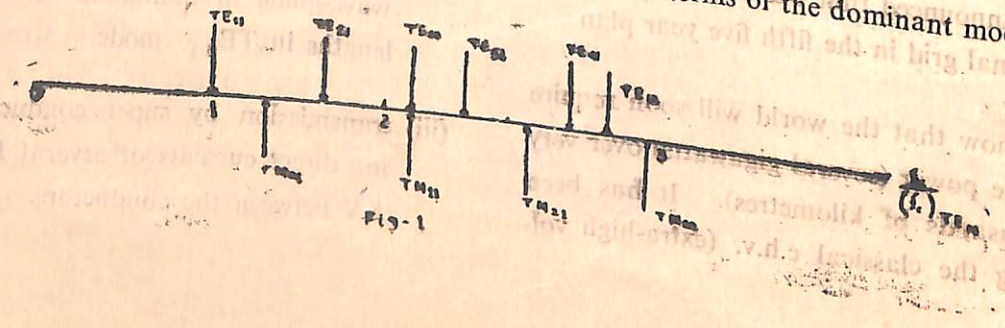

Fig-1

It should be mentioned here that inorder to introduce a desired mode in a waveguide, the excitation must be provided in such a way that the field distribution due to it simulates the field distribution pattern of the desired mode. Thus when the excitation is done through a loop, the loop should be oriented in a plane perpendicular to magnetic field of the mode pattern. On the other hand, if the excitation is done by a probe or antenna, then this should ne oriented in the direction of the electric field. The field distribution patterns of important modes can be seen from any standard book dealing with waveguides.

For our present purpose, the important thing is the attenuation of the various modes due to the Copper losses in the walls of our circular waveguides. Fig. 2 shows the nature of the variation of attenuation with the size (diameter) of the guide (for a fixed frequency), while the Fig. 3 shows the nature of the variation of attenuation with frequency (guide diameter fixed) for the important modes.

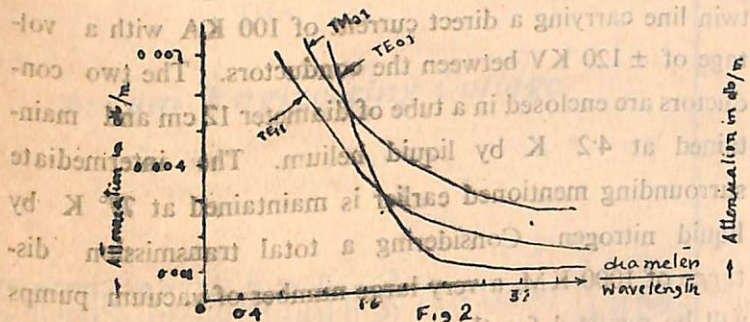

Fig 2

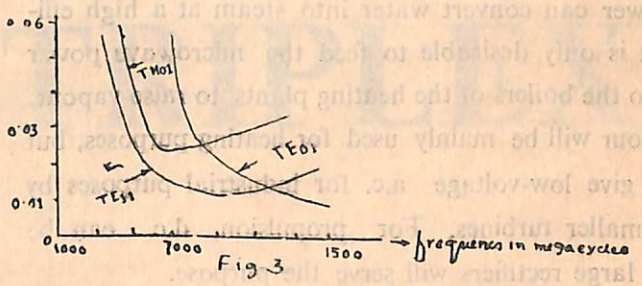

Fig 3

Fig. 2 shows that for a fixed frequency, the attenuation of TE_{01} mode decreases monotonically with the increase in the diameter of the pipe, while fig. 3 shows that for a fixed diameter of the pipe the attenuation of the TE_{01} mode decreases indefinitely with the increasing frequency. This explains why TE_{01} mode is choosen for the transmission of the electric power by circular waveguides. To transmit about 3 gigawatts of power over a distance of 1000 Km. by such a wave guide the pipe radius will be around 0·5m at a frequency of 10 GH_2 to get about the same attenuation as is encountered in a 50 H_2 e.h.v. ac. transmission line (about 1 db per 1000 km). If the frequency is reduced the pipe radius will increase correspondingly. Such large diameter pipes should not deter us, because we are accustomed to transmit oil by big pipes over long distances.

But we must note that as TE_{10} is not the mode of lowest cut-off frequency (as discussed earlier), the launching of it in the guide by the appropriate excitation (discussed earlier) may atleast give rise to TE_{11}, TM_{01}, TE_{21} and TM_{11} modes as is clear from fig. 1. From the property of a wave type below cut-off frequency, we know that these latter modes will be highly attenuated and so will reduce power from the TE_{01} mode. The more the deviation from the truly circular shape, the more the scope for the excitation of the spurious modes. Also due to irregularities in the guide shape or direction, coupling from TE_{01} to undesired modes occur. Mode fitters may be a solution if they can discriminate against the undesired modes but leave the desired mode atmost unaffected giving it almost no attenuation. A closely wound helical wire has been found to be very useful for this purpose. For this attenuation of the TE_{01} mode is a little higher than in a solid pipe, while the attenuations of the undesired modes are several hundred times more. This can be understood by considering the current directions of the TE_{11} mode and of the undesired modes.

Mode conversion losses also decrease by applying appropriate di-electric-coat of proper thickness on the inner surface of the wave guide. It is to be noted that when the power transmitted is of the order of several gigawatts, a loss of even 1 db per 1000 km. will give rise to large amounts of heat and for a waveguide kept underground forced-air or nitrogen cooling will be required for the removal of the heat.

From the energy source, the microwave power will, of course be obtained with the help of the magnetrons with the accompanying cooling arrangements.

H. Paul in his article "Power transmission of the future —microwaves or Super conductors ? in Electronics and Power, the journal of the I. E. E., May 1970 has described a energy-supply system with microwave transmission for a city of several million inhabitants. In the system 4 gigawatts of microwave power is transmitted over the waveguide along a distance of 1000 Km. About 80% of the energy is finally used as heat, and since the microwave power can convert water into steam at a high efficiency, it is only desirable to feed the microwave power directly to the boilers of the heating plants to raise vapour. This vapour will be mainly used for heating purposes, but can also give low-voltage a.c. for industrial purposes by driving smaller turbines. For propulsion, d.c. can be used for large rectifiers will serve the purpose.

Transmission by super conducting cable--super conductors are materials which give zero resistance below some critical temperature near absolute zero. Recent advances in cryogenics make it possible to kees the twin conductors closed in a tube whose temperature may be held around 4° K by liquid helium. The problem here is the difficulty involved in maintaining this temperature, because the difference between the temperature of the tube and that of the surroundings (which is at the ambient temperature of about 300° K) is very large and large amount of heat may be transmitted to the tube from outside. The tube may be thermally isolated by a vacuum region from an intermediate surrounging maintained around 80° K by liquid nitrogen. The whole system thus formed may be covered by a vacuum tight metal trough (having inspection windows) and then surrounded by a concrete channel in soil with ambient temperature around 300° K. We note that vacuum can not prevent flow of heat by radiation, and that heat can also flow from the nitrogen channel into the helium line. Thus good amount of heat can flow to the two conductors to raise their temperature. Heat can also be produced in the conductors themselves due to fluctuations of the magnetic field effected by the fluctuations in the demand. Large amount of heat can be produced in the conductors when the current is switched on after a shut down.

In the article mentioned above, the author has discussed a proposal for a super conducting cable with a twin line carrying a direct current of 100 KA with a voltage of ± 120 KV between the conductors. The two conductors are enclosed in a tube of diameter 12 cm and maintained at 4·2° K by liquid helium. The intermediate surrounding mentioned earlier is maintained at 77° K by liquid nitrogen. Considering a total transmission distance of 1000 KM, a very large number of vacuum pumps will be required for the vacuum line, because each pump can only serve a section several hundred metres in length. The nitrogen and helium lines comprise of sections 20 KM long and each has its own nitrogen and helium refrigeration and circulating pumps. Liquid vapour separators must also be incorporated at short intervals along the nitrogen and helium lines to take into account the evaporation of the liquids. For this proposed system, the author has shown that a very large number of vacuum pumps will be required, and that the refrigeration plant required will be so large and powerful that their counter-

parts probably do not exist in the world. He remarks that much development work is still required to surmount all the difficulties of keeping the vacuum and maintaining the flow of the two liquefied gases. It is to be noted that the losses of the cable here is the power drawn from the line to keep the refrigeration plants running (because the copper loss of the cable is zero) and the author mentions that this come to about only 2.5% of the total transmitted power, as against 8 to 10% for extra-high-voltage d. c. transmission.

Finally, the author has made rough estimates of cost from existing available data and has shown that the oversize waveguide can compete (subject to the roughness and approximation of the estimates because sufficient data are not available for large amount of microwave power transmission by oversize waveguide) with the extra-high-voltage a.c. overhead line and the super conducting cable in respect of the transmission of very high power over very long distances.

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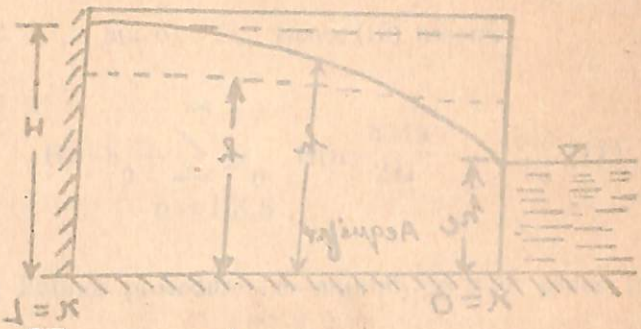

Solution of linearised Boussinesq's Equation for unconfined acquifer

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The non-linear partial differential Boussinesq's Equation :

$$\frac{\delta h}{\delta t} = \frac{k}{f} \frac{\delta}{\delta x}\left(h \frac{\delta h}{\delta x} \right) \qquad (1)$$

has been found to describe many physical problems such as : (1) The unsteady one dimensional flow of compressible ideal gas through a homogenous porous media. (2) The slow varying unsteady flow in a Hele-shaw viscous fluid model (3) The unsteady one dimensional unconfined ground water flow through a homogenous porous media etc.

In equation (1)

x=horizontal co-ordinate

t=time

K=Hydraulic conductivity

f=drainable porosity

h=dependent variable which represents the depth of free surface from the horizontal x-axis that coincides with an impermeable layer.

Analytical solutions of Equation (1) have been found independent by some investigators in which certain assumptions have been made in the initial and boundary conditions. An exact analytical solution of Equation 1 has not been found because of the non-linearity. However, numerical methods may be used for an approximate solution of mixed boundary value problem of Equation 1. A solution of Equation 1 for linearised case has been presented here for two cases of Boundary conditions.

(a) **When length of acquifer is finite :**

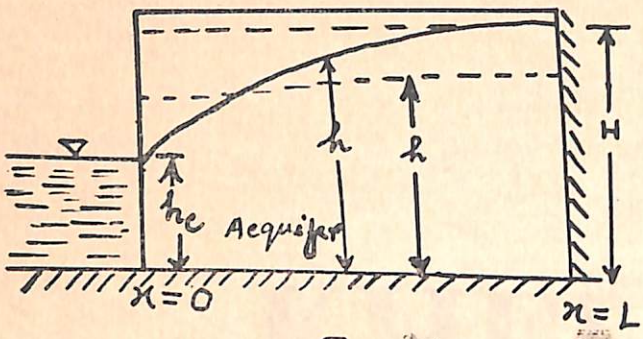

Fig 1

Equation (1) may be written after linearlisation as

$$\frac{\delta h}{\delta t} = \frac{k \bar{h}}{f} \frac{\delta^2 h}{\delta x^2} \quad \ldots\ldots\ldots (2)$$

Where $\bar{h}$ = some average height of free surface

$$\text{Putting } \frac{k \bar{h}}{f} = \alpha^2$$

Equation (2) becomes

$$\frac{\delta h}{\delta t} = \alpha^2 \frac{\delta^2 h}{\delta x^2} \quad \ldots\ldots\ldots (3)$$

Boundary conditions of the problem from the fig. 1,

1. $h(o, t) = h_c$
2. $\left[\frac{\delta h}{\delta x}\right]_{x=L} = 0$
3. Initial condition, $h(x\ o) = H$
4. $h(x, \infty) = h_c$

Using the technique of separation of variables, let the solution of Equation (3) be of the form

$$h = X(x) \cdot T(t) \quad \ldots\ldots\ldots (4)$$

From (4),

$$\frac{\delta h}{\delta t} = X \dot{T}$$

$$\frac{\delta h}{\delta x} = T X'$$

$$\frac{\delta^2 h}{\delta x^2} = T X''$$

The dots denote derivatives with respect to t and primes denote with respect to x.

Now (3) becomes

$$X \dot{T} = \alpha T X''$$

$$\frac{\dot{T}}{T} = \frac{\alpha^2 X''}{X} = -\lambda^2 = \text{Constant}$$

or $$\dot{T} + \lambda T = 0 \quad \ldots \ldots \ldots (5)$$

and $$\alpha^2 X'' + \lambda^2 X = 0 \ldots \ldots \ldots (6)$$

Hence partial differential Equation (3) is reduced to two ordinary differential equations (5) and (6).

Solution of (5) can be writters as :

$$T = A e^{-\lambda t} \quad \ldots\ldots\ldots (7)$$

Where A is a constant of integration.

Solution of (6) again can be written as

$$X = B' \cos\left(\frac{\lambda x}{\alpha}\right) + D' \sin\left(\frac{\lambda x}{\alpha}\right) \ldots (8)$$

For each value of λ, we have a solution say h_λ,

$$h_\lambda = h_c + \left[B_\lambda \cos\left(\frac{\lambda x}{\alpha}\right) + D_\lambda \sin\left(\frac{\lambda x}{\alpha}\right) \right] e^{-\lambda^2 t} \ldots (9)$$

B.C. 1. at $x=0$ $\quad h=h_c$

$$h_c = h_c + B_\lambda e^{-\lambda^2 t} \quad \text{(from 9)}$$

$$\therefore B_\lambda = 0$$

B.C. 2. $\left(\frac{\delta h}{\delta x}\right)_{x=L} = 0$

$$D_\lambda \frac{\lambda}{\alpha} \cos\left(\frac{\lambda L}{\alpha}\right) e^{-\lambda^2 t} = 0 \quad \text{(from 9)}$$

$\therefore \cos \frac{\lambda L}{\alpha} = 0$, which is possible when

$$\frac{\lambda L}{\alpha} = \frac{n\pi}{2}, \quad n=1, 3, 5, \cdots$$

λ is retricted to $\lambda = \frac{n\pi\alpha}{2L}$ with $n=1,3,5, \cdots$

Hence (9) can be written as :

$$h = h_c + \sum_{n=1,3,5..}^{D} D_n \operatorname{Sin}\left(\frac{n\pi x}{2L}\right) e^{-\frac{n^2\pi^2\alpha^2}{4L^2} t} \quad \ldots(10)$$

To determine the constant D_n,

B.C. 3. $h(x, o) = H$, Hence (10) becomes

$$H = h_c + \sum_{n=1,3,5...}^{\infty} D_n \operatorname{Sin}\frac{n\pi x}{2L} \quad \ldots\ldots (11)$$

Using Fourier procedure i.e. multiplying both sides by

$\operatorname{Sin}\left(\frac{m\pi x}{2L}\right)$, $m = 1,3,5,\ldots$ and integrating over o to L,

it can be obtained,

$$D_n = \frac{4}{\pi}\left(\frac{H - h_c}{n}\right)$$

Hence solution is

$$h = h_c + \frac{4}{\pi}(H - h_c) \sum_{n=1,3,5.}^{\infty} \frac{1}{n} \operatorname{Sin}\left(\frac{n\pi x}{2L}\right) e^{-\frac{n^2\pi^2\alpha^2}{4L^2} t}. \quad \ldots\ldots (12)$$

(b) When the length of the acquifer is infinite :

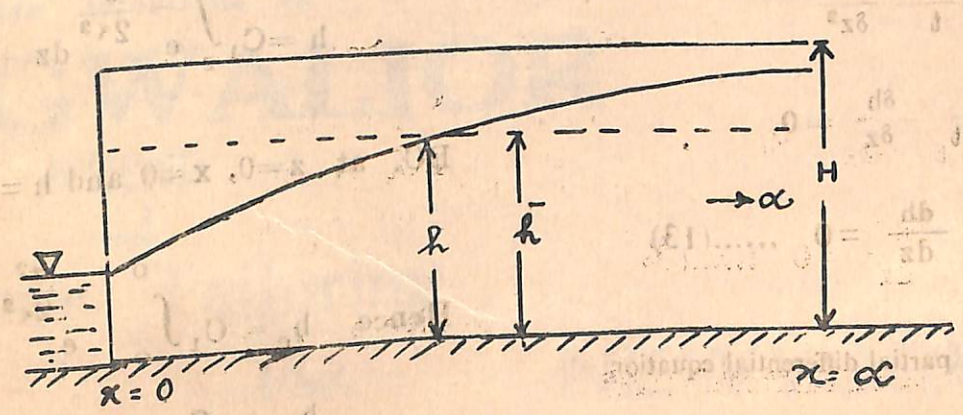

Fig 2

Boundary conditions for initially large acquifer $L \to \infty$

1. $h(o,t) = h_c$
2. $h(\infty, t) = H$
3. $h(x, o) = H$
4. $h(x, \infty) = h_c$

Using Bottzmann's transformation :

$$Z = \frac{x}{\sqrt{t}}$$

$$\frac{\delta h}{\delta t} = \frac{\delta h}{\delta z} \cdot \frac{\delta z}{\delta t} = \frac{\delta h}{\delta z} \left(-\tfrac{1}{2} x t\right)^{-\frac{3}{2}}$$

$$= -\frac{Z}{2t} \frac{\delta h}{\delta z}$$

$$\frac{\delta h}{\delta x} = \frac{\delta h}{\delta z} \cdot \frac{\delta z}{\delta x} = \frac{\delta h}{\delta z} t^{-\frac{1}{2}}$$

$$\frac{\delta h^2}{\delta x^2} = \frac{\delta h^2}{\delta z^2} t^{-1}$$

Putting all these values in (3), we have

$$-\frac{z}{2t} \frac{\delta h}{\delta z} = \frac{\alpha^2}{t} \frac{\delta^2 h}{\delta z^2}$$

$$\frac{\alpha^2}{t} \frac{\delta^2 h}{\delta z^2} + \frac{z}{2t} \frac{\delta h}{\delta z} = 0$$

$$\alpha^2 \frac{d^2 h}{dz^2} + \frac{z}{2} \frac{dh}{dz} = 0 \quad \ldots\ldots(13)$$

which is an ordinary partial differential equation

Putting $\frac{dh}{dz} = P$ and $\frac{d^2 h}{dz^2} = P'$

(13) becomes

$$\alpha^2 P' = -\frac{z}{2} P$$

$$\frac{P'}{P} = -\frac{z}{2\alpha^2}$$

$$\frac{dP}{P} = -\frac{1}{2\alpha^2} z dz$$

Integrating

$$\log_e P = -\frac{1}{2\alpha^2} z^3 + C'$$

or $P = C_1 e^{-\frac{z^2}{2\alpha^2}}$

or $\frac{dh}{dz} = C_1 e^{-\frac{z^2}{2\alpha^2}}$

or $dh = C_1 e^{-\frac{z^2}{2\alpha^2}} dz$

Integrating

$$h = C_1 \int_z^\infty e^{-\frac{z^2}{2\alpha^2}} dz + C_2$$

BC. at $z=0$, $x=0$ and $h = h_c$

Hence $h_c = C_1 \int_o^o e^{-\frac{z^2}{2\alpha^2}} dz + C_2$

$h_c = C_2$

B.C. at $z = \infty$ $x = \infty$ and $h = H$

Hence $$H = C_1 \int_0^{\infty} e^{-\frac{z^2}{2\alpha^2}} dz + h_c$$

or $$H = C_1 \frac{\sqrt{\pi}}{2} + h_c$$

$$C_1 = (H - h_c) \frac{2}{\sqrt{\pi}}$$

$$\therefore h = (H - h_c) \frac{2}{\sqrt{\pi}} \int_z^{\infty} e^{-\frac{z^2}{2\alpha^2}} d_z + h_c$$

or $$h = h_c + (H - h_c) \left[\frac{2}{\sqrt{\pi}} \int_0^{\infty} e^{-\frac{z^2}{2\alpha^2}} dz \right.$$

$$\left. - \frac{2}{\sqrt{\pi}} \int_0^{z} e^{-\frac{z^2}{2\alpha^2}} dz \right]$$

or $$h = h_c + (H - h_c) \left[1 - \frac{2}{\sqrt{\pi}} \int_0^{z} e^{-\frac{z^2}{2\alpha^2}} dz \right]$$

$$h = h_c + (H - h_c) \left[1 - \phi \left(\frac{x}{2\alpha^2 \sqrt{t}} \right) \right]$$

where $\phi(\Xi) = \frac{2}{\sqrt{\pi}} \int_0^{\Xi} e^{-\Xi_1^2} d\Xi_1$ is probability integral and

$$\Xi = \frac{x}{2\alpha^2 \sqrt{t}}$$

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Electrical Accidents and their Preventions

Debbrata Sen Gupta,
Final Year (Elect.)

Although India is in a very low State of electrical development, the number of electrical accident is very high as compared with other countries where the consumption of electrical energy is very much higher than India. In 1965-66, the per capita consumption of electrical energy in India was 85 Kws whereas the per capita consumption of energy by the U. S. A. was roughly 27 times that of India, by Britain about 15 times and by Japan about 6 times. But when in U. K. and U. S. A. there has been a fairly steady decline in the accident frequently rate between 1938 and 1957, in India it is rising. In 1957 there was a 30% decline from 1938 figure of electrical accidents in both U. K. and U. S. A. But in India there was a 50% rise in accident in 1948 from the 1938 figure and in 1956 the rise was 135% from the figure of 1938.

Electricity is safe under normal conditions. But a slight carelessness may result in a very dangerous accidents with the death of personnels and destruction to the properties. This tells how important it is to use electricity very carefully and for this purpose only efficient electrical engineers, supervisors and trained workmen should be employed in installations to handle electrical equipments.

The occurances of electrical accidents may be divided into two groups :

(1) **Domestic Installations :**—Here the head of the family should take safety precautions.

(2) **Public Installations :**—It may be a office, workshop factory, street lights, sub-stations or power house etc. Here the safety precautions are to be taken by the responsible administrations.

Domestic Accidents :—Most of the domestic accidents occur while using household articles as a ster to, heater, radios and power tools all of which are operated with relatively low voltage (230 V). Here it is necessary to

mention that although in U. S. A. the standard voltage for domestic installation is 110 V. yet many die each year due to electrical shock and other causes. Is it the current that kills. Wet situations, incorrect fuse and defective earthing are very important factors in domestic electrical accidents. Fire within the home due to electrical defects usually result from overheating of electrical conductors caused by overloaded circuits, improper insulation or fuses.

A few actual examples of domestic accidents are given below :—

(1) A person while attempting to remove the wet clothes hanging on iron clothes-line got a shock. To save him his wife ran to his rescue and she too got electrocuted and both of them died. On investigation it was found that although there was no electrical lines nearly but the iron-clothes line was touching the aerial connected to the neighbour's radio-set, which had developed an internal fault and was energising the aerial from the a.c. mains feeding the radio set.

(2) A person got an electric shock while cooking on an electric heater in the kitchen. It was found later that the kitchen was wet and what was more dangerous that there was no third wire to drain leakage current (due to improper insulation) to earth.

(3) Occupants of a residential building were receiving electric shocks when any one walked towards the varandah on even touched the wall. The floor and the walls were damp due to heavy rain. On investigation it was found that the incoming phase wire had got earthened at the point of entry into the main switch due to the absence of proper insulation. The service connection had been tapped directly off the overhead lines running in front of the building, without providing any pole fuse at the point of tapping. Due to the fault a heavy current flowed into the earth electrode through the earthing load. The earth electrode at the building had a resistance of 6 ohms, the fuse provided on the distribution pillar feeding the bunglow supply mains was of 60 amps capacity. Naturally the fault current was insufficient to blow the fuse.

(4) A person got electric shock while handling the lampholder with the switch in 'off' position. It was found later that the switch was connected in neutral line. Therefore the equipment was live due to the phase line although the switch was in 'off' position.

Accident in Public Installations :—In public installations the electrical accidents may be due to shock on electric arc. The electric arc is very dangerous and cause severel burns even at considerable distances. Therefore much care is required when working an electrical switchgear, especially an high voltage circuits. A few actual examples of electrical accidents in public installations are given below. These examples will show how dangerous electrical energy is if handled with carelessness. Further the causes of these accidents will help to be cautions to avoid re-occurences of these types of accidents.

(1) In a 11 K.V. steel cubicle, old oil switch of inadequate rupturing capacity was closed on to transformer with metal tool left across high tension links, after connection had been changed. Six men were burnt to death for this. The switch tank buckled severely. Melted steel balls were fused in transformer tanks.

(2) An electrician was burnt to death when he inserted an earthing rod into line orifice instead of dead orifice in a 22 KV metal clad switch gear.

(3) A circuit breaker had been drawn out for repair. An engineer was burnt to death when he entered into

the locked enclosure to inspect the contacts. The floor was slippery due to oil. He slipped and fell downward and caught the line bus bars.

(4) In a 500 volt clad motor control gear the tank was from the oil circuit breaker while 'live'. There was no inter-lock. When replacing a 3—phase short took place throwing hot oil and thus burning two men.

In this way there can be a number of accidents with a slight carelessness. From the above accident cases one should not think that the use of electrical energy should be avoided as it is very dangerous. In fact it is much safer than walking in the busy roads of cities. Statistical report has shown that the number of road accidents are much more than the electrical accidents.

Accident Preventions :—Electrical accidents occur when preventive measures are incomplete or ineffective. So it is important that emergency measures and first aid for victims should be widely understood. House holders should know the methods of freeing some one from a 'live' electrical circuit. The circuit should be disconnected at once or the victim should be freed from contact without being touched with bare hands or metallic substance. Emergency insulating materials which can protect rescucous include—several thickness of dry cloth or newspaper, rope, wood and similar non-conductor.

The victim of an electrical accident may be unconscious, not breathing on being badly burnt. In these cases he will need emergency medical care. Artificial respiration must be started at once an unconscious victims.

The following are the few simple but important precautions which every householder using domestic electrical equipments should take to avoid accidents.

(1) Handling electrical equipments with wet hands or standing on the wet floor should be avoided. Much care should be taken in all electrical appliances in the bathroom. As in bathroom even a slight leakage of current may be dangerous, so any defective appliances in bath room should be replaced at once.

(2) All appliances with metallic body like electric iron, heater and refrigerator etc. must be connected to 3-Pin plug so that any leakage current can be drained out through 3rd (earthed) wire.

(3) All switches must be in the phase line and not in the neutral wire. This is very important. In a 3-phase 4-wire line, the phase lines are red, white and blue. The neutral is black (I. E. E. regulation) So place the switch in the phase wires and not in black neutral.

(4) Always the correct size of fuse wire should be used. If a fuse wire of larger cross-section than the correct size is used then it may not blow in faulty conditions. The effect will be dangerous Because the apparatus will continue to be alive and at much higher potential above earth. Any person coming in contact with the metal body of the equipment or area near the earth electrode will get a shock.

(5) In temporary installations like Puja Pandal, shamianas etc. electrical wiring should be done with great care. open type fuses are strictly prohibited as the spark from a fuse blowing out may start fire.

(6) The earth terminal of the radio set must be connected to the earth. This is extremely important. As many accidents have occured due to the absence of earthing. Without earthing the aerial may because live under faulty condition which is very dangerous.

(7) While stringing a clothes line, much care should be taken so that it is not stringed from an electric post as from an aerial of radio set. Also it should be checked that there is no possibility of any kind of electrical contact with the clothes line.

(8) Before doing any work an electrical equipments first the switch must be put off and then the plug will be pulled out. One should stand on a wooden plank or rubber mat while working on electrical appliances. Everyone of the house must know the location of the main switch which may be necessary to switch off at the time of emergency.

(9) The installation must be thoroughly inspected by qualified electrician at least once a year. At the time of inspection the service connection, main switch board, internal wiring and its insulation, earth tests, switches & fuses, portable apparatus and fire precautions should be checked properly.

Besides the points written above to avoid accident one must be aware of the danger of electricity and the members of the family particularly the children should be educated about this.

Accident Prevention in Public Installations :—

In public installation the engineers and technicians are employed by the responsible administration for the maintainances of electrical equipments. So it is of utmost importance that only efficient engineers, supervisors and trained workmen should be employed. Supervisory staff must be very strict and in no case slight deviation from safe practices by the workmen should be allowed. Because by this practice he will not only endanger his life but a number of workmen in the installation may be victimised. Unless a person is quite sure about his capabilities, he should keep himself far away from the handling of electrical equipments.

All types of accidents should be recorded very carefully. This is very important. Because accident records provide the administrations to identify high accident rate departments and remove the causes which are responsible for the high rates. In brief, accident records may be used to—

(a) Furnish the supervisors with information about the accident experiences of their departments.

(b) Find out principal accident causes.

(c) Point out the most unsafe practices and unsafe conditions.

Accident report must cover the following points :—

(1) What job was employee doing including tools, machines, and materials used ?

(2) How was employee injured ?

(3) What did employee do unsafely ?

(4) What was wrong with the method ?

(5) What safe-guard should be used ?

(6) What steps were taken to prevent similar injuries ?

(7) Who was responsible for the accident ?

It must also cover a clear description of the locality, evidence and statements by eye-witnesses and staff concerned.

Apart from accident records, the following are the few important precautions which are discussed as illustrations, should be carefully taken to avoid accidents.

(1) **Proper earthing :** Generator, motor starter, iron clad board, transformer, structural steel work at sub-stations, fabricated steel transmission line towers carrying overhead conductors, metal casing of portable apparatus and metal body of iron clad switches etc. should be earthened properly.

(2) Before making the equipment dead and effectively earthened no work should be carried out. All equipments should be tested before touching.

(3) The 'shut down' and 'permit to work' should be done very carefully. It should be clear and only authorized persons will do this.

(4) Isolating switches are used for only isolation and not for cutting off the supply for which there is circuit breaker. Isolation switch if used to break a working current may endanger the operator's life. A fuse should never be pulled out to cut-off a circuit which may result in serious flashover.

(5) While carrying out any repairs in switch-gear, one must be sure that there is no tool left in the switch gear. This may lead to serious flashover.

(6) Pointing fingures while explaining something near live apparatus or bus bars are very dangerous.

Indian electricity rules and Indian Electricity act provide many sefety precautions. So this is very important that all persons in the profession of electrical engineering must read the two above mentioned books thoroughly. Further, all engineers and supervisors must know the equipments under their charges thoroughly. The equipments should be studied including the systematic wiring diagram and proper way of operation given by the manufacturer when running normally and the workmen should be trained accordingly. To write Do's and Dont's in front of every equipment is a very good practice.

Books discussed —

(1) Accident preventions, Editorial oonsultant, Maxwell N. Halsey.

(2) Operation & Maintanance of Electrical equipment by B. V. S. Rao

(3) Electrical earthing and Accident Prevention by M. G. Say.

(4) Indian Electrical Rules 1959 } Both amended upto date.

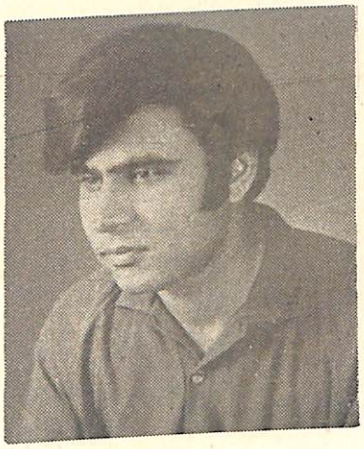
(5) Indian Electrical Act 1910 }

+ + +

AECIANS IN THE LIMELIGHT

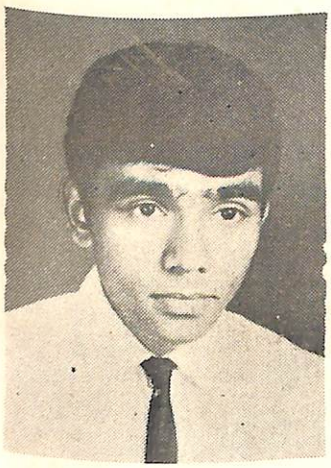
Emdadul Islam :
Who received the "College Colour" for gymnasium.

Ujjal Nag :
Who received the "College Colour" for Cricket.

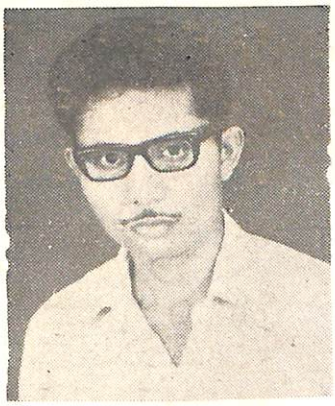


John Mehra :
He was awarded the honour of "College Blue" this year. He represented the Gauhati University, Cricket Team in All India Inter 'varsity Tournaments.

Bidyut Chakrabarty :
Who won the fame of "Best Actor" in one-act play competition in Gauhati University Inter College youth Festival, 1970.



Paban Kakoti :
The celebrated violinist of our college won the Ist Prize in Instrumental music competition in the G. U. Inter College Youth Festival, 1970.



Kalyan Chaudhuri :
Received Special "College Ribbon" for his extra ordinary brilliant career in this college. He secured highest aggregates among the successful Ist class candidates of all the branches for this session.

Best Team in one-act play competetion in Inter College Youth Festival of G. U. 1969-70. They staged the one-act play "BIBHINNA KORASH ETI SUR"

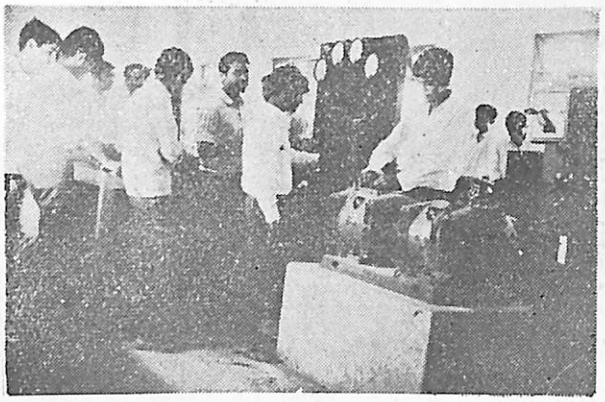
Stiting (L to R) :—**Bidyut Chakrabarty** (Best Actor), **Ramen Kalita** (Best director), **Jayanta Sarma** (Best supporting actor).

Standing (L to R) :—**Padum Saikia, Nripen Dutta, Sishir Goswami, Atul Das.**

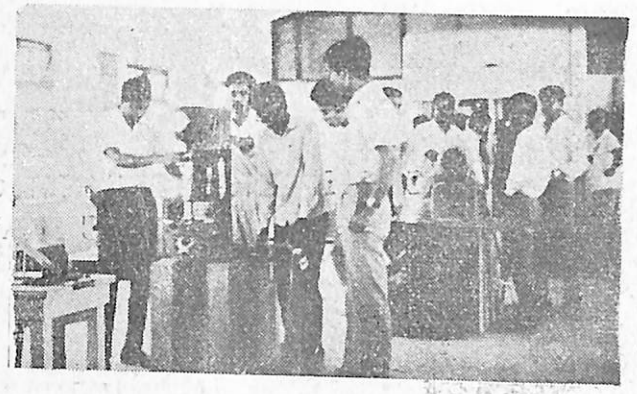
Best of the lot in Gauhati Assam Engg. College Hockey Team :
The holder of the "Ranjit Barpujari Memorial Trophy" & Runners-up of the "STEELS TROPHY" for the year 1970.

Sitting (L to R) :—**Kiran Singh, Bijan Kar** (*Vice Captain*), **Prof. K. Singh** (*Chairman, Hockey Secy*), **Dr. S. D. Gogoi** (*Principal*), **K. I. Singh** (*Captain*), **Fernandez** (*Secy. Hockey Sect.*) **A. Hassan.**

Standing (L to R) :—**Ropi a, Apare h Dey, P. Rakshit, S. Chaudhury, R. Sangma, Gautam Bhatta, Arthur Khongjur, Ranajit Banik.**

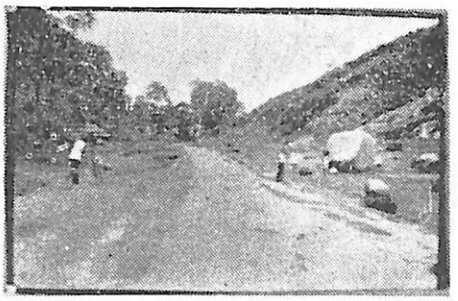


Students giving rapt attention in carrying out an experiment in the engineering electrical Laboratory.

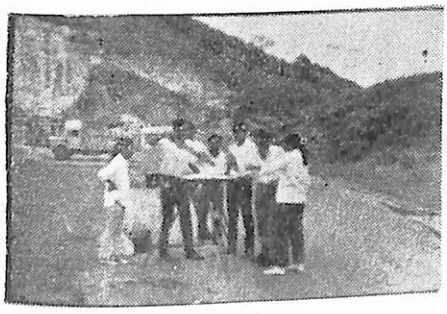


Prof. D. Deka is seen to instruct our student in the strength of materials Laboratory.

Our Students at Work



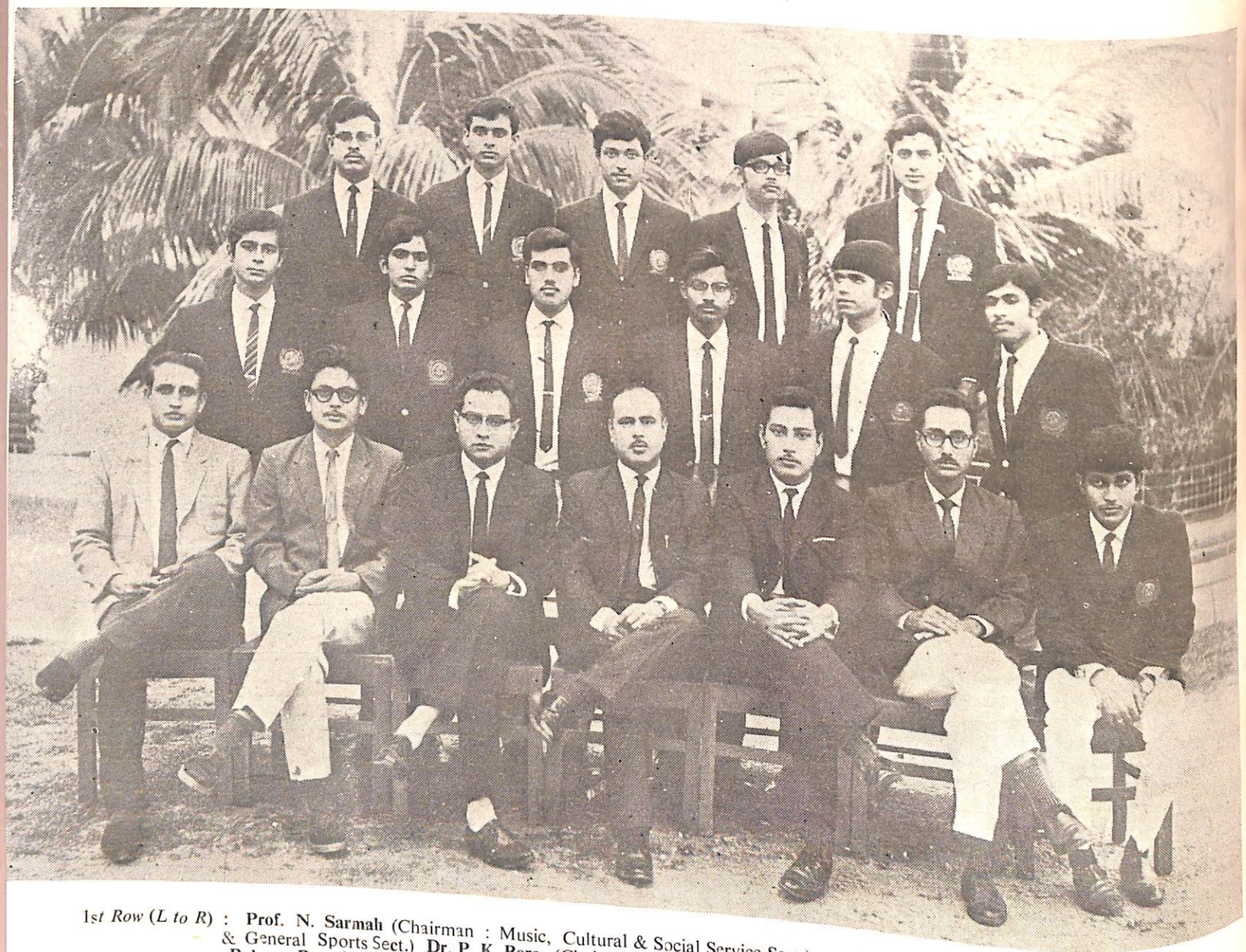
Nobody can dare to say whether this gentleman with the theodolite is focusing at the staff or at any other else. (Annual survey camp at Jhalukbari).



Perhaps the Students in the Annual Survey camp at Jhalukbari have committed some mistakes in plane table—but to Prof. D. Deka is smiling at this.

Students busy with the theodolite in the Annual Survey camp held at Jhalukbari.

ASSAM ENGINEERING COLLEGE STUDENTS' UNION SOCIETY
EXECUTIVE COMMITTEE 1969-70.



1*st Row* (*L to R*) : **Prof. N. Sarmah** (Chairman : Music, Cultural & Social Service Sect.), Prof. A. K. Padmapati (Chairman : Cricket & General Sports Sect.) **Dr. P. K. Bora** (Chairman : Debating Sect.), **Principal Dr. S. D. Gogoi** (President), **Prof. H. Rahman Baruah** (Chairman : Common Room & Minor Games), **Prof. K. Singh** (Chairman : Foot-ball & Hockey Sect.), **Shri Chidananda Medhi** (General Secy.),

2*nd. Row* (*L to R*) : **Shri Satyabrata Baruah** (Asstt. General Secy.), **Shri J. G. Fernandez** (Secy. Hockey Sect.), **Abul HassanSadaduddin Mohammad** (Secy. Foot-ball Sect.), **Samsul Hussain Khan** (Secy., Debating Sect.), **Syed Ajmal Ali** (Secy. Common Room Sect.), **Shri Parimal Karmakar** (Secy., General Sports Sect.),.

3*rd. Row* (*L to R*) : **Shri Bichitra Barman** (Secy., Magazine & Publicity Sect.), **Shri Anil Kr. Borah** (Secy., Minor Games Sect.), **Shri Promod Pathak** (Secy., Cricket Sect.), **Shri Sisir Gosami** (Secy., Music, Cultural & Social Service Sect.), **Shri Kamal Choudhury** (Secy., Tennis Sect.).

IRON REMOVAL FROM TUBE WELL WATER—
Experimental Iron Eliminator of Mangaldoi

By—**Shri K. C. Barthakur, B.E., M.E.(PH.), MICE, MRSH**
(Ex-student),
S. D. O. (PHE) Investigation Sub-Division : Mangaldoi.

Removal of iron by easy and economical means from small source of water is one of the major problems faced by the public health engineers of all countries. In most of the area of Assam the ground water contains considerable amount of iron and so if this iron cannot be removed or reduced in quantity, the wells installed to draw water cannot serve any useful purpose.

Iron occurs in natural water in several forms. In deep well waters mostly it is found as an unstable ferrous carbonate by the carbondioxide contained in the water. The water is clear when it is drawn from the well but rapidly turns opaque and throws down rich deposits on exposure. The loss of carbon dioxide and contact with atmospheric oxygen are responsible for the formation of this opacity and the precipitate In such deep well waters where the iron is held in solution by carbon-dioxide, areation followed by filtration is the only suitable method of iron removal. Areation flushes out the Co_2, raises the PH of the water and oxidises the iron. The net result is to cause them to precipitated.

Upon contact with free Oxygen (0.14 ppm.02 for each ppm. of iron oxidised) ferric oxide (Fe_2O_3) will be formed. The aeration takes place at PH 7.0 or over. The compound being insoluble, a short period of storage and sedimentation, followed, if necessary by filtration, may be desirable to collect the precipitated iron.

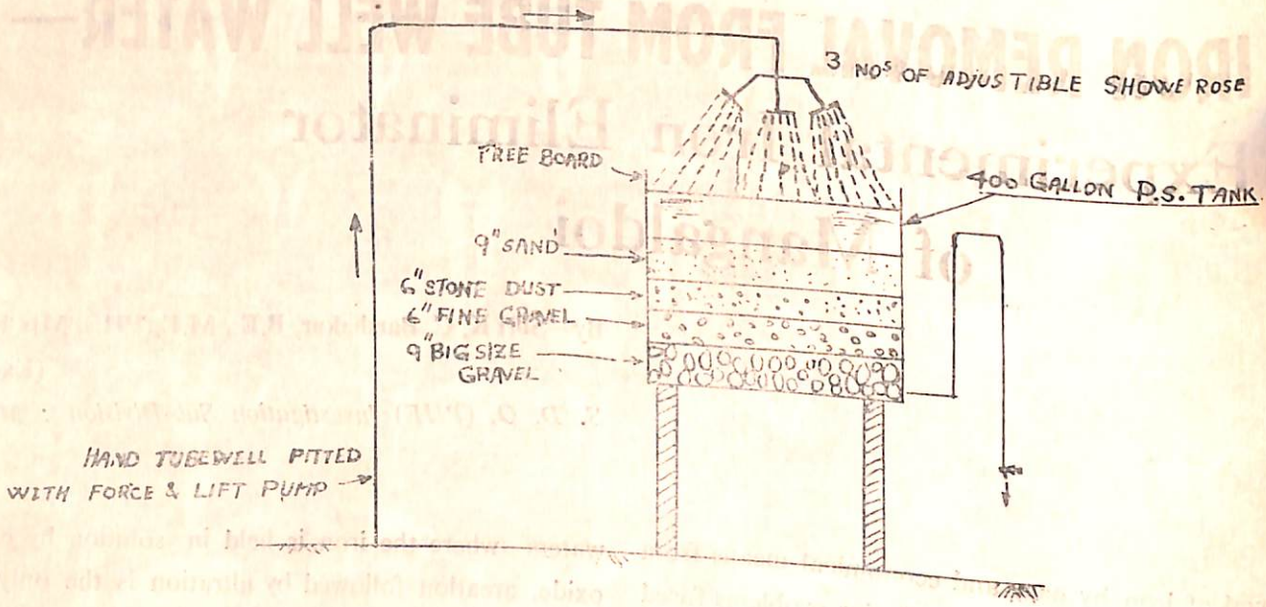
The water should come into maximum contact with the air so that it becomes saturated with oxygen. The process can be accomplished by letting the water fall by

spraying it from nozzles into the air and collecting it carefully against outside contamination. But vigorous aeration may not only add excess O_2, it may also remove more than the excess CO_2 and shift the calcium carbonate equilibrium of hard water to precipitate finely devided $CaCO_3$. At PH values greater than 7.1, positively charged ferric hydroxide particles may be absorbed on the negatively charged calcium carbonate particles and remain in colloidal suspension.

Sand	—	9″
Stome Dust	—	6″
Fine gravel	—	6″
Big size –ravel	—	9″
		2′-6″

Sketch showing the arrangement :—

—Before placing the filter media in the tank, the gravels are allowed to pass through sieves to diffentiate the finer ones from the coarser variety and both sand and gravel



Considering these factors an experimental iron eliminator has been installed at the P. H. E. Office campus of Mangaldoi on 12-6-69—The water, from the office hand tube well is allowed to be sprayed by means of three shower roses. The sprayed water is collected in a pressed steel tank which also contains sand as filter bedand gravel as supporting media. The precipitates are separated at the surface of sand and the water being free from suspended materials passes through the filter media and is collected from the bottom by means of an outlet arrangement. In the absence of properly graded sand and gravel, the filter media is given as follows :—

are properly washed. The cost of the installation work is given as follows—

(1) Installation of P. S. tank 400 gallon-capacity fitted with nuts and bolts— Rs. 790.00

(2) Cost of filter media with labour charge for placing in position— Rs. 160.00

(3) Installation of hand tube well to a depth of 81, ft. with the supply of force and lift pump Rs. 42400

4)f Inlet and outlet connections of the iron eliminator— Rs. 16600

Total :— Rs. 1610·00

—(Rupees one thousand six hundred and ten only)

The cost of foundation of the tank is not included in the estimate as we used four pieces of G. I. pipes. The total cost may however, be reduced by constructing the tank of brick work and giving an water proof lining.

After the iron eliminator was set into commission samples of water before and after treatment were sent to the public analyst to the government of Assam for testing. Analysis report is as follows:

No. sample	Ch. No. 263/69 Before treatment	Ch. No.264/69 After treatment.
Physical character—		
Colour	slightly brownish	Normal
Turbidity	slightly Turbid	Normal
Smell	No smell	No smell
Sediment	Present (iron)	Absent.
Chemical (in p.p.m.)—		
Total solids	217.0	129.0
Chlorine	3.0	10.0
Ammonical N_2	0.04	0.02
Albuminoid N_2	0.08	0.08
Total hardness($CaCO_3$)	72.0	83.0
Permanent hardness ($CaCO_3$)	35.0	40.0
0_2 absorbed (Tidy)	0.92	0.72
Nitrites (N)	Absent	Absent
Iron (Fe)	**36·5**	**0·82**
Nitrates (N)	resent	Trace
pH	7.6	8.2
Free CI_2	Absent	Absent
Alk.as $CaCo_3$ (7.0)	81.0	92.0
Total dills	114.0	
Iron in solution as Fe	0.7	
R mark —	The water contains iron in large excess	There is scope for further improvement.

Dated 15–9–69.

Sd/–

Public Analyst to the Govt. of Assam : Shillong

The content of iron in the filtered water is although above the permissible limit, the result of the experiment is highly satisfactory. It is very much encouraging to note that simply by exposing the water to atmospheric oxygen, the iron content is reduced by (36.5–0.82) = 35.68 ppm. The remaining iron may be present in other forms or some may not get sufficient access to atmosphere. So by giving sufficient exposure to the trickled particles of water, it will be possible to reduce the iron content further. As the quality of water improves greatly it is allowed to be used by the public of the locality and the behaviour of both the consumers and filter bed are observed.

The water, being very clear, is a boon to the people. They can get such water only from the patented filters. The water does not leave any stain in clothes. Each man or woman is to lift water into the tank by the hand tube well till their bucket is filled up with filtered water There is always a heavy rush of people after the office hours. People are seen to collect water ever at night with lamp at hand. At the beginnig the filtered water emitted as fishy smell. So the bed was washed on several occasion and was finally disinfected with a heavy dose of bleaching powder. Since then (i.e. 18–6–69) one washing was done till 8–10–69. As the quality of water detoriated at the end of the first week of October, the top layer of sand which looked like a layer of redish brown paint, was washed and supply of water was resumed. As the shower roses disperse water against a pressure, they give away very often. So on a few occasions they are to be shouldered and welded. In the present experiment best quality chromium plated adjustible showeres with very minute holes are in use. However, in future or in actua- field work, special showers done for this particular purt pose will withstand this wear and tear. The experiment has been carried out by creating a syphonic action at the outlet end and then breaking the action. When there is a syphonic action better pressure is available at the

outlet, but then the people, particularly the young ones try to fly away with water without lifting water into the tank. Without syphonic action water is available in full force at the outlet usually after 10 to 12 minutes of lifting water and people cannot always afford this lag of time.

In any case, this will be of great use to individual family who can afford to bear the cost. This will serve a great purpose in community life if such an eliminator is provided between 10- to 15 families. The most spriking advantages of this treatment are the devoid of chemicals, lack of mechanical parts and economy in maintenance.

References :—

(1) Water supply for Rural areas and small commuitios W. H. O. Genera,

(2) Public Health Engineering Manual and Code of practice Manual of water supply.

+ + +

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Humanities & General

The purely objective sources of the objective element in our observational knowledge have already been named . they are life, Consciousness and Spirit. we reach them the position of idealist as opposed to materialist philosophy. The purely objective world is the spiritual world and the material world is subjective in the sense of selective subjectivisim".

(The Philosophy of Physical Science, p. 69)

,".....Real happiness comes only to those who do not scramble for it frantically, but are interested in things for their own sake. That is to say, if we are interested in things not because we loved them for themselves but because we thought we would be happy thereby, then happiness should surely elude us like a mirage"

Bertrand Russell.

YOUTH MOVEMENTS AND INTERGRATION

By—**Shyamsundar Deka,**
5th Year (Mech. Engg.) Class,

Wherever he is, nobody can have a glimpse of the morning newspaper withoht finding that the youth movement is spreading in every corner of the globe. There is no least doubt that the most striking feature of to-day's scene of world societies is the extra-ordinary wave of mass demonstrations and protests by the younger generation, which almost invariably leads to violent clashes with the administrative authorities and hand to hand fight with the police personnels. In the recent times demonstrations and protests like sit ins, pray ins, lie-downs, gheraoes by the youths of different countries are becoming the order of the day. It is amazing to note that they are reported from countries which have such diverse political, economic an social frame works as France, West Germany, Tunisia, Ethiopia, U. S. S. R., Great Britain, Japan, India, Belgium, Czechoslovakia, Spain, Poland and the United States and so forth. Considering such diverse environments one will be tempted to say that this unprecendented uprising. of the youths are nothing but a vague epidemic which have swept through the minds of the younger generation. Though the character, aim and the political ideals of these movements are different in the different countries one is sure to find many similarities in them if he goes to the root of these movements. These youth movements of the late sixties has no doubt trembled the vary foundation of the modern societies. Critics, historians and the sociologists admit that these movements cannot be put into air as mere juvenile act of the never-so-much-politically concerned youths but it has a greater significance for the modern human society. It is expected that the outcome of these movements will play a greater role in the set up of the future human societies. So, before discussing the significance and the integrity of these movements it will be worthwhite for us to go through the details of the youth movements of the some of the countries which are diverse in nature from political, social and economic view points.

In West Germany the scene of the first two months of 1968 was filled with the mass demonstrations by the

students, which almost invariably lead to violent clashes with the police. A typical example is the demonstration at Bremen where the youths protested against higher public transport fares. There the demonstrators wrecked 115 trams and 45 buses and many students were injured in policebaton charges. Another example is the demonstration against American policy in Vietnam in Frankfurt which brought the whole city to complete chaos. Further, there is a constant agitation against the authorities for active student participation in the running of the Universities.

According to the critics much of the occurances have been caused due to the singular lack of perception from the part of the authorities. In Bremen, in the first place the municipal authorities took no steps to explain why it was necessary to increase the fares and although the demonstrations were peaceful for the first two days there was little sign of readiness to discuss the matter seriously with the students. When the demonstration took a violent turn the police baton-charged the demonstrators and finally the mayor announced that the increased fares would after all be reduced which made everyone strange about the necessity of increasing the fares.

It is well known that the hard core of the movement in West Germany is formed by the SDS, **the socialist German Students league,** which is a body of extreme leftists. Their leader Rudi Dueschke have openly admitted that they are bent on provoking the authorities to the point where patience snaps. It is true that SDS itself and the active demonstratars form a small minority of the West German student body ; on the other hand most students sympathise with some of their discontents if not whole —heartedly with their methods. It is significant that in a public opinion poll 60 per cent of the students in West Germany expressed support for the demonstrators, where the main pretexts for the demonstrations were the war in Vietnam, the need for a reform of the university system or material grievences such as the raising of transport fares.

Many factors are pointed out which led the movements of the German students ; one is the eternal protest of youth against the older generation, another is the "economic miracle" which brought affluence to the society and the resulting attitude of "never had it so good" among the youths. Another factor is the indifference of the older generation towards the youths. But the root cause of this particular movement lies elsewhere. Democracy itself has not long come of age in West Germany. Up to 1966 the Federal Republic had been governed by a Coalition of the **Christian Democrats** and the **Free Democrats** with a strong **Socialist Democratic Party** in opposition. But in 1966 the grand coalition' of the **Christian Democrats** was formed leaving the week **Free Democratic party** in opposition which meant that virtually there was no strong parliamentary opposition party through which grievences can be expressed. This led to the extra-parliamentaly opposition like mass demonstrations etc.

In West Germany, after the movements the authorities began to think constructively about the problems facing the youths. They now recognise that the student violence and rowdyism can be controlled by better methods than by police forces. There is also an increased recognition that the academic demands of the students must be discussed with them.

Youth violence also touched the small and undeveloped country like Tunisia in the earlier part of 1968 which was crushed with a strong hand by President Bourguiba. Sentences ranging from 6 to 14 years imprisonment have been passed on 134 youths mostly students at the university of Tunis who were accused for "various subversive activities" inspired by foreigners" as the government say.

They were also accused of the publication and distribution of the clandestine publications "**Perspectives Tunisiennes**" (Tunisian Perspectives) and "**Espoir**" (Hope). At the trial, the prosecution divided the accused into the three groups : Ba'athists, Perspectivists and communists of whom only the perspectivists and communists received sentences. The perspectivists belong to a student group whose political faith covered a range from Marxist—Leninism and Maoism to Anarchism and Trotskyism and their political catalyst had been the above mentioned **Perspectives Tunisiennes**' published from Paris which called for a 'revolution of the proletariat' to oust the Bourguiba regime. The communists (the party is banned in Tunisia) also expressed similar views through the medium of their clandestine publication '**Espoir**' These two groups, along with the Ba'athists were responsible for all the disorders at the university of Tunis in the earlier part of 1968. But these violences was put off due to the timely and strong handed intervention of the government.

The revolt of the youths, inside and outside the campus is a fairly new phenomenon in the United States and incidents vre frequently reported from one or other places generally to promote student domination of university management.

The causes of student insurgency vary from college to college. It would seem likely that the primary incitement in the United States has been the war in Vietnam—a war which tempted the U.S. Government into its course of appalling and inseusate destruction—a war which has demanded that young Americans kill and die where they can see no rational relationship between personal sacrifice and national interest. The revolts boiled up on scores of college campuses in America in the spring of 1968 and since then comparatively smaller incidents are frequently reported in the press. During the uproar at Columbia the youths ransacked the presidents office, barricated the library and burned the professor's manuscripts who opposed the strike. The immediate issues of the revolt were more symbolic then real. The original protest led by **students for a Democratic Society** (SDS), a radical students groups and by the **Students Afro-American Society** (SAS), an organization of black undergraduates, was aimed at stopping the construction of a gymnasium in Morningside Park, which seperates Columbia from Harlem and at breaking Columbia's connection with the **Institute for Defence Analysis**, a private research organization that engages in military researeh for the Pentagon. A weak after the movements began 1,000 policemen stormed the campus to drive the student demonstrators out of the five 'liberated' buildings which was occupied by them and there were violent clashes. The movements of the Negro youths of America is a common phenomenon with the Negro College students—which sometimes takes the form of black-power-cries. But even where Negro College student protesters may be seen chanting "black power" it is mainly a rallying cry or slogan according to some observers. Closer inspection of their demands reveal divergent provocations. Howard students who launched a movement in 1968 to take over the administrative buildings, finally wrangled some concessions out of their administrators. These concessions revolved around the following : the freedom to bring liquor into the dormitories, and the opportunity in the case of girls, to take as many as three "unexplained" week ends. When students at Pennsylvania's Cheyney State College chased the administration out of its building, they demanded a state investigation of school policies. The students thrown out of Louisiana's Grambling College merely wanted less emphasis on atheletics and more on academic activities. Almost every where in America the youths are demanding more power of their own, not only in colleges but in the high schools also, and are demonstrating that they can often use it more intelligently than those who reluctantly

gave it to them. The youths of Amelica to-day are seem to be more conversant with the revolutionaries like the Guevara and others rather than with their text books as a critic observers.

Regarding the revolution of the American youths some commentators have put the blame on a handful of romantic New Leftists, playing at revolution ; or on clumsy, indecisive academic administrators ; or on the malaise of Vietnam or on the vague epidemic of student unrest which seem to be sweeping the world. Many reasons have been suggested for the uprising of the youths. One is that of the affuence of the American society. This affuence brought by modern science and technology removed the economic pressure for one's survival and thus the young people become free to indulge in other activities. The deterioration of the family unit is also another cause of these movements. This also made youths more free to be involved deeply in the social activities other than to earn their livelihood of the comparatively smaller family comprising of husband, wife and one or two children in general. Moreover, the youths of America have disillusionment with the students of the older generation which also stimulates them to revolt against their authorities who are of the older generation. To-day in America, the Universities and their faculties are more involved with non-teaching interests which encourages the youths of the universities not to confine in learning only.

Ethiopia is another small African country where a subtle movement among the youths are going on though it has not taken a violent turn. Despite the giant strides made under the Emperor Haile Selassie, there is an increasingly vocal opposition to his reign among the "bright young" men of the country. This group includes many of the university educated youths. In December, 1960, a revolt exploded in Addis Ababa, where the youths along with some other officers of the military forces and civil servants took part. Timed to take place while the Emperor was on a state visit to Brazil, it was headed by his trusted Imperial body-guard. But this was put down by the army and air force. Tacitly recognizing the basic reason for the up heaval—discontent among the educated youths the Emperor appointed several dozen bright young men' to higher posts though the leaders of the revolt were executed. Moreover, since that time he permitted the representatives to speak more freely in the parliament.

The wave of student movements is a more recent phenomenon in Great Britain and here the students are generally clamouring for more say in the running of the university affairs. The **London School of Economics** (LSE) students are probably the most politically active and aware group of youths in Britain. After the storming and recapture of a University building by the police which was held by the students for more than a year, the students seized control of their union. The students destructed some gates which was constructed by the authorities to stop the occasional sit-ins, and other school property. When police arrived to protect the gates, the youths fought and afterwards more then fifty students were arrested. The school was also closed for indefinite period. The following day a crowd of about a thousand militant students of the school marched on towards the London University Union building and seized it which they intended to use as a base for them /in exite' until their school is opened. The causes of trouble in the London School are firmly rooted in the resentment felt by a militant left wing group with Dr. Walter Adams, who is the director of the London school of Economics. He was the principal of the University College of Rhodesia formerly and the militant students believe that Dr. Adams had not shown enough resistance to the Smith regime of Rhodesia.

From the above hapenings it can be concluded that generally in Great Britain the youths are demanding more participation in the university affairs.

A great deal has been written in the Western press about the new "Wave" of protest in Russia and China But according to the press the movements have not take.n a violent turn due to the strong action of their governments. In USSR some youths are seem to have disillusionment about the promises of the Soviet government as a result of which a new development in Soviet life—open protests against the government are reported. In the April of 1968 students at Peking University, all long-term veterans of the Red Guards, chanting most un-Mao-like slogans, fought each other and their teachers with crude catapults from their universities roof-tops.

The youth movements of France in the violent spring of 1968 is the most violent movement known to us. There-insurgent French youths put trees on Paris's lovely boulevards to serve as barricades ; blames, deliberately set engulfed many houses ; youths tore down the tri-colours and replaced them with red flags ; tear gas and chlorine loosed by the police poisoned the atmosphere and the stones and brick-bats hurled by the students dented the shiny black helments of the security forces. Literally the whole France was tremored by the pandemonium created by the youths in co-operation with the workers. Originally, it began with a student protest against the teaching methods of the **Sorbonne,** but police brutality turned it into a general strike by ten million workers whose wage-are, except for the Italians', the lowest in Europe. According to the critics the blunder made by the French govern ment in handling the crisis is that they sent police to crush the students. Otherwise, they expected to witness a more progressive evolution in place of a revolution. But nowhere has youth more effectively created a elimate for

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LAKHTOKIA ROAD, GAUHATI—1

radical change then in Czechoslavakia where a repressive communist regime was swept out without resort to anarchy in the streets which is the case with the youth movements of other countries. They supported Alexander, Dubcek to oust the old order and set in motion a surge of liberalism and democratic socialism.

The current wave of youth movements has touched many of the prominent educational institutes and universities of India, though it is not a new phenomenon in this country, The struggle for independence mobilised large number of students for political action in the pre-independence period. In the recent years there are instances of several sporadic out-bursts of direct action against the authorities usually aimed at local campus issues, such as difficult examinations or poor living conditions in the campus. Calcutta is one prominent centre of such movements. In Maharastra, a big student agitation for an agricultural university was subsided in the last few months of 1968. After that the students of Nagpur University also gheraoed the state education minister and their Vice-Chancellor, demanding a reduction in academic fees. Several student agitations and demonstration took place in India during the last months of 1968 and in the begining of 1969 regarding the English-Hindi issue. The student movements in Andhra regarding the Telengana safeguards is still fresh. Recently many educational institutions including the Banaras Hindu University were declared closed. **Professor Philip G' Altbach,** an internationally recognised expert on student politics has stated in his recent book **"Turmoil and Transition : Higher Education and Student Politics in India"** that the current student unrest in India had roots in the strong Indian tradition of student political involvement and organisation stretching back to almost half a century. He recalled the part played by students in the national movement for independence. In India, it is recognised by all that some politicians always exploit the youths for their political motives, good or bad, and incite them to spirit of defiance.

From the above discussion it is evident that there were different grievences which made the young generation to revolt against the authority in different countries like the Vietnam War, reform of the University system, student participation in the running of the universities, raising of transport fare etc. From country to country and university to university the key reason varies but the characteristic of the movements is the same. The youths are becoming impatient of the modern bourgeois civilization and it is a sign of the times and the universal disillusion with politics and governments that they choose violence before negotiation. Almost everywhere it seems that they have lost faith on the govenrments and other appealing authorities. Further, they are becoming more politically conscious and know how to draw public sympathy towards them.

Much have been talked about the 'generation gap'—the conflict between the old and new generations as a root cause of the recent youth movements. The 'Hippie' movement is also an instance of this cause which is spreading gradually throughout the world after the second World War. No doubt, the modern youths are in disillusionment with the standards of the older generation. So, they are naturally irritated by the normal gap between the two. Actually this is a conflict of the rigidity of the traditional structures with the industrial world Confronted by the rapid acceleration of change in industry, in laboratories, in invention, in all matters intellectual—as J. J. Servan-Schreiber, an editor of a Paris paper observes.

It is a well known fact that in general the movements are directed against capitalism. The leaders of the West German youth movements Karl Dietrich and Rudi Daut-

schke and France's Sauvageot and Cohn-Bendit are all against capitalism. Their ultimate aim is the destruction of capitalism though they have no much faith on the so called democratic socialism but at the same time they are equally disgusted with the conventional policies of the leftists. Thus in almost every movement the youths are trying to develop techniques of their own.

In the conclusion, though the aim and characteristics of the recent youth movements are different in different countries it seems that the younger generation is generally craving for a new social order which will best suit the new concept of morality of the modern world governed by science and technology.

+ + +

National Bakery

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Come for taste.

Nostalgic Moments

"To-day, now, this moment,
or rather the present,
with its sighs of contentment,
Sweet melodies, sweet expectations,
Fill my thoughts ;
No lurking shadows perhaps,
Gloomy, ominous."

"Yet, even in this present,
At times, I ask a moment,
To linger, to await me,
For it contains—memories ;
And then it seems ;
Past melodies were sweeter ;
And the straines of laughter,
Floating through forgotten years,
With lethargy envelope me."

An evening gone long now,
Yet never forgotten,
For its unique aura,
A morning, when happiness
Teased the heart.
Long since thro' the years,
My mind in vain sought,
Another such morning,
Once more that evening,
Yet, only memories,
Crowded one another."

—Rajeeb Goswami

★ ★ ★

With Her, At The Koraput Hill

—**Partha Pratim E. Choudhuri**

With hand in hand,
We were ascending the hill of Koraput.
We were softly chattering,
With laughter on our teenth.
Suddenly,
there was lightning ;
Thunder,
crossing the crisp pages of my open book ;
ruffles,—
like the pebbles on the sea by hurricane,
Returned us to our own chambers.

Enclosed, Silent, Alone—We,
Saw the rains helmeted the wind—bears chattering with the houses.

Fail to recall her window,
I stood silent ;
I entered the self ;
I looked around the world,
dusked and husked by storm,
like none of us ever thought.

Yes !
Koraput below too gave stormy sight ;
though, they say,
At night it becomes full of light

★ ★ ★

TO MY SWEETY

Thy face resemble sandal,
And doey eyes are fickle ;
Majestic smile of thy is Heavenly ;
Oh : Nature don't blame me,
If I absorbed in her beauty.

Thou eye-brows are sharp like arrow,
Beautiful eye-edges are painted with collyrium ;
Collimation on the fore-head resembling the sun,
Smooth lips are burning like the red flint,
Slightest touch of Thy celestial shadow :
Extinguish the loneliness of my heart.

Thy body is Divinely and mind is pure :
Thou art the supreme Goddess of beauty :
Undoubtly, none can posses beauty like Thy,
In my creative soul, I need thy extremely.
I have been torchered much in my previous life ::
(By thy soul
Please don't trouble me much in this life,

★ ★ ★

—Mahadananda Das

GOD Speaking To Man

I gave you life,
You wanted freedom ;
But when I gave you freedom,
You asked for power,
The peace of the World to deflower.

I gave you understanding ;
You then asked for knowledge,
But when I gave you knowledge,
You did not ask for wisdom,
The finest fruit in My Kingdom.

I gave you beauty,
Then you asked for fame ;
But when I gave you fame
You forgot to ask for happiness,
Without which everything is a mess.

I gave you a free will
To be a snow-capped mountain
Or an insignificant hill.
But you chose the path of oblivion
Forgetting will power is life's fountain.

—**Ranjit Kr. Dutta**

★ ★ ★

I do not know

—Rajeeb Goswami

"I do not know,
What my mind seeks,
In the infinity of the universe.
A moment, any moment,
lingers long, while my listless heart,
Fervent in its of guest,
Haunts that moment."

"Yes, I do not know,
Perhaps I never shall,
The Quest shall go on,
Yet not a moment,
Shall I discern,
That shall with reluctance
leave me, and leaving,
Shall fill me with nostalgia."

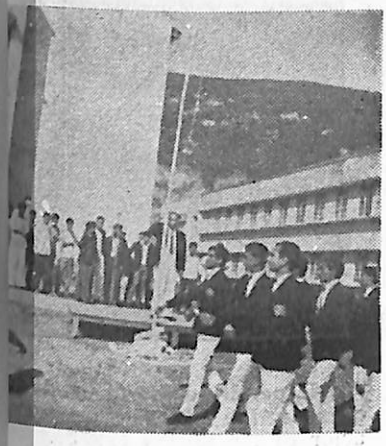
"And I wou'd not know ever,
What it is an ' where ;
Yet my fasti(iour heart,
Shall ever wait,
Knowing not what it seeks,
Until it comes along."

* * *

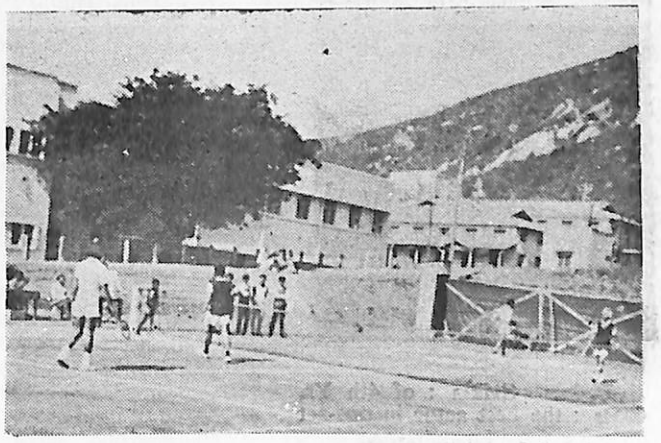
COLLEGE WEEK

HIGHLIGHT

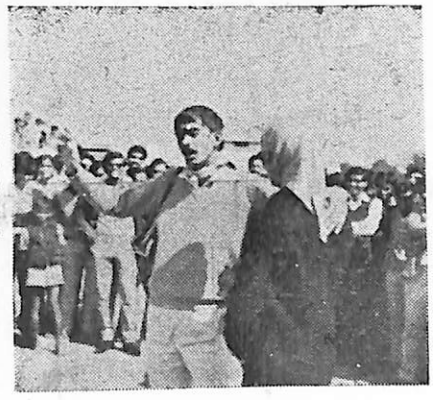
1969-70



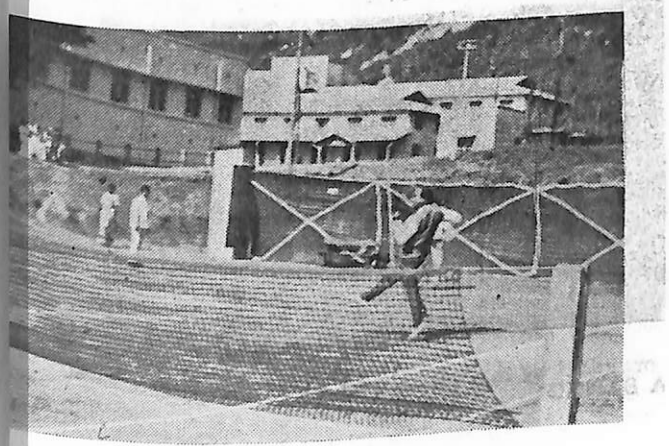
Principal Dr. S. D. Gogoi ceiving salute from the Civil adets of our college at the our of inauguration of the ollege Week.



Final match of Lawn Tennis Competeition (Double).

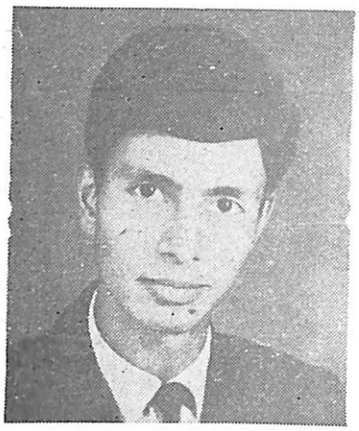


The insane fustrated lover is asking the lady (?) about his "Anima", but behold ! the gentlemen around him have found immense pleasure at this. (Go as you like, 1970).



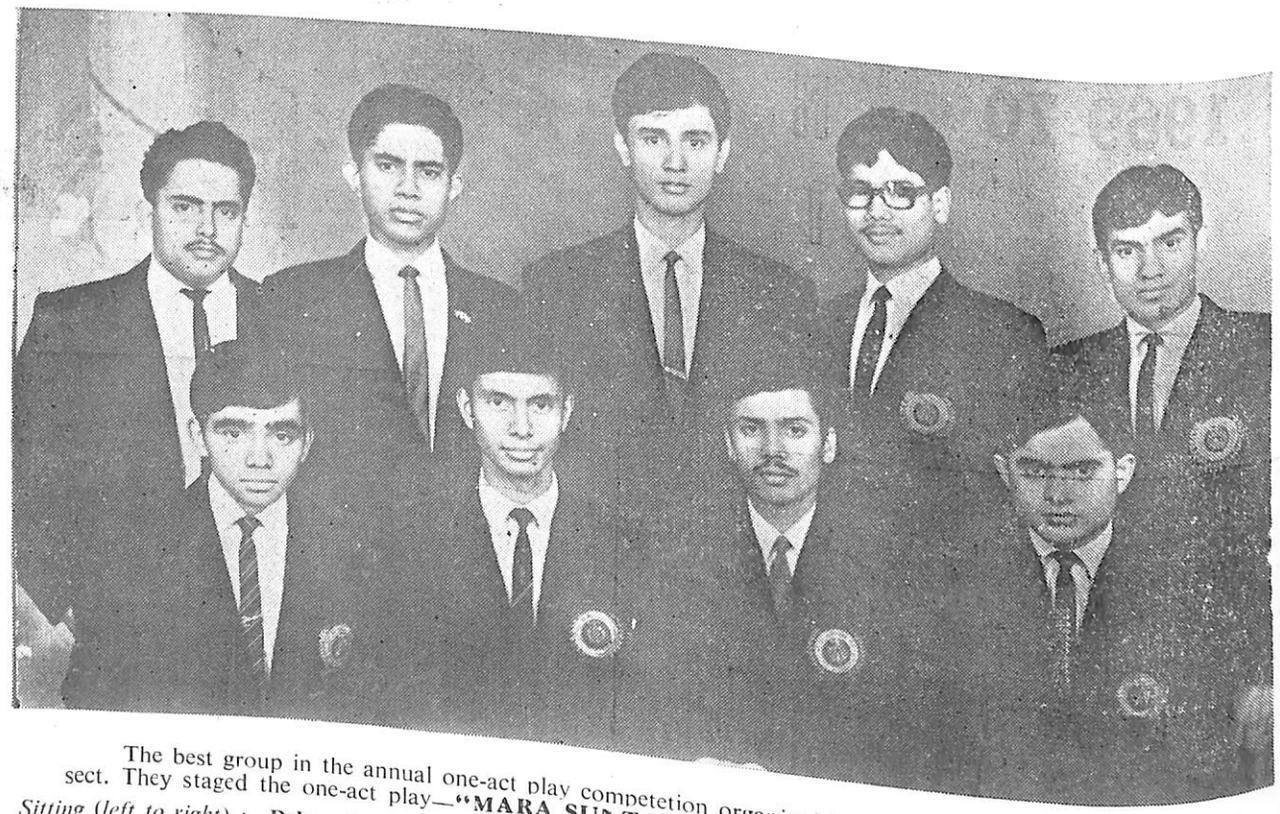
Will the ball cross the "Dee-ar" ? ....Certainly.' ....Well, this is how our rincipal inaugurates a Lawn-ennis exhibition match.

Photo shows Prir cipal's e'e-ven and the Secretary's eleven of the fancy Cricket Match.



Padum Saikia : of 4th Yr. Class : the best actor in one-act play for the year 1969-70.

Nripendra dutta of 4th year class : the 'best supporting actor of the session 1969-70.

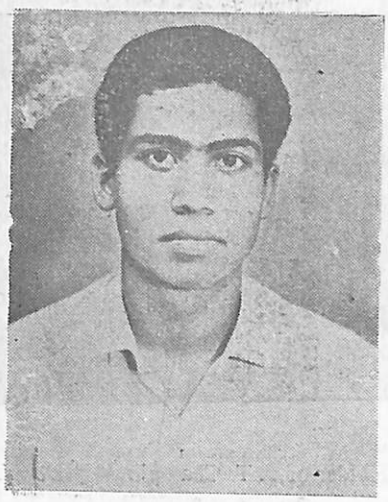


The best group in the annual one-act play competetion organised by the cultural and social service sect. They staged the one-act play—**"MARA SUNTI JIYA SANKO'.**

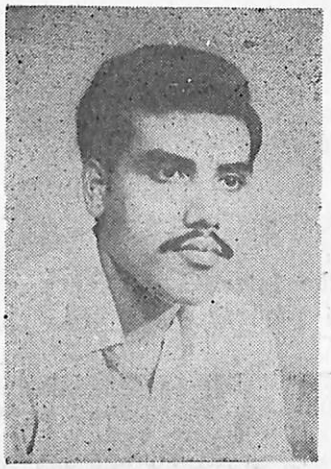
Sitting (left to right) :—**Paban Kakati, Padum Saikia** (Best Actor), **Shyamsundar Deka** (Best Director) **Bikash Bose** (Producer).

Stand ng (left to right) :—**Debajyoti Goswami, Nripen Dutta** (Best Supporting Actor), **Pradeep Adhikari, Baneswar Khound, Dhaneswar Barua.**

Ashish Chanda : Holder of New Hand Lawn Tennis Championship for 1969-70.

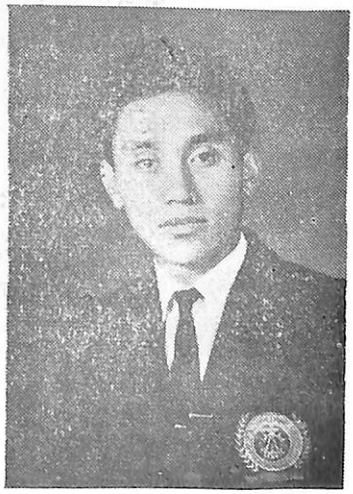


Subodh Sarmah : Best debator for the session 1969-70.

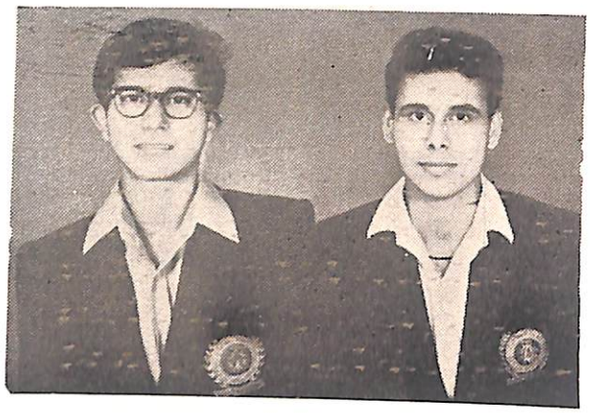


Abul Hassan Sadaduddin Mohammad : of 3rd Year Class : holder of the litle "Mr. AECIAN" for the last two consecutive years.

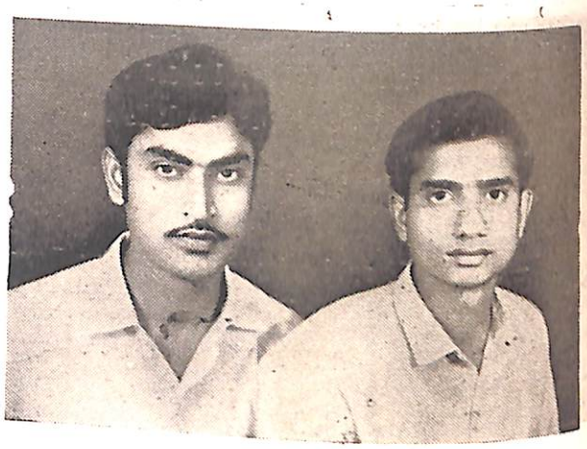
Dibakar Bhatta : "Best man" in General Sports.



Kiron Singh : Badminton (Single) Champion for 1969-70.



From left : Mr. Nayan Sarmah and Mr. Amal Sarmah : Holder of T. T. Championship(*Double*) for 1969-70.



From left : Mr. Rupak Agarwalla and Mr. Jonardan Jain Holder of Badminton Championship(*Double*)for 1969-70

Winner of the Inter Class Volley-ball Championship for 1969-70 : 3rd year class.

Sitting (*L to R*) :—**A. K. Das** (Captain), **C. M. Das, P. Gogoi.**
Standing (*L to R*) :—**Kiron Singh, N. S. Shingh, A. Konwar** (Team Manager), **B. Shaha, B. N. Das.**

News for Engineers

Automatic Fault Locator :—A new model of "live-line monitor" has been introduced by a British Electronic company which is capable of locating faults instantaneously and automatically on power transmission line.

The live-line monitor equipment significantly reduces the duration of line rbeak downs resulting from fault conditions, the search time is completely eliminated, and the repair crew can go directly to the scene of the fault.

It can also make a valuable contribution to the reliability of a transmission net work by locating and recording damage caused by transient faults. The monitoring facility also allows incipient fault conditions—for example, icing and conductor oscillation—to be seen before faults occur.

Microbalance :—An electrical microbalance for weighing primarily single fibres has been developed by the central leather Research Institute (CLRI), Madras. The principle used in the construction of the balance is the counterbalancing of the gravitational force by the force created by the magnetic field.

The balance consists of a milliammeter (I), a micro-ammeter (B), variable resistances (S & C) and shunts (Sh). A 1.5-V dry cell is used as the source of electrical energy. The micrometer is mounted in a wooden box in such a position that the pointer is horizontal. A low power microscope tube is mounted on a heavy base to which the meter mounting box is rigidly fixed.

World's Biggest Ship building crane :—A crane in Belfast North Ireland, is going into service at the docks. It is the World's biggest shipyard crane. The giant installation was designed by the German firm of Krupp and then assembled on the wharf of Harland on the Wolff. The crane will move along a 4-Kilometer stretch of track and will be able to lift prefabricated parts for tankers with a weight of upto 840 tons.

Remote control level crossing Barrier :—Siemens have developed a new level-crossing gate capable of being opened and closed from an inter locking at distances of upto 6.5 kilometers, crossing being controlled not only by gates but also by flasher light signals or colour light signals. All the important control and supervisory equipment is accomodated in the interlocking. The danger area between the gates can automatically be supervised, for example with the aid of light barriers.

Vibratory Roller :—A vibratory roller has been developed by the Indian Engineers in the Beas Dam Project, in which the centrifugal force is produced by an electric shaft which runs through the spherical roller bearings. An important feature of the roller is the use of coil springs instead of the conventional rubber paddings, to protect the frame of the roller from destructive vibrations. Further to ensure the total impact to be transmitted to the ground, the drive of the eccentric shaft has been arranged through a V-belt by using a twin disc.

High performance communications Receiver :—A fully transistorized high frequency communications receiver that has great sensitivity yet uses no more power than a flashlight bulb, introduced by a British Firm, has been evaluated by the British Combined Services Expedition to South Georgia, Antarctica, and found suitable for use any where, where compactness, low weight, and reliable high performance in difficult environments are needed. It covers a frequency range of 0.6 to 32 megacycles, with crystal calibration at intervals of 100 kilo-cycles, and will receive five types of signal mode—AM, PM, SSB, FSK

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Kamarpatty, Gauhati— 1

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and CW. For frequency selection, there are 11 three-megacycles bands, with equal channal spacing in each. It will operate on any power supply between 12 and 50 volts D. C. at a peak of 100 milliamps.

Rocketry in the West—an Indian legacy :—Many of us do not know that it is from India that the West learnt rocket technology. At the end of the eighteenth century, when the English invaded India, the Indians fought with rocket arrow projectiles. The Indian rockets in those times were in the form of an iron tube containing a charge of some combustible stabilisers made of bamboo poles, three meters long, were attached to them. The rockets weighed about five kilograms and could fly a distance of more than one kilometre. Specially constructed launching pads, too, were often employed.

Congreve, an Englishmen, on his return to England from India, started producing such missiles by the beginning of the nineteenth century. Thus the Rocket artillery soon spread to most of the European countries.

Ultrasonic Sensors in car plant :—Two ultrasonic beam sensors have been installed in the production department of the Ford Motor plant at Dagenham. Supplied and installed by Westool, Bishop Auckland, county, Durham, they operate in a similar way to photoelectric beams, but in some circumstnaces, such as locations where there is a good deal of air-borne-dirt or smoke, they are more reliable in operation. Ford's installation are at the end of the production line where vehicles are tested for weather proofing. When a car reaches the end of the assembly line, it breaks the ultrasonic beam which stops the conveyor and flashes a visual signal that the vehicle is ready to be driven away. At the testing booth, a car entering breaks the beam which switches on water spray units. When the car leaves, the spray is automatically cut off.

A new Device to Trace under-gruond cables :—A simple, inexpesnive, self contained device for locating the position and tracing the route of under ground power cables has been developed by a British firm.

The unit consists of a robust poly propylene tube containing a pick-up coil at the lower end and a miniature loud speaker at the other. The pick up coil detects the stray magnetic fluse in the vicinity of a loaded power cable.

The small voltage generated in the coil is fed to the input of a high gain transistorised amplifier, the out put of which is used to control the frequency of an audio frequency oscillator. The variable frequency is in turn amplified and fed to the loud speaker. There are two controls—an on/off push buttom and a sensitivity control. Power is supplied by a replacable Nine Volt battery.

By holding the upper end of the tube at waist level with the pick up coil and close to the ground an increase in frequency of the emitted note will be observed on approaching a loaded power cable. By "sweeping" the tracer from side to side an accurate location can be obtained and the route traced by noting the point at which the frequency is at its highest.

By turning the locator through 90° and proceeding along the side of a known or previously located cable the position of any branches or services can be ascertained.

A new Harvesters :—Messrs Willcon Bucwell India Ltd., an L & T subsidiary has introduced into the market John Deere Combine Harvesters in collaboration with the Agro-Industries Corporation Ltd.

In one continuous operation, it harvests the crop, threshes it, grades and cleans the grains. Alternatively the cleaned grain can be discharged into a trailer. The operation is swift, efficient and economical.

Electronic clock to help locate earthquakes :—An electronic clock weighing about eight pounds, but so accurate it can be set by hand to a hundreadth of a second, has been developed by he california institute of technology to help locate earthquakes. The clock was designed and built by engineer Nathanial Motta of the institute seismology laboratory to replace an older model which weighs 100 lbs. It is being teamed with a seismometer to time the moment that ground leaves from an earth quake reach that instrument. The arrival times of the ground waves are used to calculate tde distance of an earthquake. The difference between the two kinds of waves help pin-point thesite of the earth movement.

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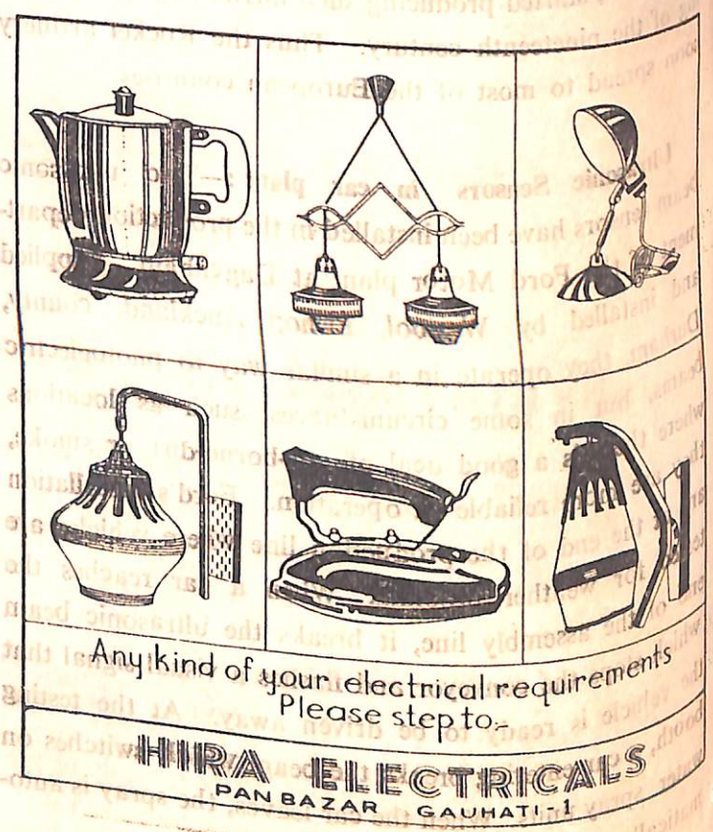
(4) Window greills
(5) gate
(6) collopsable
(7) Railing



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PAN BAZAR GAUHATI-1

Secretarial Report 1969-70

GENERAL SECTION

Chidananda Medhi,
General Secy.

Satyabrata Baruah
Asstt. General Secy

Write :

At first, we express our hole hearted gratitude to all our AECIAN friends who had given us the chance to serve them as their General Secretary and Assistant General Secretary of A. E. C. S. U. S. during the Session 1969-70.

Our Executive body is really happy enough not to deal with any unpleasant situation in this Session as the situation was very calm an quiet this year. We are glad in saying that our Union had done its utmost in the best interests of the institution as well as the students.

Functions :—

Our election was held on 6th Oct.'69 and we took our charges on 10th. We had our Freshmen social on 14th Oct.'69 and this function was very memorable one where we greeted our young freshers and welcomed to our noble Institution. Our Principal Dr. S. D. Gogoi presided over the meeting.

The 15th Jan. was a mournful day for our College when we lost one of our student friends Sri Mridul Kakaty, a final year (Mechanical) student who was a brilliant, sincere and meek boy and friendly to all. We the students and the Staff were stunned on hearing the sudden and premative death of him and recorded our deep sense of sorrow in a condolence meeting hold on the 16th Jan.'70. May his soul be rest in peace.

A Trophy was introduced by the Executive body for his sad remembrance by the name of "Mridul Kakati Memorial Trophy" for awarding the inter-hostel Cricket Champion.

The Annual College week was held from the 25th Jan '70, the College foundation day to the 1st Feb '70.

It was a very successful and memorable one and we got co-operation from both the students and the Staff and every secretary did well who worked heart and soul to present good performance from their own Sections . In the midst of our College week we celebrated the Republic Day, i e 26th Jan '70 in our College

On 9.2.70 Prof G. N. Barpujari, the seniormost Professor left the College who retires after fourteen years generous service to our College. Fourteen years ago when the College was started, the students were glad to welcome him one day but after fourteen years we felt a pain some where in our heart when we had to bid farewell to him. It is needless to say that Prof Barpujari's deparature is an irrepairable loss to our College. We can never forget him as well as our "Baidew" who is also so dearly to us. Their memory will remain ever green in the mind of all AECIANS.

Then came Saraswati Puja, one of the most celebrating festival of our College Like other years this year also on the 10th Feb '70 it was celebrated admist encouragement of students and staff alike. I offer my thanks to Sri Tridib Kataky and Sailen Bora, the Joint Secretaries who conducted the 'Puja' so successfully.

The last important function that we had to arrange was the Parting Social for the outgoing studnets which was held on 20th May'70 The meeting was presided over by Dr. S. D. Gogoi our Principal We wish the new batch of Engineer from our College all the fruitful purposeful and scientillating future.

Demands and Achievements—

On the month of December'69 we had a Students' delegation headed by us to Shillong for fulfilling some of our legitimate demands. Here some of the assurances given by Sri H. R. Diengdoh, under Secretary to the Govt of Assam, Department of Education (P T M) are given below :

1. A sum of Rs 3,000/- has been sanctioned for publication of Magazine for Assam Engg College, Gauhati during 1969-70.

2. As regards the proposals for construction of a Swimming pool and installation of coiling fans in the hostels the matters are being looked into.

3 The proposal for sanction of scholarships to students passed in compartmental is under examination.

4. The post of Professor, Chemical Engg at Assam Engg College has been lying vacant since its creation It was advertised twice but the Assam Public Service Commission did not find any suitable candidate to recommend for the post. A proposal is under active consideration of Govt. to make some interim arrangement.

5. The Govt are taking steps to post a suitable person at Assam Engg College to teach Physical Chemistry. As an interim measure Smti Ranu Misra, Lecturer Chemistry, Assam Engg Institute, Gauhati has been instructed to take Physical Chemistzy Classes at Assam Engg. College.

(6) The administrative approval for the Chemical Engg. building at Assam Engg College has since been accorded. But due to some technical difficulties, the construction work could not be undertaken. It is expected that it will be possible to start the work soon.

(7) Action is being taken by the Principal to provide necessary books and furniture for the Library.

In this connection we would like to suggest that the forthcoming Union bodies should keep a vigilant eye so that our vital demands be implemented as early as possible.

one of our long felt grivances is relieved by the University that is the reduction of Compartmental examination fees. Previously we had to pay Rs. 69/- as Compartmental fees, which was the same as the final examination fees. Now onwards it has been reduced to Rs. 40/-.

Another big achievement of our Union is that—that the University will award now onward four Gold Medal to all the four branches (i.e. Civil, Electrical, Mechanical and Chemical Engg.) and the first in each branch will get the Gold Medal. It is to be noted that only one Gold medal was awarded to the first among the Engineering graduates previously.

Other activities :

This year also the Model Competition was held like last year and the models were exhibited to the public in an exhibition together with other arts in the College during the College Week.

The names of the the Prize winners are given below :

Name of students	Name of Model	Amount of price.
1. Shri Apurba Sarma 3rd Year Class	(Auto Coin Exchange)	Second Prize of value Rs. 120/- in cash.
2. Shri Pradip Chakraborty 3rd Year Class	(Auto Drtink Seller)	Third prize of value Rs. 80·00 in cash.
3. Shii Shyam Agarwalla 4th Year Class	(Hover Craft)	Consolation prize value Rs. 40/00 in cash.
4. Shri Kalyan Kr. Lahkar 1st Year Class	(Electric crane)	Consolation prize of Rs. 40.00 in cash.

The judges have decided not to award the First prize as none of the models was of the standard as to deserve the first prize.

For the improvement of the College Canteen, the Canteen was given to contract experimentally for one year. But as ill luck would have it we cannot be successful in improving the management for some unavoidable circumstances. We regret our unability and hope a better management in the next session.

This year the Inter College SPORTS' FESTIVAL was held in Nowgong and 'Inter College Youth Festival' was held in he Gauhati University. Our College had a good performance in both the festival.

This year our students had to suffer a lot due to the strike of the Assam State Electricity Board Employees Union. It was held during our Examination time and the students was very much disturbed in their study and the students had to live in hostel in shortage of water. As a result examination was postpond for about one week. But this days were not enough for one to refresh one's mind and to settle down for preparing for the examination after break down, as the examination was held after three days of the resumptiom of Electricity Supply. We approach he authority but the authority paid no heed to it and as a result many students could not be able to do good in the Examination Hall.

We congratulate the following students who received College Ribbon, College Blue, and College Colour for the the year 1970.

COLLEGE RIBON—1970

Shri Kalyan Kumar Choudhury 5th year Mechanical Engg. for his proficiency in Carricular activities.

COLLEGE BLUE—1970

Shri John Mehra 5th year Chemical Engineering for his commandable performance in the Game of Cricket.

COLLEGE COLOURS—1970

1. Shri Emdadul Islam, 5th year Mechanical Enginering for his proficiency in Gymnastics.

2. Shri Dalim Chandra Gogoi, 5th year Civil Engineering for his proficiency in Tennis.

3. Shri Ujjal Nag, 5th year Civil Engineering for his proficiency in Cricket.

We shcould now take this opportunity to convey my whole hearted gratitude to Dr. S. D. Gogoi, our Principal and President, A.E.C.S.U.S. whose time to time adviee and suggestion guided us very now and then, We are also graeful to Dr. N. K. Choudhury, Treasurer, A.E.S.U.S. Prof. H. Rahman Barua, Prof. A K. Padmapati, and Dr. P. K. Bora for obliging us with their valuable advice. I express my indebtedness to my colleagues and so many fellow students friends but for whose co-operational help, the functioning for the students' Union would have been zeoparadised. It is a reward to us that our friends is not finish their duty by simply electing us to this high offce by they rendered their ungruding co-operatiion if and when when necessary. We once again thank them all.

Before concluding our Annual report we like to write a few words about the burning question of the day—the unemployment problem of engineers. Much have been said on this issue and plentiful of crocodile tears have been shed by the authoriries concerned. What little has been done is commendable no doubt but that too is insuffieient. It is a matter of great regret that the situation has already reflected on the interest of meritorious students for engineering study. This really is an ominous sign for a developing country like ours and something positive should be done before it is too late.

Thanking you all.

Long live A.E.C.S.U.S.

MINOR GAMES SECTION

Anil Kumar Borah,
Minor Games Secy.
Writes :

It is a great pleasure to write this annual report about my activities as Minor Games Secretary during the academic session 1969-70. I take this opportunity to express my gratefulness to the Aecian friends who gave me the

honour of serving them & without whose help & co-operation it would have been extremely difficult for me to efficiently carry on my duty.

Games in general are essential for physical well being as well as mental relaxation Minor Games are specially suitable because they tone up the body without excessively taxing the physical stamina of the players. So it is not surprising to find that minor games are quite popular & I am glad that the students take keen interest inspite of various difficulties & draw-backs such as lack of proper grounds & guidance. I am happy to state that the standard of our badminton is remarkably good & can compare with that of any other College in Assam.

The lack of training facility in Volleyball has been felt for a long time. Without a proper Coach, it is not only absurd but also impossible to build up a Volley ball team of high standard. I hope the authority will consider the matter with urgency.

The Annual Competitions had successfullly been staged during the College Week in January'70. The students participated enthusiastically in badminton & Volleyball. The results for the badminton & volleyball competitions are given below :—

Badminton :—

(a *Singles*—Kiron Sing of 3rd year class eligible to hold the Championship title defeating Rupak Agarwalla of final year class.

(b) *Doubles*—Rupak Agarwalla (5th yr.) & his partner Jonardan Jalan (4th year) won the title defeating Kiron Singh (3rd yr.) & his partner Aradhendu Kahali (2nd yr.).

Volleyball :—

The Volleyball Competitions were held in two categories (1) Inter hostel (2) Inter Class. The title for Inter hostel Championship earned by Hostel–5 ; and the title for Inter Class Championship earned by 3rd year class.

An effort had been made to arrange a basket-ball Competition, but unfortunately the Competition could not be held due to the lack of a suitable ground.

Since girl students are few in number ; the badminton competition for girls could not be held this year.

Inter College Sports meet :—

The Inter College sports was held in the month of Dec'. 69 at Nowgong. A strong contingent consisting of the following players had been sent to participate in the badminton Competition. (1) Kiron Singh. ( ) Jayanta Dutta Choudhury (3) Ardhendu Kahali. In the first round our college got a walk over against Silchar College. In the 2nd round our College had to face Imphal College To our great surprise, we came to know that the players of Imphal College really could not qualify because they had crossed the period of eigth years, to play in the Inter-College meet We lodged a proces with our Prof. in-Charge Pulin Mahanta (Lect. M. E.) against this, but it was ignored by the authority. It was really a shock for us to learn that the protest for the same reason which was turned down in our case was granted when moved by Cotton College. As a result our deserving team could not shine because of the biased attitude of the authorities.

I conclude my report by offering my heartiest thanks to my Prof.-in-Charge H. R. Baruah, Dr. N. Choudhury & Dr. S. D. Gogoi, whose help & guidance were invaluable. I also offer my heartiest thanks to Mrs. Gogoi for the trouble she had had taken to distribute the prizes in the Prize giving ceremony. Finally I should offer thanks to Sri Manabendra Kakati of 2nd year class who helped me much in conducting the games smoothly.

TENNIS SECTION

Kamal Chaudhuri,
Tennis Secretary writes :

Countless thanks to my dear Aecian friends for their kind consent on allowiug me to serve as their Tennis Secretary for the Session 1969–70. I do not know, how far I was successful on my humble endeavour, but it is true that during the tenure of my office, I got the fullest support from all.

This time I introduced inter hostel competition instead of inter class competition. Great enthusiusm was seen among the students and the players. Hostel–4 which was represented by Dalim Kr. Gogoi, Mridul Sarma and Dulal Dutta became the Champion and Hostel–1 which was represented by Aschis Chand, Utpal Bora, and Amal Sarma became the runner's up. In the new hand Tennis Competition many students joined and showed great interest. As the number of student competitors was very few for the open single', I allowed the staff to compete with the students. In 29th January, 1970, when the inter hostel final and open single's final were playerd an exhibition match between our principal Dr. S. D. Gogoi and Prof. P. Padmapati Vs. Dr. P. Bora and Prof. H. Rahman Baruah was arranged. Principal and Prof. Padmapati won the match.

I am very sorry for not being able to sent our College Tennis team to join the inter College competition as both the Competitors were from the final years class and they had to go for the excursion at that time. The scarcity of Tennis balls throughout India is well known for all the Tennis lovers. I am very sorry as I could not arrange the Double Tennis Competition for the balls. At the last moment I could manage few balls by which I conducted the competitions. I think the authority should not take immediate step to promote the position of Tennis balls.

I am very much indebted to the students and the staff from which I got the many helps during the tenure of my office. I would fail my duty if I do not mention the names of Dr. Amal Sarma, Prof. in-Charge of the Tennis Section and Prof. P. Padmapati, from whom in every step I got the advice and help and to speak from them I could do what I did.

The results of the competitions are as follows :—

Inter Hostel Competition :—

Champion—Hostel 4.
Runner's up—Hostel–1.

Open Single's Competitin :—

Champion—Dalim Kr. Gogoi (Civil 5th year)
Runner's up—Mridul Sarma Mech., 5th year)

New hand competition :—

Champion—Aschis Chand (Civil, 4th year)
Runner's up—Amal Sarma (Chem., 4th year)

CRICKET SECTION

Promod Ch. Pathak,
Cricket Secy writes :

At the very outset of my annual report I would like to offer my heartiest thanks to my Aecian friends for giving me the opportunity to serve them as their Secretary, Cricket Section.

Our college cricket team though had the glory of being the inter-college champion & had a good reputation, could not maintain the same this time. So, I would like to beg my Aecian friends pardon for failing to maintain the fame. There are some reasons which I would like to mention for the defeat in the inter college cricket match. The first reason is the lack of proper ground facilities The college ground, which is under construction is not yet been completed. My several requests were in vain for which I must blame the authority.

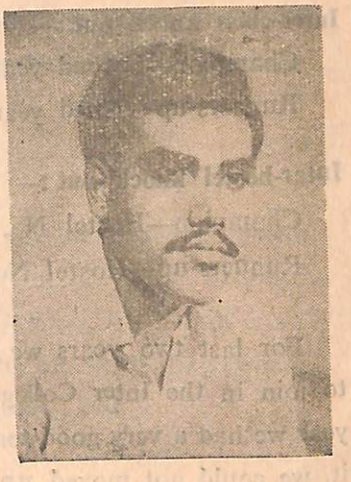
Another reason is that many of our players had their compartmental examinations (of Gauhati University'69) which was held just before the inter college match. So they had to play without any practice. Moreover, players did not get any facilities from the college regarding the class attendance ; so they did not like to attend the practice regularly. Also, the requirements for the game supplied were not upto the mark.

It was a great pleasure for me to introduce "Inter hostel cricket Competition" this year. A trophy was declared by the A. E.C. S. U. S. for the same in memory of our beloved friend late Mridul Kakoti. The Hostel No. 1 was the winner of the trophy. I saw a great enthuthiesm of the students in the competition.

We are proud of Sri John Mehra of our college team, who represented the State team in the Ranji Trophy matches this year successfully. Another two boys Sri Ujjal Nag & Ranjeet Das represented the University Cricket team and Gauhati District Cricket team respectively.

At the conclusion, I offer my hearty thanks & gratitude to Prof. A. K. Padmapati for his encouraging guidance. I also acknowledge the help of Sri Bhupen Sarmah, Sri Pramath Sarmah, Sri Amal Sarma , Paran Phukan & Sri Parag Phukan.

FOOTBALL SECTION



A. H. S. Mohammed
Football Secy. writes :

I thank all the Aecian friends for giving me the opportunity to serve as foot-ball secretary for the session 1969–70. Though foot-ball is not as popular as cricket in our college still players show their keen interest in playing foot-ball. As a matter of fact, we had to face great diffi-

culty in playing foot-ball due to the poor condition of the play ground. Our College foot-ball goound has not yet been completed for last two years. Thus all the Aecians deprived of playing all kinds of games. It is a matter of great regret when we had to go to University authority concerned for the permission for their field in running our matches. Therefore, I request our college authority to complete the field immediately so that our sportsmen get all the facilities to show their talents. We are informed that a large amount of money had been sanctioned for the field and still why it stopped so abruptly was a mystry to us.

This year also we had inter-class and inter-hostel foot-ball competition. But due to lack of field and time we had to decide all the matches in the very day fixed. This decision was not supported by all the Aecians as they were getting only one opportunity for playing such matches. I also opposed this decision but could not alter it. Both the matches were contesting Following are the results of the two competitions :—

Inter-class knock out :—

Champion—Second year class.

Runners-up—Third year class.

Inter-hostel knock out :—

Champion—Hostel No. 4

Runners-up—Hostel No. 6

For last two years we were getting the opportunity to join in the Inter College foot-ball competition. This year we had a very good team, still as ill luck would have it, we could not moved up I hope if we can play this way we would shine in the near future. This year the college authority has given many facilities to the players which indicates that the interest for foot-ball has been increased among all. I feel proud in mentioning the name of Shri Kumaresh Ghosh who represented the Gauhati University foot-ball team last year and G. S. A. team for I. F. A. shield this year.

Lastly I would like to thank the University for giving me permission to use their play ground and Mr. kripal Singh who helped me in proceeding all steps. On his keen interest our field infront of hostel No. 5 and 6 has been improved at lot. I thank Dr. S. D. Gogoi and Dr. N. K. Chowdhury for their kind co-operation.

I will never forget my Aecian friends who helped me in all aspects. Thanking you all.

GYMNASIUM SECTION

Ramen Kalita,
Gymnasium Secy. writes

At the very outset of my report I congratulate you all for giving me the opportunity to serve you as your Gymnasium Secy. and also co-operating me in discharging my duties as the Gymnasium Secy., A. E. C. S. U. S. for he Session 1969–70.

This year our boys showed much better performance in every department of Gymnasium in comparison to other previous years in the Annual Gymnasium Competition. Especially in weight lifting our boys showed excellent performance.

As regards, the instruments & equipments of Gymnasium Hall our need and demand has been partly fulfilled but I request my successor to do his best for the well equipment of the Gymnasium Hall. This year particularly, one thing caught my eyes that most of our boys have taken much interest for gymnasium which is very important to keep individual's both mind and body, fresh and sound.

Lastly, I have nothing to write except to pay my heartiest thanks and respect to Prof-in-Charge, Gymnasium Section Dr. A. Sarma for his valuable suggestion and guidance in all respects in discharging my duties as your Gymnasium secy.

Thanks.

HOCKEY SECTION

Joseph Guy Ferandez,
Hockey Secretary writes :

Firstly, my gratitude to all fellow Aecians for having elected me as your Hockey Secretary.

Before proceeding I devote a few words to Shri Bijan Kar who died in a plane crash while on his way to Gauhati from Silchar. We miss him not only on the field and as a team mate but as a man and friend, too. One who was the livliest and healthiest ; the bulwork of our team and our leader on the field—one who remained undaunted in time, of crisis and was responsible for many of our victories all I could say is that fate has been wel and our only fitting tribute to him who was our dearest friend would be his memory which shall live for ever in our minds.

Now for my regular report.

Starting with activities inside the college campus, this year saw the iniatiation of the inter-Hostel Tournament where we had seven teams taking part instead of five. had it been inter-Class wise. The tournament was a success and we had the honour of having Mrs. Gogoi give away the prizes to Champions Hostel No. 2 who defeated Hostel No. 4 in the Finals. The best player award went to Abul Hussan S. Mohammad, Hostel No. 2

For our activities in Gauhati—Our college remain on top of the Hockey arena with our retaining the 'Ranjit Barpujari Trophy' and coming out runners up of the steels Trophy—a great feat indeed considering the fact that we had as many as five of our boys making their maiden appearances for our college this season.

In the Steels Trophy semi final (we were given a free passage to the semi finals being previous runners-up we met Don Bosco Club. In them we found a very methodical team and our 2–0 win was indeed hard-earned. The goal getters were K. Ibotomba Singh & Somnath Choudhury. However we could not repeat the performance with 19 Wing Air Force and so had to be satisfied with the runners-up prize.

The Ranjit Barpujari Trophy saw in us a determined team ready to avenge our defeat in the steels Trophy. As expected me again met the 19 Wing Air Force team after having a smooth passage to the semi-finals where we defeated young Blues' of Gauhati 2–0.

The final was a memorable game one in which the eleven of us on the field that day shall never forget.—We were all out for a win and it was this positive attitude which helped us bring glory to our college with a convincing 3–1 win. The goal getters were Kiron Singh, Ra-

phira and K. I. sing (Captain) special mention must be made of Shri Allen Rayma who was out-standing in mid field and it was he who along with the late Shri Bijan Kar, iniatiated most of our offensive moves.

All said I sincerely thanks all the players and our Professor-in-Charge Shri Kripal Singh for the hard work and enthusiasm shown by them. It was their sincerity which finally paid for our success.

Lastly my thanks to our president Principal Dr. S. D. Gogoi and the Treasurer Dr. N. K. Choudhury for their co-operation and understanding which made my term a success.

Thanking you,

GENERAL SPORTS SECTION

Parimal Karmakr
General Sports Secy.
writes :

At the very outset I offer my heartiest thanks and deep sense of gratitude to all my aecian friends for their love and kindness in electing me to serve them as secy. General sports section A. E. C. S. U. S for the session 1969-70.

I had to arrange our annual college sports after the inter college sports festival. This inter college sports was held this time at Nowgong. Actually for our college it is not possible to arrange anual college sports before inter college, because compartmental examinations generally held at November and at that time it is not possible for the students to take part in games and sports. So in every year we are to select the athlets for inter college competitions according to their performine in the previous sessions.

The sports opening was declared by our Principal which was followed by Inter hostel march Past, All the hostels except the girls one took part in the event.

This time the prizes of the respective items were distributed in the play ground after finishing the event. I am gratefull to principal and Professor staff for helping me in distributing the prizes.

Regarding to the play ground I am to say that the ground is not fit for any game. The most attractive items held in this time were Professossors Back race, Balanc race and Music chair for Campus Ladies.

The results of annual sports given below :—

Marathan Race
(1) Monoj Srutikar
(2) Kumaresh Ghose
(3) N. S. Shingh.

March Past
(1) Hostel—7
(2) Hostel—6
(3) Hostel—5

Shot-Put :
(1) Sachi Mazumdar.
(2) Prakash Sarma.
(3) Bhupen Das.

Slide Rule race :
(1) Billal Haque.
(2) I. Islam
(3) B. L. Maheswari.

Pole Vaults :

(1) Devakar Bhattachary
(2) Mahmadul Hussain
(3) Tarun Borgohain

Hammer throw :

(1) Bhupen Das
(2) Emdadul Islam
(3) Tarun Borgohain

Hill Climbing :

(1) Amril Konwar.
(2) N. S. Shing
(3) Bimal Rajbansi

Fast Cycling :

(1) Achinta Roy Choudhury
(2) Ramen Kalita
(3) Anup Laskar

Javeline Throw :

(1) Abani Baruah
(2) S. Mukherjee
(3) Ujjal Nag

High Jump :

(1) Devakar Bhattacharya
(2) Tobarak Hussain Mazumdar
(3) Romakanta Gogoi

× 100 metre Relay race :

(1) Hostel No.—4
(1) Kamala Kataki
(2) Shyamal Sarkar
(3) Radesyam Singh
(4) Monoj Srutikar

400 Metre Race :

(1) Kamala Kataki
(2) Emdadul Islam
(3) Mojon Kr. Srutikar.

200 metre Race :

(1) Anil Bora.
(2) Kamala Kataki.
(3) Debakar Bhatta

Long Jump :

(1) Ujjal Nag
(2) Devakar Bhattacharya
(3) Abani Boruah.

Discus Throw :

(1) N. S. Shing
(2) Dinesh Choudhury
(3) T. Borgohain

Hop Step & Jump :

(1) Ujjal Nag
(2) Bidyut Chakravarty
(3) S. Bhowmik

100 Metre Race :

(1) Debakar Bhatta
(2) Kamala Kataki
(3) Anil Bora

100 Metre race (Hurdle) :

(1) Debakar Bhattachary
(2) Anil Bora
(3) Kamala Kataki

(2) Hostel No.—2
(1. Dinesh Choudhury
(2) Emdadul Islam
(3) Debakar Bhatta
(4) Gautam Bhatta

1500 —Metre Race :

(1) Monoj Srutikar
(2) N. S. Shing
(3) Kamala Kataki

(3) Hostel No.—5
(1) S. Zaful Haque
(2) P. Gogoi
(3) A. Bora
(0) Arjun Das

Swimming 100M (free style) :

(1) Arjun Das
(2) Depak Chaudhury
(3) Chitta Ranjan Paul

Girls' 80 race :

(1) Bibha Das
(2) Mridula Das
(3) Labanya Padmapati

Swimming 100M(back style.)

(1) Depak Choudhury
(2) Parimal Karmakar
(3) Krishna Das

Girls' Tennis Ball Throw :

(1) Surya Begum
(2) Bibha Das
(3) Mridula Das

Egg and Spoon Race (per Groups Ladies) :

Go as you like :

(1) Deba Pziya Das
(2) Bidyut Chakravarty
(3) Monoj Srutikar

(1) Miss Tripti Barpujari
(2) Miss Mridula Das
(3) Miss Bibha Das

Professor's Back Race :

(1) Dr. S. D. Gogoi
(2) Prof. Nereswar Sarma
(3) Prof. Kripal Singh

Music Chair for Ladies :

(1) Mrs. S. D. Gogoi
(2) Mrs. H. Rahaman Barua
(3) Ms. G. N. Barpujari

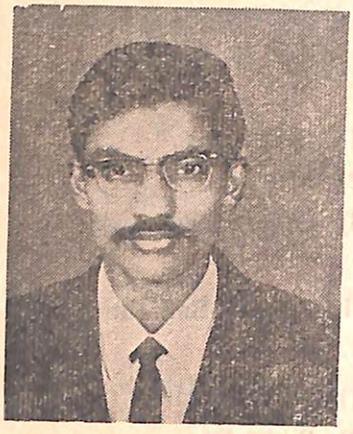
Best man—Devakar Bhatta.

Inter College Winner (2nd)—Parimal Kamkar.

In the conclusion, I take the opportunity to exprees towards President S. D. Gogoi ; Dr. N. K. Choudhury and Prof.-in-Charge. Prof. A. K. Padmapati for their help and guidance.

At last I thank my college friends for their kind co-operation.

DEBATING SECTION



Samsul Hussain Khan,
Debating Secretary
writes :

At the very outset, I convey my hearty thanks to all my Aecian friends for giving me privilege of serving them as their Debating Secretary during the academic session 1969–70.

The activities of the Debating section were so limited that I can haraly mention anything other than our participation in a few inter college debating competition held in Gauhati. The limitations I faced was due to the lack of fund and interests of our students.

I am compelled to write that the interest of our students in the field of Debating is decreasing day by day. This is perhaps due to the fact that a technical man does not like to spend his time in the art of Debating. It is a matter of regret. as we know, that eloquence and oratary are important assets in a democratic country where the freedom of speech is one of the fundamental rights. Almost all the students of a institution should not take part in the actual debating competition, but it is reasonable to expect that students in general would be present in the auditorium at least. At the time of competition of he participants and the chief guests find that half of the auditorium is empty ; half of their interest will vanish automatically.

During the session I wished to introduce a new item in the Debating Section i e. Mock parliament. But the response found was too week for the item.

During this session our college participated in a few inter college Debates. Our participants could not know inter college Debates. Our participants could not show their perfomance upto the mark although it was satisfactory.

The Annual Debates, Extempore speech and quiz competition were held during the college week in which Sjt. Sarat Goswami, Principal of Handique College was the Speaker. Sri Subodh Sarmah was adjudged the best Debator of the year.

My appreciation goes to the participants of Annual functions of our college and those who represented our college in inter college Debates.

I offer my heartiest thanks to our honourable Principal for his kind advices and encouragements. I am also very grateful to prof-in-Charge Dr. P. K. Borah & Prof.-Dr. N. K. Choudhury & Prof. A K. Padmapali for the help they extended by giving the valuable suggestions.

Before conclusion, I express my deep sense of gratitude to my Aecian friends who offered their helping hands to make me carry out my duties smoothly and successfully.

Thanking you all.

MUSIC, CULTURAL & SOCIAL SERVICE SECTION

Sisir Goswami,
Secy. Music, Cultural & Social Service writes :

It i indeed a great pleasure to be writting the annual report of this section for the XII Vol. of THE AECIAN.

I must begin with a word of thanks to all my Aecian friends for giving me the opportunity to serve them for the session '69–70 as their secretary for this section, the importance of which was further increased with the inclusion of Music section to Cultural & Social Service since this year. I did my utmost to carry out my duties & come upto the expectation of the Aecians.

Competitions on recitation, wit & Humour, Literary, fine arts, photography & cartoon were held during the college week with very good response from the aecians. A fine arts exhibition was arranged during the college week with great success for which I am very gratefull to Mr. Mihir Bardoloi & Mr. Bhiwand Kar of Gauhati for giving their paintings for display in the exhibition. I also thank my friends & well wishers & others who greatly helped me on many occasions to make the functions a great success.

Like the previous years one act play competition was held, but to my utter surprise the number of groups were very few & the enthusiasm & the standard which was seen two years back was lacking. It is my earnest request to all aecians to do our best & bring back the fame.

Like last year the staff dram was a great success & the fine performance shown by the Professors will be remembered by the students for some years to come. The students drama in which some of the Union Secretaries took part was very humerous & I am really very greatfull to Sri Jogen Buragohain & Paresh Khaund who took great interest in arranging it.

The college week was concluded with a $5\frac{1}{2}$ hr. long music social in which renouned artists like Dr. Bhupetn Hazarika. Sri Khagen Mahanta, Jayanta Hazarika, Ramen Barua & Dwipen Barua, Miss Santana Barua, Melodica, & a fine mono acting by Sri Thaneswar Sarma high lighted the function. I offer my thanks to all of them who helped me to make the music social a grand success.

After a lapse of couple of years the Inter College Youth festival was arranged this year by the Gauhati University authorities at Jalukbari. A team of 16 members from our college participatec in different iteams & was highly hounored by wining as many as 7 different prizes. I take the honour in stating that our one act play team was highly acclaimed by all & has been invited to perform the play in the All India Radio's Gauhati Centre. I offer my thanks & congratulations to the writer of the play Mr. Imtaz Ali, an ex-aecian.

A number of movies were shown during this session but due to the non-availability of a 35 mm projector & a Cine Club some of the very good films could not be shown in our college I hope if we can have these two things the students as well as the staff will be greatly benifited & surely give some recreation to all, in this lifeless Jalukbari Campus.

Before concluding I must take the oportunity to convey my gratitude to our Principal & Piesident of the Union Society Dr. S. D. Gogoi, treasurer Dr. N. K. Chaudhury & Prof.-in-Charge Sri N. Saima for their valuable advice & suggestions on many occasions.

Thanking you all.

Results of the Annual Competitions.

Recitation (Assamese) :—

Ist—Deva Goswami Ist Yr.
2nd—Bidyut Chakraborty 5th Yr. (Mech.)
3rd—Jyotirmoy Barua 3rd Yr.

Recitation (English) :—

Ist—Prabir Kr. Bora 4th Yr. (Chem.)
2nd—Utpal Bora 3rd Yr. (Mech.)
3rd—Bidyut Chakraborty 5th Yr. (Mech.)

Wit & Humour :—

Ist—Bidyut Chakrabarty 5th Yr. (Mech.)
2nd—Emdadul Islam 5th Yr. (Mech.)
3rd—Jyoti Chetia 4th Yr. (Civil.)

Photography :—

Ist—Nil
2nd—Vinood Sharma.
3rd—Nil

Cartoon :—

Ist—Nil
2nd—Emdadul Islam
3rd—Nil

Assamese Short Story :—

Ist—অনুৰাগে ৰঞ্জিত মন Hemendra Nath Bora 2nd Yr.
2nd—প্ৰতাৰণা : Parag Phukan 3rd Yr. (Chem.)
3rd—আবৰ্জনা : Kamal Chaudhury 4th Yr. (Chem.)

Assamese Poem :—

Ist—ইলিজী : Chitta Deka 4th Yr (Mech.)
2nd—পৰিচয় : Hemendra Nath Bora 2nd Yr.
3rd—কঙ্কালৰ হেপাহ : Parag Phukan 3rd Yr (Chem.

English Poem :—

Consolation : Rajeeb Goswami 2nd Yr.

English Short Story :—

Consolation : Nirode Das 4th Yr.

Water Colour :—

Ist—Niren Mazumdar.
2nd—Parag Phukan 3rd Yr. (Chem.)
3rd—Joseph Gug Fernendez, 4th Yr. (Mech.)
Conso : Emdadul Islam, 5th Yr. (Mech.)

Pencil Sketch :—

Ist—Jayanta Brahma Ist Yr.
Conso : Ranajeet Bonik 4th Yr. (Civ.

One Act Play :—

Best Drama : মৰাসুঁতি জীয়া সাঁকো
Runners-up : ঘোলা কণী
Best Actor : Padum Saikia 5th Yr. in মৰাসুতি জীয়া সাঁকো
Best Supporting actor : Nripen Dutta in মৰাসুতি জীয়া সাঁকো
Best Director : Syamsundar Deka 5th Yr. in মৰাসুতি জীয়া সাঁকো

Results of Youth Festival :—

One act Play :—

Best Drama : বিভিন্ন কৰাছ এটি সুৰ Writer-Imtaz Ali.
Participants :
Ramen Kalita.
Bidyut Chakrabarty
Sisir Goswami
Nripen Dutta.
Jayanta Sarma.
Atul Das.
& Padum Saikia.

COMMON ROOM SECTION

Syed Ajmal Ali,
Common room Secretary.
writes ;

As I begin to write the Annual report of the common room, I recall with deep gratitude and sincere acknowledgement, all my accian friends, who have given me the opportunity to serve them as their Common room Secretary I gratefully take their opportunity therefore, to thank all those who have offered their help to me in every possible sphere during my tenure.

It gave me encouragement to see that participation in the Annual games their year shamed marked improvement than the previous years. The no. of competitors too increased greatly and the keeness and enthusiasm with which the boys frezuqented the common room really heartening to note.

As before our boys displayed their superiority and skill in teble tennis, Our college had so far produced a no. of player in their field, who have received even statewide recognition. I am sure our players will shine even more in the year to come.

The difficulties we have been facing every year due to non-availability of certain common room facilities. were prevalent this year too. However we hope that the new Union building will eradicate all these problems and prove to be of great help to the students.

As usual, during my term too, the Annual Common room games were completed amidst tremendous enthusiasm. The college team were also entered in the Inter-College Sports festival held during the year.

I grasp this opportunity to heartily thank especially those who have offered their valuable suggestions to me whenever I had occasion to approach them. I am ever grateful to Profs.-in-Charge Rahman Baruah, President Dr. S. D. Gogoi, and Dr. N. K. Choudhury, tresurer, whose co-operation and guidance enabled me to acquire a new table tennis board and other necessary amenitise for the Common Room.

Also I offer my sincere thanks to my Aecian friends **Anup Lashkar, Pramath Sarmah and Rajeeb Goswami** for the co-operation they had extended to me during my tenure.

It is up to the Aecians to judge how far I have been successfull in the smooth running of my office.

Lastly, I take pleasure to congratulate the following participants for their proficiencies in the last annual competition of Common Room.

THE RECORDS OF COMMON ROOM OF THE YEAR 1970-71

Table Tenis (Singles) :—

1. Nayan Sarman, (Champion).
2. Ashis Chanda (Runners up).

Table Tenis (Doubles) :—

1. Nayan Sarmah & Amal Sarmah (Champion).
2. Ashis Chanda & Bikash Bose (Runners up).

Inter Hostel T. T. Competition :—

1. Hostel No.4 (Champion)—D. Gogoi, A. Lashkar & S. Saikia.
2. Hostel No. 6 (Runners up)—Nayan Sarmah, N. Majumder & S. Dutta..

Profs. T. T. Competition :—

1. Prof. Pradip Bardoloi (Champion).
2. Dr. S. D. Gogoi (Runners up).

Carrom (Singles) :—

1. Durjoy Majumder (Champion).
2. Syed Ajmal Ali (Runners up).

Carrom (Doubles) :—

1. Syed Ajmal Ali & Gautam Bhattacharya (Champion)
2. Paban Phukan & Durgeshwar Kr. Das (Runners up)

Bridge (Contract) :—

1. Dilip Choudhuri & Bijon Kar. (Champion)
2. Sailen Bhagavati & Amarendra Choudhuri (Runners up)

Bridge (Auction) :—

1. Anowar Hossain & Gunish Paul (Champion)
2. Bikash Bose & Pradip Adhikari (Runners up).

Chess Competetion :—

1. Anowar Hossain (Champion)
2. Himadri Ghosh (Runners up).

MAGAZINE & PUBLICITY SECTION

Bichitra Barman
Secy, Magazine & Publicity Section,
Writes :

It is a matter of great pleasure on my part to offer my heartiest thanks to the AECIAN friends of mine for giving this opportunity to serve them as their Secy., Magazine and Publicity Section.

I convey my heartful gratitude to our Principal Dr. S. D. Gogoi, Prof. R. M. Dutta Chaudhuri, Dr. N. K. Chaudhuri, Dr. P. K. Bora, Dr. A. S. F. Aowal, Prof. S. K. De Purkayastha, Dr. B. N. Gogoi, Prof. S. N. Medhi, Prof. M. M. Das and Prof. D. Deka for their kind advice and co-operation in discharging my office. I also acknowledge the help of Mr. K. Mitra, Ramen Kalita (5h Yr. Civil), Hemen Boiah, (3rd Yr. Civil), Chakradhar Kakati (5th Yr. Civil), Giasuddin Ahmed (5th Yr. Civil), Hrishikesh Chaudhuri (5th Yr. Civil), Kushal Kalita, Phani Talukdar (5th Yr. Mech.) Mr. Harinath Haloi, Mr. Nirmalendu Dass.

I wish my successor Mr. P. Phukan all success in his office.

Long live "THE AECIAN" !

★ ★ ★

Editorial

Just to maintain the convention after my predecessors I, being the editor of our college magazine, am led to write something in the editorial column. Before anything being written, let me convey my thanks and gratitude to my dear friends who favoured me in holding this office. The seven hundred students of the college elected me to this office, yet the treatments of the authority concerned make me feel that I am none but a bearer of this office. Any person having a little sense of individuality and a zeal for literaerary creation cannot give way to the whims of a man in power, whoever he may be !

About this Issue :

The publication of this issue is too late to be excused. To make my friends see who is at fault I must put forth the difficulties causing unusual delay in its publication. Generally our college magazine is published in the month of September of every year. It is really surprising why this issue of 1970 has not yet come out even in 1971. The blame for this delay should be laid on the authority concerned, and not on the editor, By way of example I like to bring to the knowledge of my friends that the contract of printing the magazine was given to the Gauhati Press Pvt. Ltd. because of its lowest rate, Is it binding that the tender offering lowest

rate should be accepted ? Even then, can it not easily be guessed that the present issue can definitely not represent the good name of the college ? It is perhaps impertinent when the president of the Union Society of a college like ours should go in person to the press in connection with the magazine instead of the editor. As a result, any request by the editor to the press was turned down with frown looks and ill-behaviour. Quite naturally, any pressure to the press to bring the magazine out in time does not yield the fruits desired.

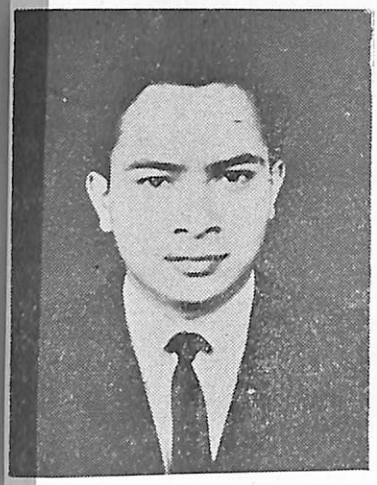
Further, it is Surprising that none of the union body has the nerve to put forward its legitimate claim with healthy atmosphere to get the magazine published in time. Students are students only when they are aware of thier common sense. Must we be obedient forgetting our sense of reasoning !

In fiine I like to urge upon the authority to make every room for the exercise of the freedom of the editors succeeding me, as this office demands. Let our magazine be the medium for expressing one's literary aptitudes, and not the rod of the authority.

Outgoing Students of our College

Batch 1969-70

Civil Engg.

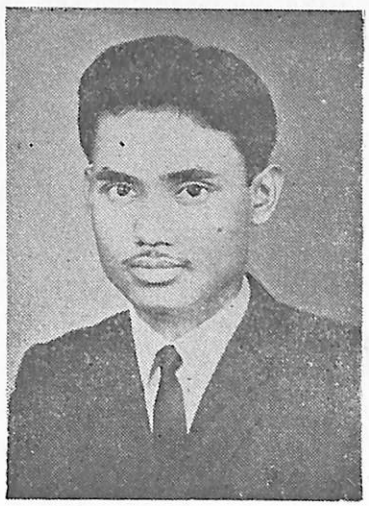


Bimal Rajbanshi
Kathalmura, Tihu, Kamrup.

A constant source of energy very much like a thermodynamic reservoir. He believes that the name of person plays a significant role in his life. So he changed his name from "*Bipad*" (Danger) to "*Bimal*" (Spotless).

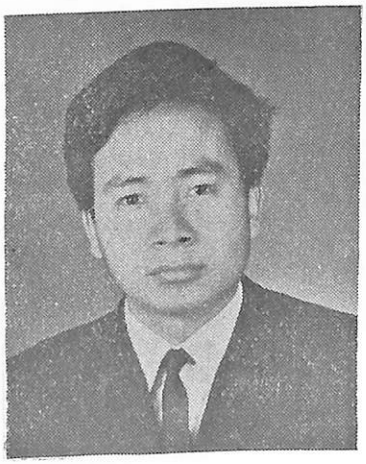
Chitralekha Barkakati
Sibsagar, Assam.

This miniature lady has an inborn capacity to draw affection of all the professors she came into contact. First lady-engineer from our college. May be her structure small but her knowledge in "Structures" is fathomless—So much to write about our Chitralekha (Nisha) but she is afraid of comment. So no further comment.



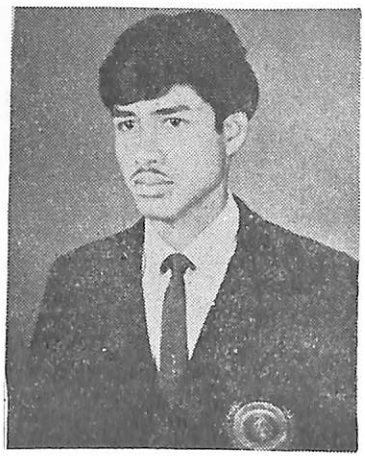
Deva Kanta Borah
C/o. Sit. Maneswar Borah,
Hatichong, Nowgong.

This simple gentleman favouritely known as "*Kalir Krishna*" Spends his leisure time with his flute. Do you know who is his most intimate friend ? She is—(Class-mates may fil up the blank).



Ramhluna Khiangte
Aizal, Mizo, Dist.

It is known to everybody that Khiangte will fare well in days to come. A perfect gentleman and extra-ordinarily brilliant student Mr. Khiangte is a true Christian. He has in his possession an attractive library of Biblic literature.



Sankar Prasad Roy
Gauripur, Goalpara, Assam.

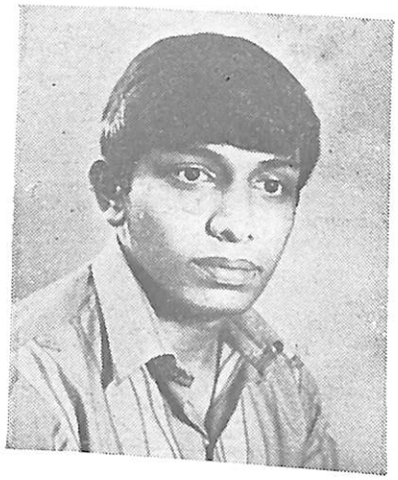
This calm and quiet gentle man is a lover of music. Very often you will find him absorbed in singing the folk songs of Goalpara. He is very much serious about his studies and a regular user of sun-glass.

Hobby : Sketching landscape

Civil Engg. (Continued)

Sonar Chand Singh B.Sc.
Kwakeithel, Imphal, Manipur

In 1965 Mr. Pebam (alias "*Satyaban*") passed M.Sc. previous and was teaching in an Imphal School when suddenly he was haunted by a thaught that he should be and must be an engineer. He at once flew for Gauhati and now this old guy is full-fledged B.E. Is it not interesting ?

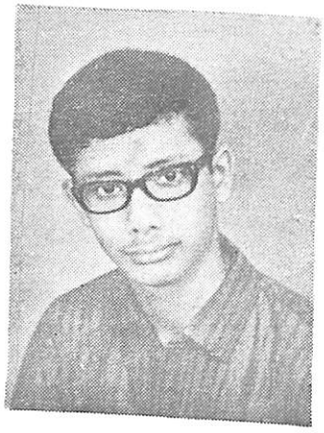


Joy Prakash Bhartia
C/o. K. L. Bhartia, Namrup.

Clad with well-tailored (and well-tight) dress Bhartia is always a smart presence. He is a good debator and brilliant student.

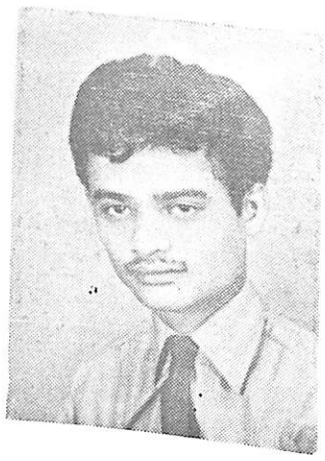
Kamala Kanta Kataki
Mazirgaon, Via. Fakshbari.

He has a repulsive air round him. A really good singer Kamala is very much sensitive about protecting his personality. He is a good runner.



Dalim Gogoi
M. C. Road, Gauhati.

This four-eyed chap is very much particular about his courtesy & manners specially while dealing with his foe. Gifted with a radiant laughter Dalim is very much fond of playing lawntennis.



Dulal Chandra Dutta
C/o. Mrs Labanya Dutta Choudhury, K. R. Choudhury Road, Bharalocmukh. Gauhati-9.

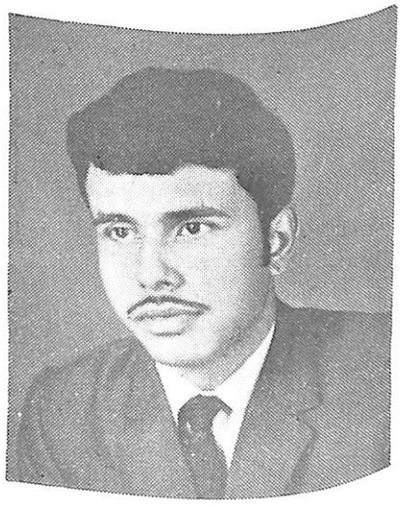
In every action Dulal justifies that he is the younger brother of that illustrious Pradip Dutta, the ex-aecian. He is always a jolly presence in his friend circle.

Hobby : Listening record-players.

←

Paran Baruah
Chiringchapari, Dibrugarh.

He is one of those few gentleman who will never rebuke in a hard voice. Slow in steps Paran is very much loved by his friends for his extremely tender voice. Do not take impression from his photograph that he knows little of this complex World. But he really does wherefrom ? Why, from the encyclopedia of Hindi Pictures. Yes, he is a regular Cinegoer.

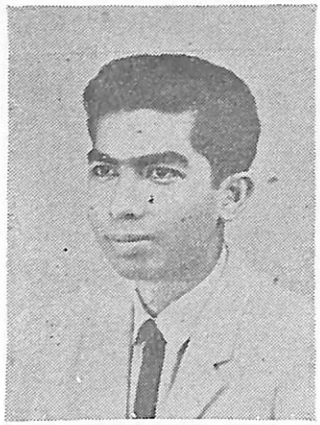


→

Prabin Chandra Baruah
Nazira.

Please donot mind for his offensive temperament. He hides a soft corner for his friends in his mind. He is a good Volley ball player.

Hobby : Seeing film in the very first Friday.



Jehirul Islam Ahmed
C/o. D. Ahmed, Santipara, Golaghat Town, Golaghat.

He tries to make friends with anybody & everybody. He thinks what is the use of calling God as our father, if we do not treat our neibours as our brothers.

Pradip Sarmah
C/o. G. K. Sarmah, North Lakhimpur.

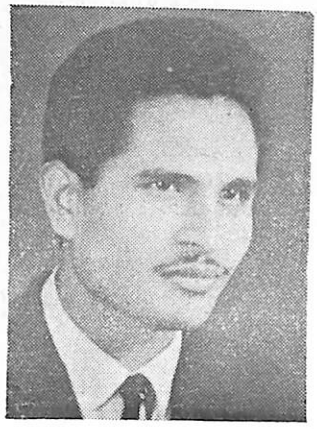
This handsome and bespectacled gentleman is very sincere about his studies. A tireless writer of our college magazine. Never minds if his article is not finally accepted. He deals with his friends sweetly.

Dimbeswar Medhi
Joria, Nowgong.

The geometry of his physique is exactly what his name suggests. Any way Dimbeswar is a good student.
Hobby : Collecting honey from different flowers.

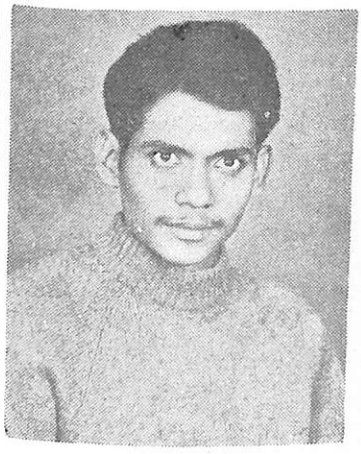
Subrata Bhattacharya
Red Cross Road, Dibrugarh.

Probably a few days ago our Subrata applied to a famous director to get a break as the hero of the latter's forthcoming picture. But he rejected him outright. Possibly the above photograph is one of those the director sent back to our unfortunate friend.



Jogen Saikia
Nowgong.

This introvert chap can radiate smile while he speaks. He is as calm as the pacific ocean. He has a habit to respond to the roll call a bit later i.e. at a time when the turn of the next has already come.



←

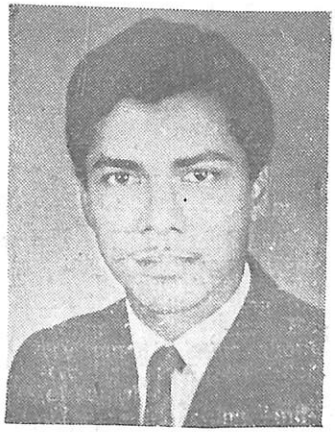
Ujjal Nag
Satribari Road, Gauhati- .

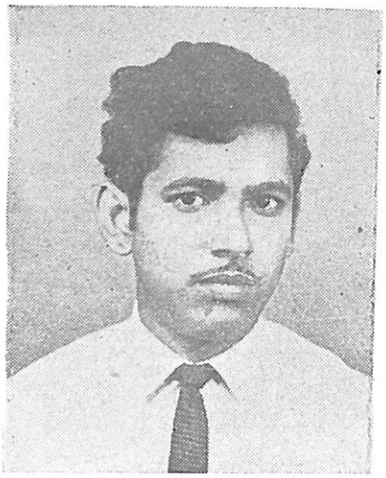
Our Ujjal popularly known as "*Bhaio*" represented our College in almost all games. It is hard to believe that a sportsman like him can be so lazy. It is very difficult to him to attend the first class of the day.
Hobby : Sleeping.

→

Gobinda Das
Banamali Road, Karimganj.

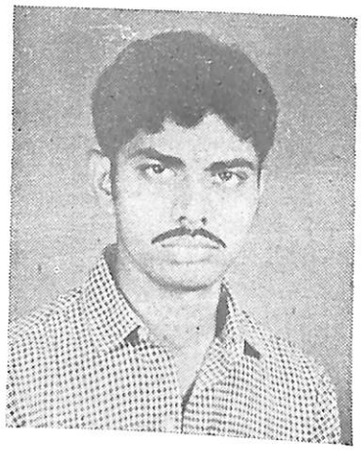
He is serious in every walk of life even in the evening-walk in the 'Versity Campus. He has a keen desire to be a hero of any love-affairs as seen in the Hindi Picture.





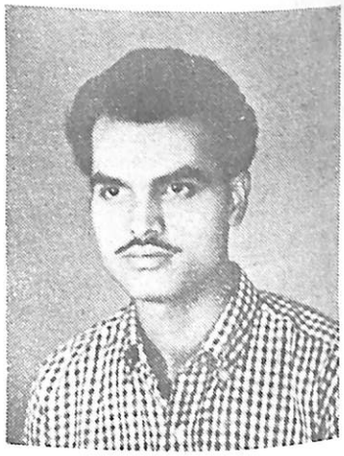
Sushil Baran Sarkar
Nepalipatty, Tezpur.

He represents a happy man in this unhappy world. Popularly known as "Cement" for his frequent trip to Tezpur in cement loaded truck.
Hobby Study of theology.



Baidyanath Bhattacharjee
Ulubari, Gauhati-8.

This gentleman with a sinusoidally smiling face is a stockist of a particular type of magazines. He is always a sincere friend especially to those who need him.
Hobby : Gossiping in restaurant (once a letter was found which was addressed as : B. N. Bhatta, C/o. "*Caprico*")



Pranab Chakraborty
College Tilla, Agartala.

If he could divert his devotion for Panbazar Chariali to anything else his career would be a bit different. A regular cine-goer Pranab is known for his sincere smile.

←

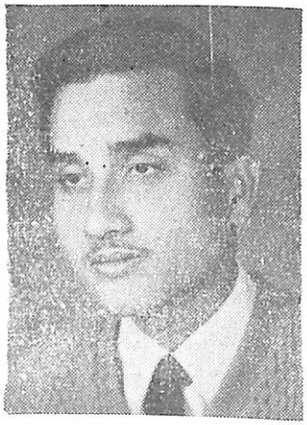
Amal Kumar Rajkhowa
Kamarbandha Ali, Golaghat.

Our Amal stands for the fact that revolution and love can be blended in one personality. In day time he dreams of revolution but at midnight his lovetryst appears before him through sweet dreams. A sincere student he has an attractive appearance. At present he is trying to publish a "Key to Sessional Marks" for the benefit of the engineering students.

Mukut Dutta
P.O. Mangaldoi.

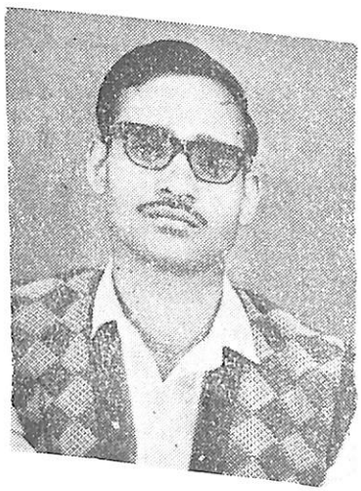
You'll understand what a true gentleman is when you speak to Mr. Dutta. Ex-gymnasium sectetary he is also a brilliant student.

→



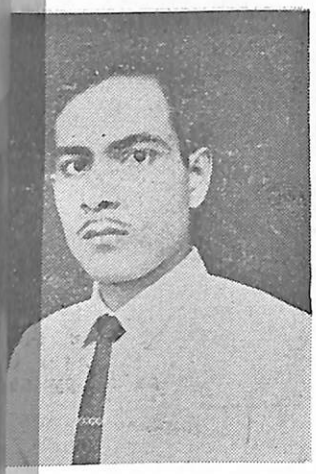
Naba Kumar Borgohain
Dhakuakhana,
North Lakshimpur.

If you do not find him in our college campus look for him at the 'Versity Corner. Known as "*Romeo*" of our college, he is also a good writer.



Babul Kumar Bhattacharjee
East Laban Road, Shillong-1

Mr. Bhattacharjee reminds us of those noble Brahmins of yore who sacrified their lives for the benefit of others. Gifted with a manly physique, he has a rare strength of character accompanied with most sincere dealings with anybody and everybody. He is also famous for his untrained '*Kabiraji*' which has very few parallels in our College.

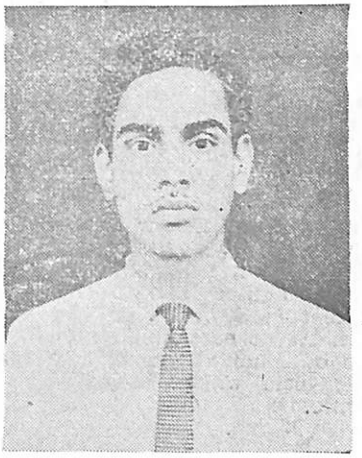


Niranjan Deb Nath
o. Premdhan Deb Nath
Abhaynagar, Agartalla

ich a chap will always love and sympathy from body who has come in act to him. An extra-narily brilliant student nath is known to the essors and students as a jewel.... But nath should learn eng- with a bit of care. He lso the parmanent store-er of hostel No. 5.

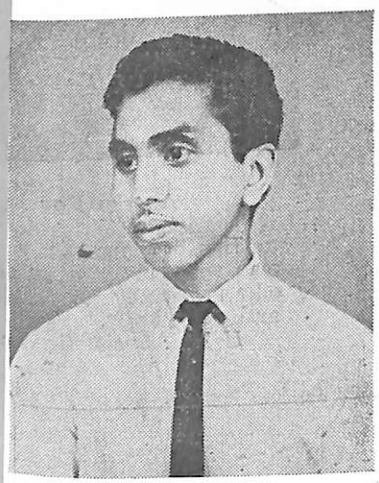
Animesh Bhattacharjee
Nagajanka Tea Estate,
Mariani, Sibsagar.

A laborious student bound to success. He is laborious in another important matter —but we are not going to peep into his personal life.
Hobby : Writing letters regularly.



Gauranga Dhar
C/o. Shri Ramesh Ch. Dhar.

He set out for the Himalayas when he was made captive in the engineering college. And now he is going to be an engineer quite unconciously.
Hobby : Writing letters inside mosquito net.



←

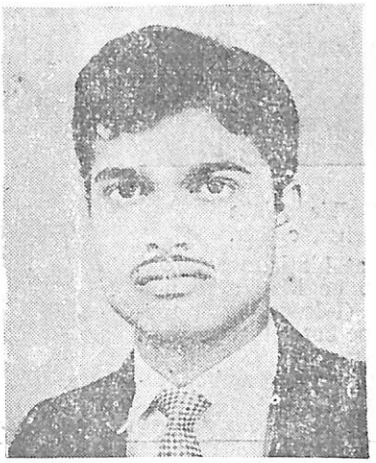
Kiriti Sen Laskar
Subhash Nagar, Karimganj.

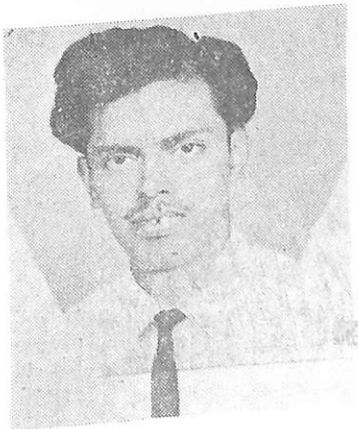
Mr. Sen Laskar has a peculiar capacity to read even in his sleep. He is famous for his excessive "*Kaviraji*". Simple and mild natured he is loved by students and professors alike.

Ranjit Kr. Paul
Tilak Deka Road, Nowgong.

All kinds of foods and drinks starting from horlicks to greenleaves are available in his desk. Honest and carefree our Ranjit is friendly to anybody & everybody.

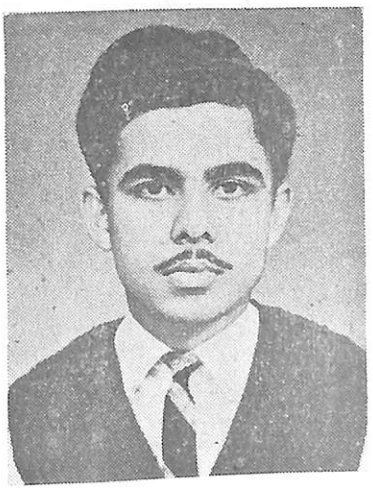
→





Dilip Chaudhuri
Harishavapara, Laban,
Shillong-4

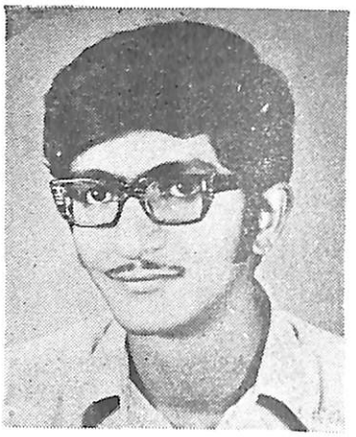
"Jack of all trades master none"—this proverb suits n very much. Mr. Chauuri is popularly known as ligh pressure Gas Master"(?) his friend circle. But he a brilliant student and s some rare virtues that appreciated by his firends.
Hobby : Playing on Tabla st ten minutes before the amination hour.



Bhuloke Chakrabarty
Bilasipara, Goalpara.

He will dare not to go in a way which has yet to be trodden. Bhuloke has a genuine love for "football" even you may not call him a player. Our serious Bhuloke is very fond of paying library fine.
Hobby : Sessional work

Electrical Engg. (Continued)



Shymal Sarkar

Could he be a bit less light and a bit less friendly you would find a really good student in Shymal. He has a habit to purchase booklets on Hindi film song and sing them without any audience.

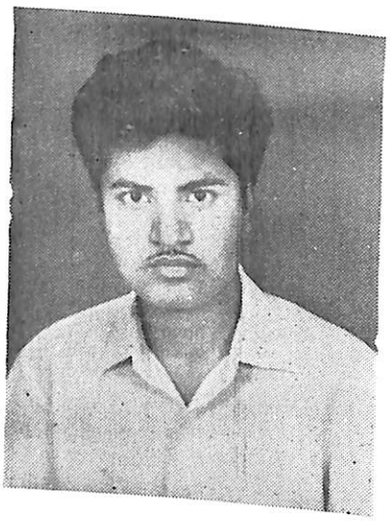
Siddiquor Rahman
Seleng, Jorhat.

He will labour just as much necessary. Spends a good deal of time before the looking glass. Our Siddique is as happy as a cuckoo.

Sudhir Sinha
Silchar, cachar.

Look at his innocent face. Seems to be Ma-i a-ko n-a-ja-no (I-do-not-know-anything) type but actually knows everything.

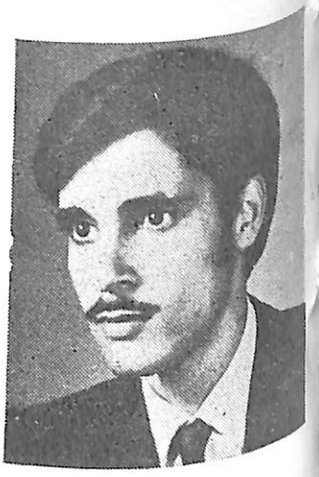
Hobby : Eating and collecting books.



Nirmalendu Das

Laborious and sincere Mr. Das is always busy with others'. He is the Organization Secy, Students welfare Association.

Hobby : Social work.



Angshu Roy
Bilpar, Silchar–1.

This tall figured gentleman with magnificient mastche is friendly to anybody and everybody.

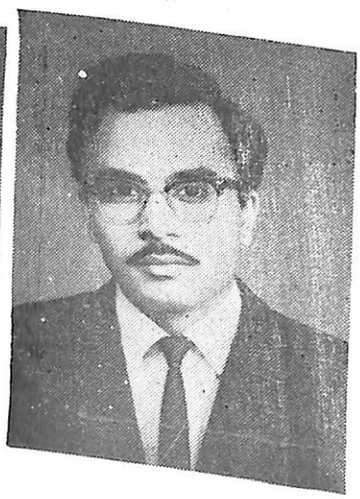
Hobby : Social Service.

Mechanical Engg

Sunil Kalita
Borbang, Kamrup Dist.

Mr. Kalita never misses any chance to talk in his favourite "Kamripia" tongue. Very much fond of hostel dishes this healthy and meritorious gentleman is also a good volley-ball player.

Hobby : Collecting wordings of Assamese hit songs.

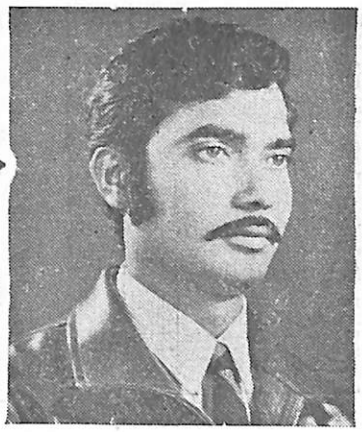


Utpal Saikia
Bishnupur, Shillong–4

This mild natured gentleman from Shillong thinks much for his class routine which he often forgets. He has a genuine weekness for his magnificient mustache. If you are a singer he will always suplement you with his table-tabla.

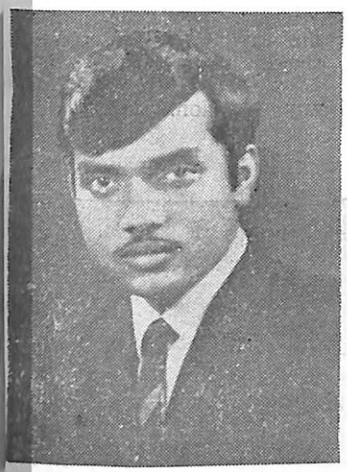
Mukut Dutta :
Joypur, Lakshimpur.

If you don't find him anywhere in the evening you are sure to get him in the "Madhumita Restaurant." Mr. Dutta is a handsome fellow. They say that he has a craze for romance. Anyway that is not harmful.



Emdadul Islam :
A, M. C. O. Road,
Bidyapara, Dhubri.

Sometimes he is misunderstood as the clown of circus party. But actually he is nothing but a smart young chap of twenty first century. Gifted with a well-built physique he is a good cartoonist.

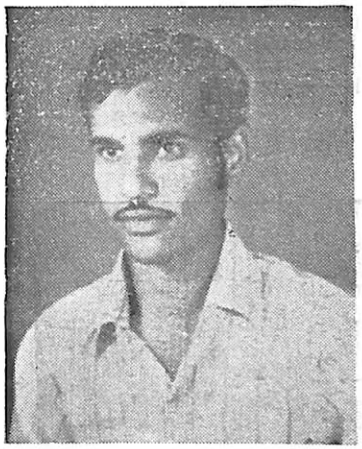


Dipak Chaudhuri :
Silchar.

This smart chap is known as "Romeo" who has at last found his "Juliet." But will you believe that while in study he reads loudly in the peculiar style of a school boy.

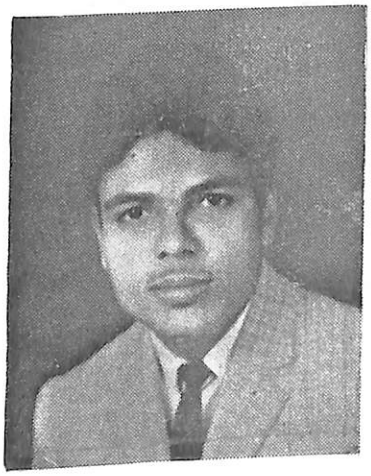
Bijon Bihari Kar :
C/o. J. N. Kar, Tarapur,
Silchar–3

He is like a sage in meditation in the jungle of his text books. An extremely serious chap Bijon is a vivid example of the fact that it is education that makes a man gentle.



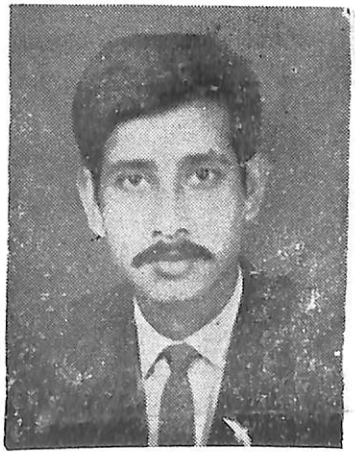
Arun Kumar Paul :
Divial Tea Estate, Hoogrijan,
Lakhismpur.

Arun could show better result in examination if he could win over his fascination about films. He is very soft in nature and the regular subscriber of a number of weekly magazines.



Dinesh Ch. Choudhuri :
Pathsala Town, Kamrup.

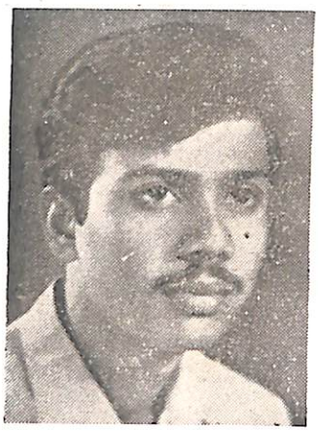
Our Dinesh bursts out in laughter at any ordinary jest. Known as "Mr. *Haturi*" he is very much proud of his own physique. The intensity of his voice varies inversely with his anger.



Harinath Haloi :
Sundarbari, Gauhati–14

This indigenous gentleman from Sundar Bori has an inborn quality to cut jokes on anything and every thing. He is the first engineer from Sundar Bori. Expert in eveteasing, he is also known as "Voice of Jhalukbari."

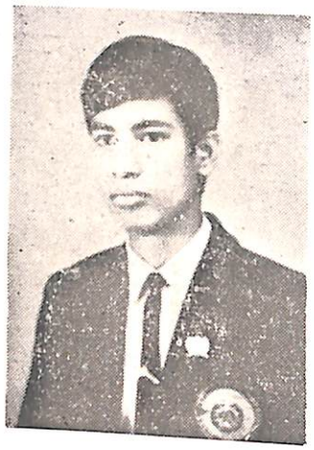
Mechanical Engg. (Continued)



Shyamsundar Deka :
Barbhag, Nalbari, Kamrup.

This lovely chap with dreamy eyes is very carefree in nature. He seems to be indifferent even in compartmental examination. Ex-magazine Secretary he can fluently talk on either Ornithology or Maxism.

(AECIAN: 1970)

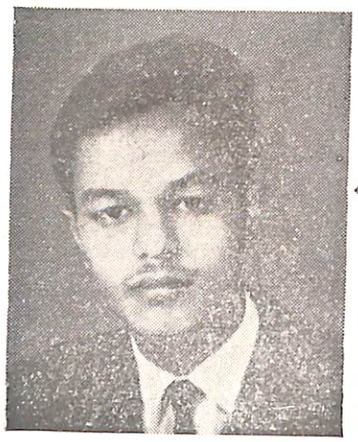


Mridul Sarma :
Near K. P. Hall, Sibsagar.

Mr. Sarmah is the constant twelve man of our college cricket team. Even if he has only fifteen paisas in his pocket he is sure to get out of the hostel in the evening.

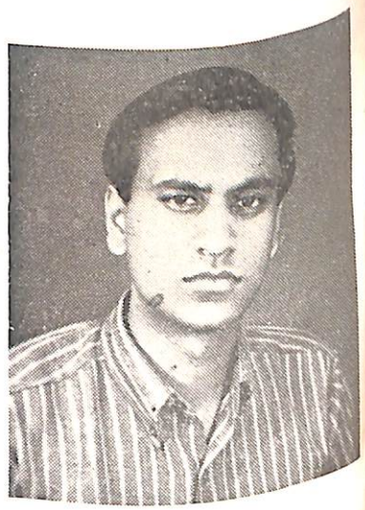
Bishamber Mamtani :
Lajpat Nagar, New Delhi-24.

This gentleman from the capital of our country moves in a majestic style. Likes to recite Shayer on any occasion.



Birinchi Kr. Bhuyan :
East Chowkidingi, Dibrugarh.

A gentleman with dimpled cheeks. Magasensitive (?) Birinchi is fond of arguing on any and every topic.
Hobby : To walk in dainty steps.



Sanjar Prasad Agarwala :
Binraj Road. Tezpur.

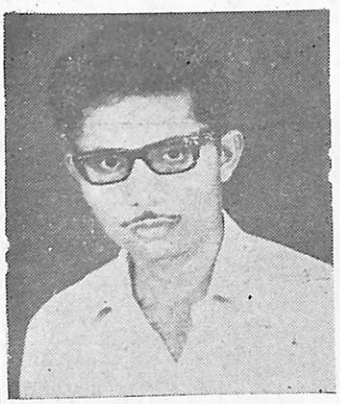
This aged gentleman is fond of a polished hair style. Very sincere about studies Mr. Agarwala is jolly presence only amidst his limited friend circle.

Sunil Ghosh :

This small gentleman has a habit to sing always though he is not at all a Singer. Has an ardent desire to increase his height by "Yogic Asanas." He is a good student and a bit home-sick.

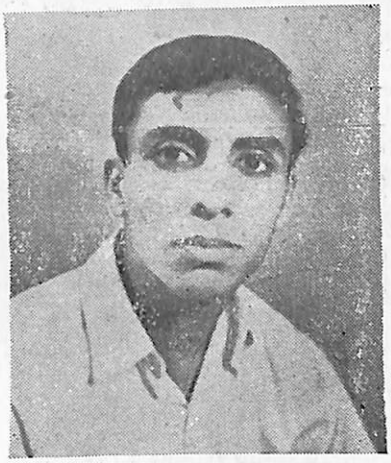
Sujit Kr. Basu :
Parbatiya Road, Tinsukia.

A healthy guy with a voice tuned to its maximum intensity. He is a keen "Baldex" fan.



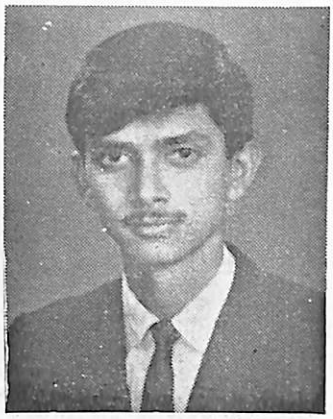
Kalyan Chaudhuri
Silchar.

This bespactacled gentleman believes that one who deals in sweets must deal with sweetly. Very gentle and sweet in dealings with others Mr. Chaudhuri is gifted with an extra-ordinary merit.



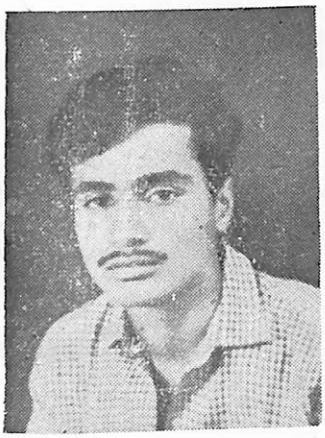
Parameswar Agarwala :
Chowkidingee, Dibrugarh.

Mr. Agarwala is very much particular in maintaining courtesy to his friends. A really frank gentleman he is sincere about his studies.



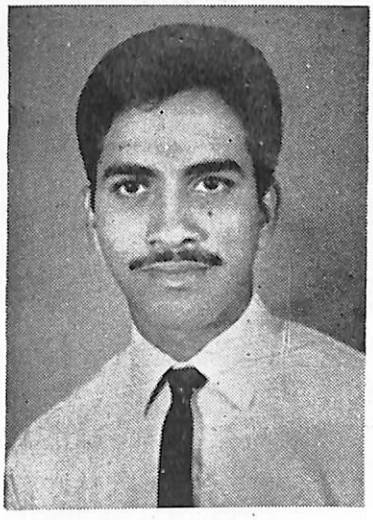
Manik Chaudhuri :
Maligaon Das Colony, Gauhati-11

"Manik" fervently believes that Health is Wealth So he is very much worried about his health. He is one of the few students having ceiling fan in their room.
Hobby : Hossiping.



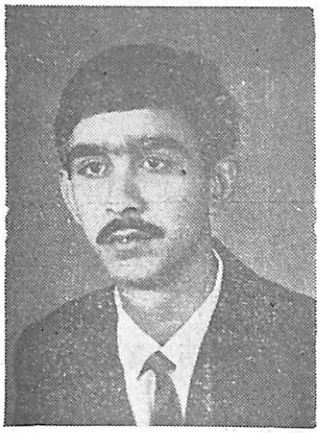
Ashim Deb Roy :
Ulubari, Gauhati–7.

This slim figured chap has a smiling appearance and an impression of satisfaction on his face. It seems as if he would be the happiest person if he can pass his days in any corner of this earth in a humble manner.



Arijit Kr. Endow
Silchar–1.

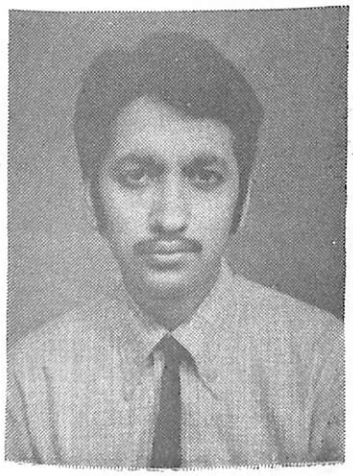
Mr. Endow has a genuine love for military hair cut. Gifted with a manly physique. He is a regular foot ball player though hardly seen beyond hostel play ground. Ever smiling and like to keep beard during examination period.



Bidyut Chakrabarty :

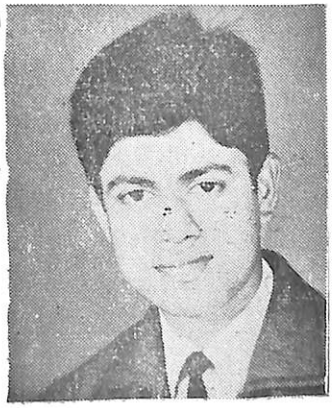
Bidyut has certain qualifications that endears him to anybody and eyerybody he comes in contact. A good humourist and a talented actor Bidyut is known to all Aecians. He has an affinity for military service as is evident from his spectacular moustache.

Chemical Engg.



Bimalendu Sinha Roy :

Please do not take impression from the smart countenance of his photograph. He is as introvert as a poet, as diligent as a scientist and a type of "*Kaviraji*" hardly seen in our college.



Alokemoy Bhattacharjee :

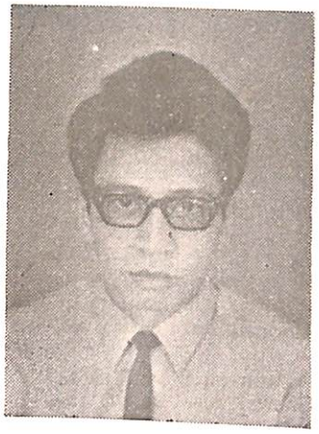
Either Aloke should try to decrease his '৮' or at least he should increase his '৫' whichever is easier.

Hobby : fond of singing the old songs of Anarkali age."

Chemical Engg. (Continued)

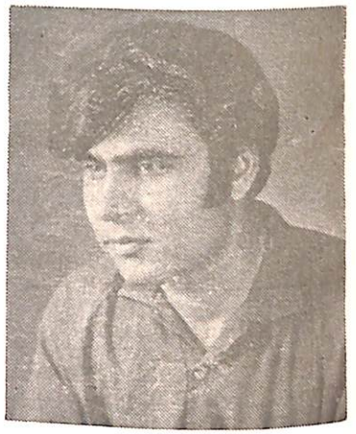
PFradip Adhikary :

No, he is not a "Daddy's Child"—nor even as quiet as it seems He knows many things that a child shou d not know. Versatile genius Pradip is also brilliant student.



Aswini Kr. Barua :

Our Aswini has a genuine love for silent life. Will you believe that just a few days ago I came to know that this handsome and well-mannered chap is also a brilliant student ? But he seldom takes bath and is honoured as the inventor of what is called "Aswini fication" (i.e. a peculiar type of passport bathing;')



John Mehra :

His is a familiar name in the realm of Assam Cricket. Very much fond of western dress and music—John has a habit to push back his carefully careless locks of hair every now and then.

Concealers :

Civil Engg.

1. Hari Sankar Paul
2. Ananda Baruah.
3. Sashi Kumar Mazumder
4. Karumthil Govindan Nair
(5) Sailendra Nath Bhagabati.
(6) Ganesh Chandra Seal
(7) Bibhas Chandra Sen.
(8) Dhruba Mojinder Baruah.
(9) Gobinda Chandra Das
(10) Indreswar Das.
(11) Umasankar Chakravarty.
(12) Bipin Bhatta.
(13) Dilip Kumar Sarmah.
(14) Badan Chandra Barman.
(15) Kanakeswar Gogoi.
(16) Md. Anwar Ali.
(17) Bhubaneswar Saikia.
(18) Abhijit Barkataki.
(19) Sekhar Chakravarty.
(20) Subrata Sen Gupta.
(21) Kousik Ranjan Das.

Electrical Engg.

(1) Jayanta Kumar Bhattacharjee.
(2) Mahmudar Rahman.
(3) Sailesh Ranjan Nag.
(4) Santosh Ranjan Deb.
(5) Chandan Bardhan.
(6) Debabrata Sen Gupta.
(7) Samarendra Mandal.
(8) Prabodh Ch. Banik.
(9) Monoranjan Saha.

Mechanical Engg.

(1) Barun Kumar Chakravarty.
(2) Swapan Kumar Gonsalves
(3) Achyut Kumar Das.
(4) Arun Kumar Paul.
(5) Pradip Kumar Hazarika.
(6) Sujit Kumar Basu.
(7) Samarendra Narayan Roy Choudhury.
(8) Mrinal Kanti Sen Sarma.
(9) Swapan Das Sarma.

Chemical Engg.

(1) Ajoy Kumar Chatterjee.
(2) Pradip Kumar Das.
(3) Heramba Prasad Sarma.
(4) Bhabendra Kumar Bora.
(5) Prasenjit Mukherjee.
(6) Santosh Kumar Jain.
(7) Paban Chandra Phukan.
(8) Nani Gopal Das.
(9) Dipankar Chakravorty.
(10) Habiboor Rahman.
(11) Rupak Kumar Agarwalla.
(12) Nikhil Chandra Bora.
(13) Amulya Adhyapak.
(14) Bibekananda Das.

এইচিয়ান

অসম ইঞ্জিনীয়ারিং কলেজ আলোচনী

অসমীয়া বিভাগ

দ্বাদশ সংখ্যা ঃ ১৯৭০ ঃঃ সম্পাদক ঃ বিচিত্র বর্মন্

মূল আৰু কাৰিকৰী বিজ্ঞান
কুন্দশালৰ খুটি-নাটি

ডঃ ভোলা গগৈ
কেশৰ চন্দ্ৰ চলিহা বি, এ

মূল আৰু কাৰিকৰী বিজ্ঞান

ডঃ ভোলা গগৈ
পদার্থ বিজ্ঞান বিভাগ।

আজিৰ যুগত বিজ্ঞানে আমাৰ মানব জীৱনৰ প্ৰায় প্ৰত্যেকটো দিশকে নিৰ্ণয় কৰি দিবলৈ আৰম্ভ কৰিছে। আৰু কোনো কোনো ক্ষেত্ৰত বিজ্ঞান এই সভ্য জগতৰ একপ্ৰকাৰৰ দৰ্শন ৰূপেও পৰিগণিত হৈ পৰিছে। আমি এতিয়া পৃথিবীৰ সমস্যাসমূহ বৈজ্ঞানিক দৃষ্টি-ভঙ্গীৰে চোৱাৰ আৱশ্যকতা অনুভব কৰিছোঁ, কাৰণ তেতিয়াহে গোটেই সমস্যাসমূহে জাগতিক প্ৰকৃত সত্যবোৰ আঁকি তুলিব পাৰিব। জ্ঞান পিপাসু মানুহৰ বাবে সেইকাৰণেই বিজ্ঞান চিন্তাজগতৰ এক গতত পৰিণত হৈছে আৰু বিজ্ঞান সন্মত কামতহে আত্মনিয়োগ কৰা উন্নতি কামী সমাজৰ ধৰ্ম্ম হৈ উঠিছে।

বিজ্ঞান দুটা লাই খুটাৰ ওপৰত নিৰ্মিত। তাৰে প্ৰথমটোৰ তিনিটা ভাগ: প্ৰকৃতিৰ ঘটনাসমূহৰ বিৱৰণীৰ সংগ্ৰহ, এই ঘটনাসমূহ ব্যাখ্যা দিয়া কেতবোৰ প্ৰকল্প, আৰু এই প্ৰকল্পবোৰ দৃঢ় কৰি তুলিবৰ বাবে নতুন পৰীক্ষাৰ উদ্ভাৱন। পৰীক্ষাবোৰে যদি আশানুৰূপ ফল দিয়ে তেতিয়াহে প্ৰকল্পবোৰ শুদ্ধ বুলি গ্ৰহণ কৰা হয়। দ্বিতীয়টোৰ মতে আমি এটা কথা নিসন্দেহে মানি লব লাগিব। সেয়ে হল: এই বিশ্বব্ৰহ্মাণ্ডৰ ঘটনাসমূহ কিছুমান নিৰ্দ্দিষ্ট নিয়মেৰে ঘটি আছে; আৰু এই নিয়ম বাশিৰ সম্যক জ্ঞান লাভ কৰিবলৈ মানুহৰ শক্তি জোখাৰে আছে। কিছুমান কথা হয়তো সদ্যহতে আয়ত্ব কৰা জটিল, কিন্তু দৰকাৰী আনুসঙ্গিক বাকী কথাবোৰ জনাৰ পিচত তেনে-কুৱা জটিল সমস্যাও সমাধান হবই।

সেই বুলি বিজ্ঞান সাধনা মুখৰ কথা নহয়। অকল অধ্যৱসায় আৰু হেপাহেই সত্য উদ্ভাৱনৰ মূল সজুলি হব নোৱাৰে। সাধকৰ ব্যক্তিগত উদ্ভাবিকা শক্তিৰ ওপৰতহে সৰহখিনি কৃতকাৰ্য্যতা নিৰ্ভৰ কৰে। Tycho Brahe আৰু Kepler দুয়োৱেই সূৰ্য্যোদয় নিৰীক্ষণ কৰি কৰি গ্ৰহ নক্ষত্ৰৰ গতি বিধি বাহিৰ কৰিবলৈ বিচাৰি-ছিল। Brahe এ দেখিলে বেলিটো পৃথিবীৰ চাৰিওপিনে এক বৃত্তত ঘূৰি আছে। কিন্তু Kepler এ অনুভৱ কৰিলে যে পৃথিবী-য়েহে সূৰ্য্যৰ পিনে বাগৰি আহি আছে। দুয়োজনে একেবোৰ দৃশ্যকেই লক্ষ্য কৰিছিল—কিন্তু অন্তৰ্দৃষ্টিত দুয়ো বেলেগ বেলেগ ঘটনা ধৰা পেলাইছিল। আমি জানো যে শেহত Kepler আৰু Galileo এ প্ৰকৃত সত্য উদ্ধাৰ কৰিলে। আৰু উদ্ধাৰ হোৱাৰ পিচত আমি অতীতৰ কল্পনা সমূহলৈ ঘূৰি চোৱাৰ দৰকাৰ অনুভৱ কৰা নাই।

এইখিনিতেই বিজ্ঞান আন আন দৰ্শনৰ লগত অমিল। বিজ্ঞানত আগবাঢ়ি যোৱাৰ এটা প্ৰবল সোঁত। এটা সত্য উদ্ধাৰ হোৱাৰ পিচত বিজ্ঞানে তাতে গয়না লৈ নতুন সত্যৰ অনুসন্ধান চলায়। যথাযথ মৌলিক চিন্তা আৰু পৰীক্ষাৰ দ্বাৰা পেনিচিলিন বা আণবিক বোমা আবিষ্কাৰ কৰাৰ পিচত অন্য এচাম বৈজ্ঞানিকে আৰু উন্নত ঔষধ বা প্ৰলয়ঙ্কাৰী বোমা সৃষ্টি কৰিব পাৰে।

বিজ্ঞান সাধনাত প্ৰবল যুক্তিৰ দৰকাৰ। যুক্তিপূৰ্ণ ভাবে বিচাৰ কৰিহে বিজ্ঞানত মৌলিক অৱদান আগবঢ়াব পাৰে। কিন্তু এজন চতুৰ যুক্তিবিদ এজন প্ৰকৃত বৈজ্ঞানিক নহবও পাৰে। Euclidৰ

উপপাদ্যবোৰ কিছুমান প্ৰাৰম্ভিক সংজ্ঞাৰ ওপৰত প্ৰতিষ্ঠিত। আৰু এই সংজ্ঞাবোৰৰ ওপৰত ভিত্তি কৰিয়েই গোটেই যুক্তিসমূহ আগবঢ়োৱা হৈছে। যাই সংজ্ঞাবোৰ শুদ্ধমনে অশুদ্ধ জানিবৰ কোনো দৰকাৰ নাই। কিন্তু বিজ্ঞানৰ বেলিকা তেনেকৈ নচলিব; বিজ্ঞানত যুক্তি খটুৱাবলৈ হলে প্ৰাৰম্ভিক ভেটিটো শুদ্ধ বাস্তৱ কাহিনীৰে গঠিত হ'ব লাগিব।

এই বিশ্বখনক নিখুঁত ভাবে অঙ্কিত কৰাই বিজ্ঞানৰ কাম। তাকে কৰিবলৈ হলে বিশ্বত ঘটি থকা ঘটনাসমূহৰ বুজন অংশ এটা অধ্যয়ন কৰিব লাগিব। খিজন মানুহে জীৱনত মাত্ৰ এটা গৰুহে দেখিছে আৰু যদি কেনেবাকৈ সেই গৰুটো তিনিঠেঙীয়া হয়, তেন্তে সেই মানুহজনৰ গৰুৰ প্ৰতি শুদ্ধ ধাৰণা নহয়। সেই বুলি এসোপা ঘটনা সংগ্ৰহ কৰিলেই বিজ্ঞান কৰা হৈ নুঠে। তাহানিৰ প্ৰাণীতত্ত্ববিদসকলে পৃথিবীৰ নানান জীৱ-জন্তুৰ বিষয়ে বিশদ ভাবেই জ্ঞান আহৰণ কৰিছিল। কিন্তু Darwin হে মাত্ৰ বৈজ্ঞানিক পদ্ধতিৰে সিহঁতৰ পাৰস্পৰিক সম্বন্ধবোৰ ফঁহিয়াই দেখুৱাব পাৰিলে। এতেঁকৈ Darwin হ'ল বৈজ্ঞানিক।

আজি কালি আমি বিজ্ঞানৰ বিভিন্ন বিভাগ দেখিছোঁ। পূৰ্ব্বতে এই বিভাগবোৰ নাছিল আৰু সিহঁতৰ আৱশ্যকতাও অনুভৱ কৰা হোৱা নাছিল। কিন্তু যেতিয়াই বিজ্ঞান কেৱল প্ৰকৃতিৰ ওপৰত কৰা গৱেষণাৰ পৰা আঁতৰি আহি মানুহৰ জীৱিকা উপাৰ্জনৰ আহিলা স্বৰূপেও দেখা দিলে তেতিয়াই বিজ্ঞানৰ ৰূপৰ পৰিবৰ্ত্তন হবলৈ উপক্ৰম হ'ল। বিজ্ঞান ভাগ ভাগ হ'ল—যাইকৈ মূল বিজ্ঞান আৰু ব্যৱহাৰিক বিজ্ঞান। পদাৰ্থ বিজ্ঞান, ৰসায়ণ আৰু জীৱন-বিজ্ঞানকে মূল বিজ্ঞান বুলি কোৱা হয়। এই বিজ্ঞান এসময়ত এক শ্ৰেণী মুষ্টিমেয় বিজ্ঞ লোকৰ বিষয় বস্তু আছিল। কিন্তু পিচত যেতিয়া বিজ্ঞানক ব্যৱহাৰলৈ টানি অনা হ'ল তেতিয়া সৰহ মানুহে অধ্যয়ন কৰিবলৈ আৰম্ভ কৰিলে আৰু লগে লগে বিশেষজ্ঞৰ আবিভাব হবলৈ ধৰিলে।

মূল বিজ্ঞানে অগ্ৰগতি লাভ কৰাৰ আগতেও অৱশ্যে কাৰিকৰী শিক্ষা মানুহৰ মাজত প্ৰচলিত আছিল। কিন্তু এই শিক্ষাৰ পৰিসৰ অতি ঠেক আৰু সীমিত আছিল। ইয়াৰ কাৰণ হ'ল তেতিয়াৰ কাৰিকৰ সকলে আগৰ মানুহৰ পৰা শিক্ষা লৈছিল আৰু সেই শিক্ষাতেই ক্ষান্ত আছিল। তেওঁলোক নিজ নিজ শিক্ষাত একান্তই নিপুণ হৈছিল কিন্তু তাৰ প্ৰসাৰতা আৰু বিকাশত সাধনত কমেই মনোযোগ দিছিল। সেইকাৰণে সেই যুগত নানান বিস্ময়কৰ বস্তু গঢ়ি উঠিলেও তাৰ ভিতৰৰ গোপন ৰহস্য আলোচনীৰ পিঠিত প্ৰকাশ নাপাইছিল। আজি কালি কোনোবাই কিবা নতুন ৰহস্য উদ্ধাৰ কৰিলেই তাক বাকী বিজ্ঞান চৰ্চ্চা কৰা মানুহৰ উদগণিৰ কাৰণে প্ৰকাশ কৰি উলিয়ায়। ই আধুনিক বিজ্ঞানৰ স্বভাবেই। আৰু সেই কাৰণেহে জ্ঞানে পুলি পোখা মেলিব পাৰিছে।

আজিৰ যুগত কাৰিকৰী শিক্ষা উন্নত সমাজৰ প্ৰতীকৰ দৰে হৈ উঠিছে। কাৰিকৰী শিক্ষাপ্ৰাপ্ত বিশেষজ্ঞ সকলৰ ওপৰত বৰ্ত্তমান প্ৰগতিশীল দেশসমূহে বহু পৰিমাণে নিৰ্ভৰ কৰে। এই কাৰিকৰী শিক্ষা পদাৰ্থ বিজ্ঞান, অঙ্কশাস্ত্ৰ, ৰসায়ন আৰু কেতিয়াবা জীৱন বিজ্ঞানৰ বলতহে মাত্ৰ থিয় দি থাকিব পাৰিছে। মূল বিজ্ঞানৰ প্ৰগতিৰ লগত সমন্বয় ৰক্ষা কৰি আগবাঢ়ি অহাৰ কাৰণেহে কাৰিকৰী বিজ্ঞানে জগতত ইমান চমকপ্ৰদ কাম কৰিব পাৰিছে। সেই কাৰণেহে আজি কালি কাৰিকৰী শিক্ষাৰ লগত মূল বিজ্ঞানৰ শিক্ষা ওতঃপ্ৰোতঃ ভাবে জড়িত কৰি দিয়া হৈছে। মূল বিজ্ঞানত অৱহেলা হলে উন্নত কাৰিকৰী শিক্ষাই অৱশ্যেই গতিহীনতা লাভ কৰিব আৰু প্ৰকাৰান্তে ধ্বংসমুখী হ'ব।

মূল বিজ্ঞানৰ দিশ ইতিমধ্যে বহুমুখী হৈ গৈছে। এতিয়া এজন ৰসায়ন বৈজ্ঞানিকে তেওঁৰ গৱেষণাৰ স্থলিখন পদাৰ্থ বিজ্ঞানবিদ এজনৰ পৰা বহু দূৰৈত থকা বুলি অনুমান কৰে। অন্যকি ৰসায়নৰে এটা বিভাগত কাম কৰি থকা গৱেষকে অন্য এটা বিভাগত চলি থকা গৱেষণাৰ ফলাফল সম্পৰ্কে বৰ বেচি ব্যগ্ৰ নহয় বা হয়তো হবলৈ সন্ধিও নাপায়। কাৰিকৰী বিজ্ঞানেহে এইদৰে ফালৰি কাটি যাবলৈ বিচৰা মূল বিজ্ঞানৰ অংশ বিশেষক গোটাই আনি একেলগে একোটা-হঁত বিশিষ্ট কামত লগাই দিয়ে। আকাশীৰথৰ কাৰিকৰী সজ্জাখিনিৰ কথাকে ভাবোচোন বাৰু! এই ক্ষেত্ৰত কি হৈছে? ৰসায়ণ বিদ সকলে নতুন নতুন ধাতুৰ ভাঁজ কিছুমান সৃষ্টি কৰিব পাৰিলে কাৰণেহে জেট ইঞ্জিন তৈয়াৰ হৈ উঠিল। আকাশী ৰথৰ কাৰণে দৰকাৰী শক্তিখিনি ৰাসায়ণিক মিশ্ৰণে যোগান ধৰে। এই উপযুক্ত মিশ্ৰনটোও ৰসায়ণ বিজ্ঞানীয়ে উদ্ভৱ কৰি তুলিছে। গতিকে দেখা যায় যে ৰসায়ণ বিজ্ঞান বিদ সকল বৰ্ত্তমানে বিভিন্ন পন্থী হলেও তেওঁলোকৰ সুকীয়া সুকীয়া আবিষ্কাৰ সমূহ কাৰিকৰ সকলে একত্ৰিত কৰিছে আৰু মানুহৰ ব্যৱহাৰত অহা একোটিহঁত যন্ত্ৰত সন্নিবিষ্ট কৰিব পাৰিছে। দৰাচলতে মূল বিজ্ঞানৰ যুগান্তৰকাৰী আৱিষ্কাৰ সমূহ ব্যৱহাৰলৈ টানি আনিব পৰাতেই কাৰিকৰী বিজ্ঞানৰ কৃতিত্ব। এসময়ত মূল বিজ্ঞানৰ চৰ্চ্চাই মানুহক সভ্য আৰু শিক্ষিত কৰিছিল, এতিয়া তাৰে মানুহ সমাজ সমূহীয়াকৈ উপকৃত হৈছে।

আগতে উল্লেখ কৰা মতে পদাৰ্থ বিজ্ঞান, ৰসায়ণ আৰু জীৱন-বিজ্ঞানকহে মাত্ৰ মূল বিজ্ঞান বুলি গণ্য কৰা সমীচীন। ভূতত্ত্ববিদ্যা

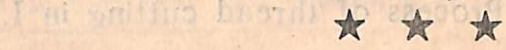
মূল বিজ্ঞান বুলি কোৱা নহয়, কাৰণ এই বিভাগে ৰসায়ণৰ, আৰু জীৱন বিজ্ঞানৰ বিধ বিধ সমস্যা লৈহে ব্যস্ত থাকে। ইয়াক অৱশ্যে উন্নত বিজ্ঞান বুলি ক'ব লাগিব। জ্যোতিষশাস্ত্ৰও সেইদৰে মূল বিজ্ঞান নহয়; ই ৰসায়ন আৰু পদাৰ্থবিজ্ঞানৰ অংশ বিশেষহে!

মূল বিজ্ঞানক 'প্ৰকৃত বিজ্ঞান' আৰু 'বৰ্ণনামূলক বিজ্ঞান' এই দুই ভাগে ভগাব পাৰি। উদাহৰণ স্বৰূপে নিউটনে আবিষ্কাৰ কৰা গতিৰ বিধিবোৰ প্ৰকৃত বিজ্ঞান। উদ্ভিদ বিদ্যা আৰু জীৱবিদ্যাৰ বহুতখিনি কথা বৰ্ণনামূলক। বৰ্ণনাৰ পৰা বিশেষ মৌলিক কোনো সন্ধান বাহিৰ নহলে বিজ্ঞানৰ জন্ম নহয়। অৰ্থাৎ বৰ্ণনাই বিজ্ঞান হৰ নোৱাৰে। কিন্তু বৰ্ণনাবোৰ বিশ্লেষণ কৰি যেতিয়া কোনো সূত্ৰ বাহিৰ কৰা যায় তেতিয়া বৰ্ণনাইও বিজ্ঞানৰ আখ্যা পায়। Mendel এ মিঠা মটৰ মাহৰ বংশোৱৰ বৰ্ণনা অধ্যয়ন কৰিলে আৰু তাৰ পৰাই বাহিৰ কৰিলে কেনেকৈ জীৱই জন্মতেই জাতগত স্বভাৱৰ উত্তৰাধিকাৰী হয়। এয়া বিজ্ঞান। অভিজ্ঞতাৰ পৰা আহৰণ কৰা জ্ঞানক বিজ্ঞান কোৱা নহয়। এনে জ্ঞান মানুহৰ ব্যৱহাৰলৈ আহে, কিন্তু প্ৰকৃতিৰ ৰহস্য উদ্ঘাটৰ ইন্ধন হৈ নুঠে।

অঙ্ক শাস্ত্ৰৰ অবিহনে বিজ্ঞানৰ উন্নতি সম্ভৱপৰ নহ'ল হেঁতেন। কিন্তু তথাপিও অঙ্ক শাস্ত্ৰই বিজ্ঞানৰ বুকুত জাহ নিয়াৰ নোৱাৰিলে। অঙ্ক বিদ্যা এটা সুকীয়া বিষয়। মূল বিজ্ঞান আৰু অঙ্ক বিদ্যাৰ মাজত প্ৰভেদ এইখিনিতেই যে প্ৰথমটোৱে বাস্তৱ বস্তুৰ কথা চিন্তা কৰে কিন্তু দ্বিতীয়টোৱে বিমূৰ্ত্ত ভাবত যুক্তিৰ ৰহনেৰে মূৰ্ত্ত প্ৰণালী সৃষ্টি কৰে। আৰু এই প্ৰণালীবোৰ ইমান সুদৃঢ় ভেটিৰ ওপৰত প্ৰতিষ্ঠিত যে তাৰে বিজ্ঞানৰ জটিল সমস্যাসমূহ ব্যাখ্যা দিয়াৰ আশঙ্কাৰ কোনো কাৰণ নাথাকে। সেই কাৰণেই অঙ্কবিদ্যাক বিজ্ঞান প্ৰাসাদৰ বাণী আৰু লগুৱা এই দুই ধৰণৰেই বিবেচনা কৰা দেখা যায়।

বিজ্ঞানৰ আবিষ্কাৰবোৰ জটিলতাৰে সুন্দৰ। এবাৰ আবিষ্কাৰ হোৱাৰ পিচত ঘটনাটো জটিলতাৰ বুকুত স্পষ্ট হৈ উঠে। তেতিয়া ভাব হয় যেন কথাটো ৰৰ উজুৰেই আছিল। কিন্তু যেই কোনো এটা আবিষ্কাৰ সংঘটিত কৰিবলৈ হলে কিমান প্ৰজ্ঞাবদ্ধিৰ দৰকাৰ সেয়া বৈজ্ঞানিক গৱেষণাত লিপ্ত থকা সকলোহে বুজে। কোনো এটা আবিষ্কাৰৰ পূৰ্ব্বতে আৱশ্যক হয় এটা অভিজ্ঞতা আৰু শৃঙ্খলা-যুক্ত নিৰীক্ষণ প্ৰসূত প্ৰকল্প। আৰু এই প্ৰকল্পক পৰীক্ষাৰ প্ৰমাণ কৰি দেখুৱাব পাৰিলেই আবিষ্কাৰৰে ঠন ধৰি উঠে।

ছাঁ লৈ।



"আন্ধাৰক শাওপাত দিবৰ কাৰণে আমি ইয়ালৈ অহা নাই; সেই আন্ধাৰৰ মাজেদি নিৰাপদ আৰু সুস্থ এক ভৱিষ্যতৰ ফালে আমাক বাট দেখুৱাই নিব পৰা চাকি এটা জ্বলাবৰ কাৰণেহে আহিছোঁ।"

জন্, এফ্, কেনেডি।

কুন্দশালৰ খুটি নাটি

শ্ৰীকেশৱ চন্দ্ৰ চলিহা বি, এ,
ৰ্কচ'প চুপাৰ ভাইজাৰ্

কুন্দশালত গুণাকটাৰ পদ্ধতিঃ—

(Process of thread cutting in Lathe)

কুন্দশালত গুণাকটাৰ পদ্ধতিৰ বিষয়ে আলোচনা কৰিবলৈ যোৱাৰ আগতে কাৰিকৰীমতে ছুৰী বা গুণা (thread) কাক কয় জানি লোৱা প্ৰয়োজন। তাৰোপৰি গুণাৰ বেলেগ বেলেগ অংশ বিশেষৰ কথাও জনা উচিত। গতিকেই প্ৰথমতেঁ ছুৰী বা গুণাৰ (thread) যথাবিহিত কথাসমূহ আলোচনা কৰা হওঁক।

ছুৰী বা গুণা (thread)

গোটা সজীয়া (Plain cylindrical)বস্তুৰ পিঠিত বা ফোপোলা গোটা সজীয়া (Hollow cylindrical) বস্তুৰ ভিতৰ পিঠিত যিটো লোৰে (groove) একেধাৰে ইমূৰৰ পৰা সিমূৰলৈকে সমদূৰত্বৰে আঁত নেহেৰুৱাকৈ আগবাঢ়ি যায়, সেই লানি নিছিগা লোৰটিকেই গুণা বা ছুৰী (thread) বোলা হয়।

এই গুণা (thread) বাহিৰ পিঠিত কটা হলে বহিগুণা (outside thread) আৰু ভিতৰ পিঠিত কটা হলে অন্তৰ্-গুণা (Inside thread) বুলি অভিহিত হয়। গুণা আকৌ সোঁ পকীয়া (Right handed) বা আওঁপকীয়া (Left handed) কৈ কাটিব পাৰি। সোঁ পকীয়া গুণাৰ অগ্ৰগতি সোঁ পকীয়া অৰ্থাৎ বহিগুণা (outside thread) আৰু অন্তৰ্গুণাৰ (Inside thread) মিলন ক্ষেত্ৰত এটি আনটিৰ লগত সোঁপকীয়া অগ্ৰগতি প্ৰদায়ক হয়। আওপকীয়া গুণাৰ (Left hand thread) অগ্ৰগতি ঠিক তাৰ ওলোটাটোহে হয়।

এতিয়া এটা বল্টু আৰু নাটৰ (Bolt and Nut) উদাহৰণেৰে কথাটোৰ বুজ লবলৈ যোৱা যায় তেন্তে কথাবোৰ এনেদৰে হ'ব:

ধৰিলোৱা হওঁক বল্টু আৰু নাটৰ গুণা সোঁপকীয়াকৈ কটা। এতিয়া বল্টুটো সোঁ পাকে ঘুৰালে নাটটো আগবাঢ়ি আহিব বা নাটটো সোঁপাকে ঘুৰালে বল্টুটো আগবাঢ়ি আহিব বা যাব। আকৌ যদিহে দুয়োটা আওঁপকীয়া গুণা কটা হয় তেন্তে আওঁপাকে ঘুৰালেহে নাটটো বা বল্টুটো আগবাঢ়ি যোৱা কামটো সমাধা হ'ব।

গুণাৰ অংশবিশেষ—

গুণাৰ অংশ বিশেষৰ ভিতৰত ঘাট (Pitch), পোত বা পোতল (Depth of thread), বাওঁ বন্ধীয়া ব্যাস (Major diameter of thread), গুণামূলীয়া ব্যাস (Minor diameter of thread), গুণাৰ ধাৰ (face of

thread), গুণাৰ মধ্যৱৰ্ত্তী কোণ (Included angle of thread), গুণাৰ মূধ (Crest of thread), এইবিলাকেই প্ৰধান।

ঘাট (Pitch)— 'নাট'টোৰ এপাকত 'নাট'টো যিমানদূৰ বল্টুটোৰ ওপৰত আগুৰাই যাব সেই দূৰত্বকে ঘাট (Pitch) বোলা হয়।

দৰাচলতে ঘাট বুলি কবলৈ গলে কব লাগিব যে গুণাৰ শিয়লু-টোৱে (groove) সৃষ্টি কৰা ঢিপবিলাকৰ এটাৰ সোমাজৰ পৰা তাৰ কাষৰীয়া ঢিপটোৰ সোমাজলৈকে চলিত দূৰত্বটোক ঘাট (Pitch) বোলে।

বাওবন্ধীয়া ব্যাস (Major diameter of thread)

যি ব্যাসৰ ওপৰ পিঠিত গুণাৰ শিয়লু টনা হয় সেই ব্যাসকেই বাওবন্ধীয়া ব্যাস (Major diameter of thread) বোলা হয়।

গুণামূলীয়া ব্যাস (Minor diameter of thread)

গুণাৰ শিয়লুৰে সৃষ্টি কৰা দুয়োফালৰ দ বাদ দিলে যি ব্যাস পোৱা যায় তাকেই গুণামূলীয়া ব্যাস বোলা হয়।

গুণাৰ পোতল (Depth of thread)

বাওঁ বন্ধীয়া ব্যাসৰ পৰা গুণামূলীয়া ব্যাসৰ অন্তৰৰ আধাকেই গুণাৰ পোতল (depth of thread) বা পোত বুলি কোৱা হয়।

সংক্ষেপতে গুণাৰ পোতল $= \frac{\text{বাওঁবন্ধীয়া ব্যাস} - \text{গুণামূলীয়া ব্যাস}}{২}$

গুণামূলীয়া ব্যাস = বাওঁবন্ধীয়া ব্যাস − পোতল × ২

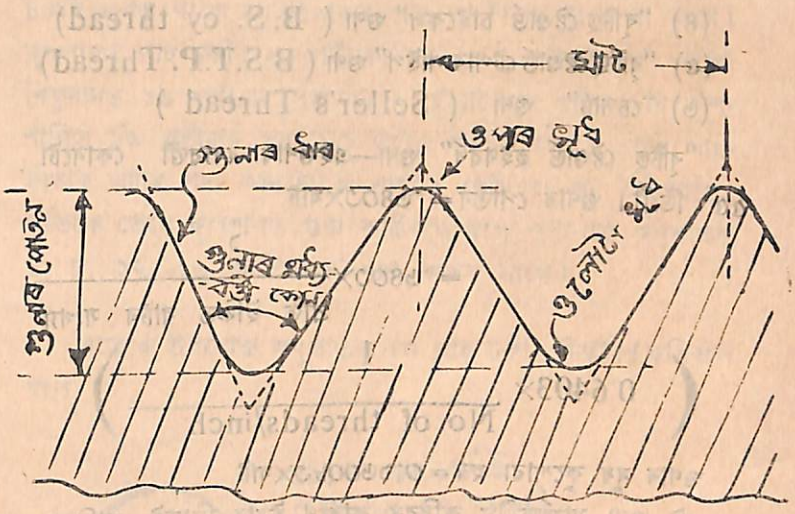
বাওঁ বন্ধীয়া ব্যাস = গুণামূলীয়া ব্যাস + পোতল × ২

গুণাৰ ধাৰ (face of thread)

গুণাৰ লোৱাটোৱে সৃষ্টি কৰিথৈ থোৱা দুই গালকে গুণাৰ ধাৰ (face of thread) বুলি কোৱা হয়।

গুণাৰ মধ্যৱৰ্ত্তী কোণ (Included angle of thread)

গুণাৰ দুই ধাৰে সৃষ্টি কৰা কোণটোকেই গুণাৰ মধ্যৱৰ্ত্তীকোণ বোলা হয়। এই কোণ বেলেগ বেলেগ গুণাৰ ক্ষেত্ৰত বেলেগ বেলেগ হয়।



গুণাৰ মূধ (Crest of thread)

গুণাবিলাকৰ লোৱে সৃষ্টি কৰা ঢিপটোৰ জোংটো টিক্ টিক্‌কৈ জোঙাকৈ নাবাখি জোংটো কুন্দাই সামান্য পৰিমাণে জাঁ-নাজান ভোটা কৰি দিয়া হয়। জোংটোৰ দুয়োফালৰ মূৰৰ ঠাইডোখৰকে গুণাৰ মূধ (Crest of thread) বোলা হয়।

ওপৰ মূধ (Top crest) আৰু ওলোটা মূধ (Bottom crest)

গুণাৰ বাওঁবন্ধীয়া ব্যাসৰ ফালে থকা জোঙটোক ওপৰ মূধ (Top crest) আৰু গুণামূলীয়া ব্যাসৰ ফালে থকা জোংটোক ওলোটা মূধ (Bottom crest) বোলে।

গুণাৰ প্ৰকাৰ—গুণা বহু প্ৰকাৰৰ আছে। তাৰ ভিতৰত সদা-ব্যৱহৃত গুণা হৈছে জোংমুৰীয়া গুণা (Vee thread) সম-কোণীয়া গুণা (Square thread), আদ সমকোণী গুণা (Buttress thread), এক্‌মি গুণা (Acme thread) নাক্‌ল গুণা (Knuckle thread), বটল মুখৰ গুণা Bottle thread), বহুমুখী গুণা (Multistart thread) আদিয়েই প্ৰধান।

এই জোংমুৱীয়া গুণা (Vee thread) আকৌ কেইবা নমুনাৱে।——(১) "বৃটিছ ষ্টেণ্ডার্ড হুইট্‌ৱর্থ" গুণা (British Standard Whithworth Thread সংক্ষেপতে B. S. W, Thread), (২) "বৃটিছ ষ্টেণ্ডার্ড পাইপ" গুণা (British Standard Pipe thread)

(৩) "বৃটিছ এচোচিয়েচন" গুণা (B. A Thread)

(৪) "বৃটিছ ষ্টেণ্ডার্ড চাইকেল" গুণা (B. S. cy thread)

(৫) "বৃটিছ ষ্টেণ্ডার্ড টেপাৰ পাইপ" গুণা (B S.T.P. Thread)

(৬) "চেলার্চ" গুণা (Seller's Thread)

"বৃটিছ ষ্টেণ্ডার্ড হুইথৱর্থ" গুণা—এইগুণাৰ মধ্যৱর্ত্তী কোনটো ৫৫° ডিগ্রী। গুণাৰ পোতন = ·৬৪০৩×ঘাট

$$= ·6403 \times \frac{1}{\text{প্রতি ইঞ্চিত ঘাটৰ সংখ্যা}}$$

$$\left(0·6403 \times \frac{1}{\text{No of threads/inch}} \right)$$

গুণাৰ মূধ কুন্দোৱা হয় = ০·১৬০০৮৩×ঘাট

এই গুণা সাৰ্ব্বজনীন কৰিবৰ কাৰণে ইয়াৰ নিৰ্দ্দিষ্ট তালিকা এখন প্রস্তুত কৰা আছে।

বাওঁ বন্ধীয়া ব্যাস	প্রতি ইঞ্চিত ঘাটৰ
১″	৮ টা
৭/৮″	৯ টা
৩/৪″	১০ টা
৫/৮″	১১ টা
১/২″	১২ টা
৭/১৬″	১৪ টা
৩/৮″	১৬ টা
৯/১৬″	১৮ টা
৫/৪″	২০ টা
১/৮″	৪০ টা

"বৃটিছ ষ্টেণ্ডার্ড" মিহি গুণা (British Standard Fine thread)

এই গুণাৰ মাত্র বাওবন্ধীয়া ব্যাস অনুপাতে "হুইথৱর্ড" গুণাত কৈ প্রতিইঞ্চিত ঘাটৰ সংখ্যা বেচি। মটৰ গাড়ীৰ অংশবিশেষত এই গুণা ব্যৱহৃত হয়। 'হুইথৱর্থ' গুণাৰ দৰেই সকলো লক্ষণ একে।

"বৃটিছ এচোচিয়েচন" গুণা—সৰু সৰু যন্ত্রপাতিত এই গুণাৰ ব্যৱহাৰ হয়। মধ্যৱর্ত্তী কোণ ৪৭½° ডিগ্রী। ইয়াৰ জোখমাখ মিলিমিটাৰতহে হয়। গুণাৰ পোতল = ০·৬×ঘাট

"চেলার্চ" গুণা—(Seller's Thread)—এই গুণা "আমেৰিকান নেচনেল ষ্টেণ্ডার্ড" গুণা বুলিও জনা যায়। ইয়াৰ মধ্যৱর্ত্তী কোণটো ৬০° ডিগ্রী। গুণাৰ মূধটো সমানকৈ চিকুনাই দিয়া হয়। চিকুনাই দিয়াত চেপেটা হ'ব লাগে ঘাটৰ ⅛ অংশৰ সমান।

"বৃটিছ ষ্টেণ্ডার্ড পাইপ" গুণা—পাইপৰ অর্ন্তব্যাসৰ অনুপাতত প্রতি ইঞ্চিত ঘাট (Pitch)ৰ তাৰতম্য ঘটে ১/৮″ ইঞ্চি অর্ন্তব্যাস হলে প্রতিইঞ্চিত ২৮ টাকৈ গুণা থাকে; ১/৪″ ইঞ্চি আৰু আৰু ৩/৮″ ইঞ্চিত প্রতি ইঞ্চিত ১৯ টকাকৈ গুণা থাকে। ১/২″, ৫/৮″, ৩/৪″ আৰু ৭/৮″ ইঞ্চি অর্ন্তব্যাসত ১৪ টাকৈ গুণা, তাৰ ওপৰত ১″ ইঞ্চিৰ পৰা ৪″ ইঞ্চিলৈকে প্রতি ইঞ্চিত ১১ টাকৈ গুণা থাকে।

"বৃটিছ ষ্টেণ্ডার্ড চাইকেল" গুণা— ১৯৩৮ চনৰ আগলৈকে এই গুণা "চাইকেল ইঞ্জিনিয়াৰিং থ্রেদ" নামৰেহে জনাজাত আছিল। ১৯৩৮ চনত সাৰ্ব্বজনীন পর্য্যায়লৈ আনি এই নামেৰে জনাজাত হয়। মটৰ চাইকেলত এই গুণা ব্যৱহাৰ কৰে।

"আদ সমকোণীয়া গুণা (Buttress Thread)

একেধাৰে হেঁচা দিব লগা অৱস্থাত এই গুণাৰ ব্যৱহাৰ হয়। সমকোণীয়া গুণাত (Square Thread) কৈ আদ সমকোণীয়া গুণাৰ ঘঁহনি কম। মধ্যৱর্ত্তী কোণ ৪৫° ডিগ্রী,

চেপেটা অংশ = $\frac{\text{ঘাট}}{৮}$ গুণাৰ পোতন = ০·৬৯×ঘাট

"এক্‌মি" গুণা (Acme Thread)——গুণাৰ যোগে শক্তি সঞ্চালন কৰিবৰ কাৰণে 'একমি' গুণা ব্যৱহাৰ কৰে। সমকোণীয়া

গুণাৰে সংশোধিত ৰূপেই হৈছে 'এক্‌মি' গুণা। কুন্দশালৰ (Lathe) ছুৰীশলখাত (Lead Screw) এই 'এক্‌মি' গুণা থাকে। ইয়াৰ মধ্যৱৰ্ত্তী কোণ ২৯° ডিগ্ৰী। আৰু পোতন = ৬/১০ × ঘাট + ০·০১

মূধৰ চেপেটা অংশ = ০·৩৭০৭ × ঘাট

গুণা কটাৰ নিয়ম—কুন্দশালত গুণা কাটিবলৈ হলে তলেকেইটি কথালৈ লক্ষ্য ৰাখি কুন্দশালৰ যোগাৰ বিলাক ঠিক-ঠাকৈ লব লাগে।

(১) প্ৰতি ইঞ্চিত কাটিব লগা গুণাৰ সংখ্যা নিৰ্ণয়

(২) গুণা কাটিব লগা কামটোৰ লগত নিৰ্দ্ধাৰিত অনুপাতত বটালীৰ (tool) স্বসঞ্চালিত হব পৰাকৈ পাহচকৰিৰ (gear) সংযোজনা।

(৩) গুণাৰ মধ্যৱৰ্ত্তী কোণ অনুযায়ী বটালীৰ ধাৰ দিয়া

(৪) বটালি বটালি ধাৰকত (tool post) স্থাপন।

(৫) গুণাধৰ (Threading Dial) নিয়োগ।

(৬) গুণাধৰৰ নিচান নিৰূপণ।

(৭) সোঁপকীয়া বা আওঁপকীয়া গুণা কাটিবলৈ দোপাকী জোঁটৰা (Reverse gear assembly) সংযোজন।

এতিয়া বটালি স্বসঞ্চালিত কৰিবৰ কাৰণে পাহচকৰি সংযোজনা কৰিবলৈ হলে ছুৰী শলখাৰ (Lead Screw) ইঞ্চিমূলি ঘাটৰ (Pitch) সংখ্যা আৰু কাটিব লগা গুণাৰ সংখ্যা দুয়োটাৰে অনুপাত অনুযায়ী পাহ-চকৰি (gear) নিৰ্দ্ধাৰণ কৰি যোজনা কৰিব লাগিব।

ধৰিলোৱা হওঁক কাটিব লগা গুণাৰ সংখ্যা প্ৰতি ইঞ্চিত ১২ টা

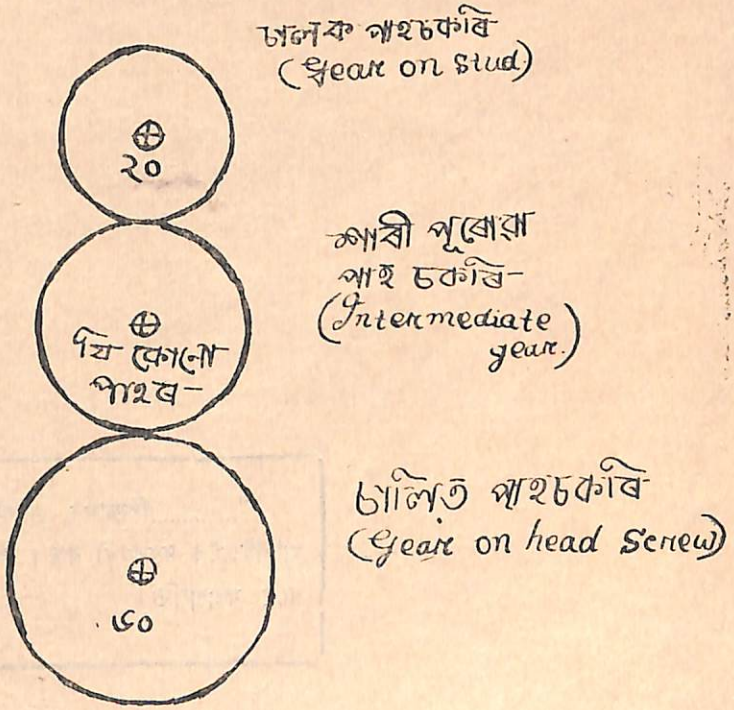
ছুৰী শলখাৰ ইঞ্চি মূলি ঘাট হৈছে ৪ টা। এতিয়া এই দুয়োটাৰে অনুপাত উলিয়াবলৈ হলে—

$$\frac{\text{কাটিব লগা ঘাট (Pitch to be Cut)}}{\text{ছুৰী শলখাৰ ঘাট (Pitch of Lead Screw)}} = \frac{\text{চালক পাহ চকৰি}}{\text{চালিত পাহ চকৰি}}$$

$$\therefore \frac{\frac{১}{১২}}{\frac{১}{৪}} = \frac{১}{১২} \times \frac{৪}{১} = \frac{১}{৩}$$

এই অনুপাতে ৫, ১০, ১৫, ২০, ২৫, ৩০, ৩৫, ৪০, ৪৫, ৫০, ৫৫ আৰু ৬০ যিকোনো সংখ্যাৰে পূৰণ কৰিলে পাহ চকৰি সংযোজনা কৰিবৰ কাৰণে আমাক লগা পাহ চকৰি নিৰ্দ্ধাৰণ কৰিব পৰা হব। এই সংখ্যাৰে পূৰণ কৰিব লগাৰ কাৰণ হৈছে কুন্দশালত পাহ চকৰি (gear) সংযোজনা কৰিবৰ কাৰণে যিবিলাক পাহ চকৰি লগত থাকে সেইবিলাকৰ পাহ ৫ টাকৈ বাঢ়ে বা কমে। কুন্দশালত পাহ চকৰি ২০ পহীয়াৰ পৰা ১২০ পহীয়ালৈকে আৰু কিছুমানত ১৬ পহীয়াৰ পৰা ৮০ পহীয়ালৈকে থাকে। যি কুন্দশালিত ১৬ পহীয়াৰ পৰা ৮০ পহীয়া পাহচকৰি থাকে তাত পাহবিলাক এটাৰ পৰা আনটো ৪ পাহকৈ বেছি বা কম হৈ আহে। গতিকে তেনে কুন্দশালত গুণা কাটিবলৈ হলে ওপৰোক্ত অনুপাতক ৪, ৮, ১২, ১৬ আদিৰেহে গুণ কৰিব লাগে।

এতেকে উপৰোক্ত অনুপাতৰ পৰা পাহ চকৰি নিৰ্দ্ধাৰণ কৰিবলৈ হলে



$$\frac{১ \times ২০}{৩ \times ২০} = \frac{২০ \text{——চালক পাহচকৰি}}{৬০ \text{——চালিত পাহচকৰি}}$$

এই পাহচকৰিৰ পাহ নিৰ্দ্ধাৰণ কৰাৰ পিচত ছবিত দেখুৱা দৰে পাহচকৰি সংযোজিত কৰিব লাগে ইয়াৰ পিছতে বটালিটো

গুণাৰ মধ্যৱৰ্ত্তী কোন অনুযায়ী শানত (grinding wheel) ধৰাই লৈ শান শিলত(Hone) পুনৰ মিহি ধাৰ দি বটালিধাৰকত পন কৰিব লাগে। বটালি ধাৰকত (Tool Post) বটালিটো বান্ধিবৰ বেলিকা লক্ষ্য ৰাখিব লাগিব যাতে কামটোৰ (Job) লগত বটালিটো (Cutting tool) সমকোণীয়া হয়। তাৰ পিচতে মন কৰিব লগীয়া কথা হ'ল বটালিটো কামটোৰ ব্যাসৰ আধা উচ্চতাত বন্ধা হয়। এনেদৰে বটালিটো বান্ধি লোৱাৰ পিচত আৰু এটা কথালৈ লক্ষ্য ৰাখিব লাগে যাতে গোৱাধাৰক (Compound Slide) বানি সাধকৰ (Crossslide) লগত সম্পূর্ণ সমকোণীয়াকৈ বন্ধা থাকে। ইয়াৰ পিচতে ছুৰী শলখাৰ (Lead Screw) লগত গুণাধৰ (Threading dial) ভালদৰে খাপ খাই পৰাকৈ লগ লগাই লব লাগে। সোঁ পকীয়া বা আঁওপকীয়া গুণা কাটিবলৈ হলে দোপাকী জোট (Reverse gear Assembly) কোন ঠাইত নিবদ্ধ কৰিব লাগিব নির্দ্ধাৰণ কৰি সেই অনুপাতে সংযোজনা কৰি লব লাগে। এতিয়া বটালিত কাটনৰ পোতন (depth of cut) দি গুণাধৰৰ (Threading dial) নির্দ্দিষ্ট নিচানৰ আওঁ ধৰি গুণা কটা কাম আৰম্ভ কৰিব লাগে। মনত ৰাখিব লগা কথা হ'ল যোৰ পাহ চকৰি (Back gear Assembly) সংযোজনা কৰি গতিবেগ কম কৰি লৈহে গুণা কটা কাম আৰম্ভ কৰা উচিত।

সাধাৰণতে ৮ টা বা ১০ টা কাটনৰ পোতল দিয়াৰ পিচত গুণাৰ আচল ৰূপত পৰিপূর্ণ হব লাগে।

(গুণা কটাৰ নিয়ম কেইবাটাও আছে। সৰ্ব্বসাধাৰণ কটাৰ নিয়ম এইটোৱেই। আগলৈ গুণা কটাৰ পদ্ধতিৰ বিশদ বিৱৰণ প্ৰকাশৰ আশা ৰাখি ইমানতে সমাপ্ত কৰা হ'ল।)

★ ★

".....বিজ্ঞানৰ উৎকর্ষৰ কাৰণে মানুহৰ স্বাধীনতাই হ'ল আটাইতকৈ দৰকাৰী বস্তু। বিজ্ঞান ঘাইকৈ মানুহৰ ব্যক্তিগত সাধাৰণ-বহে ফলশ্রুতি।"

ডঃ চি, ভি ৰমণ।

কবিতা

কঙ্কালৰ হেপাঁহ

—পৰাগ ফুকন

বন্ধু!

মোৰ মূৰটো তোমালৈ 'উইল' কৰি গ'লো,
মোৰ মগজুত তুমি নোপোৱা—
বাট্ৰেণ্ড ৰাছেলৰ অশান্ত ব্যক্তিত্বৰ ছায়া,
বা, আইনষ্টাইনৰ অঙ্কৰ লেবৰেটৰী।
পাবা এক বিক্ষুব্ধ মনৰ আক্ৰোশ—
আৰু ছন্দহাৰা বিপ্লৱৰ ব্যৰ্থ মিচিল।
সকলো ফালে খেলিমেলি
'ডাষ্টবিন'ৰ ভিতৰৰ দৰে!
সঁচায়ে মই স্থবিৰ 'ডাষ্টবিন'
ইলেকট্ৰনৰ গতি মোৰ নাই।
—ভলটেয়ৰ হ'ব খুজিছিলোঁ—নোৱাৰিলোঁ।
কিন্তু, হাতীপটিৰ দৰে অজস্ৰ ভাৰৰ
এটা সুৰ বাচি ল'বা,
এটা গীত গাবা,
বিপ্লৱৰ।
বন্ধু!
মোৰ লাওখোলাটো অতীতক দি দিবা
নতুন লাওখোলাৰে মই আকৌ আহিম।

———:০:———

আই এম টুয়েনটি

—পার্থ প্রতিম ই। চৌধুরী

বিশ বছৰৰ এই ট্রেনৰ খিড়িকীত মুখ থৈ মোৰ আপাত দিক্‌ভ্রম হয়
বৃক্ষশাৰী পাৰ হৈ যায় মোৰ গতিৰ বিপৰীতে
পুখুৰীত গাঁধোৱা দৃশ্য মুহূর্ত্তৰ সত্যৰ পৰা পৰমুহূর্ত্তৰ অলৌকিক তত্ত্ব....
মোৰ বুকু হু হু কৰি উঠে
অথচ
নির্দিষ্ট কোনো শোক নাই, সেয়ে সান্ত্বনাৰ কথাও মনত নাহে।

আয়ুৰ সীমা কোনেও নেজানে, সেয়ে মনত হয় বহুত কিবা হেৰুৱাইছো
কিন্তু মুহূর্ত্তৰ সত্যৰ নিচিনা সেই মুহূর্ত্ততে মনত পৰে
সকতে হেৰুৱাইছিলো অতি প্ৰিয় এটা মাৰ্বল
এতিয়াও চকুত ভাঁহে তাৰ গাঢ় ৰং
মনত আনে হেৰুৱা আবেশ
কেবল মাৰ্বলটো হেৰাই গৈছে এই দুখত
মোৰ মুখত ক্ষীণ কাতৰ হাঁহি লাগি থাকে।

পোহৰ—সুদূৰত

—অম্বিকা প্ৰসাদ ভুঞা

সুদূৰত এছাটি পোহৰ দেখিছোঁ,
সেই পোহৰ ছাটি মোক লাগে।

সেয়া সূৰ্য্য নতুবা চন্দ্ৰ নহয়,
অথবা মহা শূণ্যত তিৰ্‌বিৰাই থকা
অগণন গ্ৰহ নক্ষত্ৰৰ এটা
সিও যে নহয়।

স্থিৰ অথচ উজ্জ্বল
সেই পোহৰৰ চোপাখে—
উজ্জ্বলি আছে—উজ্জ্বল জীৱনবোৰ;
সেয়া যেন দুৰ্ল্লভ নহয়।

ময়ো বিচাৰো সেই পোহৰত
পোহৰাবলৈ মোৰ জীৱন।

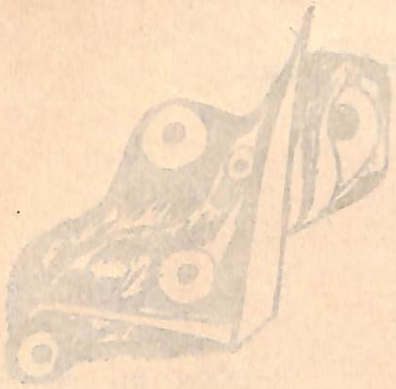
সুদূৰত সেয়া পোহৰ——
আৰু, সেই পোহৰৰ পম খেদি--
মই আগ বাঢ়িছো—
কণ্‌ কণ্‌ জোনাকী পৰুৱাৰ
জিমিক্‌ জামাক্‌ পোহৰত
মোৰ মানস ৰাজ্যৰ——
এটা এন্ধাৰ বাটেৰে।

* * *

॥ ইলিজী ॥

—চিত্ত ডেকা

এপিয়লা গৰম কফিৰ ধোৱাৰ ধুৰলী কুঁৱলীৰ দৰে
কেতবোৰ স্বপ্নালস আশা উৰি ধোৱা দেখি
মই ভাবিলো—এক অনাদি সত্যৰ কথা।
স্বপ্নালস চকুৰ পতাত বিলীয়মান হৈ যোৱা
বহুতো অনামী বেদনাৰ ক্ৰন্দনোচ্ছাস
চিৰ-অম্লান বিষাদেৰে ভাৰাক্ৰান্ত মন গহনত
সাঁচি থলো খুউব সংগোপনে। সেয়া মাথো জীৱনৰ সঁচা
পাণ্ডুলিপি।
স্বপ্নময়ীৰ ভৰা বহুতো আশা আৰু তাত আঁকা আছে
এক সঁচা জীৱনৰ বঙ্কিম ভবিষ্য—
যাৰ বাস্তৱ ৰূপ বিচাৰি ভ্ৰমিলো অনেক দূৰ—জীৱনৰ মধ্যাহ্ন
বেলিত।
অনুষ্টুপীয়া এখনি সংসাৰ আৰু তাতে পোনাটিৰ থুনুক থানাক
মাত
স্বপ্ন-বিভোৰ জীৱনৰ এক বাঙময় প্ৰতিচ্ছবি
বুলালো ক'ত ৰঙে অসীমৰ ৰূপতৃষ্ণা লই।
এদিন জীৱন হ'ল পাটীগণিতৰ বিৰাট শূণ্য
যাৰ পৰিধি.....অসীম।
সকলোটি উটি গ'ল প্ৰৱাহমান সময়ৰ কোঢ়াল সোঁতত।
স্বপ্ন হ'ল ক'লা ক'লা ছাঁইৰ দ'ম,
আশাবোৰ উৰি গ'ল ধোৱা হৈ কুণ্ডলী পকাই।
দেহ হ'ল পুৰণি ফছিল'—যেন এটি গলিত স্থবিৰ।
মাথো ৰ'ই গ'ল, এছিকটা পোৱামাটিৰ গোন্ধ
আৰু এক ৰঙা কাপোৰ আঁৰা বিজুলীবাহৰ ডাল—
অনামী এক জীৱনৰ অন্তিম স্বাক্ষৰ কঢ়িয়াই।



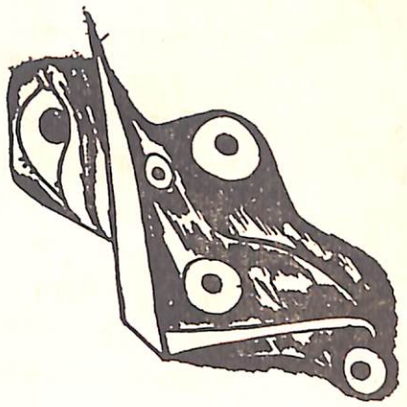
আকর্ষণ

—ৰমেন কলিতা

এজাক, দুজাক
ৰৰষুণ; ভীষণ ৰৰষূণ।
বাহিৰত। ভিতৰতো।
মোৰ কাষৰত গাভৰু পৃথিবী,
শ্ৰাৱণ স্নাতা, সূঁচী কুঁৱৰী;
মই গোপনে টোপনি গলো
কৃষ্ণাক্ষীৰ চকুৰ পতাত।
মোৰ চকুত তাইৰ সেউজী নাচোন
যেন সুউচ্চ স্তনত যৌৱন দ্যুত
অবলুপ্ত এক গোপন ৰহস্যাৱৰণ।
গাভৰু দেহাত উন্মাদ তৰঙ্গ
নামি আহিছে ওপৰৰ পৰা তললৈ
কুমাৰী পৃথিবীৰ ৰহস্যময় ভবিষ্যত সন্ধানত।

সেউজী পৃথিবীত এতিয়াও ফুল ফুলা নাই
লুকাই আছে য'ত অদম্য উদ্ভাবিকা শক্তি সম্ভাৱ
যাৰ আকর্ষণত থুপ খালে মোৰ সিচৰিত যৌৱন
শিৰাই শিৰাই প্ৰৱাহিত হ'ল প্ৰমত্ত পুলক।
মোৰ দেহাত আজি সোণালী জুই
ওঁঠত লাগি আছে কেঁচা পাতৰ কোমল কম্পন
আৰু মনত সেউজ সপোন॥

* * *



সময়ৰ জখলাত বগুৱা বাই আমি উঠিছিলোঁ,
এতিয়া বহুত উৰ্দ্ধত;
দৃষ্টি আমাৰ সুদূৰ প্ৰসাৰী।
সৃষ্টিৰ গূঢ়তম ৰহস্যভেদৰ সন্ধানত
আমি অন্য এক আৰোহীৰ দল।

কিন্তু,
এই বিস্তীৰ্ণ পথত
বাৰুদৰ ধোঁৱা আৰু সঙ্গীনৰ নিৰ্মম আঘাতৰ বলি
আবাল -বৃদ্ধ-বণিতাৰ ৰক্ত ৰঞ্জিত
দুৰবি ডৰাই যেন কৈছে——
তোমালোক সভ্য হোৱা!

এইৱা,
সভ্যতাৰ শেষ প্ৰান্তৰত থিয় হৈ
ভাবিছোঁ;
আদিম মানৱৰ উন্মত্ততাৰ তেজ
এতিয়াও আমাৰ দেহত।

তেন্তে,
হয়তো ইতিহাসে সাক্ষী ক'ব
আমি কোন?
পৰিচয় আমাৰ কিহত!

★ ★ ★

ইতিহাস—নতুন যুগৰ

—"কবিৰাজ"—

ভগৱান আজি অকাম্মিলা

—কমল চৌধুৰী

যোৱা কালি মাজনিশা লগ পাইছিলোঁ
ভগৱানক আকস্মিক ভাৱে।
মহানগৰীৰ নির্জ্জন নিস্তব্ধ ৰাস্তাবে
ভগৱান অকলে অকলে ঘূৰি ফুৰিছিল,
আৰু হঠাতে মুখা-মুখি হৈছিল মোৰ লগত।
দেখিছিলো এটা কঙ্কাল, যেন কবৰৰ পৰা
ওলাই অহা এটি মৰা শ; তেতিয়াও
বিচাৰি আছিল কিবা—কিবি ডাষ্টবিনৰ মাজত।
মাজনিশাৰ নিস্তব্ধতাক আৰু ভয়াবহ কৰি তুলিছিল
কেইটিমান কুকুৰৰ ভুকভুকনিয়ে;
আৰু উলঙ্গ প্ৰায় ভগৱানে সকলোবোৰ আওকান কৰি
একান্তমনে নিমগ্ন হৈছিল ডাষ্টবিনৰ উছিষ্টবোৰৰ মাজত।
মোক দেখি হঠাতে থমকি ৰৈছিল, তাৰ পিছত
মাৰিছিল এটি দুৰ্ব্বোধ্য হাঁহি। (কঙ্কালেও যে হাঁহিব পাৰে!)
বিষ্ময়াভিভূত মই ভগৱানক সুধিছিলো, এইদৰে
মাজনিশা শ্ৰান্ত-ক্লান্ত হৈ ঘূৰি ফুৰাৰ কাৰণ।
আৰু ভগৱানে বহু সময় মোৰ পিনে চাই,
খাল হৈ যোৱা পেটটোত হাতখন থৈ
অতি কষ্টেৰে ক'লে, "ৰৰ ভোক লাগিছে।"

তাৰ পিছত ভগৱানে আৰু বহুত কিবাকিবি ক'লে,
সকলোবোৰ শুনিবৰ ধৈর্য্যও নাছিল;
আৰু সকলোবো বুজিও নেপালো।
ভগৱান যে আজি মৃত্যুমুখত
আহাৰ লাগে ভগৱানক ভিটামিন যুক্ত;
শৰীৰত যে শক্তি লাগে
অন্যায় অত্যাচাৰ ৰোধিব।
নহলে যে ভগৱানৰ চকুৰ আগতেই
সকলো গ্ৰাস কৰি পেলাব অনাচাৰে।
গলিত বিকলাঙ্গ ব্যাধিৰে আক্ৰান্ত ভগৱানৰ
কণ্ঠ আজি ৰুদ্ধ; শক্তিহীন আজি
প্ৰতিবাদ কৰিবলৈ অন্যায় অবিচাৰৰ বিৰুদ্ধে,
(কিজানিবা খাদ্যৰ যোগান কৰি দিয়ে বন্ধ।)
সেয়েহে ভগৱানক পূজা নালাগে আজি, লাগে আজি শক্তি
উপদেশ নিবিচাৰে তেওঁ, বিচাৰে আৰ্হি
বক্তৃতা নেলাগে তেওঁক, লাগে মাথো আহাৰ
ভগৱানে যে শক্তি গোটাবই লাগিব——গঢ়িবলৈ
উচ্চ-নীচ, ধনী-দুখীয়া হীন এক স্বৰ্গীয় সমাজ,
ভগৱানৰ মুখত দেখিছিলোঁ——মই মোৰ নিজৰ মুখখন॥

★ ★

অশ্রু অঞ্জলি যাচিলোঁ---

দার্শনিক বাট্রাণ্ড বাছেল, কলাগুরু বিষ্ণুবাভা, নটসুর্য্য ফণীশর্ম্মা আরু ডাঃ চি,ভি, বমণব মহাপ্রয়াণত আমি মর্ম্মান্তিক শোক পাইছোঁ। তেওঁলোকব আত্মাব সদগতি কামনা কবিলোঁ।

★ ★

Whom we Lost :

Mridul Kakaty

: স্মৃতি চয়ন :

স্মৃতি, তুমি আজি বেদনা
মানুহৰ জীৱনত।
যি বস্তি জ্বলাইছিলা এন্ধাৰ বুকুত—
হাঁহি আৰু গানেৰে।
বিষাক্ত বতাহত নুমাল যি শিখা হায় !
মিলি গ'ল কালৰ বুকুত।

ৰৈ ৰৈ আহে মনলৈ
সুখ-দুখ স্মৃতি যত,
ভাষাক্রান্ত হয় মন
গভীৰ আবেশত।

সেয়ে আজি কওঁ মাথোঁ—
স্মৃতি, তুমি আজি বেদনা
মন গহনত।

ফুল, কেতিয়ানো ফুলিছিল
নাজানিলোঁ।
জানো মাথোঁ ভৰিছিল মন।
অকালতে সৰি গ'ল
স্মৃতি মাথোঁ ৰাখি গ'ল।
ব্যথাভৰা হৃদয়ত
স্মৃতিৰ তৰ্পণ কৰি
চকুলোৰে ওপচালোঁ দুয়োটি নয়ন।

নিষ্ঠুৰ এই সংসাৰত
স্তব্ধ হৈ মাথোঁ মই
কৰি যাওঁ স্মৃতিৰ চয়ন।

Bijan Kar

Mitrajit Singh

Two Victims of air-crash at "Jatinga"

ওমর খৈয়ামর মৃত্যুত	'সমীৰণ'
চৰিত্ৰ	প্ৰদীপ গগৈ
অনুৰাগে ৰঞ্জিত মন	হেমেন ৰৱা
ডাঃ লিন্‌ডো	নৰ কুমাৰ ৰৱগোহাঞি
জীৱন বোধ	'বীণু'

স্কীন্ টাইত্ চেপামৰা পেন্টটো যদি হঠাৎ মানুহৰ ভিৰৰ মাজত বেয়াকৈ ফাটি যায় মুহূর্ত্তৰ বাবে কি হ'ল একো ভাবিবৰ মন নোযোৱাৰ দৰে মোৰ এতিয়া কোনো কথা চিন্তা কৰিবৰ মন যোৱা নাই। মোৰ এতিয়া এনে লাগিছে যেন মই কোনো এক অনামী দ্বীপৰ এটা নির্জ্জন ঘৰত অকলে শুই আছোঁ। মোৰ মন-সত্ত্বা, আশা-আকাঙ্ক্ষাবোৰক গিলি পেলাইছে—কোঠাত বন্দী হৈ থকা কিছুমান অতৃপ্ত আত্মাৰ হা-হুমুনিয়াহ আৰু অস্ফুট ক্রন্দন ধ্বনিয়ে। শুই আছে পৃথিবী, শুই আছে দ্বীপটো আৰু শুই আছো মই। এনেদৰেই যেন অনন্তকাল পাৰ হৈ গৈছে।

মই এতিয়া একো ভবা নাই।

ভবা নাই এটা যৌৱনৰ আশা-আকাঙক্ষাৰ কথা।

ভবা নাই এটি ব্যর্থ জীৱনৰ কিছুমান অনামী বেদনাৰ কথা।

মই ভাবিছো, কেৱল ভাবি গৈছো--যিবোৰ কথা মই কোনো-দিন নাভাবিম বুলি প্রতিজ্ঞা কৰিছিলোঁ।

....ৰাতিপুৱাৰ আমেজ মিহলি টোপনিত দেখা শেষ সপোন-টোৰ আঁতখিনি হঠাতে হেৰুৱাই পেলালোঁ। ছন্দ পতনৰ এক গভীৰ আর্ত্তনাদত মই বিছনাত বহি পৰিলোঁ আৰু লগে লগে শুনিলো ঘড়ি-এলার্মৰ কর্কশ শব্দবোৰ। এলার্মৰ শব্দবোৰৰ ওপৰত মোৰ খিমান খং উঠিছিল তাতোকৈ বেচি খং উঠিল—যিয়ে এলার্ম বজোৱা কৌশলটো প্রথমতে উলিয়াইছিল।

শ্বিলং মটৰ ষ্টেচনৰ দীঘল 'কিউ'টো দেখি মই ঠিৰাং কৰিলো যে ৰাজধানীলৈ যোৱা দিনবোৰেও মোৰ বাবে 'কিউ' কৰি আছে। দিনটোৰ ভিতৰতে ঘূৰি আহিব লাগিব। টেক্সিৰ বাহিৰে অন্য উপায়ো নাই। বাচেৰেও যাব পাৰি শ্বিলঙলৈ। টেক্সিত গলেও সেই একে।

হয়তো হেলিকপ্টাৰত গলেও....

: আৰে ভাই সমীৰণ! কলৈ যাব?

মই গম পাই গৈছিলো যে হঠাতে দুখন সবল হাতে মোক আঁকোৱালি লৈছে পিচফালৰ পৰা। আৰু সেই হাত দুখনৰ গৰাকী হ'ল মোৰ কলেজীয়া জীৱনৰ অন্যতম বন্ধু ইন্দুকল্প চলিহা। প্রায় সাত বছৰৰ মুৰত মই ইন্দুকল্পক এনেদৰে লগ পাৰ বিচৰা নাছিলোঁ। অন্ততঃ আজিৰ দৰে এটা বিশেষ ৰাতিপুৱাত।

ঃ বুইছ' সমীৰণ, তোক আজি লগ পাই মোৰ কিমান ভাল লাগিছে সেয়া ভাষাৰে বুজাব নোৱাৰিম। ····ধোৱাকালি মাখন-হঁতৰ পৰা তোৰ খবৰ লৈছিলোঁ। তোক লগ পোৱাটো এটা সমস্যা। আৰু আজি পাইছো যিহেতু তোক সহজে এৰি নিদিম। মাখনহঁতো ৯ বজা মানত পাণবজাৰলৈ অহা কথা আছে।

মই যে আজি শ্বিলংলৈ ধোৱাতো খুউব জৰুৰী সেয়া ইন্দুকল্পক বুজাবলৈ অশেষ চেষ্টা কৰিও নোৱাৰিলোঁ। ইন্দকল্পক লগ পাই মোৰ ভাল লাগিছে সঁচা, কিন্তু যিমান ইন্দুকল্পৰ লাগিছে হয়তো মোৰ সিমান নহয়। কাৰণ মাখনহঁতৰ পথৰ পৰা মই বহু-দিনৰ আগতেই এটা বিশেষ উপপথ বাচি ললো যি পথেৰে কেৱল আগবাঢ়িহে থাকিব পাৰি, ঘূৰি আহিব নোৱাৰি।

ঃ অ'ই সমীৰণ, চাচোন মোৰ ফালে চা। আমি আজি ইমান দিনৰ মূৰত একে লগ লাগিছো। মাখন, কমক্ষজ, তই আৰু মই। ধৰি ল' চাৰিবছৰ আগৰ পাণবজাৰ। সেই জামাতুল্লাৰ দোকান, বিখ্যাত মহামায়া কেবিন, মাণ মেকিং ফাৰ্ম্মাচী, মধুমিতা····। সকলো একে আছে; আমিও ঠিক আগৰ দৰেই চিঞৰি চিঞৰি কথা পাতিম যেন আমি একো একোজন কলেজীয়া ডেকা। অন্য নহলেও আমি চাৰিবছৰ আগৰ এটা বিশেষ দিনলৈ উভতি যাম।

চাৰিবছৰ আগৰ মই আৰু আজিৰ মই। মোৰ জানো কিবা পৰিবৰ্ত্তন হৈছে? —শাৰীৰিক, মানসিক। মই ক্ষীনাইছো, ই স্বাভাৱিক। কিছুমান মানুহ ক্ষীনাই আৰু কিছুমান হয় শকত। ইন্দুকল্প শকত হৈছে। মুখখন আগকৈয়ো তেজাল। এটা থুলন্তৰ ডেকা। বহু ছোৱালীৰ মুৰ খাৰ পৰাকৈয়ে স্বাস্থ্যবান ধুনীয়া ডেকা। সি পিচে কোনো ছোৱালীৰ মুৰ খাৰ নালাগিল। লতিকাই তাৰ মুৰ খালে নে সি লতিকাৰ খালে কব নোৱাৰো; কিন্তু সিহঁতহালে এদিন কামাখ্যালৈ গৈ মালা বদলালে। সেইবোৰ ঘটনা সিহঁত বিশ্ববিদ্যালয়ত পঢ়ি থাকোতেই হৈছিল সকলোৰে অজানিতে। শেষ বাৰৰ বাবে বিশ্ববিদ্যালয় এৰিবৰ দিনাখন লতিকাৰ বিচনাখন মালিটোক প্ৰজেণ্ট দি সকলোকে অবাক কৰি তাইক লৈ গ'ল যোৰহাটলৈ। অফুৰন্ত মনোবল সম্পন্ন হাঁহি হাঁহি ভাগৰি নপৰা ইন্দুকল্পই হেনো ঘৰত মাকক কৈছিল—মা তোমালোকে মোক খং কৰিব নালাগে, কাৰণ মই শ্বিলঙৰ পৰা বিয়া কৰোৱা নাই—বিয়া কৰাইছো কামাখ্যাৰ পৰা। ভয় নাখাবা, ইতিমধ্যে মই কোম্পানী এটাত চাকৰিও যোগাৰ কৰিছোঁ।

ঃ হেই সমীৰণ, কি ভাবিছ? বিক্সাৰ পৰা নাম। তই এতিয়া পাণবজাৰত, শ্বিলঙত নহয়।

ঃ আচ্ছা ইন্দুকল্প, লতিকাই তোক এতিয়াও মৰম কৰেনে?

ঃ এইটো এটা প্ৰশ্ন হ'লনে?

মাখন, ইন্দুকল্প, কমক্ষজ, সমীৰণ।

আমি যেন শেষ হৈ ধোৱা কেইটামান বছৰৰ দিনবোৰলৈ উভতি গৈছোঁ। পাণবজাৰখন বহুত সলনি হৈ গৈছে, কিন্তু আমাৰ এনে লাগিল যেন আমাৰ একো হোৱা নাই। চাৰিবছৰৰ চাৰিটা অতি মূল্যবান বসন্তই আমাৰ মনৰ কোমল চুককেইটি আলফুলকৈ টুকুৰিয়াই থৈ গ'ল আৰু দেহৰ প্ৰতিটো অঙ্গৰ আঁহপাহবোৰ মেল খালে চাৰিজাক ফাগুনী বতাহৰ মৰমৰ হাতবুলনিত। আৰু মই আজি উপলব্ধি কৰিছো এই চাৰিটা বসন্তই মোৰ জীৱনলৈ আনিছে ব্যৰ্থতা, হতাশা; প্ৰতিজাক ফাগুনী বতাহে মোৰ দেহত একো-টাকৈ ছেকনিৰ কোৰ মাৰি এৰি থৈ গৈছে। তথাপিও মই এই এৰি অহা ব্যৰ্থতাপূৰ্ণ বছৰ কেইটিৰ প্ৰতিটো মুহূৰ্ত্তক ধৰি ৰাখি-বলৈ চেষ্টা কৰিছোঁ, পাহৰিব খুজিও যেন পাহৰিব পৰা নাই।

মাখন, ইন্দুকল্প, কমক্ষজ।

সিহঁতক দেখিলে এনেকুৱা লাগে যেন তাহাঁতক সময়ৰ নিষ্ঠুৰতাই চুই যাব পৰা নাই। শেষ হৈ ধোৱা এইকেইটা বছৰ যেন ছিলমিলিয়া টোপনি এটিত দেখা ধুনীয়া সপোন এটাৰ মধুৰ কেইটি-মান মুহূৰ্ত্ত। সেই মধুৰ মুহূৰ্ত্ত কেইটিৰ কথা মৰম লগাকৈ সুৰঁবিব পাৰি, মূল্যাঙ্কন কৰিব নোৱাৰি। আমি চাৰিওজনে পাণবজাৰৰ হাজাৰ সন্ধিয়াই পৰশি ধোৱা চ'কটোত থিয় হৈ পুৰণি দিনবোৰৰ কথা কৈ চিঞৰিছো, হাত চাপৰি মাৰি হাঁহিছোঁ, ইজনে সিজনক জোকাইছোঁ। আমাৰ হাঁহিৰ শেষ নাই যেন বহুবছৰ ধৰি আমাৰ হাঁহিবোৰ কোনো এটা পুখুৰীত বন্দী হৈ আছিল; আৰু আজি হঠাতে পাৰ ভাঙি ওলাই আহিল।

মাখন!

ঃ বুইছ' ইন্দুকল্প, মই এই কেইবছৰত, মানে তহঁতৰ লগত এৰা-এৰি হোৱা দিনবোৰত নিজকে বিভিন্ন পৰিবেশৰ মাজত খাপ খুৱাবলৈ চেষ্টা কৰিছোঁ। চাকৰি মই কোনো দিনেই নিবিচাৰিলোঁ।

কাৰণ দেউতাৰ সম্পত্তিখিনি চলাই খাব পৰাকৈয়ে মই যেতিয়া উপযুক্ত হোৱা নাই, গৱর্ণমেণ্টৰ কাম কৰি ফাঁকি দিয়াৰ চখ্ নাই। মই ভালকৈ জানো যে কোনো অফিচত চাকৰি কৰিলে চকীখনত পেলাই থৈ অহা কোট চোলাটোৱেহে কাম কৰিব লাগিব।

বুইছ্' কমৰুজ, সমীৰণক দেখিলে এনেকুৱা লাগে যেন ই আমাৰ লগত এক্‌টিং কৰিছে। Script লিখা আছে—হাঁহিব লাগে, সেইবাবে হাঁহিছে। ঐ সমীৰণ, ক' চোন ক'—কাৰবাৰ, প্ৰেম-ট্ৰেমত পৰিলি নেকি? প্ৰেম কৰ, মহব্বত কৰ, কিন্তু ইস্ক্ হবলৈ নিদিবি। আৰু শুন, অসমীয়া ছোৱালীৰ লগত এইবোৰ নকৰিবি। বেষ্টুৰাত চাহ খাবলৈ লগ ধৰিবি, কৰ—"মাহঁতে কি ভাবিব"? চিনেমা চাবলৈ লগ ধৰিবি, আপত্তি কৰি কৰ—"মাহঁতে কেনেবাকৈ গম পালে কি হব?" কিন্তু সেইবোৰ ছোৱালীয়ে বিয়া কৰাব খুজিলে কেতিয়াও নকয়— বিয়া হলে মাহঁতে কি ভাবিব বুলি।

হেৰ'—যদি বিয়াৰ আগতে আৰচুৱকৈ অলপ-অচৰপ ৰোমাঞ্চ কৰি নলয়, বিয়াৰ পিচত দেখোন হাঁহ-কুকুৰা, ছাগলি, চাউল দাইলৰ মাজত হেৰাই যাবি।

(মাখনৰ যেন কথাই শেষ নহয়।)

বাৰু সেইবোৰ বাদ দে। ক'চোন সমীৰণ তোৰ কি হৈছে? এই ৰুক্ষ চেহেৰা, অসংযত কাপোৰকানি। জানো, তোৰ মূৰত পলিটিক্স সোমাইছে। সেইবোৰৰ আশা এৰ। যৌৱন মানুহৰ জীৱনৰ এবাৰেই আহে; তাক উপভোগ কৰিব জানিব লাগে। লিভিং ইজ এন্ আৰ্ট। জীৱনটোৰ মাজত গভীৰ ভাৱে সোমাবলৈ হ'লে এটা আৰ্টিষ্টিক মন থাকিব লাগে।

মাখনে জীৱনক গভীৰ ভাৱে লব জানিছে—হয়তো সি কোৱাৰ দৰে তাৰ এটা আৰ্টিষ্টিক মন আছে। জীৱনটোক যদি মাখনেই উপভোগ নকৰে কৰিব কোনে? বাপেকৰ একমাত্ৰ উত্তৰাধিকাৰী সূত্ৰে এতিয়া অগাধ সম্পত্তিৰ মালিক। সুন্দৰ চেহেৰা, মাৰ্জিত ব্যৱহাৰ, ভাল খেলুৰৈ; তেনেস্থলত মাখনৰ স্কুটাৰৰ পিচত বহা পাঞ্জাবী গাভৰুৰ মৃদু হেঁচাই অকল মাখনক কিয়, অন্য কাৰোবাক বিচলিত কৰিলেও ভাবিবলৈ একো নাই। আৰু সেয়ে সি যৌৱনৰ প্ৰতিটো মুমূৰ্ত্তকে মধুৰ ভাৱে গ্ৰহণ কৰিছে। সমাগত দিনৰ প্ৰতিটো প্ৰভাতে তাৰ জীৱনলৈ এমুঠি নতুন ৰং লৈ আহে। সেই ৰঙৰ যেন কোনো দিন শেষ নহব।

আৰু কমৰুজ! ডাক্তৰ কমৰুজ আহমেদ!!

: ভাবিছিলো ডাক্তৰ হ'লে বহুত ডাঙৰ কিবা এটা হৈ যাম। ডাক্তৰ হ'লো কিন্তু সেই 'বহুত ডাঙৰটো' দেখোন হব নোৱাৰিলোঁ। আচলতে কি জান, মই কেতিয়াও ডাক্তৰি পঢ়িব নালাগিছিল। মই মাথোন career মোহত পৰি ডাক্তৰ হ'লো। নিজকে বহুদিন সুধি চাইছো, মই জানো গঁচাই ডাক্তৰ হব বিচাৰিছিলোঁ! সঁচাকৈ মই ডাক্তৰ হোৱা হেঁতেন ডিতকৰা গাঁৱৰ মানুহক সেঁৱা কৰিবৰ সুবিধা পায়ো ফাঁকি মাৰি গুৱাহাটীত নাথাকিলোহেঁতেন।

কি কলি? ফেমিলি প্লেনিং? শুনিলে আচৰিত হবি, মই এই বঙা ত্ৰিভুজৰ ঘোৰ বিৰোধী। ছিৰিনক মই প্ৰথম লগ পাবৰ দিনাই কৈছিলো—"তুমি যদি ফেমিলি প্লেনিং নকৰা মোৰ লগত বিয়া হব পাৰিবা।" কাৰণ, মই মা-দেউতাৰ পঞ্চম সন্তান। দেউতা-হঁতে এই পৰিকল্পনা কৰা হেঁতেন মই কমৰুজ আহমেদে পৃথিবীৰ পোহৰ হয়তো কোনোদিন নেদেখিলোহেঁতেন।

হাঁহিছ কেলেই! হঁহা কথা নহয়। ইট্ ইজ্ কোৱাইট চেণ্টিমেণ্টেল। এটা জীৱনৰ কথা। পৃথিবীলৈ তুমি জন্ম লৈ অহা মানে জীৱনৰ কেইটামান বছৰক আঁকোৱালি লবলৈ অহা। হ'ব পাৰে সেই বছৰকেইটা শেষ হৈ যোৱা অতীতৰ তুলনাত অতি নগন্য, তথাপিও কিমান মূল্যবান।

পৃথিবীত জন্ম গ্ৰহণ কৰিবলৈ ভাগ্য লাগে।

জীৱনটো উপভোগ কৰাই মানৱৰ শ্ৰেষ্ঠ ধৰ্ম্ম।

জীৱনটো মাখনে উপভোগ কৰিছে, কমৰুজে কৰিছে উপলব্ধি। হয়তো এই উপভোগ-উপলব্ধিৰ মাজত এটা ফাঁক আছে পোৱা-নোপোৱাৰ। হয়তো সেয়ে জীৱন। ইন্দুকলাই জীৱনৰ মাজত গভীৰভাৱে সোমাইছে। ময়ো জানো জীৱনৰ মাজত গভীৰ ভাৱে সোমাব বিচৰা নাছিলো? বিচাৰিছিলো? যৌৱনৰ অতি মূল্যবান কেইটিমান বছৰৰ প্ৰতিমুহূৰ্ত্তত মই জীৱন নামৰ মৰীচিকা বিচাৰি হাবাথুৰি খাইছোঁ।

আৰু এসময়ত মই ভাগৰি জীৱনৰ পৰা পলাইছোঁ। কোনে জানে হয়তো মই তেতিয়াও জীৱন বিচাৰিছিলোহে।

যেনেকৈ বিচাৰিছিল এদিন মা'ই।

এদিন বিচাৰিছিল দেউতাই।

আৰু হয়তো মেঘালীয়েও।

মোৰ মা'। মা'ৰ কথা মনত পৰিলে মোৰ এতিয়াও চকুহাল সেমেকি উঠে। মাই এদিন জীয়াই থাকিব বিচাৰিছিল। কিন্তু মা মৰিল। তথাপিও মা'ই জীয়াই থাকিব খুছিজিল মোৰ মাজত। মোৰ দেহৰ প্ৰতিটো শিৰা-উপশিৰাত। মই জানো মাক জীয়াই ৰাখিব পাৰিলোঁ?

ঝিজনী মাতৃয়ে সমীৰণ বৰুৱা নামৰ একমাত্ৰ সন্তানক জন্ম দি বছৰৰ পিচত বছৰ ধৰি কল্পনা কৰি আহিছিল এজন সমীৰণে নোৱাৰিলেও এজাক কণ কণ সমীৰণে এদিন সত্য বৰুৱাৰ ঘৰ উছৰমুখৰ কৰি তুলিব। মাই সদায় গোসাই ঘৰৰ থাপনাত ফুল দি তাকে বিচাৰিছিল। মাই আশা কৰিছিল যেন সেই দিনবোৰ মা'ৰ জীৱনৰ ভিতৰতে আছে।

ঃ জান সোণ! মোৰ এনে লাগিছে যেন গোটেই জীৱনজুৰি তোক আগত লৈ চাই থাকিম। তোৰ জন্মৰ পিচৰ পৰাই প্ৰতিমুহূৰ্ত্তে ভাবিছো যেন মই আৰু বেচিদিন জীয়াই নাথাকো। কিন্তু ভগবানৰ কি কৃপা, ভয়ভয়কৈ থাকোতেই আজি ২২ বছৰ কেনেকৈ পাৰ হৈ গ'ল কবই নোৱাৰিলোঁ। এতিয়া মোৰ মৰণলৈ ভয় নাই, কাৰণ মই মৰিব নোৱাৰো।

মাৰ কথা ভাবিলেই মোৰ মেঘালীলৈ মনত পৰে।

মেঘালী চলিহা—

মোৰ যৌৱনৰ বিশেষ কেইটিমান বছৰৰ লগত যাৰ স্মৃতি মধুৰ ভাৱে জড়িত আছে। মেঘালী মোৰ জীৱনলৈ যেতিয়া আহিছিল তেতিয়া মোৰ এনে এটা বয়স আছিল যি বয়সত মই গোটেই পৃথিবী বঙীণ চশমাৰ মাজেদিহে দেখিছিলোঁ। কেউফালে ৰং, মনত ৰং, আকাশত ৰং, দুৰৰিব দলিচাৰ নিয়ৰ-টোপালত জীৱনৰ সোণালী ৰং। সেইবোৰ দিনত মই আকাশৰ জোনটি পাইন গছৰ জোপোহাৰ ফাঁকেদি দেখিছিলোঁ।

আৰু আজি?

আজিও মই সেই একে পূৰ্ণিমাৰ জোনটিৰ মাজত জীৱনৰ পূৰ্ণতা বিচাৰি হাহাকাৰ কৰিছোঁ। মই আকাশলৈ ভয়ে ভয়ে চাইছোঁ। বেৰৰ কৃপণ জলঙাৰ ফাঁকেদি। সেই কণমানি ফুটাটোৰেদি মই দৃষ্টিৰ পূৰ্ণ প্ৰসৰতা বিচাৰিছোঁ।

★ ★ ★ ★

আজি আঠ বছৰ আগৰ কোনোবা এটা দিনত মেঘালী নামৰ এজনী ফ্ৰক পৰিহিতা ভন্টি আমাৰ ঘৰলৈ আহিছিল। আমাৰ ঘৰলৈ অহা এজাক মানুহৰ উছৰমুখৰ পৰিবেশৰ মাজত মাই এই ছোৱালীজনীক লৈ কিবা এটা কল্পনা কৰি পেলালে। সেই কণমানি পাটগাভৰুজনীক সেইদিনা দেখি মা'ৰ এনে লাগিল যেন তাই আমাৰ ঘৰৰ বহুদিনৰ চিনাকী। এনেকুৱা এজনী ছোৱালীৰ কথাই মায়ে যেন বহু বছৰ ধৰি ভাবি আহিছিল। মেঘালী বৰুৱা ভৱনৰ বহু আকাঙ্খিত এটা আলফুলীয়া স্বপ্ন। সেই স্বপ্নৰ মৰমী আৱেশেৰে বহু যুগৰ বেদনা ধুই দিব পাৰি।

মা'ই ভাবিলে, মুহূৰ্ত্ততে ভাবি পেলালে—এই মেঘালী নামৰ এপাহ ফুলৰ দৰে মৰম কৰিব পৰাকৈ ধুনীয়া ছোৱালজনী সমীৰণ বৰুৱাৰ বাবেহে জন্ম গ্ৰহণ কৰিছিল।

আৰু হয়তো মেঘালীৰ বাবেহে ময়ো জন্ম লৈছিলোঁ।

অন্ততঃ সেই দিনবোৰত মই ভাবিছিলোঁ। মাই যেতিয়া মনৰ কথাষাৰ মোৰ আগত কৈছিল তেতিয়া মেঘালী যোৱহাট পাইছিলগৈ। মাই কোৱা প্ৰতিষাৰ কথা মোৰ এতিয়াও মনত আছে। তেতিয়া মাথোন মই মেঘালীৰ কোমল মুখখনি মনত পেলাবলৈ বাৰে বাৰে যত্ন কৰিছিলোঁ। যিমানেই চেষ্টা কৰিছিলো সিমানেই তাইৰ মুখৰ ছবিখন খেলিমেলি হৈ মোৰ চকুৰ আগত ভাঁহি উঠিছিল। সেইদিনা মোৰা কোঠালীৰ দৰ্জাৰ হুক লগাই বিছনাত পৰি গুণগুণাই এটি শব্দৰ উচ্চাৰণ কৰিছিলো—মে-ঘা-লী। শব্দটোৰ প্ৰতিটো বৰ্ণ, আকাৰ, ঈকাৰ ইমান কোমলকৈ উচ্চাৰণ কৰিছিলো যেন অলপ ইকা।-সিকাল হলেই শব্দটোৰ মাধুৰ্য্যখিনি হেৰাই যাব।

এটি মাৰোন নাম।

তিনিটা আখৰৰ মধুৰ গাঁথনি।

চকমকাকৈ মনত পেলাৰ পৰাকৈ স্বপ্নকোমল এখনি মৰমী মুখ।

সেই মুখখনিত থুপ খাই আছে—

কৃষ্ণচূড়াৰ জুইৰঙা ফুলৰ থোপত হেৰাই যোৱা এটি গধূলি, সোণাৰুৰ বুকুত আশ্ৰয় পোৱা এটি স্নিগ্ধ ৰাতিপুৱা,
আৰু—,

আৰু মোৰ জীৱনৰ-যৌৱনৰ মধুৰ ক্ষণকেইটিত অলপ অলপকৈ সাঁচি থোৱা গোটেইখিনি ৰং।

মেঘালীৰ কথা যিমানেই ভাবিছিলো সিমানেই মোৰ বুকুখন দুঁৰুদুঁৰু কঁপিছিল। সেই কণমানি ছোৱালীজনীক অজানিতে এবাৰ বৈ বৈ চাবৰ মন গৈছিল। আৰু সেয়ে প্ৰতিখন বিহুতলিৰ সহস্ৰ মানুহৰ ভিৰৰ মাজেৰে, পাৰ হৈ যোৱা প্ৰতিখন চিটিবাচৰ খিৰিকীৰে মোৰ চকুহাল বগাই ফুৰিছিল এখনি মুখৰ সন্ধানত। মই যদিও জানিছিলো মেঘালীৰ ঘৰ যোৰহাটত, কেৱল বন্ধৰ দিনতহে মোমায়েকৰ ঘৰলৈ আহে, তথাপিও মই ভাবিছিলো হয়তো মই অকস্মাতে এটি মধুৰ দুৰ্ঘটনাৰ সমুখীন হৈ যাব পাৰো। মেঘালী যদিও ইমান দূৰত, কিমান ওচৰত। মই মেঘালীৰ ওচৰত অছো নে কোনোদিন ভবা নাছিলো। মই মেঘালী নামৰ এজনী ছোৱালীৰ নামটোকে নহয় তাইৰ জীৱনটোক, শ্বাস-প্ৰশ্বাসক, বুকুৰ প্ৰতিটো দুঁৰুদুঁৰু কঁপনিক এদিন নিজৰ কৰি লম বুলি প্ৰতিজ্ঞা কৰিছিলোঁ। সমীৰণ আৰু মেঘালী এদিন এক হৈ যাব। এয়া মাৰ ইচ্ছা-এটি অপূৰণীয় জীৱনৰ পূৰ্ণতাৰ বাস্তৱ কল্পনা। মা'ৰ জীৱনৰ নিমিলা অঙ্কটোৰ বাবে মেঘালী এটা 'টাৰ্‌ চিটিউচন্‌'।

মা'ই মোক নিজৰ আদৰ্শৰে গঢ়ি তুলিবলৈ যত্ন কৰিছিল। জীৱনেটোক সুন্দৰভাৱে গ্ৰহণ কৰিবলৈ শিকাইছিল, আৰু কৈছিল—মা'-দেউতাৰ জীৱনত যিখিনি নহল সেয়া মোৰ জীৱনৰ মাজত মা'ই দেখিব পাৰ লাগিব। দেউতাই নিজৰ জীৱনত একো কৰিব নোৱাৰিলে, আনকি ককাদেউতাৰ সম্পত্তি ঘৰ-বাৰিকে চলাই খাৰ নোৱাৰিলে। সেয়া "বৰুৱা ভৱনৰ" প্ৰতিখন বেৰে, প্ৰতিখন দুৱাৰ-খিৰিকীয়ে প্ৰমাণ কৰিছে।

এয়া মাইৰ কথা।

কিন্তু দেউতাৰ ব্যক্তিত্বপূৰ্ণ চকুহালৈলৈ চালে এনেকুৱা লাগে যেন, মা'ৰ মতে দেউতাই যিখিনি হেৰাইছে তাতকৈ বহুত বেচি পাইছে। সেয়া মই ডাঙৰ হোৱাৰ লগে লগে বুজিছিলো। দেউতাৰ, মানে সত্য বৰুৱাৰ জীৱন-দৰ্শন আন দহজনতকৈ বহুত বেলেগ। স্বাধীনতা যুঁজত একেখাহে বহু বছৰ জেলত থাকি যেতিয়া দেউতা ৰঘলৈউভতি আহিছিল তেতিয়া তেওঁ দেখিছিল—আকাশত এখন ৰঙীণ পতাকা, আৰু ঘৰত কি দেখিছিল—সেয়া কোৱাৰ প্ৰয়োজন নাই। মাত্ৰ যেতিয়া চৰকাৰে দেউতাক 'পলিটিকেল চাফাৰাৰ' হিচাবে এটি পেঞ্চন দিছিল, তেতিয়া সেই পেঞ্চন উভতাই দি তেওঁ হেনো কৈছিল—দেশৰ কাৰণে জেল খাটি যদি ক্ষতিপূৰণ লৱ লগা হলো, তেতিয়াহলে মই দেশৰ বাবে কি কৰিলো?

এয়াই মোৰ দেউতা। মানে এসময়ৰ প্ৰাতপাত্ত থকা উকিল নীলকমল বৰুৱাৰ একমাত্ৰ সন্তান, 'বৰুৱা ভৱনৰ' ভবিষ্যৎ ৰঙীণ স্বপ্ন সত্য বৰুৱা। জেলৰ পৰা ঘূৰি অহাৰ পিচৰ পৰা দেউতাই ওকালতি প্ৰায়ে বাদ দিছিল। কাৰণ ককাদেউতাৰ দিনৰ যিখিনি সম্পত্তি আছে সেইখিনি চলাই খালেই গজেন্দ্ৰৰে সৈতে আমাৰ চাবিজনীয়া সংসাৰখন চলি যায়। অৱশ্যে সেয়াই যথেষ্ট নাছিল।

ককাদেউতা উকিল, দেউতা উকিল আৰু হয়তো মৰো হৈ লাগিছিল উকিল। কিন্তু মই হ'লো ইঞ্জিনিয়াৰ। ভাবিলে মোৰো বিসদৃশ লাগে। দেউতাই হয়তো বিচাৰিছিল সমীৰণ বৰুৱা হওঁক সত্য বৰুৱাৰ এটা নতুন প্ৰকাশ। সেয়া নহল। মই কৈছোৱেই মা'ৰ 'আদৰ্শৰে ডাঙৰ হোৱা বুলি।

ঃ বুইছ' সোণ, তই এইবোৰ উকিল-তুকিল হব নোৱাৰ। এইবোৰ ঠিক নহয়। এইবোৰ মানুহৰ আগডোখৰ বয়সত দেখিবি ব্ৰহ্ম গৰমতো ক'লা কোটটো পিন্ধি আদালতত গৈ চিঞৰিব—মাই লৰ্ড, মাই লৰ্ড, যেন নাটকহে কৰিছে। আৰু শেষত যেতিয়া ক'লা কোটটোৱে আমুৰাৰ তেতিয়া দেখিবি গাত খদ্দৰ চোলা আৰু মুৰত কংগ্ৰেছী টুপী পিন্ধি ৰাজহুৱা সভালৈ যাব। আৰু তিনিটা বাক্য চিঞৰি চিঞৰি কৈ, প্ৰতিজাক হাত চাপৰিৰ বিৰতিত একো গিলাচ পানী হজম কৰি কৰ—ৰাইজ সকল! আমি স্বাধীনতা পাৰৰ যদিও এটা দশক পাৰ হৈ গল, এই দশকটোত আমি কিমান উন্নতি কৰিলো, দেশে কিমান····।

সেই কাৰণেই তই আৰ্টচ পঢ়িব নালাগে। চায়েঞ্চ পঢ়, ইঞ্জিনিয়াৰ হ'। যিবোৰ অঙ্ক দেউতাৰাই ভুলকৈ কৰিলে সেইবোৰক তই শুদ্ধ কৰিব লাগিব।

আৰু আজি মই দেখোন দেউতাই কৰা সেই ভুলবোৰকে কৰি গলোঁ। মই যিমানেই শুধৰাব গ'লো সিমানেই ভুল হৈ যাব ধৰিলে। এসময়ত সেইবোৰ তালুকৰ সাঙিৰদৰে মোৰ গলগ্ৰহ হ'ল। এৰাই যাব খুজিও মই যাব নোৱৰা হ'লো। মই মা'ৰ আদৰ্শক খামুচি ধৰিবগৈ দেউতাৰ জীৱন দৰ্শনক আঁকোৱলি ললো। কিন্তু দেউতাই আজি বিচৰা নাই যে মই তেওঁৰ এটা নতুন প্ৰকাশ হওঁ।

সত্য বৰুৱাই আজি জীৱনৰ শেষ বয়সত জীৱনক বিচাৰিছে। পিচে বহুত পলম হৈ গ'ল।

সেইবছৰ মই ফাইনেল ইয়েৰত আছিলোঁ। মই জীৱনৰ ৰঙীণ স্বপ্নত ডুব গৈছোঁ। মই হেৰাই গৈছো নিজতে। মোৰ বাহিৰে মোক কোনেও বিচাৰি নাপায়। হয়তো মইয়া আচল 'মই জনক' চুব পৰা নাই যেনেকৈ দিগন্তই চুব পৰা নাই আকাশক। মাত্ৰ চাৰি মাহ, এই চাৰিমাহ শেষ হৈ গলেই মই এটা বন্দী জীৱনৰ পৰা মুক্ত হম। এটি বন্দী বিহঙ্গমৰ মুকলিৰ আনন্দেৰে মই কৰবালৈ উৰি যাম। আৰু এদিন হঠাৎ প্ৰত্যাৱৰ্ত্তন কৰিম এটি চিকুণ বাতিপুৱা এজাক সোণালী ৰ'দ মূৰত লৈ। লগত থাকিব—মেঘা চ লহা নহয়, মেঘালী বৰুৱা। আমি তেতিয়া নতুন প্ৰভাতৰ কোমল ৰ'দৰ জিল্‌মিলনিত সোণ হৈ যাম।

★ ★ ★ ★

ঃ অ'ই সমীৰণ' কি ভাবিছ, চাহকাপ ঠাণ্ডা হৈ গ'ল। আমি তিনিজন যে, ইয়াত বহি আছোঁ খবৰ আছে নে নাই?

ঃ ক' চোন সমীৰণ, সেই মেঘালী নামৰ ছোৱালী জনীৰ লগত তই কিমান দূৰ গৈছিলি?

★ ★ ★ ★

মই বৰ বেয়াকৈ মাখনহঁতৰ ওচৰত ধৰা পৰি গ'লো। মই ভাবি থকা কথাবোৰ ইহঁতে কেনেকৈ গম পালে বাৰু?

ঠাণ্ডা একাপ চাহ! মেঘালী!

এৰা মেঘালী এতিয়া মোৰ বাবে একাপ ঠাণ্ডা চাহ। গৰম কৰি খাব পাৰি কিন্তু একাপ নতুন চাহৰ সোৱাদ পাব নোৱাৰি। (কি বোৰ যে ভাবিছো?) মেঘালীৰ লগত মই কিমান গৈছিলো বা মেঘালী মোৰ লগত কিমানদূৰ আগবাঢ়িছিল সেয়া কব নোৱাৰো, মানে মই ভবাই নাই কোনোদিন। মাত্ৰ মেঘালী নামৰ এই ছোৱালী-জনীৰ এক 'অনামী মৰমে মোৰ সমগ্ৰ সত্ত্বাকে আৱৰি ৰাখিছিল আৰু মোৰ মনৰ ফাগুণ ৰঙীণ দিনবোৰত আবিৰ সানি দিছিল আল-ফুলকৈ। মই শুদ্ধমনেৰে বিচাৰিছিলো মোৰ জীৱনৰ লগত মেঘা-লীৰ জীৱন নিবিড়ভাৱে সাঙোৰ খাই যাওঁক। মেঘালীয়ে মোক ভাল পাওক নাপাওঁক সেয়া মই নিবিচাৰো। মেঘালীক যে, মই ভাল পাও সেয়েই যথেষ্ট।

মেঘালীক মই দূৰে দূৰে, আৰচুৱাকৈ, সমুখে সমুখে বহুৰৰ পিচত বছৰ ধৰি লক্ষ্য কৰিছোঁ। তাইৰ মুখৰ চঞ্চলতা চপলতা এদিন নাৰীসুলভ কমনীয়তালৈ পৰিবৰ্ত্তন হ'ল। পৰিবৰ্ত্তন হ'ল তাইৰ দেহৰ, সাজ-পোচাকৰ, চলন-ফুৰণৰ। মেঘালীৰ প্ৰতিটো পৰি-বৰ্ত্তণেই মোৰ মনটোত নতুন মাদকতাৰে দোলা দি গ'ল।

সেই দিনবোৰৰ প্ৰতিটো ক্ষণে মোৰ মনৰ গোপন থলীত আল-ফুলে ছতিয়াই থৈ গ'ল—কিছুমান মৰমী স্বপ্ন। সেই স্বপ্নৰ ফুল-কোমল পৰশত মই হেৰাই গেছিলোঁ। মোক আৰু বহুত ৰং লাগে, লাগে অনেক স্বপ্ন। সাগৰ গভীৰ এআকাশ নীলাৰ মৰমৰ হাত-বুলনিত মই শেষ হৈ যাম। শেষ হৈ যাব সমীৰণ বৰুৱা নামৰ এক স্বপ্নাকুল ডেকাৰ বাইশটা বসন্ত।

মেঘালীয়ে তাইৰ স্কুলৰ, কলেজৰ বন্ধুৰ দিনবোৰ গুৱাহাটীত প্ৰায়ে কটায়। মোমায়েক দেৱজিৎ চলিহা আমাৰ প্ৰতিবেশী। ভাষাভৰা অনেক মৌন মুহূৰ্ত্ত মেঘালী আৰু মোৰ মনৰ গোপন বাৰতাৰে বাঙ্‌ময়। মেঘালীৰ অনেক নোকোৱা কথাৰ সন্ধেদ পাই-ছিলোঁ। কথা ক'লেই নাৰ্ভাচ হৈ যাব খোজা মেঘালীৰ নাকৰ আগত বিৰিঙি উঠা বিন্দু বিন্দু ঘামৰ টোপালত বিচাৰি পাইছিলো মই নিয়ৰ সিক্ত শেৱালিৰ প্ৰভাতী কমনীয়তা। মেঘালীয়ে একো নকলেও মই বুজিছো তাইৰ আন এটা নাম সমীৰণ। তাই জীয়াই থাকিব খুজিছে মোৰ মাজত। মোৰ হৃদয়ৰ প্ৰতিটো স্পন্দ-নত মেঘালী সজীৱ হৈ উঠিছে, সজীৱ হৈ উঠিছে তাইৰ জীৱনৰ, যৌৱনৰ আশা আকাঙক্ষাবোৰ। সেই আশা আকাঙক্ষাবোৰ সেউজী বোলেৰে বোলোৱাৰ দায়িত্ব মোৰ।

আৰু সেয়ে মই জীৱনটোক সুন্দৰ ভাৱে গ্ৰহণ কৰিবলৈ এক অনামী স্বপ্নৰ মায়াজলত ডুবগৈছিলোঁ। এটা সুন্দৰ স্বাস্থ্য হাঁহি হাঁহি ভাগৰি নপৰাকৈ এক উৎফুল্ল মন। এই সকলোবোৰৰ আঁৰে আঁৰে লুকাই আছে মেঘালী।

মই এনেকুৱা এটা দিনৰ প্ৰতীক্ষাত আছো যিটো দিনত মই এজন পূৰ্ণ সমীৰণ বৰুৱা হম। তেতিয়াই মই কোনো এটি মুহূৰ্ত্ত ক্ষণত বছৰৰ পিচত বছৰ ধৰি সাঁচি ৰখা মনৰ গোপন বাৰতাখিনি উজাৰি দিম মেঘালীৰ আগত। সেই দিনটোক মই কি বিশেষণেৰে বোলাম ভাবিলেই বুকুখন কঁপি উঠে—এক সীমাহীন আনন্দত।

সেই দিনটোৰ কথা মই যিমানেই ভাবিছিলো সিমানেই অধিকতৰ বোমাঞ্চিত হৈছিলোঁ।

সেই দিনটো এদিন আহিছিল।

পৰীক্ষা পাছ কৰি ঘৰতে বহি আছোঁ। একে লেঠাৰীয়ে ইমান বছৰ পঢ়াৰ পিচত মোক অলপ জিৰণি লাগে। মই এজন ১৫ বছৰীয়া ভাগৰুৱা পথিক। মোক জিৰণি লাগে এইবাৰেই যে, মই অতিকে ক্লান্ত। এক কষ্টকৰ যাত্ৰাৰ অৱসানত কেইটামান নিৰিবিলি দিনৰ খুউব প্ৰয়োজন মোৰ।

পিচে মই ভুল কৰিছিলোঁ। মই ভাগৰুৱা পথিক নহয়। মোৰ যে ভাগৰ লাগিব পৰাকৈ যাত্ৰাই আৰম্ভ হোৱা নাই।

এদিন হঠাৎ বাইশ বছৰে মনৰ মাজত পুহি ৰখা আশা-আকাঙ্খা-বোৰক জনাঞ্জলি দি মা' গুচি গ'ল চিৰদিনলৈ। সেইদিনা দেউতাই কান্দিব পাহৰিলে, আৰু মই জীৱনত প্ৰথমবাৰৰ বাবে কান্দিলো কোনোদিন কান্দিব নলগাকৈ। এটি জীৱনৰ অৱসান ঘটিল। মাত্ৰ বৈ গ'ল—কিছুমান হা-হুমুনিয়াহ, পোৱা-নোপোৱাৰ বেদনা বৰুৱা ভৱনৰ বেৰে-চালে, দেৱালে। আমি তিনিজন গুচি দুজন হ'লো। ককাদেউতাই সজা কাঠৰ দুমহলীয়া ঘৰটোত দেউতা আৰু মোক একোটা ভূত যেন লগা হ'ল। মাত্ৰ আমাৰ যোগ-সূত্ৰক জীয়াই ৰাখিলে পুৰণি ভৃত্য গজেন্দ্ৰই।

মা'ৰ মৃত্যুৰ পিচত মই একদম ভাঙি পৰিলোঁ। মা' জীয়াই থকা দিনত মই কোনোদিন অনুভৱ কৰা নাছিলো যে, মোৰ ভাই-ককাই, বাই-ভনী কোনো নাই। মায়েই মোৰ জীৱনৰ কাৰণে সকলো। মা'য়েই মোৰ বাবে সকলো। মা'ই—মোৰ মাজত সকলো বিচাৰিছিল। কিন্তু সেয়া জানো মই মা'ৰ জীৱিত কালত দিব পাৰিলো?

আচলতে মা' এতিয়াও জীয়াই আছে। জীয়াই আছে মা'ৰ আশা-আকাঙ্খা, জীৱনৰ অভিলাষ।

মা'ক জীয়াই ৰখাৰ দায়িত্ব মোৰ। মা'ই যি বিচাৰিছিল সেয়া যদি মই দিব পাৰো তেতিয়াই মা' মৰি মৰি জীয়াই থাকিব। মোৰ জীয়াই থকাৰ যি স্বপ্ন সেয়া মাৰ। মাই যি বিচাৰিছিল তেওঁৰ একমাত্ৰ সন্তানে সেই স্বপ্নক বাস্তৱত ৰূপ দিব। বৰুৱা ভৱন এদিন হৈ উঠিব উছৰমুখৰ।

আৰু মই—বৰুৱা ভৱনৰ একমাত্ৰ উত্তৰাধিকাৰী হৈ সেই ভৱনক জীয়াই তুলিব লাগিব নতুন ৰূপেৰে। শেষ হৈ নুমাই যাব খোজা দেউতাৰ জীৱনৰ অকণমান হাঁহি, মাৰ স্বপ্নক বাস্তৱত ৰূপ দিবলৈ অলপমান ৰং, আৰু মোৰ বাইশ বছৰীয়া যৌৱনটোক সাৰ্থক কৰিবলৈ লাগে মোৰ দৃঢ়তা, মনোবল, এটি সুস্থ সুপৰিকল্পিত মন। মানে মই জীয়াই থাকিব খুজিছো যেনেকৈ আন দহজনে বিচাৰে। মোক জীৱন লাগে।

মোৰ জীৱন মানে মেধালীৰ জীৱন, মা'ৰ আশা-আকাঙ্খা। মাক জীয়াই ৰাখিবলৈ, মেধালীক জীয়াই ৰাখিবলৈ দেউতাক অকণ-মান শান্তি দিবলৈ হলে মই জীয়াই থাকিব লাগিব।

মই জীয়াই থাকিব বিচাৰিছো সুস্থভাৱে, শ্ৰমৰ মৰ্য্যাদাৰে। মোক কৰ্ম্মস্থান লাগে। মোৰ বুদ্ধি বৃত্তিৰ বিকাশ লাগে।

পঢ়ি থাকোতে ভাবিছিলো পৰীক্ষা পাছ কৰা বৰ টান। চাকৰি এদিন এনেয়ে হৈ যাব। পিচে 'চাকৰি এদিন এনেয়ে' নহয়। এই কৰ্ম্মস্থান সমস্যাক সমাধান কৰিবলৈ কোনো নিয়ম—কানুন নাখাটে-(মেথদ অৱ চাৰ্চ টিটিউচন, ল্যাপ্লাচ ট্ৰেনচ্ ফৰমেচন বা ট্ৰাইয়েল এণ্ড এৰ'ৰ মেথদ)। বাতৰি কাকতত ডাঙৰ ডাঙৰ আখৰেৰে ছপা হৈ ওলাইছে—৪র্থ পৰিকল্পনাৰ শেষত এক লাখৰো অধিক ইঞ্জিনীয়াৰ নিবনুৱা হব যেন ইমান ইঞ্জিনীয়াৰ বেকাৰ কৰাটো চৰকাৰৰ সুনাম অৰ্জ্জন কৰিবলৈ কৰা পূৰ্বপৰিকল্পিত ব্যৱস্থাহে।

দেৱবছৰ ধৰি মই ত্ৰিবিউনৰ ২য় পৃষ্ঠা মনোযোগেৰে পঢ়িছোঁ। কেবাটাও ইণ্টাৰভিউ দিলো, বহুত ইণ্টাৰভিউৰ কল নাপালোঁ। সৰু এটা চুটকেচত এজোৰা কাপোৰ, বিশ্ববিদ্যালয়ৰ চাৰ্টিফিকেট কেইখন, কেৰমবোৰ্ডত চেম্পিয়নশ্বিপ্, ক্ৰিকেটৰ চেম্পিয়নশ্বিপৰ (যদিও মই ১২ নং খেলুৱৈ) চাৰ্টিফিকেট আৰু প্ৰিন্সিপালৰ হিজ কেৰেকটাৰ এণ্ড কন্দাকট্ ইজ্ গুদ—বুলি লিখি দিয়া পত্ৰ আদি লৈ বহু ঘূৰিলো বিভিন্ন কৰ্ম্মদাতাক প্ৰাৰ্থনা জনায়। কিন্তু কোনো ফল নধৰিলে। সকলোৱে উপদেশ দিলে—ইউ ইয়ং মেন, ইউ আৰ এপ্ৰচিং এ প্ৰচ্পেকটিভ্ কেৰিয়াৰ—বিজ্নেচ্ কৰা, ইণ্ডাষ্ট্ৰী খোলা, চাকৰি কৰিলে কি লাভ?

বিজনেচ কৰা মানে ঠিকা কৰা, ইণ্ডাষ্ট্ৰী খোলা মানে এটা 'পেট্ৰ'ল পাম্প বহাই নিজে বহি থকা।' ঠিকা কৰিবলৈ বা পেট্ৰল পাম্প বহাবলৈ মইতো ইমান পঢ়াৰ দৰ্কাৰ নাছিল। কি দৰ্কাৰ আছিল হায়াৰ মেথেমেটিক্চ পঢ়িবলৈ, ডিজাইন কৰিবলৈ ইলেক্ট্ৰনিক্চ

পঢ়িবলৈ। আৰু বিজনেচ কৰিবলৈ টকা কত আমাৰ? আমাক দেখোন চৰকাৰে ইক'নমিকেল বেকওৱার্ড বৃত্তি দি পঢ়ালে। চৰকাৰে ধাৰে দিব খোজা টকা? সেই সাত হাজাৰ টকাৰে জানো কিবা বিজনেচ্ হয়, ইণ্ডাষ্ট্রী হয়?

নহয়! গৱর্ণমেণ্টে, দেশৰ ৰক্ষণাৱেক্ষণকলে আমাক Cheat কৰিছে। আমাৰ কার্য্যক্ষমতাক উপলুঙা কৰিছে। আমি এক-গোট হৈ তেওঁলোকৰ অদূৰদর্শিতাৰ বিৰুদ্ধে খামখেয়ালিৰ বিৰুদ্ধে লাগিম।

মেল-মিটিং, আলোচনা আৰম্ভ হ'ল আমাৰ মাজত।

প্ৰথমতে পাণৰজাৰৰ চাৰিআলিত, বেষ্টুৰাত। শেহত নবীন ৰৱদলৈ হলত।

পিচে দেউতাৰ হাতত মই এদিন ধৰা পৰি গ'লো।

: সমী, তোক আজি সমুখত বহুৰাই এনে লাগিছে যেন মই চৱিশ বছৰ আগতে এখন আয়নাৰ সমুখত বহি আছোঁ। ···তোৰ মাৰাই এদিন যি ভয় কৰিছিল আৰু মই আজি যি ভয় কৰিছো সেয়াই দেখোন আৰম্ভ হৈছে। তহঁতে যিবোৰ কথিৰ লৈছ সেইবোৰ কোনোদিন শেষ নহব। এয়া মই নিজ অভিজ্ঞতাৰ পৰা কৈছোঁ। আমাৰ দেশ স্বাধীন হব পৰাকৈ উপযুক্ত হোৱাই নাছিল। সেয়ে ইমান গোলমাল।

তই এইবোৰ এৰ। তোক মই চাকৰি লোৱাই দিম। তোক এটা চাকৰিৰ খুউৰ দৰ্কাৰ—সেয়া তোৰ মাৰাৰ ইচ্ছা, হয়তো মোৰো। অন্য নহলেও আৰ্থিক ফালৰ পৰাও অতি প্ৰয়োজনীয়। এই বয়স উপভোগ কৰাৰ বয়স। অন্ততঃ মই যি ভুল কৰিলো তোক সেই ভুল কৰিব নিদিও।

: কিন্তু, দেউতা! কিন্তু!!

: মই কোনো কিন্তু' ব্যাখ্যা শুনিব নোখোজো।

ইয়াৰ পিচত মোৰ চাকৰি হৈ গ'ল। মই ইণ্টাৰভিউ দিব যাওঁতে বিশ্ববিদ্যালয়ৰ চার্টিফিকেটসোপা ৰা প্ৰিন্সিপালৰ হিজ কণ্ডাক্ট এণ্ড কেৰেকটাৰ আৰ গুড্ লেখা চার্টিফিকেটখন লৈ যোৱা নাছিলোঁ। তাৰ সলনি লিছিলো দেউতাই মোৰ হৰ খোজা বহু সব্যসাচী ৰৱভূঞাঁলৈ লিখি দিয়া চিঠিখন। এই চিঠিখন যিখন লিখোতে দেউতাৰ হাতখন ৰৱকৈ কঁপিছিল মোৰ আটাইতোপা চার্টিফিকেটতকৈ গধুৰ লাগিছিল।

কামত জইন কৰিবৰ আগদিনাখন মই মেঘালীক লগ পাইছিলো এখন বিয়াঘৰত। বিয়া ঘৰৰ উদুলি-মুদুলি এক উছৰমুখৰ পৰিবেশত মোৰ নিজকে ৰৱ ৰোমান্তিক ৰোমান্তিক লাগিছিল। মেঘালী যেন মোৰেই তেনেই অচিনাকি। দীঘলীয়াকৈ বন্ধা খোপা-টোৰে যেন এইজনী—এজনী স্বপ্নকাতৰ শেৱালীকোমল ৰূপকোঁৱৰী যাৰ দৃষ্টিৰ গভীৰতাত লুকাই আছে সমীৰণ ৰকৰা নামৰ এজন যুৱকৰ কিছুমান আকাশমুখী স্বপ্ন। এজাক ছোৱালীৰ মাজত, ন' পাউদাৰ চেণ্ট ধূপ-ধূনাৰ সুবাসত, চেপি চেপি কোৱা টুকুৰাটুকুৰ মৃদু হাঁহি সদা শব্দৱোৱৰ মাজত যিজনী ছোৱালীৰ লাজ-ৰঙ্গিম মুখখন ওপঙি আছে সেয়া মেঘালী। কোনে জানে হয়তো মোৰ হৃদয়ৰ তেজৰ সোঁতটো মেঘালীৰ কণমানি হৃদয়ৰ মাজেৰে বৈ গৈছে। কোনোৱে হয়তো কৰ নোৱাৰিব বিয়াঘৰৰ এজাক উছৰ-মুখী মানুহৰ মাজত হেৰাই যাৰ খোজা মেঘালী নামৰ ছোৱালী-জনীৰ হৃদয়ৰ প্ৰতিটো স্পন্দনত, প্ৰতি উশাহ-নিশাহত মই লুকাই আছো। আৰু মোৰ জীৱনৰ সেউজী আশাৰে লজ্জাগধুৰ ৰঙ্গিম আভা গালত মাৰি লৈ মেঘালীয়ে হৃদয়ৰ দুঁৱক দুঁৱক কম্পন গণিছে। মেঘালীৰ স্বচ্ছ স্ফটিকৰ দৰে নিমজ মুখখনত মই অহৰহ নিজ প্ৰতি-বিম্ব দেখি আছোঁ। এদিন ঠিক এনেকুৱা এটি পৰিবেশ গঢ়ি উঠিব মেঘালী আৰু মোক লৈ। সেইদিনা কেঁচা হালধি ধূপ-ধূনৰা সুবাসে আমাৰ জীৱনলৈ কঢ়িয়াই আনিব—জীয়াই থকাৰ নতুন স্বপ্ন।

এসোপা গহনাৰ, নতুন কাপোৰৰ ভৰ সহিব নোৱাৰি মেঘালী গোটেই মানুহজনী অৱশ হৈ মোৰ বুকুত লুকাই পৰিব। আৰু মই বহুযুগৰ সাঁচি থোৱা মৰমেৰে অধীৰ-উন্মনা হৈ মেঘালীৰ জীৱনক মোৰ জীৱনেৰে ঢাকি ৰাখিম। মেঘালীৰ শিৰৰ সেন্দুৰ মোৰ জীৱনাকাশত প্ৰভাতী সূৰুযৰ ৰং হব।

সেইদিনা সেইমুহূর্ত্তত ভাগি পেলালো যে ইমানদিনে অন্তৰৰ গভীৰতম প্ৰদেশৰ নিভৃতকোণত পুহি ৰখা মনৰ গোপন বাতৰাখিনি মেঘালীৰ আগত প্ৰকাশ কৰাৰ এয়ে উত্তম সময়। এটি নতুন জীৱ-নৰ আৰম্ভণিতে মেঘালীৰ লগত সাক্ষাত যেন মোৰ বাবে আশীৰ্বাদ স্বৰূপ।

এষাৰি মাথোন কথা যিয়ে পৰশি গ'ল চৱিশটা বসন্তত কিঞ্চিৎ কিঞ্চিৎকৈ সাঁচি থোৱা হৃদয়ৰ গোটেইখিনি আবেগ, অনুভূতি আৰু

অনুৰাগ। সেই মুহূৰ্ত্তত পৃথিবীখন মোৰ খুউৰ সঁচা আৰু বাস্তৱ যেন লাগি গ'ল। এই আকাশ-পানী সাগৰ-মাটি কিমান সঁচা। সঁচা আমাৰ জীৱন। আমি যুগ যুগ ধৰি জীয়াই থাকিম কৃষ্ণ-চূড়াৰ বুকুৰ মৰমেৰে, সোনাৰুৰ প্ৰাণোচ্ছল উচ্ছ্বাসেৰে। মেথালীক ছোৱালীসুলভ লজ্জালস কমনীয়তাৰে মোৰ ইমান মৰম লাগিছে যে তাক বুজাবলৈ মোৰ ভাষা হেৰাই গৈছে। নাকৰ আগত বিবিঙি উঠা বিন্দু বিন্দু ঘামৰ টোপাল আৰু বিৰিণাৰ দৰে কঁপি থকা ভাষা-গধূৰ দুটি পাতল ওঁঠ। বৰফশুৱ গুটি গুটি দুপাৰি দাঁতৰ ফাকেৰে নিগৰি আহিব খোজা এটি হাঁহি। কেইটিমান নীৰৱ মুহূৰ্ত্ত পাৰ হৈ গলেই মেথালীৰ পৰা মই শুনিব পাম····। কি শুনিম সেয়া নকলেও হব। সাতবছৰ ধৰি মিজনী ছোৱালীৰ জীৱনৰ প্ৰতিটো স্মৃতি মোৰ মনৰ মাজত গথা আছে সেইজনী ছোৱালীৰ মুখত বিবিঙি উঠা ক্ষুদ্ৰ বেখাবোৰত জানো তাইৰ নোকোৱা কথাবোৰ পঢ়িব পৰা নাই? আৰু তায়ো জানো এনে এটা দিনৰ বাবে বছৰৰ পিচত বছৰ ধৰি প্ৰতীক্ষাৰত নাছিল?

নাছিল, কেতিয়াও নাছিল। মই যি ভাবিম সেয়া মে মেথালীয়ে ভাবিব তাৰ কোনো মানে নাই। মই বৰ নিষ্ঠুৰভাৱে মোৰ ওচৰত হাৰি গলো। মোৰ চাইকলজীৰ জীৱন-দৰ্শনৰ অপমৃত্যু ঘটিল। যাৰ জীৱনৰ গতিক মই সাত বছৰে নিজৰ লগত এক কৰি পেলাই-ছিলো, যাৰ হৃদয়ৰ স্পন্দনত জীয়াই থকাৰ ছন্দ বিচাৰি পাইছিলো সিয়ে তাৰ জীৱনৰ কক্ষত মোক কোনোদিনেই সোমাব দিয়া নাছিল। মই অবহেলিত, পৰাজিত, অপেক্ষিত। মই দুৰ্ব্বল। এজনী ছোৱালীৰ, তেনেই ফুলকলীয়া ছোৱালীৰ হাতত মোৰ বিদ্যা-বুদ্ধি, জ্ঞান, ব্যক্তিত্বৰ অপমৃত্যু ঘটিল। পৃথিবী নিষ্ঠুৰ, নিৰ্জীৱ, জড়, কুৎ-সিৎ। এই যে কৃষ্ণচূড়াৰ জুইৰঙা থোপা, তাত জীয়াই থকাৰ ৰং নাই, আছে জীৱনক পুৰি ছাই কৰিব পৰাকৈ জুইৰ শিখা। সোণা-ৰুৰ বুকুত স্বপ্নোজ্জ্বল প্ৰভাতৰ জিলমিলনি নাই, আছে মাখোন জন্মিচ্ বেমাৰীৰ মৃত্যুশীতল চাৱনি।

সেইদিনা পৃথিবীখন ঘূৰিছিল। আকাশখন মোৰ মূৰৰ ইমান ওচৰলৈ নামি আহিছিল যেন মোৰ অলপ পিচতে উশাহ বন্ধ হৈ যাব। হাজাৰ হাজাৰ বছৰ ধৰি পৃথিবীৰ বুকুত সঞ্চিত শীতে সৰী-সৃপৰ শীতলতাৰে মোক মেৰিয়াই ধৰিছিল।

বিয়া ঘৰৰ পৰা মই কেনেকৈ ওলাই আহিলো গমেই নাপালোঁ। পৰাজিত সৈনিকৰ বেদনাৰে প্ৰত্যাবৰ্ত্তনকাৰী দুৰ্ভগীয়া নাবিকৰ মন লৈ উভতিছো ঘৰলৈ। লুইতত উটি যোৱা এটুকুৰা জড় কাঠৰ দৰেই মোৰ গতি আৰু লক্ষ্য। ৰাতি বিচনাত অলসভাৱে দেহাটো এৰি দি মই বৰ অকলশৰীয়া বোধ কৰিছিলোঁ। জীৱনত মই ইমান নিসঙ্গতা কেতিয়াও ভোগ কৰা নাছিলোঁ। মা' মৰিলেও মা'ৰ আশা-বোৰ জীয়াই আছিল। মা' যেন আজিহে ঢুকাল। শেষ হৈ গ'ল বৰুৱা ভৱনৰ এটি আলুফলীয়া স্বপ্ন। এটি কবিতাৰ ছন্দ পতনৰ বেদনাৰে ক্লান্ত মই। মই আত্মবিস্মৃত। সমীৰণ বৰুৱা নামৰ কোনো মানুহ পৃথিবীত কেতিয়াও জন্ম গ্ৰহণ কৰা নাছিল। এই বিছনাখনত এটুকুৰা জড় পদাৰ্থ যুগ যুগ ধৰি পৰি আছে। ইয়াৰ চাৰিওফালে কেৱল শূন্যতা, শূন্যতা আৰু শূন্যতা।

মই কামত জইন নকৰিলোঁ।

মোৰ মাজত বাইশ বছৰৰ অগৰু দেউতাজন যাৰ পাই উঠিল। মই মেথালীৰ নামত ইমান ডুবি গৈছিলো যে, বাহিৰৰ পৃথিবীখনে মোৰ চেতনাক চুই যাব পৰা নাছিল। এজনী ছোৱালীৰ মৰমৰ মাজত মই ইমানদিনে পোত গৈ আছিলোঁ। এটি জীৱনৰ নিচাত মই হেৰাই গৈছিলো, হেৰাই গৈছিল সত্য বৰুৱাৰ জীৱন দৰ্শন।

ই কেতিয়াও হব নাৱাৰে।

মই এজন নতুন সত্য বৰুৱা।

নোক জীৱন লাগে, কিন্তু ইমান দিনে বিচৰা দৰে নহয়। মই জীয়াই থাকিব বিচাৰো দেউতা যেনেকৈ জীয়াই আছিল। মই জীয়াই থাকিম জীৱনক বিচাৰি হাহাকাৰ কৰি থকাবোৰৰ মাজত।

জীয়াই থাকিম নোপোৱাৰ বেদনাৰে।

তাৰ পিচত বছৰবোৰ বাগৰি গৈছিল।

এক, দুই, তিনি, চাৰি।

সুদীৰ্ঘ চাৰিবছৰৰ ভিতৰত মই এবছৰমানহে ঘৰত আছিলোঁ।

বাকীদিনবোৰ মই কেনেকৈ কটাইছিলো মোৰ মনত নাই।

মনত আছে মাথোন মনত নথকা দিনবোৰৰ কথা।

সেই দিনবোৰত বহুতবাৰ চিলঙলৈ গৈছো চাকৰি বিচাৰি, সংস্থাপনৰ অন্বেষণত ন্যায্য দাবী লৈ। মোৰ বাবে নহয়। মই সিবোৰৰ বাবে গৈছিলো যিবোৰকৈ অভিভাবকৰ ফাৰ্ম্মৰ মেনেজিং ডিৰেক্টৰৰ লগত চিনাকী নাই, কোনোদিন কোনো জেলখটা নাই ৰাজনৈতিকবিদৰ লগত।

তেতিয়া মোৰ চকুৰ আগত এখন মুখেই ভাহি উঠিছিল আৰু মনত পৰিছিল এখন কঁপি থকা হাতৰ কথা। সেইখন হাতে এদিন লিখিছিল বিশ্ববিদ্যালয়ৰ ডিগ্ৰীতকৈ গধুৰ চিঠি।

মই আকৌ এটি নতুন নিচাত ডুব গলোঁ।

এদিন মায়ে এটি শিচা দিছিল—জীৱনৰ।

মই হাৰিলোঁ।

দেউতাৰ জীৱনৰ পৰা এটি নতুন নিচা পালোঁ—জীয়াই থকাৰ। এইবাৰো হাৰিলোঁ।

জীৱনত মই মাথোঁন ব্যৰ্থতা, তিক্ততাখিনিহে ভাগত পালোঁ। মই মন কৰিছিলো যে যিবোৰৰ কাৰণে মই চিঞৰ-বাখৰ কৰিছিলো যিবোৰৰ মাজত মই জীয়াই থকাৰ স্বপ্ন দেখিছিলো—সিহঁত এদিন মোৰপৰা পলাই ফুৰা হ'ল। সিহঁত মোৰ পৰা কিয় পলাই ফুৰা হ'ল তাৰ ব্যাখ্যা নাই। হয়তো তাৰ কাৰণ মই, হয়তো সিহঁত নাইবা কোনোৱে নহয়।

মোৰ জীৱনৰ আৰম্ভণিতেই ভুল হৈ গ'ল। মই নাজানিছিলো মই কি হব বিচাৰিছিলোঁ। মই মা'ৰ আদৰ্শৰ অনুসৰণৰ দোহাই দি জীৱন বিচাৰিছিলো স্বাৰ্থপৰৰ দৰে। কোমল বয়সতে মেঘালী মোৰ জীৱনৰ লগত নিবিড়ভাবে সাঙোৰ খাই পৰিছিল। অন্ততঃ মই তাকে ভাবিছিলোঁ। মা-দেউতাৰ আদৰ্শৰ অজুহাতৰ সুযোগ লৈ মই এটা খেয়ালী জীৱন কটাইছিলোঁ। ই হয়তো এটি বিলাস।

মেঘালীক হেৰুৱাৰ পিচত মই অনুভৱ কৰিছিলো মই তাইক কিমান ভাল পাইছিলোঁ। সেই ভালপোৱাৰ বেদনাই মোৰ যৌৱনটো, জীৱনটো খুলি খুলি খাইছিল। শেষ হৈ যোৱা সপোনৰ কৰুণ পৰিণতিৰ নিষ্ঠুৰ বাস্তৱ মই।

মইতো এনে হব বিচৰা নাছিলো।

মোৰ এয়া কি হ'ল?

এটি সুস্থ, শান্ত, নিৰিবিলি জীৱন বিচাৰিছিলো এদিন মই। আৰু তাৰ বিনিময়ত পালো—যিবোৰৰ কথা কোনোদিন ভবা নাছিলোঁ।

জীৱনৰ ব্যাখ্যা বিচাৰি এদিন কিতাপৰ পাততে ডুব গলো। শেক্সপিয়েৰ, ডষ্টভয়েস্কি ছমাৰচেট্ মম্, চক্ৰেটিচ্, ওমৰ খায়াম সকলোৱে জীৱনৰ ব্যাখ্যা দিছে। সেইবোৰৰ কিমান মিল অথচ কিমান বেলেগ!

জীৱন জীৱনেই।

মোৰ জীৱন, মা'ৰ জীৱন, কমকজৰ জীৱন।

আৰু মেঘালীৰো।

এক নাটকীয় চৰিত্ৰৰ জটিলতাৰে এদিন মেঘালী মোৰ ওচৰলৈ আহিছিল।

ঃ সমীদা, আপোনাক আচৰিত কৰিবলৈ মই আজি অহা নাই। বৰং মইহে আজি আচৰিত হৈছোঁ।

মই এদিন আপোনাক বিমুখ কৰিছিলো। আৰু আজি? আজি সময়ে মোক উপহাস কৰিছে। সেইদিনাৰ ঘটনাই চাৰি বছৰে মোক খুলি খুলি খাইছে। মই জানো সঁচাই আপোনাক তেনেদৰে কৈছিলোঁ? ভাবিলে আজিও মোৰ কিবা আচৰিত আচৰিত লাগে।.....

আপোনাক মই এদিন কিমান বিচাৰিছিলো সেয়া আপুনি জানে। আৰু আপোনাৰ জীৱনত মোৰ কি স্থান তাকো মই জানো। তথাপিও কিয় এনে হ'ল?——

.....আপুনি যে সহজ হ'ব মোৰাৰে মই বুজিব পাৰিছোঁ। কিন্তু মই আজি সহজ হৈছো। মানে সময়ে মোক বাধ্য কৰাইছে। মই এদিন ভুল কৰিছিলোঁ আৰু আপুনি তাক অতি সহজে মানি ললে। মোৰ যিকোনো ভুলকে আপুনি ইমান সহজে মানি লব কিয়?

সমীদা, আজি সোধক—মই কিয় তেনেদৰে আপোনাক অপমান কৰিছিলোঁ।..... (মই তেতিয়াও খিৰিকীৰে আকাশৰ এটি বিশেষ বিন্দুত চকুহাল নিবদ্ধ ৰাখিছিলোঁ)।

মই জানো আপুনি মোক ক্ষমা কৰি দিব পৰা নাই। সেয়ে মৰো আজি আপোনাক একো বুজাব নোৱাৰো। অন্ততঃ আপুনি তাকে বিচাৰিছে। মই যদি আপোনাক কিবা কব খাও আপুনি ভাবিব——মই যুক্তি--তৰ্কৰ সহায় লৈছো দোষ মোচনৰ বাবে।

মাত্ৰ মই ইয়াকে কওঁ——আজি চাৰিবছৰে মই ভাবিছো, কেৱল ভাবিছোঁ——এয়া মই কি কৰিলোঁ? মই আপোনাক বিচাৰিছিলোঁ খুউব আন্তৰিকতাৰে তাত সন্দেহ নাই। মই আপোনাৰ মনৰ গহন বনত ইমান নিবিড়ভাৱে সোমাইছিলোঁ——সেয়া ভাবি মই আজিও ৰোমাঞ্চিত হওঁ। তথাপিও এয়া মোৰ কি হ'ল? মই জানো ইয়াকে বিচাৰিছিলোঁ?

এই চাৰিবছৰে আপোনাৰ স্মৃতিয়ে মোক নিকাকৈ ধুইছে যিখিনি বাকী আছিল আগৰ কেইবছৰত। মই যিমানেই আপোনাৰ কথা ভাবিছো সিমানেই আপোনাৰ জীৱনৰ মাজলৈ সোমাই গৈছো। কিন্তু মই জানো সঁচাই সোমাইছো আপোনাৰ জীৱন কক্ষত? মই মাথোন দূৰে দূৰে আপোনাক নিৰীক্ষণ কৰিছো আৰু আপুনি শেষ হৈ গৈ আছে দিনে দিনে। মই বিচাৰিছো মোৰ জীৱনে আপোনাৰ জীৱন যেৰি ৰাখিব।

মোৰ মাজে মাজে কি ভাৰ হয় জানে?

মই যেন এজনী ৰূপকথাৰ ৰাজকুঁৱৰী শিল হৈ পৰি আছো অনন্ত কাল ধৰি। অনেক প্ৰতীক্ষাৰ মূৰত এজন ৰাজকোঁৱৰ এদিন আহিল সোণৰ কাঠি হাতত লৈ। সেই ৰাজকোঁৱৰে হাতত সহস্ৰ কাঠি থাকিও মাথোন এডাল কাঠিয়ে ব্যৱহাৰ কৰিলে ৰাজকুঁৱৰীৰ টোপনি ভাঙিবলৈ। ৰাজকুঁৱৰীৰ টোপনি ভাঙিল, নাভাঙিল কেৱল অভিমান। সেই ৰাজকুঁৱৰী আজিও অভিমানী। আজিও প্ৰতীক্ষাৰত।

—তাৰপিচত ধীৰ খোজেৰে মেঘালী কোঠাৰ পৰা ওলাই গৈছিল।

মই মাখোন মেঘালী ওলাই যোৱা পিনে চাই ৰ'লো এক বোবা চাৱনিৰে।

অপ্রত্যাশিত যদিও মেঘালীৰ এই প্রত্যাবর্ত্তনে মোক বিশেষ আচৰিত কৰিব পৰা নাছিল। মেঘালী যে এদিন আহিব মই যেন বহুদিনৰ পৰা আশা কৰি আছিলোঁ। তাই আহিল, কিন্তু অসময়ত। অসময়ত মেঘালীৰ এষাৰ কথাৰ বাবে মই যিকোনো পৰিস্থিতিকে মানি লবলৈ উদ্যত আছিলোঁ তেতিয়া তাই শিলা হৈ গ'ল। আৰু আজি মই শিলা হৈ গ'লো। মোৰ সকলো আছে, তথাপিও একো নাই। বত্রিশ বছৰত মানুহৰ যৌৱন শেষ নহয়, জীৱনৰ আৰম্ভণিহে হয়। পিচে ইচ্ছা, আশা-আকাঙ্ক্ষা আৰু যৌৱনটো উপভোগ কৰিব পৰাকৈ এটা মন যদি নাথাকে তেতিয়া সেই জীয়াই থকাক জীয়াই থকা বুলি জানো?

মই যেতিয়া জীৱন বিচাৰিছিলো, যৌৱনটো কিঞ্চিৎ কিঞ্চিৎকৈ উপভোগ কৰিবলৈ এটি মন আৰু স্বাস্থ্য আছিল তেতিয়া জীৱনে মোৰ পৰা পলাইছিল। মই জীৱনৰ আকাশলঙ্ঘী জখলাৰ পৰা হঠাতে খহি পৰিলোঁ। আৰু আজি মই জীৱনৰ পৰা পলাইছো, জীৱনে মোক খেদিছে।

দেউতাৰ বন্ধু ৰামদাস পাটনায়কৰ চিঠিখন এতিয়াও মোৰ পকেটত আছে। আৰু মোৰ কাণত বাজি আছে মেঘালী জীয়াই থকাৰ কেইটিমান ৰহস্য।

.....মই পানীত ডুবি কক্‌বকাই আছো। কাষৰত কাঠ এটুকুৰা পায়ো মই হাত মেলা নাই।

হাতখন মেলিব খুজিও যেন মই পৰা নাই।

হয়তো মই এয়েই বিচাৰিছিলোঁ।

মই কেতিয়া কমৰূজহঁতক এবি ঘৰলৈ খোজ কাঢ়ি উভতিছো কবই নোৱাৰিলোঁ। সিহঁতৰ আগত মোৰ ইমানদিনে সুপ্ত হৈ কথা-বোৰ ব্যক্ত হৈ গ'ল। ভাবিছিলোঁ ইয়াৰপৰা মই সকাহ পাম।

বিহ ফোঁহোৱা জানো খজুৰাই আৰাম পায়?

জুন মাহৰ প্রখৰ ৰ'দ। সূর্য্যৰ বুকুত উম দি পুহি ৰখা বেদনা-বোৰ গলি গলি পৃথিবী চুইছেহি। চকুহাল পুৰিছে। মোৰ দৃষ্টিক আকাশৰ এচপৰা পলৰীয়া শুকুলা মেঘৰ পৰশ লাগে। নাই, হাহাকাৰ কৰিলেও সুনীল আকাশত এটি মেঘৰ ৰেখাও নাই। ক'তো অকণমান ছাঁ নাই। ৰ'দবোৰ গছৰ পাতেৰে বিন্ধি বিন্ধি সোমাইছে। এটি দীঘল পথ। পিচ্‌ঢবোৰ ঘীণ লগাকৈ গলি গলি জাতাত লাগি ধৰিছে। এটি ছন্দহীন দুপৰীয়া।

—তই এই যুগৰ বাবে কাৰিল নহয়।

—পৃথিবীৰ বুৰ্ব্বকবোৰহে চেণ্টিমেণ্টেল।

—স্বার্থপৰ আৰু দুৰ্ব্বল মানুহবোৰেহে অজ্ঞাত বাসৰ বিলাসিতা ভাল পায়।

আজি বুজিছো মই সঁচাই স্বার্থপৰ।

মই দুৰ্ব্বল। দুৰ্ব্বলতাক জয় কৰিব পৰাহেঁতেন মই জীৱনৰ আটাইতকৈ মূল্যবান বহুবকেইটি অথলে যাব দিদিলোহেঁতেন। মই যদি সঁচাই মেঘালীক ভাল পালোহেঁতেন, তাইক বুজিবলৈ চেষ্টা কৰিলোহেঁতেন।

মই কেতিয়াও মেলা-মিটিং কৰি ঘূৰি ফুৰিব বিচৰা নাছিলোঁ। বিলাসক প্রশ্রয় দি কিহুমান ডেকাৰ ভবিষ্যত কেনা লগাব খুজিছিলো।

মই বিলাস পাগল। ঘীণ লগাকৈ স্বার্থপৰ।

মোক উপহাস কৰিছে সকলোৱে।

মা'ই।

দেউতাই।

কমৰূজহঁতে।

আৰু হয়তো মেঘালীয়েও।

.....ৰ'দৰ প্রসৰতা বাঢ়িছে।

মই বেগাইছো, কিজানি দৌৰিছো।

ড্রয়িং ৰূমেৰে মোৰ কোঠালৈ সোমাব যাওতে হঠাৎ চকু পৰিল ফ্রেমত সজাই মোৰ নিজৰ ফটোখনলৈ। বিশ্ববিদ্যালয়ৰ পাঁচটকীয়া 'ভি' পেটার্ণৰ মাফলাখনেৰে, পৃথিবী জয়ৰ গৌৰৱমিহলি হাঁহি-টোৰে মোৰ প্রচ্ছায়াটোলৈ খুউব খং উঠি গ'ল। মুহূর্ত্তটো গণিব নাপাওঁতেই ফুলদানিটো কেনেকৈ হাতলৈ আহিল গমেই নাপালো।

তাৰ পিচত মই একো কৰ নোৱাৰো।

সাৰ পাই উঠি এটা কথাই উপলব্ধি কৰিলো যে ঘৰখন প্রয়োজনতকৈয়ো বেচি নীৰৱ। হয়তো অলপ আগতে বহু অচিনাকি মানুহৰ ভিৰেৰে মোৰ কাঠাটো বৰ ব্যস্ত হৈ পৰিছিল।

মোৰ এতিয়া কোনো কথা ভাবিবলৈ মন যোৱা নাই।

এই কোঠাটোৰ মৃত্যুশীতল নীৰৱতাখিনিৰ প্রতি মহূর্ত্তক উপলব্ধি কৰিবলৈ মই বিচাৰিছো। এই ঘৰটোত মোৰ বাহিৰে এতিয়া কোনো নাই আৰু নাছিলোঁ। যুগ যুগ ধৰি মূৰত বেন্দেজ লৈ মই শুই আছোঁ।

মই এতিয়া জীয়াই থকা আৰু মৃত্যুৰ মাজৰ প্রভেদ বিচাৰি পোৱা নাই। জীৱন আৰু মৃত্যুৰ মাজৰ ফাঁকখিনিৰ অসীমত মই হেৰাই গৈছো।

আশা-আকাঙক্ষা কামনা-বাসনা, জীয়াই থকাৰ স্বপ্নই মোৰ বুকুখনত এটি জ্বলন্ত অগ্নিপিণ্ড হৈ পুৰিছে। মোৰ মান-অভিমান ক্ষোভবোৰ প্রশাৱতা লাভ কৰি কৰি কোনো এটি বিদ্যুত থুপ খাইছে গৈ। মোৰ চকুত বৰষাৰ ভগ্নাংশ।

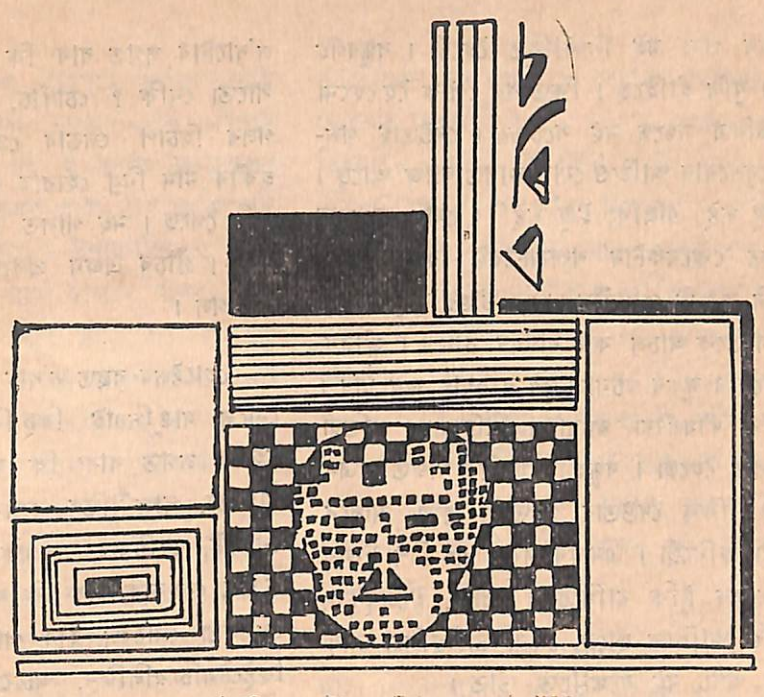
মোৰ জীৱনলৈ কাইলৈ এটি দিন আহিব। কাইলৈ কি হব মই এতিয়া একো কব নোৱাৰোঁ। হয়তো চকুলোখিনিয়ে মোৰ গাল দুখনত দুটি শুকান নদীৰ মানচিত্র আঁকিব।

.....চকুৰ পতা দুটা মোৰ হেঁচা মাৰি ধৰিছে শেষ হৈ যাৰ খোজা যৌৱনৰ অন্তিম বছৰকেইটাই। চকুহাল মেলিৰ নোৱাৰিলেও মই গম পাইছো——দহোটা মখমকোমল আঙুলি মোৰ চুলিৰ মাজে মাজে বগাই ফুৰিছে। আৰু যেন শুনিছো-কোনোবা ৰূপকুঁৱৰীৰ অভিমানভৰা শেষ উচুপনি।.....

.....মই ডুবি গৈছো। কক্ বকাইছো। ওচৰত পোৱা কাঠ-ডোখৰকে জীৱনৰ শেষ সম্বল বুলি সাৰটি ধৰিছো——খুউব জোৰেৰে।

★ ★ ★

এটি স্নেপ্ —— কলসীত
ধৰা দিছে—শান্তি জৈনৰ কেমেৰাত।



প্রদীপ গগৈ

'চা বস্তি, এই বয়সত আমি ছোৱালীৰ প্রেমত পৰি লুইত, জোনাক, মলয়া, বঙা ওঁঠ আদি শব্দৰ ধুনীয়াকৈ ব্যৱহাৰ কৰিব লাগিছিল। কৰিছোঁ কি? চিগাৰেটৰ ধোৱাঁৰে এই পঢ়া ৰুমটো ধুৱঁলি কুৱঁলি কৰিছো। হিন্দী গানৰ ভগ্নাংশ আৰু টেবুলত তবলাৰ শব্দ কৰি এই অমূল্য সময় অবাৰত অপব্যয় কৰিছোঁ। ইচ বাম, গল্পবোৱত যে থাকে কলেজৰ দ্বিতীয় বাৰ্ষিকৰ ছাত্র নিৰুপম দুৱৰা, কি সুন্দৰ গান গায়, স্পিন বাউলাৰ। পি, ইউৰ ছাত্রী নীলাক্ষী বৰুৱাই আহি নিৰুপমক কলে—নিৰুপমদা, আপোনাৰ গান শুনি মোৰ কি ভাব হৈছে জানা? বাৰিচ্। নিৰুপম, নীলাক্ষী। আমাৰ নামবোৰ নাম নহয় নেকি? আমি কলেজত পঢ়া নাই নেকি?' এয়া মুনীনে আহি মোৰ বিছনাত লেপেতি কাঢ়ি বহি ললে। এতিয়া আলোচনাই কিমানদূৰ আগ বাঢ়ে ঐকো কব নোৱাৰো। মোৰ টেবুলত ফিজিক্সখন দুফাল হৈ মেল খাই আছে। 'পলাৰাইজেশ্যন্ অব্ লাইট'ৰ তলত মাৰি থোৱা বঙা চিগাঁহীৰ তীব্র আঁচডাল জিলিকি আছে। কিবা এটা নতুন খবৰ লৈ ত্রিদিবো মোৰ ৰুমলৈ আহিল। চকীখন টান মাৰি বহিল। ইহঁত মোৰ বন্ধু। বন্ধু মানে স্কুলৰ পৰা কলেজলৈকে ইহঁতেই মোৰ লগ। মোক বস্তি বুলি মাতে। ইহঁতে আৰম্ভ কৰা যিকোনো প্রসঙ্গৰ পৰাই মই পলাই থকাৰ চেষ্টা কৰো। ইহঁতৰ আলোচনাই সদায়েই শালীনতাৰ সীমা চেৰ পলায়। ত্রিদিবে যিকোনো কথা টেবুলত ভুকু এটা মাৰিহে আৰম্ভ কৰে। 'জিম্নেচিয়াম' হলত এশ চল্লিশ পাউণ্ড ওজন সি অতি সহজে ওপৰলৈ তোলে। ত্রিদিবে মুনীনৰ কাণত কথা এটা ফুচ্‌ফুচাই কলে—মুনীনে ফিচ্‌ফিচ্‌কৈ হাঁহি দিলে। ৰুমৰ বেৰত খুন্দা খাই সেই হাঁহিটোৱে কেইবাবাৰো মোৰ কাণত খুন্দা মাৰিলে। "বস্তি, তই এইবোৰ কথা শুনিব নালাগে। তই সাধু মানুহ।" মোৰ অৱস্থিতি,মোৰ সত্ত্বা এটমলৈ পৰিণত হোৱা যেন অনুমান হৈছে। মই যেন নিৰাকাৰ এটা জীৱ হৈ গৈছো। মই আনৰ হাঁহি শুনিব পাৰোঁ, আনে উপভোগ কৰা দেখিব পাৰো কিন্তু মই নিজে হাঁহিব নোৱাৰোঁ, উপভোগ কৰিব নোৱাৰো। মুনীনে মোৰ ঈষৎ সঙ্কোচিত, ত্রস্ত মানুহটোলৈ চাই কলে, "আৰে সৰু ল'ৰা নহয় দে, ছোৱালীৰ কথা পাতিছোঁ। ধুনীয়া ছোৱালী এজনীৰ কথা। নামটো তোক নকওঁ। কি কৰ ত্রিদিব? কিন্তু ভীষণ সাংঘাতিক ছোৱালী জান? তইনো কি মহাপুৰুষডাল ওলাবলৈ আহিছ অ'! কলেজত পঢ়িছোঁ, চিগাৰেট খাম, চিনেমা চাম আৰু ছোৱালীৰ কথা পাতিমেই।" এনেধৰণে আলোচনাই গা-কৰি উঠে। অৱশেষত ই গৈ হেমামালিনীৰ চকু, এলিজাবেথ টেইলৰ, অনিতা একৰাৰ্গৰ দেহৰ ষ্টেটিস্টিক্‌তেই শেষ হয়গৈ। মই টাৱেলখন লৈ বাথৰুমলৈ আহিছোঁ এটা মুখশোচক হাঁহিৰ মাজত শুনিবলৈ পাইছোঁ "বস্তি পলাল।"

মই পলাইছোঁ। ত্রিদিব আৰু মুনীনৰ ওচৰৰ পৰা বহুবাৰ পলাইছোঁ। মই নিজৰ কাষৰ পৰাও পলাই ফুৰিছোঁ। মোৰ বিবেক,

মোৰ চিন্তা, সকলোবোৰৰ পৰা মই নিৰ্ব্বাসিত হৈছোঁ। বন্ধুবৰ্গই মোক সঙ্কোচিত, পলৰীয়া বুলি হাঁহিছে। কিতাপৰ পোক হৈ হেনো মানুহ হ'ব নোৱাৰি। চৰিত্ৰ সম্বন্ধে মই সচেতন। দেউতাই গল-গলীয়া মাতেৰে দিয়া উপদেশবোৰ আজিও মোৰ কাণত বাজি আছে। "হোৱেন কেৰেক্‌টাৰ ইজ্‌ লষ্ট্‌ এভ্রিথিং ইজ্‌ লষ্ট্‌"। মোৰ দেউতাৰ ইংৰাজী উচ্চাৰণৰ ভিতৰত 'কেৰেক্‌টাৰ' শব্দটোৱেই বিশেষত্বপূৰ্ণ। দেউতাই 'কেৰেক্‌টাৰ' বুলি কলেই পৃথিবীৰ ডাঙৰ ডাঙৰ মানুহবোৰৰ নামবোৰ মনলৈ আহে। গতিকে আচল কথা মানুহৰ চৰিত্ৰ। জীৱন, কৰ্ত্তব্য, চৰিত্ৰ আদি শব্দবোৰ স্কুলৰ ৰচনাত খুব ব্যৱহাৰ কৰা যায়। এসময়ত 'ছাত্ৰৰ কৰ্ত্তব্য'ৰ দীঘলীয়া ৰচনা লিখিছিলো। এতিয়া নিজৰ কৰ্ত্তব্যক লৈ নিৰুপায় হৈছোঁ। বন্ধুবৰ্গৰ হাঁহিৰ মাজত কৃত্ৰিম মৌনতা বিচাৰি ফুৰিছোঁ। কিন্তু দেউতাৰ প্ৰতিটো কথা আখৰে আখৰে পালন কৰাৰ চেষ্টা কৰিছোঁ। এমাহৰ খৰচ এশ-বিশ টকাৰ হিচাব বহী এখনত ভালদৰে টুকি ৰাখিছোঁ। প্ৰটন, ইলেক্‌ট্ৰন, কোৱাণ্টামৰ মাজত বিদ্যুতি আহিলে ছাদ্রে, কেমু, ভাৰ্জ্জিনিয়া ওলফ্‌ হাতত লৈ বহি গৈছোঁ ; অথচ মই সঙ্কোচিত, ভীত।

হোষ্টেলত থকা এশ ওঠৰটা চৰিত্ৰৰ মাজত মোৰ মানসিক নিঃসঙ্গতা দেখি মই বহুবাৰ উচপ্‌ খাই উঠিছোঁ। মোৰ বয়স বাইশ বছৰ।মোৰ সৰুকালৰ লগৰ দুই-এজনী ছোৱালীৰ কোলাত কেঁচুৰা দেখিছোঁ। শিৰত সেন্দুৰৰ তিৰ্‌বিৰণিত মই ঈষৎ গম্ভীৰ হৈছোঁ। মৃদুল আৰু বীৰেনৰ কথাবোৰ শুনিলে কিবা ভাববোৰ আহে সিহঁতে হেনো বিয়া কৰাবৰ বাবে ছোৱালী চাইছেই। যিকোনো ধুনীয়া ছোৱালীৰ লগতেই সিহঁত বাজী। "আমি আচলতে বুঢ়া হৈছোঁ জান ? বিয়া পাত, সংসাৰ কৰ, বহু গহীন হৈ যা।" মৃদুলৰ কথা-বোৰ মই এবাই যোৱাৰ চেষ্টা কৰিছোঁ। এয়া বয়সৰ দোষ। আমি ছাত্ৰ। আমি মানুহ হোৱাৰ প্ৰস্তুতি চলাব লাগিব।

ৰুমমেট্‌দ্বয়ে আৰু এজন লগৰ ল'ৰাৰ লগত কিবা এটা কথা লৈ খুব হাহিছে। হাঁহি হাঁহি তিনিওটা বিচনাত ঢলি পৰিছে। মই ধূপ এডাল জ্বলাই স্ববস্বতীৰ ছবিখনৰ তলত পুতি দিছোঁ। হাঁহি হাঁহি ল'ৰা তিনিওটা মৌন হৈ গৈছে। ইঙ্গিতেৰে সিহঁতে কিবা কোৱা-কুই কৰিছে। এটা সময়ত চোৰৰ দৰে তিনিওটাই মোলৈ জুমি চোৱা মই লক্ষ্য কৰিছোঁ। হঠাৎ মোৰ নিজকে এটা যন্ত্ৰ যেন অনুমান হৈছে। চকু দুটা জোৰেৰে মুদি দিছোঁ। "ৰুম-মেট, এওঁক চিনাকি কৰি দিছোঁ দেই—মলয় বৰুৱা, আমি মলয়া বুলি মাতো। আৰু মলয়া কৈছোঁ নহয়, এয়া মোৰ ৰুমমেট।" লাইটটো অফ্‌ কৰি দিবলৈ খুব মন গৈছে। অলপ আন্ধাৰ হোৱা-হেতেন ! হাতদুখন ওচৰ চপাই নমস্কাৰ এটা কৰিলো। এই নতুন ল'ৰাটোৰ লগত বাকু কি কথা পতা যায়। খেলাৰ কথাকে অলপ পাতো নেকি ? চোৰাচি, চেপেল চিহানৰ স্কোৰ, পেলেৰ এহেজাৰ গলৰ হিচাপ লেডাৰ প্ৰেমজিতৰ ইণ্টাৰেষ্টিঙ খেলাখন, ভাৰতীয় হকীৰ মান নিম্ন হোৱাৰ কাৰণ। ৰুমৰ পৰা এটা সময়ত ল'ৰাটো গুচি গৈছে। মই গালত ভেজা দি বহি আছোঁ। এটা যেন প্ৰাচীন মূৰ্ত্তি। গ্ৰীচৰ এজন প্ৰখ্যাত দাৰ্শনিক। চিন্তা কৰি কৰি শিল হৈ গল।

হোষ্টেলৰ বহুত ল'ৰাই মোক যাদুঘৰৰ শিলৰ মূৰ্ত্তিৰ দৰেই ভাবে। মোলৈ আঙুলিয়াই ফিচ্‌ ফিচ্‌কৈ হাঁহে। মই হেনো খুব বেকৰ্ৰ্ড। ইহঁতৰ লগত বাকু কি কথা পাতিম। কেতিয়াবা মুনীনৰ লগত সাহিত্য, ৰাজনীতিৰ কথা আলোচনা কৰো। হিটলাৰৰ পাৰ্‌চ-নেলিটি, চাৰ্চিলৰ এল'কোৱেন্‌সি আৰু গান্ধীজীৰ আদৰ্শৰ লগত যুদ্ধ ; নেহৰুক বাকু কি কম ? ৰাজনীতিজ্ঞ নে সাহিত্যিক ? চাৰ্চি-লেওঁতো নোবেল বঁটা পাইছিল। কাফ্‌কাৰ লেখাত ছাৰ্ত্ৰেৰ এক্‌-জিষ্টেনচিয়েলিজিম্‌, আয়নেস্কু, টেনাচি উইলিয়াম আৰু বেকেটৰ নাটকৰ নতুন ধাৰা। এইসব মোৰ ভাল নালাগে। অলপ লাইট কথা পাত না বস্তি। অলপ জমক্‌। ফ্রেঙ্কলি কবলৈ গলে মই পদ্মা ৰৰকটকী, 'অলকা' 'অঞ্জনা' এইবোৰহে ভাল পাওঁ। 'অঞ্জনা' দুবাৰ পৰিছোঁ। 'সুবালা' 'ললিতা'ক গাৰুৰ তলত ৰাখো। আচ-লতে আজিকালি এড্‌ভেন্সাৰ, চেক্স, চুমা, এইবোৰহে ভাল লাগে। মুনীনৰ কথাৰ মোট সলোৱাৰ প্ৰমাণ পাইছোঁ। দেউতাৰ গম্ভীৰ কণ্ঠস্বৰ বিণি বিণি মোৰ কাণত ভাহি আহিছে। মই ভাগৰুৱা হৈ পৰিছোঁ, মুনীনক ইচ্ছাকৃতভাবে বিদায় দি দিছোঁ।

এয়া নিউটন, ৰাডাৰফৰ্ড, ফেৰাদেৰ মাজত মই সোমাই পৰিছোঁ। ডাৰ্ৱিড, ট্ৰায়ডৰ চাব্‌কিটৰ মাজত মই যেন কিবা নন্‌কনডাক্টৰ। এইবোৰৰ মাজত বহুবাৰ মই কুৎসিত নিসঙ্গতাকেই লগ পাই আহিছোঁ। মোক বাকু কি লাগে ? নিজেই প্ৰশ্ন কৰি, নিজেই এটা ভুৱা উত্তৰ দি নিবীড় প্ৰশান্তিত বহি আছোঁ। মই জানো, দুনিয়াৰ বাজে কথা, বাজে চিন্তাৰ পৰা আঁতৰি থকা উচিত। প্ৰকৃত মানহ হবলৈ বহুত ত্যাগই লাগে। হোষ্টেলৰ পাচফালে কিবা এটা হৈ-চৈ শুনিবলৈ পাইছোঁ। কোনোবা তিৰোতাৰ কান্দোনৰ মাজত ল'ৰাবোৰৰ এটা মিশ্ৰিত হুলস্থূল। "ইহাঁ সে ভাগ যাও। মে চাবাপ পিতা সব বাবু জানতা হাই—বাবুলোগ মুঝাকো কিৱা কবেগা ? ইত্‌না শাম তুম ঘৰ নহী কাঁহা জাতী"। জামাদাৰ নান্‌কাই ঘৈনীয়েকক মৰিয়াই খেদি আনিছে। হোষ্টেলৰ ফালে। এইজনী তাৰ দ্বিতীয়পক্ষ। নান্‌কাৰ ল'ৰা-ছোৱালী নাই। কিছু সময়ৰ পাছত হুলস্থূল সাম কাটিল। ল'ৰাবোৰে মুখেৰে বি-বি বা-বা

কৰি নিজৰ ৰুমলৈ ঘূৰি আহিল। দীঘলীয়া খোজেৰে ত্ৰিদিব আহি মোৰ বিছনাত বহিলহি। "চালা কুত্তাকা বাচ্চা- একে ৰোঁহাই নাকেদি তেজ বাহিৰ হৈ গৈছে। মদ খাই ই সদায় ঘেনীয়েকৰ ওপৰত বজা। আৰু সেইজনী, এই ৰাতিখন বাৰু তাই ক'ত ঘুৰি ফুৰিব লাগে ?" ত্ৰিদিবৰ গাত জোৰ আছে। উশাহ-নিশাহত দেহৰ মাংসপেশীবোৰ কঁপি উঠে। তাৰ বয়স আৰু স্বাস্থ্যৰ সুন্দৰ কম্-বিনেচন্ হৈছে। কেমিষ্ট্ৰিত অনাৰ্চ আছে। তাৰ ৰুমত গলে হলিউড আৰু হিন্দী চিনেমাৰ সকলোবোৰ অ ভনেতা অভিনেত্ৰীক লগ পোৱা যায়। চিগাৰেটৰ টুকুৰাবে টেবুল-চকীৰ তল ভৰি থাকে। অথচ পাৰ্টৰানত ফাষ্ট ক্লাচ পাই আছে। তাৰ অপৰিপাটি আৰু অসংযত কাম-কাজৰ বিষয়ে কিবা এটা কলেই সি গম্ভীৰ মাতেৰে ক'ব—'ডেকা হৈছোঁ, দৈনিক ডাঢ়ি খুৰাওঁ, আৰু কি কৰিব লাগে ?" ত্ৰিদিব খুব গহীন হৈ মোৰ কাষত বহি থকাৰ বাবে মোৰ অস্বস্তি লাগিছে। তাৰ নিৰ্ব্বাক মুখমণ্ডলত সাংঘাতিক প্ৰশ্ন কিছুমান মোৰ চকুত পৰিকাৰ হৈছে। হঠাৎ সি টেবুলত ভুকু এটা মাৰি কলে— "বন্তি, সঁচা কথা কবি, মীনাক তই ভাল পাৰ ?" মই ঈষৎ বিস্মিত হৈছোঁ। ত্ৰিদিবৰ লগত মোৰ বন্ধুত্ব। মোৰ চিন্তা, কল্পনা হঠাৎ যেন অসুস্থ হৈ পৰিল। মুখত বিৰক্তিৰ হাঁহি এটা মাৰি কলো— "নাই, নাই কিযে কথাবোৰ কৰ ?"

"ফাকি নিদিবি, তোৰ বয়সবাইশ বছৰ। কিতাপী চৰিত্ৰ এটা হৈ কিমান ফাকি দি থাকিবি ?"

"ফাকি ? তহঁতকতো মই কেতিয়াও ফাকি দিয়া নাই। একো নাই, জান ! আচৰিত কথা কিছুমান যে উলিয়াৰ আৰু !"

পৰম বিশ্বাসত ত্ৰিদিব মোৰ ৰুমৰ পৰা আঁতৰি গৈছে। লাইটটো অফ্ কৰি বিছনাত পৰি দিছো। আন্ধাৰৰ মাজত অন্ততঃ কেইটামান মূহূৰ্ত্ত পলাই থাকিব পৰা যাব। কিন্তু দেউতাৰ গভীৰ কণ্ঠস্বৰৰ ধ্বনি-প্ৰতিধ্বনি ভাহি আহি মোৰ আৰহাৰা গধুৰ কৰি পেলাইছে। মই বাৰে বাৰে চক্ খাই উঠিছোঁ। হোৱেন কেৰেক্-টাৰ ইজ্ লষ্ট এব্ৰিথিং ইজ্ লষ্ট। মীনাৰ লগত মোৰ ভালপোৱা ! ত্ৰিদিবৰ কথাকেইষাৰ ভবিয়েই মোৰ ভয় লাগিছে। মৃদুল, মুনীন, বীৰেন সকলোৱে যদি এই কথাটো গম পাইছে ? আৰু যদি মীনায়ো গম পাইছে মই তাইৰ প্ৰমত পৰিছোঁ ? মই এক অস্থিৰতাৰ মাজত ঘনঘন শ্বাস-প্ৰশ্বাস লৈছোঁ। নাই নাই নাই, আচলতে মীনাৰ লগত মোৰ একো নাই। কলেজত পঢ়িছোঁ। মাহত ঘৰলৈ তিনিখন চিঠি দিওঁ। গধূলি স্বৰস্বতীৰ ছবিখনত এডাল ধূপকাঠি জ্বলাওঁ। মোৰ ৰুমৰ কাষৰ কমন্ ৰুমটোত কেৰমৰ খট্ খট্ শব্দ। দৈনিক পেপাৰৰ মুখবোচক খবৰ পঢ়ি ল'বাবোৰৰ মিশ্ৰিত কথা-বাৰ্ত্তা। কেলভিনত মোহৰত জিন্দেগী হাই, এই যে অজয়বাবু কিতা কৰলেন দেখছ ? তিনিদিন ফাষ্টিং। উইদাউট ফাষ্টিং দেয়াৰ ইজ্ ন' পলিটিক্স ইন ইণ্ডিয়া। ৰাডেকাৰ আৰু বিশ্বনাথক দেখিছ ? সেই সময়ত মই 'এমিচন অব্ ইলেক্ট্ৰন' 'মাচ স্পেক্ট্ৰগ্ৰাফৰ মাজত সোমাই যাওঁ। প্ৰথম বাৰ্ষিকতো এনেকৈয়ে মই কিতাপৰ মাজত সোমাই পৰিছিলো। অথচ মোৰ মাজত বেলেগ এটা মানুহ কেতিয়াবা আহি ভূমুকি মাৰেহি। তেতিয়াই নোটচ্ আৰু থিয়ৰিৰামৰ মাজত ভীষণ অকৰ্-শৰীয়া লাগে। সৰু সৰু আখৰেৰে বহীৰ মাজত, কিতাপৰ ক'ভাৰত এটা নাম লিখি মই এক কুৎসিত আনন্দ লাভ কৰিছিলো। এতিয়াও সেই নামটো মোৰ দেহৰ অদেখা অঙ্গত টুকুৰা টুকুৰ হৈ লাগি থকা যেন লাগে। মীনা ফুকন।

"ককাইদেউ আপোনাক মই চিনি পাওঁ দেই। মোৰ নাম মীনা। আপোনাক মাতিম মাতিম বুলি সদায় ভাবো।"

'মীনা' শব্দটো কিবা এক গেঙনি হৈ মোৰ মুখৰ পৰা বাহিৰ হৈ আহিল। মীনা' 'মীনা' শব্দবোৰে এক প্ৰচণ্ড ধুমুহা হৈ মোক যেন জোকাৰি পেলালে। মোৰ দেহৰ ৰক্ত প্ৰবাহ হঠাৎ আন্দোলিত হ'ল। কাণ দুখন গৰম হৈ আহিল।

"মোৰ ককাইদেউৰ নাম ৰণেন ফুকন। বোধহয় চিনি পায়।" নাটকৰ সংলাপৰ দৰে কথাকেইষাৰ কৈ ছোৱালীজনীয়ে হাঁহি হাঁহি মোলৈ চালে। সেই দৃষ্টিত মই জহি-পমি শেষ হৈ যোৱা যেন লাগিল। কিতাপত ধুনীয়া ছোৱালীৰ বৰ্ণণা পঢ়িছোঁ। ধুনীয়া চকুৰ গভীৰ দৃষ্টিৰ গভীৰতা কল্পনা কৰি উপলব্ধি কৰিবলৈ কাহানিও চেষ্টা কৰা নাই। কিন্তু মীনাৰ এই দৃষ্টি ! মোৰ চকুৰ আগত যেন দেউতা থিয় দি আছে ; চকুত গধূৰ ফ্ৰেমৰ চশমা, কান্ধত এখন চাদৰ "বুইছ পোনা, মনত বাখিবি, হোৱেন কেৰেক্টাৰ ইজ্ লষ্ট এব্ৰিথিং ইজ লষ্ট।" মই ধীৰে ধীৰে আঁতৰি আহিলো।

ত্ৰিদিবৰ সকলো কথাতে মই গুৰুত্ব দিদিওঁ। হঠাৎ ৰুমত আহি সি অৰ্গেনিক কেমিষ্ট্ৰিৰ ফৰমূলা, বিএকচন্ মুখস্থ মাতিব আৰু তাৰ মাজতে চাইধাবানু, মৌচুমী আৰু দত্তচাৰৰ বাইদেউৰ কথা উলিয়াব। সি মোক ৰুমৰ পৰা বাহিৰলৈ মাতি আনিছে খুব গোপন কথা এটা কবলৈ। বাৰান্দাত পি-ইউ'ৰ ল'ৰা এটা বৈ আছিল। তাক সি ভতৰলৈ ধাবলৈ নিৰ্দ্দেশ দিছে। মই তলৰ ওঁঠটো কামুৰি এক আসন্ন বিপদৰ বাবে সাজু হৈছোঁ।

"বন্তি, আজি তই মোক সঁচা কথা কব লাগিব।"

মোৰ বুকুখন কঁপি উঠিল। ডিঙিটো শুকাই ঘোৱা যেন লাগিল। কপালৰ গাঠি থুপ খালে।

"মীনাই কি কৈছে জান, তাই খুব ব্লাইণ্ডলি তোৰ প্ৰেমত পৰিছে। তই তাইক কিবা কৈছ?"

মই নিমাতে ৰলো। হঠাৎ মীনা নামৰ ছোহালীজনীয়ে হাঁহি হাঁহি মোলৈ চাই থকা যেন লাগিল। মীনা ফুকন।

"নাই নাই ত্ৰিদিব, তই এনেয়ে মোক দিচ্‌টাৰ্ব দিছ।"

ত্ৰিদিবে হো-হোকৈ হাঁহি এটা মাৰিলে। সেই হাঁহি হোষ্টেলৰ দুৱাৰ খিড়িকীত চিটিকি পৰিল। এটা সময়ত ত্ৰিদিবৰ হাঁহি বন্ধ হ'ল। তাৰ মুখমণ্ডলত ফুটি উঠিল এক অহেতুক গাম্ভীৰ্য্য। জেপত হাত ভৰাই সি লেফাফা এটা বাহিৰ কৰিলে। লেফাফাটোৰ ভিতৰৰ পৰা ফটো এখন উলিয়াই মোলৈ আগবঢ়াই দিলে। মোৰ চিনাকি ছোৱালী এজনীৰ ফটো। ফটোখনৰ চকুদুটা জীয়া জীয়া লাগিল।

"বুইছ বন্তি, তোৰ কাৰণে ভয় লাগি আছিল। এদিন কথাৰ মাজতে তোৰ নামটো কৈছিল।"

মই ৰুমলৈ আহি চকীখনত জুপুকা মাৰি বহিলোঁ। ক্লাচ কটিনত চকু ৰাখিলো—থাৰ্মডাইনেমিকৰ্চ, ডিফাৰেনচিয়েল কেলকুলাচ, লেবৰেটৰী। কাষৰ ৰুমটোৰ পৰা এটা সমবেত হাঁহি ভাহি আহিছে। কম্‌ৰুমত সাঙ্গীতিক সুৰত কেৰমৰ খট্‌ খট্‌ শব্দ, ডাইনিং হলত ঠাকুৰৰ ধাতৰ-চিঞৰ বাখৰ। মোক অলপ নিৰ্জ্জনতা লাগে। খুব অকলশৰীয়াকৈ গভীৰ মৌতাৰ মাজত ডুব যাব পৰা এটা পৰিবেশ লাগে।

হোষ্টেলৰ এশ ওঠৰটা চৰিত্ৰৰ মাজত বহুবাৰ মই নিৰ্জ্জনতা বিচাৰি পাইছোঁ—হৈ-হাল্লা, চিঞৰ-বাখৰ। কিতাপৰ কাষত বহিও মই এটা বাঙময়, হুলস্থূলীয়া পৰিবেশহে লগ পাওঁ। মোক কিন্তু ভীষণ নীৰৱতা লাগে। এতিয়া মই মোৰ চৰিত্ৰৰ কথা ভৰা নাই, দেউতাৰ গভীৰ কণ্ঠস্বৰ মোৰ কাণত বাজি উঠা নাই। মোৰ সম্মুখত মীনা নামৰ ছোৱালীজনী থিয় হৈ থকা যেন লাগিছে, ওঁঠত অৰ্থপূৰ্ণ হাঁহি, দেহত পৰিপাটি যৌৱন। মোৰ বাৰু বয়স কিমান হৈছে? চকু দুটা জাৰেৰে মুদি দিছোঁ। দুৱাৰত দুটা টোকৰ পৰিছে। ত্ৰিদিব ৰুমলৈ সোমাই আহিল। জেপত হাত ভৰাই লেফাফা এটা উলিয়াই মোলৈ আগবঢ়াই দিলে।

"বুইছ বন্তি, এটা ভাই, দুজনী ভণী, মা, কি কৰিম? এতিয়া ল'ৰা পঢ়োৱা মাষ্টৰ হ'ব লাগিব।" কথাষাৰ কৈ সি হো-হোকৈ হাঁহি এটা মাৰিলে। সেই হাঁহিৰ শব্দত মই একো নুশুনা হলো। মোৰ দেউতা চুকুৰা খবৰ পোৱা হলে বোধহয় খুব কান্দিলোহেঁতেন। মই এতিয়া বুজি পাইছোঁ—মোৰ একো চৰিত্ৰই নাই।

+ + +

★

'প্ৰকৃত মহৎ মানুহজনক তিনিটা লক্ষণেৰে চিনা যায়—উদ্দেশ্যত উদাৰতা, কাৰ্য্য সম্পাদনাত মানৰতা আৰু কৃতকাৰ্য্যতাত আত্মসংযম।"

—বিচ্‌মার্ক

অনুরাগে রঞ্জিত মন

বিছনাখনত একাষৰীয়াকৈ শুই থকা নীলকান্তৰ কাণৰ ওচৰতে কিৰণমতীয়ে খুব সৰু সৰুকৈ ক'লে, "বোলো শুনিছেনে ?" নীলকান্তৰ পৰা কোনো সহাঁৰি নেপাই গাটোত সোঁহাতখনেৰে এটা মৃদু জোকাৰণি দি আকৌ ক'লে, "বোলো শুনিছেনে ?"

নীলকান্তৰ টোপনি আহিছিল। দিনটো দলঙঘাট বজাৰত ঘূৰি-পকি গধূলি কামিমুনি পৰত মাত্ৰ ঘৰ সোমাইছেহি। ৰাতিৰ ভাগৰ ভাগৰ লগাত খাই-বৈ উঠিয়েই বিছনাত পৰিছিল। ভাগৰত অহা মানুহ তৎকালেই টোপনি অহাটো স্বাভাৰিক। কিৰণমতীয়ে কিন্তু সেইটো বিচৰা নাছিল। নীলকান্তক দিনটো ঘৰত লগ পোৱা টানেই। খেতি পথাৰতে যেন মানুহটোৰ জীৱটো। ৰাতিপুৱাই খি পথাৰলৈ যায়, দুপৰীয়া ভাতকেইটা খাই, তামোলখন খোৱাৰ সময়হে খি জিৰণি লয়, আকৌ গ'ল ওলাই। গধূলি সময়ছোৱা আকৌ ঘৰত নেথাকেই। ক'ত যায় একমাত্ৰ তেওঁহে জানে। ৰাতিৰ এইকণ সময় নিবিড়ভাৱে একান্ত আপোনভাৱে লগ পায় কিৰণমতীয়ে। গতিকে এইকণ অমূল্য সময় কিৰণমতীয়ে অযথা ব্যয় হ'বলৈ নিদিয়ে। দিনটোৰ কত কথা থাকে ক'বলৈ। কিৰণমতীয়ে ভাবে নীলকান্তই তাইক বুকুৰ মাজত লৈ অলপ মৰম কৰক, দুয়োৰে দিনটোৰ সুখ-দুখৰ কথাৰ আদান-প্ৰদান হওঁক।

সেয়েহে আজিৰ ৰাতিটোও অযথা ৰাবলৈ দিব নুখুজিলে কিৰণমতীয়ে। ভাগৰত যে নীলকান্তৰ টোপনি আহিছে সেইকথা কিৰণমতীয়ে জানে। তথাপি দিনটো ঘৰখনৰ ভিতৰতে ইফালে-সিফালে টাকুৰী ঘূৰাদি ঘূৰি-ফুৰি তাইৰতো এটা ভাগৰ আছে। সেই ভাগৰলৈকো আওকাণ কৰিয়েইতো তাই নীলকান্তৰ লগত কথা-বতৰা পাতিব খোজে। মানুহৰ মনৰ তৃপ্তিয়েই আচল কথা। মনৰ তৃপ্তিয়ে দেহৰ ক্লান্তি ভালেখিনি দূৰ কৰে। দেহ আৰু মনৰ একেবাৰে ওচৰ সম্বন্ধ। ফুলশয্যাৰ ৰাতি এইবোৰ কিবাকিবি কথা নীলকান্তই তাইক কৈছিল।

নীলকান্তৰ টোপনি আহিছিল যদিও লেপৰ তলত চেঁচা পৰশ এটা টোপনিতে অনুভৱ কৰিছিল। পিচত যেতিয়া কিৰণমতীয়ে গাত ধৰি জোকাৰি দিলে, সি খক্‌মকাই উঠিল। চকুহাল মেলি দীঘলকৈ হামি এটা মাৰি দিলে। ঘৰটোৰ ভিতৰখন ঘিটিঘিটিকৈ

এন্ধাৰ। ক'লা দৈত্য এটাইহে যেন গোটেই ঘৰটো গ্ৰাস কৰিবলৈ ওলাইছে নীলকান্তৰ এনে লাগিল। ঘৰৰ মূখত থকা বাঁহৰ চিলি-ওখনৰ ফাকে ফাকে পোহৰৰ খুব অনুজ্জ্বল আভা এটা দেখিবলৈ পোৱা গৈছিল। পিচফালৰ আমগছজোপাৰ পৰা ফেঁচা এটাই বৈ বৈ উকলি দি আছিল। লেপখনৰ একাল ওলাই থকাত নীলকান্তই অলপ জাৰ অনুভৱ কৰিছিল। জাৰ হওক জহ হওক নীলকান্তৰ চোলা পিন্ধি শোৱাৰ অভ্যাস নাই। এন্ধাৰতে কিৰণমতীয়ে লেপখন ঠিক-ঠাক কৰি দি ক'লে--

এটা কথা কওঁ বুলি ভাবিছো।"

'কোৱা" নীলকান্তই শুনিবলৈ উদ্‌গ্ৰীৱ হৈ ব'ল।

'মোৰ টেঙা এটা খাবৰ মন গৈছে" কিৰণমতীয়ে কওঁ নকওঁকৈ ক'লে।

"টেঙা! কি টেঙা?" নীলকান্তৰ ওঁঠৰ কোণেদি এটা হাঁহি বাগৰি গ'ল। কিৰণমতীয়ে এন্ধাৰৰ কাৰণেই মন কৰিব নোৱা-বিলে। দিনত হোৱা হ'লে নীলকান্তই ঢেকুঢেকুকৈ হাঁহি দিলে-হেঁতেন। টেঙা খাবৰ মন গৈছে খাকেই হ'ল। তাকে আকৌ ক'ৰ লাগেনে? বাৰীৰ ভিতৰতে কাজিনেমু, ৰবাৰ-টেঙা, কৰদৈ ক'তবিধৰ টেঙা আছে। লাগ বুলিলে হাততে পায়।

"কমলা টেঙা"—কিৰণমতীয়ে ক'লে।

কমলা টেঙাৰ নামটো শুনিয়েই হঠাৎ যেন নীলকান্তৰ হাঁহিটো ক'ৰবাত হেৰাই গ'ল। তথাপি ক'লে, "বাৰু কাইলৈ আনি দিম এতিয়া শুই থাকা।" কিৰণমতীয়ে সকলো পোৱাৰ পূৰ্ণ পৰিতৃপ্তিৰে টোপনি যাবলৈ চেষ্টা কৰিলে।

নীলকান্তৰ টোপনি অহা নাছিল। কমলা টেঙাৰ চিন্তাই তাৰ টোপনি নাইকিয়া কৰি দিলে। কমলা টেঙা এটাকো হঠাতে পায় ক'ত। বজাৰলৈ যোৱাৰ আগ মূহূৰ্ত্তত কোৱা হ'লে কোনো কথা নাছিল। বজাৰত ভাটাফলীয়া পাইকাৰী বেপাৰীয়ে বহুত কমলা টেঙা উলিয়াই দিয়েহি। বজাৰ শেষ হোৱাৰ লগে লগে আকৌ ওভোতাই লৈ যায়। বজাৰৰ দিনটোৰ বাহিৰে এই অঞ্চলত আৰু কমলা টেঙা পোৱা নেযায়। কমলা টেঙা আনিবৰ কাৰণে এতিয়া ৩০ মাইল আঁতৰত থকা চহৰৰ পৰা আনিবলৈ লাগিব। আৰু এটা টেঙা আনিবলৈকে সি চহৰ পাবগৈনে?

নীলকান্তইঁতৰ গাৱঁত এজোপাই মাত্ৰ কমলা টেঙাৰ গছ আছে। কিন্তু সেইজোপাও আছে হৰিধন সাতোলাৰ বাৰীত। কিন্তু সি প্ৰাণ গ'লেও সাতোলাৰ ঘৰত কমলা খুজিবলৈ যে যাব নোৱাৰে। সিও কমলা টেঙাৰ পুলি এটা চহৰৰ পৰা আনি ৰুই লৈছিল। কিন্তু বহুত আপদাল কৰিও পুলিটো বচাব নোৱাৰিলে।

লাহে লাহে নিশা গহীন হৈ আহিছিল। ফেঁচাটো বোধকৰো ক'ৰবালৈ উৰি গৈছিল। ঘৰটোৰ আগফালে থকা টিনৰ বাৰান্দা-খনৰ কাষতে থকা নিমগছ জোপাৰ পৰা নিয়ৰ পৰি টপ্ টপ্ শব্দ হৈছিল। কিৰণমতী গভীৰ টোপনিত পৰিছিল। ভিতৰৰ কোঠা-টোৰ পৰা অস্পষ্ট সুৰত ৰৱগীত এটি নীলকান্তই শুনিবলৈ পালে। বোধকৰো মাকেও টোপনি যোৱা নাই।

মহৰাৰ পাকৰ দৰে এটা এটাকৈ নীলকান্তৰ সৰুকালৰ ঘটনা-বোৰ মনত পৰি গ'ল। তেতিয়া সি পাঠশালা স্কুলৰ ৩য়মান শ্ৰেণীত। ভনীয়েক বাণুমাই ক-মান শ্ৰেণীত। দেউতাক এদিন ভৰ বাৰিষা ককাদেউতাকৰ বছেৰেকীয়া সেৰাৰ কাৰণে কপিলিৰ সিপাৰে গাখীৰ লগাবলৈ গৈ আৰু উভতি নাহিল। উভতি আহোতে কপিলিৰ তাণ্ডৱ নৃত্যত নাৱেৰে সৈতে পানীৰ তললৈ সোমাই গ'ল। আনকি মৃতদেহটোও বিচাৰি নেপালে। নীলকান্তৰ স্পষ্টকৈ সকলো মনত নাই। সি কান্দিছিল কিন্তু মাকৰ অৱস্থা দেখি অসম্ভৱ ভয় খাইছিল। চুলি-তুলি মেলি কিবে কিম্ভূতকিমাকাৰ হৈছিল! বহুত দিনলৈ মাকৰ মুখলৈ চাবলৈ তাৰ সাহ হোৱা নাছিল। তেতিয়া সি একো বুজা নাছিল; কিন্তু লাহে লাহে বুজিছিল। বুজিছিল, পিতৃহীন ল'ৰা-ছোৱালীৰ বেদনা কিমান!

মাকক নীলকান্তই খুব শ্ৰদ্ধা কৰে। সিহঁত দুটাৰ কাৰণেই মাকে নিজকে তিলতিলকৈ শেষ কৰি দিলে। দেউতাক ঢুকুৰাৰ পিচৰে পৰা কম কষ্টকৈ ডাঙৰ কৰা নাই। সিহঁতৰ বিপদৰ সময়ত গাৱঁৰ কোনো মানুহেই সহায় কৰিবলৈ নাহিল। আপোন খুৰা-য়েকটোও আঁতৰি গ'ল।

সপ্তমমান শ্ৰেণী পাওঁতেই নীলকান্তই স্কুল এৰি দিলে। আৰু পঢ়িব পাৰিলেহেঁতেন; কিন্তু আৰ্থিক অৱস্থাই আৰু নুকুলালে। পঢ়াত বৰ বেছি চোকা নহলেও পাছ কৰিব পৰা জোখাৰে তাৰ অৰ্হতা আছিল। কিন্তু মনেপতা পুখুৰীত মানুহে পানী খাবলৈ নেপায়।

নীলকান্তই পঞ্চমমানত পঢ়ি থাকোতেই এদিন গম পালে সাতো-লাই তেওঁৰ ঘৰৰ কাষতে থকা সিহঁতৰ বাৰীখন নামজাৰী কৰি

লৈছে। দেউতাকে হেনো বন্ধকত থৈছিল মৃত্যু হোৱাৰ দুমাহ আগতেই এতিয়া সময় উকলি যোৱাত বাৰীখন তেওঁৰেই হ'ল। মাকে গোটেই গাৱঁকে কথাটো গোকাট মিছা বুলি জনাই দিয়াতো কোনেও প্রতিবাদ কৰিব নোৱাৰিলে। কৰিবই বা কোনে? সকলোৱেই যে সাতোলাৰ ওচৰত ধৰুৱা। বহুতেই মনে মনে মোকৰ্দ্দমা কৰিবলৈ কৈছিল; কিন্তু পেটৰ ভাতমুঠিৰ কাৰণে চিন্তা কৰা মানুহে মোকৰ্দ্দমা কৰিবলৈ অ'ত টকা পাব ক'ত? একমাত্র ভগৱানৰ বাহিৰে গোচৰ দিবলৈ মাকে অন্য কোকো বিচাৰি পোৱা নাছিল। নীলকান্তই এতিয়া ভাবে, সেইখিনি সময়ত সি কিয় বাৰ বছৰীয়া ল'ৰা আছিল। তাৰ পঁচিশ বছৰীয়া ডেকা তেজটো নেথাকিল কিয়? এতিয়া আৰু হা-হুতাশ কাঢ়ি লাভ নাই। সাতোলাই আজি পোন্ধৰ বছৰে দখল খাই আছে। তথাপি কেতিয়াবা বাৰীখনৰ আগেদি সিপাৰ হৈ যাওঁতে তাৰ গা চেঙচেঙাই যায়। বুকুখনৰ কানোবাখিনিত ৰৰ বিষাই উঠে। দেউতাকে কিমান যত্ন কৰিয়েই যে বাৰীখন নুতুলিছিল। এনেকুৱা জাৰৰ দিনতে জলফাই খাবলৈ গৈ সৰু সৰু ল'ৰা-ছোৱালীৰ লগত কৰা কাজিয়াবোৰ তাৰ এতিয়াও স্পষ্ট মনত আছে।

টোপনিতেই কিৰণমতীৰ হাত এখনে নীলকান্তৰ ডিঙিটোত মেৰাই ধৰিছিল। হাতখন একৰাই দিব বুলি ভাবিও সি নিদিলে। কি যেন এক গভীৰ প্রশান্তিত কৰণমতীৰ টোপনি আহিছে। সৰ্ব্বস্ব তাকেই অর্পণ কৰি এক পৰম নির্ভয়ে তাই টোপনি গৈছে। কিৰণমতীৰ আশা-আকাঙ্খা কামনা-বাসনাৰ শেষ আশ্রয়স্থলটো সিয়েই। নীলকান্তই কিৰণমতীৰ মুখখনত এনেয়ে এবাৰ হাত ফুৰাই দিলে। ইমান মিহি ইমান মসৃণ!

এইজনী কিৰণমতীকে সি বিয়া কৰাই আনিছিল। সেইয়া দহমাহ, মাত্র দহমাহৰ আগৰ কথা। মাকে তাৰ বিয়াৰ কাৰণে ব্যতিব্যস্তহৈ উঠিল। উঠিবৰ কথাই। ল'ৰাৰ উপযুক্ত বয়স হৈছে। উপযুক্ত বয়সত বিয়া পতাটো সকলো মাক-বাপেকৰে ইচ্ছা, নহ'লে হেনো তেওঁলোকক পাঁপে চুব। সন্তানৰ সুখ-শান্তি বাঞ্ছা কৰাটো মাক-বাপেকৰ স্বভাৱধর্ম্ম। তাৰ জীৱনতো এজনী ছোৱালীৰ প্রয়োজন সেইটো নীলকান্তই আজি দুই-তিনি বছৰৰ আগৰ পৰা অনুভৱ কৰি আহিছিল। মাকো লাহে লাহে বুঢ়ী হৈ আহিছে। এজনী ন কন্যাই এইখন ঘৰ নগছালৈকে বাণুমাইকো আন এঘৰলৈ উলিয়াই দিব নোৱাৰি। নহ'লে যে মাকে কামত খুব কষ্ট পাব।

সেয়ে ছোৱালী চোৱা হ'ল। বেছি দূৰৰ নহয়। ছয় মাইল দূৰৰ উলুৱনিত। ছোৱালী পাঠশালাখন পাছ। কামে-বনে বোলে তনস্কাৰ। বোৱা-কটাত চেৰ পেলাৰ পৰা ছোৱালী সেইখিনিত নাযেই। মাকৰ লগত ছোৱালী চাবলৈ যোৱা কণমাই পেহীয়ে ক'লেহি, 'ইচ্ বোপাই, এনে ছোৱালী দেখা নাই দে। কামত এনে খৰংখোচ। সঁচাকৈয়ে ঘৰ ধৰিখোৱা বিধৰ। তোৰে সৈতে যে এনে যোৰ হ'ব। যোৰো যোৰ একেবাৰে পাভ যোৰ। নাকে-মুখে গঢ়ে-পিটে তেনেই কুন্দত কটা। এপাহ যেন ফুলি উঠা গোলাপহে কিবা ভাগ্যৰ বলতহে সেইজনী ছোৱালীত চকু পৰিছেগৈ।"

এইজনী কিৰণমতীৰ লগতে নীলকান্তই আজি দহমাহে সংসাৰ কৰিছে। এজনী ছোৱালীৰ বুকুত ইমান মৰম, ইমান চেনেহ, ইমান সহানুভূতি লুকাই থাকিব পাৰে বুলি সি বিয়াৰ আগতে অনুভৱেই কৰিব পৰা নাছিল। হঠাতে এটা কথা মনত পৰি নীলকান্তই এক অদ্ভুত তৃপ্তি অনুভৱ কৰিলে। এইজনী, এইজনী কিৰণমতীয়ে যে আজি সাতমাহে গা ধোৱা নাই। সি যে বাপেক হ'বলৈ ওলাইছে। হঠাতে কিৰণমতীলৈ তাৰ খুব মৰম লাগি গ'ল। কিৰণমতীক খুব জোৰেৰে সাৱটি লবলৈ হাতখন আগুৰাই নিও আকৌ পিচুৰাই লৈ আহিল। নাই থাওক, কিমান নির্ভয়ে শুইছে। এইটো টোপনি ভাঙিব নোৱাৰি। সি বাপেক হ'ব। এইটো ভাবেই শৰীৰ-মন সকলো আচ্ছন্ন কৰি পলালে। এটি শিশুৰ প্রতিচ্ছবিয়ে নীলকান্তৰ মনত তোলপাৰ লগালে। শিশু এটিৰ কল্‌কলনিয়ে ঘৰখন যেন মুখৰিত কৰি তুলিছে। তাক দে'তা দে'তা বুলি পিচে পিচে ঘূৰি ফুৰিছে। অ'ৰ ত'ৰ পৰা ইটো-সিটো আনি দিবি বুলি আবদাৰ ধৰিছে।

কণমাই পেহীয়েই নীলকান্তক কৈছিল—গর্ভৱতী অৱস্থাত তিৰোতা মানুহে যি বিচাৰে তাকেই খাবলৈ দিয়া উচিত। নহ'লে সন্তানটো হেনো লুভীয়া হয়। বিশেষতঃ এইখিনি সময়ত তিৰোতাৰ টেঙা হেনো বৰ প্রিয়।

সাতোলাৰ বাৰীৰ পৰাই কমলাটেঙা অনাৰ শেষ সিদ্ধান্ত ললে নীলকান্তই। তাৰ অতি মৰমৰ কিৰণমতীজনীক কাইলৈ কমলাটেঙা এটা আনি দিব নোৱাৰিলে তাৰ পুৰুষত্বই বা থাকিব ক'ত? সাতোলাৰ বাৰীৰ পৰা সি মনেমনেই লৈ আহিব। এইটো কৰাত তাৰ পাপ নহয়। কমলাটেঙা জোপাতো সিহঁতৰেই আছিল—সাতোলাই জাৰকৈ নাম লিখাই ললে কাৰণেহে। আৰু টেঙা এটা মনে-মনে আনিলে মহাভাৰতখন একো অশুদ্ধ নহয় নিশ্চয়। হঠাৎ পাচফালৰ বাৰীখনত শিয়ালৰ হোৱা শুনি নীলকান্ত উচপ খাই উঠিল। তাৰ মানে এপৰ নিশা পাৰ হৈ গ'লেই। শিয়ালে পৰে পৰে হোৱা দিয়ে। নীলকান্তই টোপনি যাবলৈ চেষ্টা কৰিলে।

পিচদিনা ৰাতিপুৱা নীলকান্তই হালোৱা পৰ্বতে সাৰ পালে। পালেওখনৰ দাঁতিতে থোৱা বনিয়নটো পিন্ধি লৈ, এৰিয়া কাপোৰখন মুৰে-গাৰে ছাটি ললে। কিৰণমতীয়ে তাৰ আগতেই উঠি গৈ পিচফালে গা ধুবলৈ গৈছিল। মাকে পুৱাৰ ৰঙগীত গাইছিল বিচনাৰ পৰাই—'উঠবে উঠ বাপু গোপাল হে নিশি পৰভাত ভেল।' ৰাণুমাই বোধকৰো শুইয়েই আছে।

নীলকান্ত বাহিৰ ওলাই আহিল। বাহিৰত কাহিলি কাহিলি পোহৰ। হিম পৰি চোতালৰ আগৰ দুৰৰিডৰা মুকুতা-মণি জিলিকাদি জিলিকি আছে। হিমত তিতি থকা বননিডৰাত ভৰি দি নীলকান্তৰ গোটেই গা সিৰ্‌সিৰাই গ'ল। নীলকান্ত পোনেই গোহালী ঘৰটোৰ ওচৰলৈ গ'ল। গৰুহালৰ গাত মশাপাটৰ থৈলাকেইটা ঠিকমতে আছেনে নাই চালে। তাৰ পিচত মেজিটোৰ পৰা খেৰ একোছা আনি গৰুহালৰ আগত থকা গৰাকটোত থৈ ইফালে-সিফালে চালে, কিৰণমতীয়ে দেখে নেকি? নহ'লে হয়তো সি আঁসৈ মাতিব লাগিব। আজি একাদশী যেতিয়া হালখতি বুলি কিৰণমতীয়ে মজনা নহয়।

নীলকান্ত পোন কোৰেই ৰাস্তা পালেগৈ। ডাঠ কুঁৱলীৰ পৰা একোকে নেদেখি। শিয়াল এটা নীলকান্তৰ সন্মুখেদিয়েই লম্ব মাৰি গ'ল। নীলকান্তই অনুভৱ কৰিলে যেন তাৰ বুকুখন কিবা এক আশঙ্কাত কঁপিব লাগিছে। কোনোদিন নকৰা কাম এটা যেন সি কৰিবলৈ ওলাইছে। সাতোলাৰ ৰাখীততো তাৰ এতিয়া কোনো অধিকাৰ নাই। এড়িয়া চাদৰখন ভালকৈ চাটি লৈ সি কঁপনিটো মাৰ নিয়াৰলৈ চেষ্টা কৰিলে। মানুহ-দুনুহ ৰৰকৈ শোৱা পাটিৰ পৰা উঠাই নাই। চৰাইৰোৱৰ কলৰৱনিয়ে গছ-ৰাহৰোৰ মাথোন মুখৰিত কৰি তুলিছে।

হঠাৎ ৰাস্তাৰ দাঁতিৰ চটিয়ল জোপা দেখি নীলকান্ত থমকি ৰ'ল। এয়া দেখোন হৰেনহঁতৰ ঘৰ পালেহিয়েই। তাৰ পিচতে সৌখন ৰাখী। তাৰপিচতে সৌটো সাতোলাৰ ঘৰ। টিনপাতৰ ৰঙা ৰঙলাটো নীলকান্তৰ চকুৰ আগত অস্পষ্টকৈ ভাঁহি উঠিল। কুঁৱলী কিছু কিছু পাতলিছিল। নীলকান্তই এখুজি দুখুজি কৰি খুব সন্তৰ্পণে ৰাখীখনৰ পিনে আগৰাঢ়িল। এক অজান ভয়ে তাৰ দেহ-মন তেনেই আচ্ছন্ন কৰি পেলালে। বুকুৰ চপ্‌চপনিটোও সি স্পষ্ট শুনিবলৈ পালে। তথাপি আগৰাঢ়িল। কাণদুখন অলপ ৰঙা পৰা যেন অনুভৱ কৰিছিল। নিয়ৰ পৰি তিতি থকা শুকান পাত ৰোৱত তাৰ ভৰি পৰি চপ্‌চপাই উঠিছিল। লতিচোৱাতৰোৱৰ পৰা হাত সাৰিবলৈ নীলকান্তই অলপ ৰেঙা মেলি খোজ পেলাইছিল। লুঙলুঙিয়া ৰাটৰ কাষত থকা হৰ্টন কাঁইটৰোৱে তাৰ এড়িচাদৰখনত টানি টানি ধৰিছিল। আকৌ এৰাৰ নীলকান্তই চাৰিওপিনে চাই ললে। তাৰ পিচত একেৰাহে টেঙাজোপাৰ ওচৰ পালেগৈ। কমলা টেঙা লাটোপাখীয়ে লাগিছে। অ'ত ত'ত দুই এটা পকিছে। ওচৰত হাকুটি আছে নেকি নীলকান্তই চালে। নাই। নীলকান্তই পলম নকৰিলে। এড়ি চাদৰখন কঁকালত ভালকৈ বান্ধি লৈ চান্দনি নোহোৱাকৈ গছজোপালৈ উঠি গ'ল। মৃদু জাকৰনিত গছজোপাৰ পাতৰ পৰা নিয়ৰৰ টোপালবোৰ সৰি নীলকান্তৰ গাটো আধা-তিতা কৰি দিলে। তালৈ ভ্রূক্ষেপ নকৰি নীলকান্তই ডাল এটাৰ পৰা পকা চাই কমলা এটা চিঙি ললে।

"অ' এইটো ৰাখীত চোৰ ঔ" কোনফালৰ পৰা মাতটো আহিল নীলকান্তই টঙকিবই নোৱাৰিলে। একেকোৰেই মাটিত জাপ মাৰি পৰি সি কণামুনাকৈ দৌৰ দিলে। পিচলৈ চাবৰ সময় নহ'ল। কিন্তু হঠাৎ ৰাস্তাৰ দাঁতিত থকা গছৰ মূঢ়া এটাত উজুটি লাগি হাম-কুৰি খাই পৰিল। লগে লগে অনুভৱ কৰিলে ভৰিখন যেন তাৰ ছিগি গৈছে। লৰালৰিকৈ উঠি চাৰিওফালে চালে। কোনো নাই। তেন্তে এনেৰে শুনিলে নেকি? নীলকান্তৰ কাণদুখনত যেন তেতিয়াও বাজি আছে "এইটো ৰাখীত চোৰ ঔ"। কাণদুখন হেঁচামাৰি ধৰি নীলকান্তই ভৰিখনলৈ চালে। তেজ ওলাবলৈ আৰম্ভ কৰিছে। ঠিক কমলা টেঙাৰ দৰেই ৰঙা।

হঠাৎ নীলকান্তৰ ৰাস্তাৰ কাষৰ দ নৰ্দ্দমাটোলৈ চকু গ'ল। কমলা টেঙাটো হাতৰ পৰা ওফাই গৈ নৰ্দ্দমাটোৰ বোকাৰ লগত লুতুৰি-পুতুৰি হৈ পৰিছে।

+ + +

"দোষ স্বীকাৰ কৰাটো ঠাইলৰা সোটাৰ দৰে, সি আৰৰ গুচাই ঠাই ডোখৰ আগতকৈ নিকা কৰে।"

—মহাত্মা গান্ধী

ডাক্টৰ লিংডোৰ বিষয়ে গল্প এটা কম বুলি ভাবিছো। কোনোবা এক বৰষাৰ বাতি আমি সন্মুখত বঙীণ গিলাছ হাতত লৈ গল্প কৰি আছিলো। আমি মানে জ'ন, প্ৰণৱ, অসীম আৰু মই। দীৰ্ঘদিনৰ কৰ্ম্মবিৰতিৰ পিচত যেতিয়া তোমাৰ অৱসাদ আহে, অথবা জীৱনৰ গতানুগতিকতাই যেতিয়া তোমাক আমুৰায়, তেতিয়া তুমি তোমাৰ অন্তৰঙ্গ বন্ধুৰ লগত হাতত একোটা বঙীণ গিলাছ লৈ আড্ডা মাৰি বলৈ বহি যোৱা, অথবা হাতত ফুলছৰ পাত লৈ ভাগ্য পৰীক্ষাত লাগি যোৱা, দেখিবা তোমাৰ সমস্ত ক্লান্তি, অৱসাদ আঁতৰি গৈছে। ডাঃ লিংডোৰ ভাষাতেই কওঁ, "হোৱেন ইউ আৰ এগজষ্টেড্, টে'ক এ গ্লাছ অৱ ৱাইন, এণ্ড ছিং ফি ফটি ম্যান অন দা ডেড্ মেন'ছ ছেষ্ট, য়্যো হো হো এণ্ড্ এ বটল্ অৱ্ ৱাম্ এণ্ড্ অল্ ইওৰ এগ্-জশ্যন্ গান্।" সঁচাকৈয়ে বঙীণ বটল আৰু ফুলছৰ পাততে এনে এক মাদকতা আছে যাক কেৱল অভিজ্ঞইহে বুজিব পাৰিব

কব খুজিছিলো ডাক্টৰ লিংডোৰ বিষয়ে এটা গল্প। আহাৰ মাহৰ কোনোবা এক বৰষাৰ বাতি জ'ন, প্ৰণৱ অসীম আৰু মই। গল্প কৰি আছিলো। বাহিৰত মুষলধাৰে বৰষুণ। এনে এক বৰষাৰ বাতি কিধৰণেৰে উপভোগ কৰা যায় বাৰু? পৰিৱৰ্ত্তনশীল প্ৰকৃতিয়ে কেতিয়াবা মানুহক এনে একোটা দিন, এনে কিছুমান মুহূৰ্ত্ত দান কৰে, যাক সম্পূৰ্ণভাৱে উপভোগ কৰিবলৈ কিছুমান বিশেষ ব্যৱস্থা, কিছুমান বিশেষ পৰিৱেশৰ প্ৰয়োজন। তেনে এক বিৰল বৰষাৰ বাতি আছিল সেইটো। সেয়েহে আমি উদ্‌ভ্ৰান্ত হৈ পৰিলো এনে এক ব্যৱস্থাৰ আয়োজন কৰিবলৈ, যাৰ দ্বাৰা আমি সেই অমূল্য মুহূৰ্ত্তখিনি সম্পূৰ্ণভাৱে উপভোগ কৰিব পাৰো। জ'নৰ মতে এনে এক বিৰল বৰষাৰ বাতি হাতত পানীয় আৰু বাহুত প্ৰেয়সীৰবাহোন লৈ কোনোবা এক নৈশ ক্লাবত পপ্ ছঙৰ ছন্দে ছন্দে আৰু বাহিৰৰ মুষলধাৰৰ বৰষুণৰ গতিৰ লগে লগে নাচি থকাই আটাইতকৈ বুদ্ধিমানৰ কাম হব। জানা, মই যেতিয়া কলিকতাৰ ম্যাড হাউচত —"ড্যাট্ছ কোৱাইট এ ছিলি আইডিয়া" জ'নৰ কথা শেষ হবলৈ নৌ পাওঁতেই অসীমে চিঞৰি উঠিল, "চোৱা, এনেহেন বৰষাৰ বাতি একো নকৰাকৈ থকাটোৱেই আটাইতকৈ বুদ্ধিমানৰ কাম হব

তুমি বহি থাকা কেৱল বহি থাকা, একো নকবিবা। তোমাৰ চিন্তা জগতত একোকেই স্থান নিদিবা। দেখিবা তোমাৰ মন প্ৰাণ এক অনিৰ্ব্বাচনীয় আনন্দত নাছি উঠিছে। একো নোপোৱাৰ, একো নকৰাৰ এক বিমল আনন্দই তোমাৰ মন-প্ৰাণ আপ্লুত কৰি তুলিব। ডাঃ জন্‌ছনৰ কথা তোমালোকে নেজানা জানো? দীৰ্ঘদিন মেলাঙ্ক-লীয়া যোগত ভুগি ডঃ জনছনে "থৈ দিয়া তোমাৰ জনছন্", অসীমৰ জনছন প্ৰীতিক মই বহুত দিনৰে পৰা ভাল চকুৰে চাব পৰা নাছিলো। সেয়েহে মই কৈ উঠিলো"মই ওমৰৰ শিষ্য। মোৰ মতে এনে এক ৰাতি ঊনবিংশ শতিকাৰ ৰোমান্টিক কবিতাৰ ছিৱিজ হাতত লৈ গোটেই ৰাতি কবিতাৰ মধুৰ ৰস পান কৰাটোহে শ্ৰেষ্ঠতৰ কাম হব। মই বোধকৰো আৰু কিবা কম বুলি ভাবিছিলো—প্ৰণৱে হঠাৎ চিঞঁৰি উঠিল—"ঐ, গল্প এটা কম, শুনিবি?" আমি আটাইকেউটাই তাৰ ফালে একেলগে চালো। আমাৰ যুক্তি তৰ্কৰ ওৰ পৰিল। প্ৰণৱৰ গল্প? এই সময়ত প্ৰণৱৰ গল্প শুনিবলৈ এবি যুক্তি তৰ্কত লাগি থকাতো যে মূৰ্খামি হব তাক আমি আটায়ে বুজো। প্ৰণৱৰ গল্প কোৱাৰ এক নিজস্ব ভঙ্গী আছে, তাৰ গল্প শুনাত এক বেলেগ আমেজ আছে। সেয়েহে আমি আটায়ে তাৰপৰা গল্প শুনিবলৈ অধৈর্য্য হৈ বলো। প্ৰণৱে কৈ গ'ল; আমি শুনি গলো

"এদিন আবেলি আমি ব্ৰহ্মপুত্ৰৰ পাৰেদি ফুৰিবলৈ গৈছিলো। আমি মানে মই আৰু মোৰ বান্ধৱী অৰুণিমা। আমি বোধকৰো অলপ নিৰ্জ্জনতা বিচাৰিছিলো, সেয়েহে জনসমাগমৰপৰা আঁতৰেদি এক নিৰ্জ্জন বাটৰকেই আমি বাচি লৈছিলো। কাষত মহাবাহু ব্ৰহ্মপুত্ৰ। আনকাষে ষ্ট্ৰীট লাইটবোৰ। তেতিয়া গধূলি নামি আহিছিল। গধূলিৰ নিৰ্জ্জনতা আৰু কাষত অন্তৰঙ্গ বান্ধৱীৰ সান্নিধ্যই মোৰ মনপ্ৰাণ অসীম আনন্দই আপ্লুত কৰি পেলাইছিল। হঠাতে আকাশত মেঘ জমা হ'ল, মেঘে গৰ্জ্জিবলৈ ধৰিলে আৰু কি কৰিম একো ঠিক কৰিবলৈ পোৱাৰ আগতেই মুষলধাৰে বৰষুণ দিবলৈ ধৰিলে। নিৰ্জ্জন বাটৰ হেতুকে মটৰ বিচাৰি একোকে ঠাইতে নোপোৱা হলো, যাৰ সহায়ত আমি বৰষুণৰপৰা ৰক্ষা পাব পাৰো। সেয়েহে কিংকৰ্ত্তব্য বিমূঢ় হৈ আমি ওচৰৰে এক প্ৰকাণ্ড ঘৰত সোমাই পৰিলো, কিন্তু ঘৰৰ ভিতৰত সোমাই আমি বেছিকৈহে অপ্ৰস্তুত হবলৈ ধৰিলো, কাৰণ সেইটো ঘৰ আছিল ডাক্টৰ লিংডোৰ ঘৰ, যাৰ খ্যাতি সমস্ত অসম জুৰি বিদ্যমান। ডাক্টৰ লিংডোই ভাল কৰিব পৰা নোৱাৰা বেমাৰ নাই। যাদুকৰৰ দৰে এক অসীম শক্তিৰ প্ৰভাৱত ডাক্টৰ লিংডোই নিষ্প্ৰাণ বেমাৰীৰ দেহত প্ৰাণ দিয়ে, নিৰাশক আশা দিয়ে। এনে এক ব্যক্তিৰ ঘৰৰ বাৰান্দাত গধূলিৰ অন্ধকাৰত এহাল যুৱক যুৱতী থিয় দি থকাটো যে নিতান্ত অশোভনীয় কথা, তাক ভাবি আমি বেছিকৈ অপ্ৰস্তুত হবলৈ ধৰিলো। কিন্তু বাহিৰত ইমান বেছিকৈ বৰষুণ পৰিছিল যে ডাক্টৰ লিংডোৰ ঘৰৰ পৰা ওলাই অহাটোও সম্ভৱপৰ নাছিল। মনৰ এক দোদুল্যমান অৱস্থাত কি কৰিম ভবি থাকোতেই কাষোৱাৰ কোমল মাতত মূৰি চাই দেখিলো—ডাক্টৰ লিংডো স্বয়ং। ভয় আৰু আশঙ্কাত বিমূঢ় হোৱাৰ সলনি ডাক্টৰ লিংডোৰ ব্যৱহাৰত আমি আশ্বস্তহে হলো। ডাক্টৰ লিংডোই আমাক সম্বৰ্দ্ধনা জনালে "হেল্লো য়াং কাপল, হাউ ডু ইউ ডু? কাম্ এনং কাম এনং।" য়াং কাপ্‌ল বুলি কোৱাত লজ্জিত হৈ কলো—'এক্সিউজ মি ছ্যাৰ, উই আৱ্ নট্ ইৰেট্ মেৰেইড।" মোৰ কথাত ডাক্টৰ লিংডোই হো হোৱাই হাঁহি দি কলে—"বাট্ ইউ উইল বি মেৰেইড্ ভেৰি চুন ইজ্ নট্ ইট?"

আমাক নি ডাক্টৰ লিংডোই ড্ৰয়িং ৰুমত বহুৱালেগৈ। বয়টোক তিনি কাপ কফিৰ অডাৰ দিলে। তাৰ পিচত আৰম্ভ কৰিলে—"তোমালোকক মই প্ৰায়ে এই বাটটোৰেদি ফুৰিবলৈ অহা দেখো। তোমালোকৰ চাল-চলন, আদিত বুজিছো, তোমালোকৰ মাজত গভীৰ প্ৰেম আছে। সেয়েহে তোমালোকক মই য়াং কাপ্‌ল বুলি কৈছো, কাৰণ মই নিশ্চিত যে তোমালোকৰ অতি সোনকালেই মিলন অৱশ্যম্ভাৱী।" পিতৃসদৃশ এজন মানুহে প্ৰণয় ঘটিত কথা কোৱাত আমি লজ্জিত হলো আৰু সেয়েহে কথা ঘূৰাবলৈকে কলো—হয়, আমি প্ৰায়ে এইফালে ফুৰিবলৈ আহো। আজি হঠাতে বৰষুণজাক দিয়াত উপায়ন্তৰ হৈ বাতিখন আপোনাক আমনি—"ন' ন' য়াং বয়, ডাক্টৰ লিংডোই বাধা দি উঠিল—"মোৰ একো অসুবিধা হোৱা নাই। বৰঞ্চ তোমালোক অহাত মই আনন্দিতহে হৈছো, অতিশয় আনন্দিত। জানা, কেতিয়াবা মই গধূলিৰ এই নীৰৱ মুহূৰ্ত্তবোৰ কটাবলৈ এক সঙ্গীৰ অভাৱত হাহাকাৰ কৰি উঠো। পুৱা সাত বজাৰ পৰা গধূলি সময়লৈকে মোৰ ইয়ালৈ অসংখ্য মানুহ আহে। অৱশ্যে শতকৰা এশভাগেই বেমাৰী। সিহঁতৰ নিষ্প্ৰাণ দেহাত মই প্ৰাণ দিওঁ, নিৰাশ বেমাৰীবোৰক মই আশাৰ বাণী শুনাওঁ, কিন্তু দিনান্তৰ শেষত যেতিয়া অন্ধকাৰ নামি আহে, মোৰ ইয়ালৈ তেতিয়া কোনো নাহে। মই বৰ অকলশৰীয়া অনুভৱ কৰো। কেতিয়াবা বৰকৈ অৱসাদ আহিলে কোনোবা বন্ধুৰ ঘৰত গৈ তাছৰ আড্ডা দি ক্লান্তি দূৰ কৰো যদিও প্ৰায়ে মই অকলশৰেই থাকিব লগা হয়। তেতিয়া মোৰ সঙ্গী হৈ পৰে কি জানা? "এ গ্লাছ অৱ্ ৱাইন্ এণ্ড ছাম অ'ল্ড মেমৰী।"

ইমানসময়ে মনোযোগেৰে ডাক্টৰ লিংডোৰ কথা শুনি আছিলো। মোৰ মনত ভাৱৰ খেলিমেলি লাগিল—ডাক্টৰ লিংডো অকলশৰীয়া

কিয়? তেওঁৰ কোনো নাই নেকি? হঠাতে সুধি পেলালো—"কিন্তু ছাৰ, আপোনাৰ পৰিয়াল, ঘৰত আন কোনো নাই নেকি?" প্ৰশ্নটো সুধি নিজেই অপৰাধী অনুভৱ কৰিলো—প্ৰশ্নটো সোধা উচিত হ'ল জানো?

মই মন কৰিলো, মোৰ প্ৰশ্নৰ লগে লগে ডাক্টৰ লিংডোৰ মুখমণ্ডল বিষাদত ভৰি পৰিছে। কিবা এক বেদনাময়ী স্মৃতিয়ে তেওঁৰ মুখখন নিষ্ঠুৰভাৱে শিলাময় কৰি পেলালে। তেওঁ কিছু সময় মনে-মনে থাকিল তাৰ পিচত নিজকে সম্বৰণ কৰি লৈ কলে—"সেই বোৰ বহুত কথা। তাকেই তোমালোকক কম বুলি ভাবিছো। চোৱা, এনে কিছুমান কথা আছে, যিবোৰ কথা কাৰোবাক নকলে শান্তি পোৱা নেযায়, কিন্তু সেইবোৰ কথা যাকে-তাকে কৰও নোৱাৰি। কিছুমান বিশেষ কথা কবলৈ কিছুমান বিশেষ মানুহৰ প্ৰয়োজন। আৰু তোমালোকক মই সেই বিশেষ মানুহ বুলি ভাবিছো, যাক মোৰ জীৱনৰ বিশেষ কথাবোৰ কব পাৰি।"

এইখিনিকে কৈ ডাক্টৰ লিংডো মনে মনে থাকিল। বোধহয়, তেওঁ কথাবোৰ মনৰ ভিতৰতে জুকিয়াই ললে। তাৰ পিচত তেওঁ লাহে লাহে আৰম্ভ কৰিলে——

"মোৰ জীৱনৰ ইতিহাস কোৱাৰ আগতে মনত পৰিছে টেনিছনৰ সেই বিখ্যাত কবিতাটোলৈ। জাৰকালিৰ কোনোবা এটা বিষণ্ণ সন্ধিয়া প্ৰেমিক বহি আছিল জুইশালৰ কাষত। মন তেওঁৰ বিষাদপূৰ্ণ। অতীত জীৱনৰ কথা মনত পৰিছে তেওঁৰ। প্ৰেম আৰু জীৱনৰ মাজত সমন্বয় ৰাখি প্ৰেমক এক মহিমামণ্ডিত ৰূপত ৰূপ দিয়াৰ সপোন দেখিছিল তেওঁ। কিন্তু তেওঁৰ সেই সপোন ভাঙি-ছিঙি চূৰ্ণ-বিচূৰ্ণ কৰি দিছিল তেওঁৰেই প্ৰেয়সীয়ে, যাক তেওঁ হিয়া ভৰা চেনেহ খাচিছিল, যাক লৈ তেওঁ সপোন ৰচনা কৰিছিল।

জাৰকালিৰ বিষণ্ণ সন্ধিয়া জুহালৰ কাষত বহি সপোন দেখিছে তেওঁ—আজি যদি তেওঁৰ প্ৰেমিকা কাষত থাকিলেহেঁতেন - প্ৰেমিকাই জুহালৰ কাষত বহি চাহ-পানী তপতাই থাকিলেহেঁতেন। আৰু তেওঁ গালেহেঁতেন স্বৰচিত কবিতা। কবিতা গালে তেওঁৰ প্ৰেমিকা নিথৰ লাগি থাকে। কিন্তু তেওঁৰ সপোন আৰু কেতিয়াও বাস্তৱত পৰিণত নহয়। তেওঁৰ পূজাৰ বেদী প্ৰেমিকাই ভৰিৰে গছকি থৈ আশ্ৰয় ললেগৈ আন কাৰোবাৰ বুকুত। হাঁয়, যাক আজি তেওঁ সাৰটি ললেহেঁতেন, তেওঁ এতিয়া কোনোবা অজান ব্যক্তিৰ বুকুৰ আলিঙ্গণত! দুখত কাতৰ হৈ প্ৰেমিকে এটা দীঘল হুমুনিয়াহ কাঢ়ো-তেই শুনিলে দুৰাৰত কাৰোবাৰ আঙুলিৰ মৃদু টোকৰ। সচকিত হৈ উঠিল প্ৰেমিক। জাৰকালিৰ এই বিষণ্ণ সন্ধিয়াত কোন আহিব পাৰে তেওঁৰ ওচৰলৈ? বিস্ময়ত হতভম্ব হৈ উঠিল যেতিয়া দুৰাৰখন খুলি-সেই সন্মুখত দেখিলে তেওঁৰেই প্ৰাণৰ প্ৰেমিকা, যাৰ কাৰণেই ইমান সময়ে তেওঁৰ প্ৰাণে কান্দি আছিল! দুয়ো দুয়োলৈকে নীৰৱে চাই থাকিল বহুত সময়।

জাৰ কালিৰ সন্ধিয়া। বৰফত হাত-ভৰি পোত খাই আহিছে প্ৰেমিকাৰ। জুইৰ কাষত বহি হাত ভৰি সেকিলে তেওঁ। তাৰ পিচত কেট্‌লীত পানী বহাই দিলে। অলপ পিচতে চাহ- পানী প্ৰস্তুত হ'ল আৰু দুয়ো ভগাই খালে।

ইমান সময়ে প্ৰেমিক নিৰ্ব্বিকাৰ হৈ আছিল। তলৈলৈ মূৰ কৰি তেওঁ ভাবিছিল—ইমান ভাগ্য আজি তেওঁৰ! ইমান আনন্দ! যাৰ কথা ইমান সময়ে ভাবি আছিল, যাৰ সান্নিধ্যত সন্ধিয়াতো মধুৰ হব বুলি ভাবিছিল, তেৱেঁই আহি তেওঁৰ সপোনক বাস্তৱত ৰূপ দিলেহি। আনন্দত মত্ত হৈ পৰিল তেওঁ।

কিন্তু হঠাতে তেওঁৰ মনত এক প্ৰবল আবেগৰ সৃষ্টি হ'ল। সেই আবেগ দুখৰ আবেগ, বিষণ্ণতাৰ আবেগ। তেওঁৰ জীৱনৰ ইমান দুখৰ কাৰণ কি? এই প্ৰেমিকাই নহয়নে? এই প্ৰেমিকাই তেওঁৰ সকলো স্বপ্ন কালৰ বুকুত নিশ্চিহ্ন কৰি দিলে। তেওঁকেই জীৱন দেৱতা বুলি অঙ্গীকাৰ কৰা সেই প্ৰেমিকাই এদিন নিজ অঙ্গীকাৰ ভঙ্গ কৰি আনৰ বুকুলৈ গুছি গ'ল।

এক মুহূৰ্ত্তমান ভাবিলে তেওঁ। তাৰ পিচত ভিতৰলৈ উঠি গ'ল আৰু অলপ সময়ৰ পিচতেই হাতত কিবা এটা লৈ পুনৰ উপস্থিত হলহি প্ৰেমিকাৰ সন্মুখত। এটা মুহূৰ্ত্ত। তাৰ পিচত নীৰৱ পঁজাঘৰ ভেদ কৰি তিনিটা শব্দ হ'ল—গুৰুম গুৰুম গুৰুম। লগে লগে এক বিকট শব্দ কৰি প্ৰেমিকা ঢলি পৰিল।"

"উঃ কি নৃশংস, কি কৰুণ, কি নিদাৰুণ ঘটনা।" ডাক্টৰ লিংডোৰ কথা শেষ হোৱাৰ লগে লগেই অৰুণিমাই কৈ উঠিল। "প্ৰেমিকে যদি সঁচাই প্ৰেমিকাক ভাল পাইছিল, আৰু যদি সেয়া প্ৰকৃত প্ৰেম হয়, তেন্তে তেওঁ কিয় গুলী কৰি মাৰিলে প্ৰেমিকাক? ই এক আচৰিত আৰু অভিনৱ কাণ্ড।"

"সঁচাকৈয়ে আচৰিত, নহয়নে বাৰু?" ডাক্টৰ লিংডোই কৈ উঠিল। "কিন্তু প্ৰেমিকৰ পক্ষে সেয়ে আছিল সহজ পথ। প্ৰেমৰ পথ অতিশয় পিচল। প্ৰেম এক ভয়ানক বস্তু। প্ৰেমিকে যেতিয়া ভাৱে যে তেওঁৰ প্ৰকৃত ভাল পোৱাক প্ৰেমিকাই অৱমাননা কৰিছে, নতুবা তেওঁক অঙ্গীকাৰ কৰিও হাস্যচিত্তে আনৰ ওচৰলৈ গুছি গৈছে, তেতিয়া তেওঁৰ পক্ষে দুটাই মাত্ৰ পথ থাকে, হয়তো নিজেই ধ্বংস হৈ যোৱা, নহয় প্ৰেমিকাক ধ্বংস কৰা। এয়া টেনিছনৰ কবিতাৰ কাহিনীহে। কিন্তু বাস্তৱ ক্ষেত্ৰতো প্ৰেমৰ বিষয়ে আশ্চৰ্য্য ঘটনাৰ অলেখ উদাহৰণ আছে।"

"ধৰি লোৱা মোৰ ঘটনাটোৱেই," ডাক্টৰ লিংডোই এইবাৰ নিজৰ ঘটনা কবলৈ আৰম্ভ কৰিলে। "তেতিয়া মই লণ্ডনৰ স্কুল অৱ্ মেডিকেল ছায়েন্সৰ ছাত্ৰ আছিলো যদিও ছবি আঁকা মোৰ এনেছোৱ্ আছিল। মানুহৰ গ্ৰন্থিতত্ত্ব, যোগ, আদিৰ বিষয়ে জ্ঞান অৰ্জ্জাৰ লগে লগে প্ৰকৃতিৰ সৌন্দৰ্য্যক বং আৰু তুলিকাৰে ধৰিবখাটো মোৰ খেয়ালী মনৰ প্ৰবৃত্তি আছিল। সেয়েহে চহৰৰ পৰা আঁতৰে আঁতৰে, কেতিয়াবা, হাইড পার্ক, কেতিয়াবা টেমছ্ নৈৰ কাষত বহি মই ছবি আঁকিছিলো।

এদিন টেম্ছ নৈৰ কাষত, জনসমাগমৰপৰা আঁতৰত বহি মই ছবি আঁকি আছিলো। জিব্ জিব্কৈ বৈ গৈছিল পানীবোৰ। অস্তগামী সূৰুযৰ ৰাঙলী আভাই মোৰ মনত এক অসীম সৌন্দৰ্য্যতৃষ্ণা জগাই তুলিছিল। কেতিয়ানো সন্ধিয়াৰ পাতল অন্ধকাৰে আৱৰি ধৰিছিল মই কব পৰা নাছিলো। হঠাতে এক পাতল নিশ্বাসৰ শব্দত মোৰ চমক ভাগিল। ঘূৰি চাই দেখিলো পিচেই কাষতে এজনী ছোৱালী। বিস্ময়ত, হতবাকত বহুত সময় ধৰ লাগি চাই থাকিলো। তাৰ পিচত প্ৰশ্ন কৰিলো——

"কোন তুমি, অকলশৰে এই সান্ধ্যাখন কলৈ আহিছা?"

"মোৰ নাম মাৰ্গাৰেট", ছোৱালীজনীয়ে কৈ উঠিল। "বহুত দিনৰেপৰা তোমাক মই লক্ষ্য কৰিছো। তুমি বাৰু অকলে অকলে নিৰ্জ্জনতাক আঁকোৱালি লৈ এইবোৰ কি কৰি ফুৰিছা? চোৱা, তুমি বাৰু বাস্তৱ কিয় ভাল নোপোৱা?"

"সেইটো মোৰ ব্যক্তিগত কথা। কিন্তু তোমাক কি লাগে, তাকে পোনে পোনে নোকোৱা কেলৈ?"

ছোৱালীজনীয়ে এইবাৰ তলমূৰ কৰিলে। তাইৰ ওঁঠ দুটা মৃদুভাৱে কঁপি উঠিল। তাৰ পিচত লাহেকৈ কলে—"কিন্তু তুমি মই যিহকে বিচাৰিম দিবা জানো?"

"সম্ভৱপৰ হলে নিশ্চয় দিম।" ছোৱালীজনীৰ কথাত আচৰিত হৈছিলো যদিও কলো।

"তেনেহলে মোক এটা চুমা দিয়া। মাথোন এটা চুমা। চোৱা, মই বৰ দুৰ্ভগীয়া। আমি কেথলিক ধৰ্ম্মৰ মানুহ। মোৰ মা-দেউতাই মোক পুৰুষৰ লগত ফুৰিবলৈ নিদিয়ে। কিন্তু চোৱা, সুদীৰ্ঘ ওঠৰটা বছৰ মই কোনো পুৰুষৰ সান্নিধ্য নোপোৱাকৈয়ে গ'ল। কিন্তু ময়োতো মানুহ, মোৰো কামনা-বাসনা আছে! মইনো বাৰু কেনেকৈ থাকো, পুৰুষৰ সান্নিধ্য নোহোৱাকৈ, পুৰুষৰ মৰম নোপোৱাকৈ?"

একে আষাৰতে কথাখিনি কৈ ছোৱালীজনীয়ে ফোপাবলৈ ধৰিলে। বুজিলো, তাই বৰ উত্তেজিত হৈছে। কিবা এটা ডাঙৰ কাম কৰি পেলোৱাৰ আনন্দত তাই ফোপাইছে। ছোৱালীজনীলৈ মোৰ পুতৌ হ'ল। একো নেভাবি আলফুলকৈ সাৱটি ধৰি তাইৰ ওঁঠত এটা চুমা আঁকি দিলো। মোৰ এই অকণমানি মৰমে ছোৱালী জনীক যি সৰগীয় আনন্দ প্ৰদান কৰিলে তাক মই বৰ্ণনা কৰিব নোৱাৰিম। কাহানিও কাৰোপৰা অলপো মৰম নোপোৱা এই ছোৱালীজনীয়ে মোৰ এই মৰমক জীৱনৰ শ্ৰেষ্ঠ সম্পদ হিচাবে ললে।

সিদিনাৰেপৰা মাৰ্গাৰেটে সদায়েই মোৰ সান্নিধ্য বিচৰা হ'ল। প্ৰকৃতপক্ষে কবলৈ গলে প্ৰথমতে মই মাৰ্গাৰেটৰ প্ৰতি সিমান আকৰ্ষিত হোৱা নাছিলো, কিন্তু পিচলৈ মাৰ্গাৰেটৰ আন্তৰিক প্ৰেমে মোকো আকৰ্ষিত কৰিবলৈ ধৰিলে। আমি দুয়ো দুয়োৰে সান্নিধ্যত পাবলৈ ধৰিলো অনাবিল আনন্দ। আমাৰ প্ৰেমৰ সাক্ষী টেম্ছ নদীৰ পাৰ, হাইড্ পার্কৰ কাষৰ বেঞ্চ আৰু নিৰ্জ্জন ৰাষ্টা-ঘাটবোৰ আজিও চাগৈ একেদৰেই আছে। কিন্তু আমি একেধৰণেৰে থাকিব নো নোৱাৰিলো।

ডাক্টৰ লিংডো অলপ সময় ৰ'ল। তাৰ পিচত আকৌ লাহে লাহে আৰম্ভ কৰিলে, শৰতৰ এদিন সন্ধিয়া। মাৰ্গাৰেট আৰু মই বহি আছিলো টেমছ্ নদীৰ পাৰৰ ঘাঁহনিডৰাত, য'ত মাৰ্গাৰেট আৰু মোৰ প্ৰথম পৰিচয় হৈছিল। আকাশত শুভ্ৰ মেঘ। বেলিটোৱে ৰঙা পোহৰ ছটিয়াই দিছিল চাৰিওফালে। টেমছ নদীৰ পানীত ৰঙা পোহৰবোৰ পৰি এক অভিনৱ দৃশ্যৰ সৃষ্টি কৰিছিল। ৰিব্ ৰিব্ বতাহৰ ছেৰে ছেৰে ঢউবোৰ উঠিছিল আৰু নামিছিল। ৰঙা আকাশৰ পোহৰবোৰ সেই ঢউৰ মাজেদি প্ৰতিফলিত হৈ উঠিছিল।

"টেম্ছ নদীৰ ঢউবোৰ উঠিছে আৰু নামিছে" মাৰ্গাৰেটে মোৰ কাললৈ চাই কলে "সিহঁতে বাৰু আকাশৰ ৰঙা ৰঙবোৰৰ লগত মিলি যাবলৈ ইচ্ছা কৰিছেনেকি? আকাশৰ ৰঙা ৰঙবোৰে কিহলৈ মনত পেলায়, জানা? প্ৰেমলৈ। প্ৰেমো ইহঁতৰ দৰেই ৰঙা।"

"কিন্তু চোৱা মাৰ্গাৰেট্, ঢউবোৰৰ প্ৰেমৰ আহ্বান নিষ্ফল হৈছে। সিহঁতে ৰঙা ৰঙবোৰৰ লগত মিলি যাব নোৱাৰে। কাৰণ আকাশৰ ৰঙা ৰঙবোৰ সিহঁততকৈ বহুত ওপৰত। চোৱাচোন, সিহঁতে ঢউবোৰৰ মাজেদিয়েই কেনেকৈ সৰকি গৈ বহুত তলত প্ৰতিবিম্বিত হৈছেগৈ!" ৰঙা আকাশখন নদীৰ পানীত প্ৰতিবিম্বিত হৈ পানীৰ তলত সৃষ্টি কৰা ছাঁয়াটো দেখুৱাই মই কলো।

"ইয়েই, তেনেহলে, ঢউবোৰৰ প্ৰেম ব্যৰ্থ হৈছে নেকি বাৰু? মোৰ হলে বৰ বেয়া লাগিছে। মোৰ প্ৰেমো যদি এনেকৈয়ে ব্যৰ্থ হয়, মই কি কৰিম জানা? মইও টেমছ নদীৰ ঢউবোৰকেই সাৱটি লম। নিষ্ঠুৰ আকাশখনৰ ৰঙা ৰঙবোৰৰদৰে যদি তুমিও মোৰপৰা আঁতৰি যোৱা, তেনেহলে চোৱা এইখিনিতেই, য'ত আমাৰ প্ৰথম মিলন হৈছিল, টেমছ নদীক সাৱটি লম।"